Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

1 CONNECTION DETAILS

Connection Details		
Name of applicant and ABN		
Name of generating system		
Connection point		
Connection point nominal voltage		kV
Type of generating system (technology)		Solar, Gas, Battery, Hydro, Wind, Other (Please Specify)
Production units no., manufacturer and model		
Nameplate rating		MVA
Maximum import/export capacity (at POC)		MW
Storage capacity (if applicable)		MWh
Maximum annual exported energy		GWh
Island-able installation		Yes / No (If Yes, operating protocol must be provided)
Site NMI		

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

2 GENERATING UNIT DATASHEET

Inverter (if applicable)		
Manufacturer		
Model		
No. of units installed		
Rated AC voltage at terminals		kV
Rated MVA		MVA
Rated MW		MW
Reactive power capability at the machine terminals		A chart showing the active power and the corresponding reactive power at the inverter terminal for voltages at 0.9 pu, 1 pu and 1.1 pu
Minimum SCR for stable operation		
X/R range for stable operation at minimum SCR		

Note: Please fill out the above table for each unique generating unit (battery/solar) for AC coupled hybrid systems.

Synchronous or Asynchronous Machines (if applicable)		
Generator type		
Manufacturer		
Model		
No. of units installed		
Rated voltage at machine terminals		kV
Rated MVA		MVA
Rated MW (at POC)		MW
Reactive power capability at the machine terminals		A chart showing the active power and the corresponding reactive power at the inverter terminal for voltages at 0.9 pu, 1 pu and 1.1 pu
Applicable control modes of the generator		Please provide the control modes of the generator (i.e. voltage/reactive power, active power control etc.)
Settings for control modes		Please provide the settings for each control mode listed above (i.e. excitation system/automatic voltage regulator operation, governor control, power system stabiliser settings etc.)

Additional information for Battery Energy Storage Systems

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

BESS (if applicable)		
Battery type		
Manufacturer		
Model		
Rated AC voltage at terminals		kV
Rated MVA		MVA
Nominal storage capacity		MWh
Connection configuration for hybrid systems		AC coupled / DC coupled
Number of individual batteries		
Individual battery capacity		kWh
Individual battery nominal voltage		kV
Individual battery rated voltage		kV
Individual battery rated current		A

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

3 STATIC PERFORMANCE

Plant level control		
Does the generating system include a central power plant controller?		If yes, please provide the manufacturer and model details.
Inverter/central power plant controller response modes		Please identify all applicable control modes (i.e. voltage and reactive power control, active power control, frequency control)
Settings for control modes		Please provide a description and the applicable set point for each of the control mode noted above. (i.e. voltage set point, reference nodes, dead bands, droop, reactive power limits, power factor etc.)
Reactive Capability		
Reactive power capability at point of connection		Charts showing the active power and the corresponding reactive power at connection point for voltages at 0.9 pu, 1 pu and 1.1 pu up to the plants maximum operating temperature (eg. One chart for 35 degC and one for 50 degC).
Site load without generation		kW
Fault Levels (post-connection)		
Maximum three phase fault level at the point of connection		kA
Maximum single phase to ground fault level at the point of connection		kA
Maximum phase to phase to ground fault level at the point of connection		kA
Minimum three phase fault level at the point of connection		kA
Minimum single phase to ground fault level at the point of connection		kA
Minimum phase to phase to ground fault level at the point of connection		kA
Fault Level Contribution		

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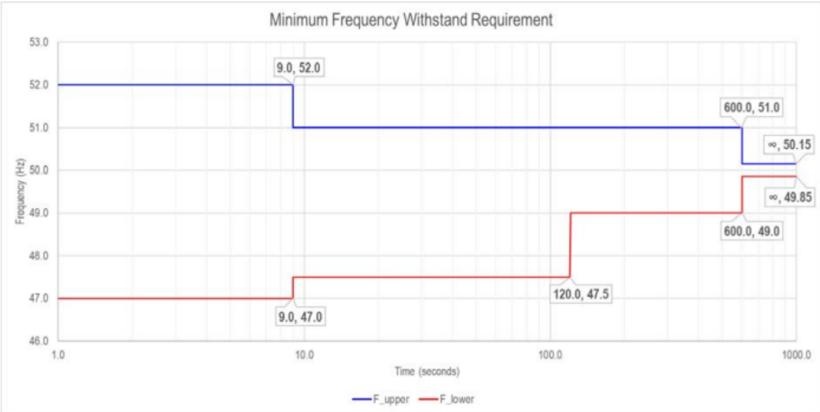
Three phase fault level contribution at the point of connection		kA
Single phase to ground fault level contribution at the point of connection		kA
Phase to phase to ground fault contribution at the point of connection		kA
Thevenin Impedance of Generating System (as seen from PoC)		
Positive sequence impedance in ohms		Z+= R+jX (ohms)
Positive sequence impedance in per unit		Z+=R+jX (pu on 100 MVA base)
Negative sequence impedance in ohms		Z-= R+jX (ohms)
Negative sequence impedance in per unit		Z-=R+jX (pu on 100 MVA base)
Zero sequence impedance in ohms		Z0= R+jX (ohms)
Zero sequence impedance in per unit		Z0=R+jX (pu on 100 MVA base)
Harmonic Allocations		
The agreed harmonic voltage distortion limits assigned to the generating system		Include tabulated harmonic voltage allocations.
REFL Compliance		
Is the applicable feeder a REFCL feeder?		Yes/No
If the feeder is a REFCL feeder, confirm whether the cable reticulation is rated up to a voltage of 33kV.		Yes/No
If the feeder is a REFCL feeder, confirm whether the cable reticulation has a fault current rating of 13.1 kA/sec		Yes/No
Operational Scenarios and Remedial Action Schemes		
Manual load transfers for which the generator is permitted to remain grid connected.		Specify if applicable
Distribution Feeder Automation/ automatic feeder load transfer schemes for which the generator is permitted to remain grid connected.		Specify if applicable
Inter-trip schemes		Specify if applicable
Runback or load management schemes		Specify if applicable
Remote Control		
Ability to change the plants reactive power control mode		Yes/No
Ability to change active and/or reactive power setpoints		Yes/No

