

ANNEX A

BESS Information Request Form

Please fill out all fields. If field is not applicable, fill with “N/A.”

PART A: Interconnection Feasibility Study Data

With the information provided in this section, *Steady-State Thermal Study* and *Steady-State Voltage Analysis* will be performed to evaluate the impact of the BESS project interconnection.

1. Overall Generating Facility Data

Item	Value	Unit
Point of interconnection (POI) ¹ :	—	—
Transmission Center (TC) ² (Name)		—
Sectionalizer ³		latitude/longitude
POI voltage level		kV
Maximum Facility net output at the POI		MW*
Generating Facility Location		latitude/longitude

*Power factor range to be evaluated: 0.85 lagging to 0.85 leading at the point of interconnection (POI)

2. Interconnection Facilities – Tie Line Data

Item	Value	Unit
Nominal voltage		kV
Line length to POI		miles
Conductor type/size		kcmil
Phase configuration (Vertical/Horizontal)		—
Rating		Amps

¹ PREPA may support the selection of the POI with an optional scoping meeting that may be requested by the developer at no cost.

² PREPA facility that has high voltage transmission lines connecting to it and is similar to a substation.

³ New facility that will be built to allow the interconnection of the Generating Facility to the selected transmission line where the generated power will be injected.

PART B: Full Interconnection System Impact Study Data

With the information provided in this section, *Short Circuit Study & Breaker Duty Review*, and *Dynamic & Transient Stability Analysis* will be performed to evaluate the full impact of the BESS project interconnection to the grid.

3. Main Power Transformer Data

Item	Value	Unit
Number of Transformers		—
Rating (ONAN/ONAF/OFAF)		MVA
Winding Type (2W, 3W)		—
Winding Nominal Voltages (Primary/secondary/tertiary)		kV
Winding Connection types: Delta or Wye (Primary/secondary/tertiary)		—
Fixed Taps available		Number of Taps / %V
Impedance on MVA base		Z1 %
		X/R Z1
		Z0 %
		X/R Z0

4. BESS – Electrical Source Function Data

Item	Value	Unit
Total Storage Capability		MWh
Charge/Discharge Cycle Efficiency		%
Rated Storage Discharging Power		MW
Discharge Duration under Rated Power		Hours
Maximum Storage Discharging Power		MW
Discharge Duration under Maximum Power		Hours
Rated Storage Charging Power		MW
Charge Duration under Rated Power		Hours
Maximum Storage Charging Power		MW
Charge Duration under Maximum Power		Hours
Grid Interface Device (Type of Converter)		-

Minimum State of Charge		%
Maximum State of Charge		%
Maximum Grid Overload Capability of Interface Device		MW
Reactive Capability (Qmax and Qmin)		MVar
Maximum Fault Contribution Current of BESS		p.u.
Life Span		cycles

5. Inverter Data and Inverter Step-Up Transformer Data

5.a Battery Energy Storage System (BESS) Inverter step-up Transformer Data

Item	Value	Unit
Number of Transformers		—
Rating (ONAN/ONAF/OFAF)		MVA
Winding Nominal Voltages (Primary/secondary)		kV
Winding Connection types: Delta or Wye (Primary/secondary)		—
Fixed Taps available		Number of Taps / %V
Impedance on MVA base		Z1 %
		X/R Z1
		Z0 %
		X/R Z0

5.b Battery Energy Storage System (BESS) Inverter Data

Item	Value	Unit
Number of Inverters to be Interconnected		—
Inverter Manufacturer		—
Inverter Model		—
Nominal Terminal Voltage		kV
Expected average high ambient temperature for the site		°C
Individual generator rated MVA at the temperature above		MVA

Individual generator rated MW at the temperature above		MW
Individual generator power factor at rated MW		—
Individual generator power factor regulation range at rated MW output (Leading (-))		—
Individual generator power factor regulation range at rated MW output (Lagging (+))		—
Generator Voltage Regulation Range (+/-)		%
Phase (Single Phase / Three Phase)		
Connection (Delta, Grounded WYE, Ungrounded WYE, Impedance Grounded)		
Maximum design fault contribution current from inverter (based on IEC 60909)		
Initial symmetrical short-circuit current (Ik")		Amps
First Peak of short circuit current (ip)		Amps
Steady-state short circuit current (Ik)		Amps
Time to reach steady-state current		ms

6. Interconnection Facilities – Tie Line Data (complement to the line data in Part A)

Item	Value	Unit
Positive sequence resistance (R)		p.u.*
Positive sequence reactance (X)		p.u.*
Zero sequence resistance (R0)		p.u.*
Zero sequence reactance (X0)		p.u.*
Line charging (B/2)		p.u.*

*On 100-MVA and nominal line voltage (kV) Base

7. Equivalent Collector System Impedance Data

Item	Value	Unit
Nominal voltage		kV
Rating		Amps
Positive sequence resistance (R) for entire length		p.u.*
Positive sequence reactance (X) for entire length		p.u.*

Zero sequence resistance (R0) for entire length		p.u.*
Zero sequence reactance (X0) for entire length		p.u.*
Line charging (B/2)		p.u.*

*On 100-MVA and nominal line voltage (kV) Base

8. Additional Reactive Compensation Devices (if applicable)

Item	Value	Unit
Type of Device		-
Total Reactive Capability		-
Q max		MVAr
Q min		MVAr

9. Dynamic Models

The BESS aggregate dynamic mathematical models are required in PSS/E v33 format (.dyr file).

PSS/E generic BESS Dynamic Models
REGCAU1
REECCU1
REPCTAU1
VTGTPAT
FRQTPAT

PSS/E library Static Var Systems and FACTS
SVSMO3U2*
SVSMO2U2*
SVSMO3U2*
CSVGN1
CSVGN3
CSVGN4
CSVGN5

SWSHNT
CDSMS1
CSTATT
CSTCNT
ABBSVC1
CHSVCT
CSSCST

*WECC, "Generic Static Var System Models for the Western Electricity Coordinating Council" April 18, 2011.