ANNEX A

PV Generation 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 PV 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) per MTR requirements

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 PV 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. Inverter Data and Inverter Step-Up Transformer Data[4]

Go to section 4.a if the Solar PV and BESS are DC connected. Go to section 4.b. if the Solar PV and BESS are ac connected.

4.a If Solar PV and Battery Energy Storage System (BESS) are DC connected, fill out the following tables:

4.a.1 Solar PV and 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

[4] PREPA Minimum Technical Requirements are applicable to the Generating Facility for connection of the facility to the power grid. These requirements indicate that an energy storage system is necessary for the integration of the Generating Facility to the power grid.

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

4.a.2 Solar PV and Battery Energy Storage System (BESS) Inverter Data

Item	Value	Unit
Number of Inverters to Be Interconnected		—
Inverter Manufacturer		—
Inverter Model		—
Inverters MVA rating		MVA
Number of Inverters		—
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

4.b If Solar PV and Battery Energy Storage System (BESS) are AC connected, fill out the following tables below

4.b.1 Solar PV 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 %

		Z0 %
		X/R

4.b.2 Solar PV Inverter Data

Item	Value	Unit
Number of Inverters to be Interconnected		—
Inverter Manufacturer		—
Inverter Model		—
Inverters MVA rating		MVA
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

4.b.3 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 %
		Z0 %
		X/R

4.b.4 BESS Inverter Data

Item	Value	Unit
Number of Inverters to Be Interconnected		—
Inverter Manufacturer		—
Inverter Model		—

Inverters MVA rating		MVA
Number of inverters		—
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

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

Item	Value	Unit
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

6. Equivalent Collector System Impedance Data

Item	Value	Unit
Nominal voltage		kV
Rating		Amps
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. Additional Reactive Compensation Devices (if applicable)

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

8. Dynamic Models

The solar PV and BESS aggregate dynamic mathematical models are required in PSS/E v33 format (.dyr file). If the solar PV and BESS are connected on the dc side, only a single inverter aggregate model is needed. If the solar PV and BESS are connected on the ac side, each inverter type requires a separate aggregate model.

PSS/E generic PV Solar Dynamic Models
REGCAU1
REECAU1
REPCTAU1
VTGTPAT
FRQTPAT

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.