4 DYNAMIC PERFORMANCE

Response to Frequency Disturbances		
The generating system will not disconnect from the network when the frequency fluctuates within the range of 47.0 Hz to 52.0 Hz with the profile shown[1]. 		Yes/No
Response to Voltage Disturbances		
The generating system will maintain continuous uninterrupted operation when a power system disturbance causes the voltage at the connection point to vary within the following ranges: 1) 110-120% range of normal voltage for up to 10 seconds 2) 90-110% range of normal voltage continuously 3) 80-90% range of normal voltage for up to 5 seconds 4) 70-80% range of normal voltage for up to 2 seconds		Yes/No
Response to Disturbances Following Contingency Events		
MFRT. The generating system is able to remain in continuous uninterrupted operation under the following conditions. 1) Up to six disturbances in a five-minute period, causing the voltage at the connection point to vary within the ranges set by AusNet; 2) Up to three of the disturbances cause the voltage at the connection point to drop below 50% of normal voltage; 3) The time difference between the clearance of one disturbance and commencement of the next disturbance exceeds 200 milliseconds; and 4) No more than three of the disturbances occur within 30 seconds provided that none of the events would result in the islanding of the generating system or cause a material reduction in power transfer capability by removing network elements from service.		Yes/No
Post Fault Clearance Behaviour. The generating system exhibits the following post fault clearance behaviour. 1) Promptly cease reactive fault current injection upon system voltage returning to its normal range, and not impose an unreasonable voltage overshoot on the network PoC due to delayed controller action or otherwise. 2) Exhibit the ability to restore 95% of their pre-fault active power supply within 500 milliseconds following the clearance of a fault by protection systems.		Yes/No

[1] Unless the rate of change of frequency (RoCoF) is outside the range of -2 Hz to 2 Hz per second for more than 0.25 seconds, -1 Hz to 1 Hz per second for more than one second; or one or more anti-islanding protection schemes detect that the generator has become electrically isolated from the primary network supply.

a) When an EG has the capability to provide frequency control within the specified timeframe and does so in response to an over-frequency condition, this characteristic shall take precedence over the above requirement for active power recovery. 3) Any oscillations present on fault clearance must be damped and generally consistent with the technology type comprising the EG, and returning to steady state within 20 seconds.		

Fault Ride Through Strategy		
Quantities measured for FRT strategy		Please specify quantities used eg. - reactive current on a per phase (or phase to phase) basis - voltage deviation per phase or phase to phase
Location of voltage measured for plants current injection strategy		Please specify whether at the point of connection or inverter terminals
Location of current measured for plants current injection strategy		Please specify whether at the point of connection or inverter terminals
Chart of the Reactive Current Injection Characteristic at the point of connection		Chart of additional reactive current per change in voltage.
For a disturbance on the distribution network the plant will supply to, or absorb from, the network: (1) during the disturbance and maintained until the Connection Point voltage recovers to between 90% and 110% of Normal Voltage, to assist the maintenance of power system voltages during the fault: (i) capacitive reactive current in addition to its pre-disturbance level of at least ___% of its maximum continuous current for each 1% reduction of the Connection Point voltage below the range of: a.___% to ___% of 22kV up to its maximum continuous current, when discharging. b.___% to ___% of 22kV up to its maximum continuous current, when charging (if applicable). (ii) inductive reactive current in addition to its pre-disturbance level of at least ___% of its maximum continuous current for each 1% increase of the Connection Point voltage above the range of: a.___% to ___% of 22kV up to it's maximum continuous current to		Please update the missing parameters in line with the plants agreed performance.

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maintain its rated apparent power, when discharging; b.___% to ___% of 22kV up to its maximum continuous current to maintain its rated apparent power, when charging (if applicable).		
Plant Controller LVRT strategy		Please provide a description including entry/exit thresholds
Plant Controller HVRT strategy		As above
Negative sequence current strategy		Please provide a description including how it is calculated and how the magnitude of negative sequence current injected is determined.
Chart of the Reactive Current Injection Characteristic at the inverter terminals		Chart of additional reactive current per change in voltage.
From the chart above, please specify the K factor for capacitive and inductive current injection at the inverter terminals.		%
Inverter LVRT strategy		Please provide a description e.g. FRT detection based on single phase/three phase/sequence voltages Entry/exit/hysteresis thresholds Fault recovery ramp rate P/Q priority Hysteresis time on fault clearance
Inverter HVRT strategy		As above
Plant level control		
Does the generating system include a central power plant controller?		If yes, please provide the manufacturer and model details.
Inverter/central power plant controller response modes		Please identify all applicable control modes (i.e. voltage and reactive power

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		control, active power control, frequency control)
Settings for control modes		Please provide a description and the applicable set point for each of the control mode noted above. (i.e. voltage set point, reference nodes, dead bands, droop, reactive power limits, power factor etc.)
The plant, when operating in direct voltage control or voltage droop control, must: (1) Regulate voltage at the connection point to within 0.5% of the setpoint, where that setpoint may be adjusted to incorporate any voltage droop or reactive current compensation agreed with AusNet; (2) Allow the voltage setpoint to be controllable in the range of at least ±0.05 pu of normal target voltage (as approved by AusNet from steady state studies) at the connection point, subject to the reactive power capability agreed with AusNet; (3) Have a settling time less than 10 seconds for voltage, reactive power and active power for a 5% voltage disturbance with the generating unit electrically connected to the power system from an operating point where such a voltage disturbance would not cause any limiting device to operate; and (4) Have limiting devices to ensure that a voltage disturbance would not cause the generating unit to trip at the limits of its operating capability		Please identify whether this clause applies to the connecting system.
The plant, when operating in power factor control mode must (1) Regulate power factor at the connection point to within 100 kVAr that the power factor requires; and (2) Allow the power factor setpoint to be continuously controllable across the reactive power capability range.		Please identify whether this clause applies to the connecting system
Maximum rate of change of active power		MW/min Please specify if a dynamic ramp rate is used (eg if participating in dispatch schemes, or

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		if runback specific ramp rates are utilised)
Reactive power limits at the point of connection.		MVAr
Frequency Droop (%)		% change in frequency / per-unit change in generating unit active power output. Please include a chart if the droop percentage is non-linear/piecewise dependent on the disturbance size.
Deadband applied to frequency droop.		Eg. +-0.015 pu
Inverter Level Control		
Inverter level control modes		Please provide a description of any inverter level control schemes. Eg Q(v)
Inverter Protection Settings		
Please provide the frequency protection settings configured for the inverter.		Please tabulate the pickup times and corresponding frequency magnitudes configured for the inverter protection.
Please provide the voltage protection settings configured for the inverter.		Please tabulate the pickup times and corresponding voltage magnitudes configured for the inverter protection.

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

5 SIGNING – CONNECTION APPLICATION STAGE

By signing this form, you acknowledge and represent that the information provided is true and correct to your knowledge.

Print Name: ………………………………………….Title:……………………………………………………..

Signature: ……………………………………………

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

6 PROTECTION INFORMATION

Information for High Voltage Protection Relay		
Manufacturer		Text
Model		Text
Location		Text
Communication method		Direct / wireless
High Voltage Protection Settings Table*		
Protection Element	**Setting**	**Time Delay (s)**
50 / 51 Phase Over Current		
50/51 Neutral Over Current		
27 Under Voltage		
59 Over Voltage		
59N Neutral Voltage Displacement		
81U Under Frequency		
81O Over Frequency		
81R ROCOF		
78 Vector Shift		
46 Phase Balance Current		
32 Reverse Power		
67 Reverse Current		
94 Inter-trip		
50M Communication Failure		
Dead Network Line Block Gen C/B Close		
Communication method to AusNet SCADA		
Medium Voltage Inverter Protection Settings		
Relay make and model		
Include a table of the voltage protection settings for each inverter		
Include a table of the frequency protection settings for each inverter		

* For the central protection relay, to be located as close to the 22kV connection, within the Main Switch Board. See AusNet Services Protection Requirements document SOP 11-16

Generator Performance, Protection Settings and Technical Data Form

Please fill out this form in black pen and tick the boxes where appropriate. Attach all available documents where requested.

7 SIGNING – DETAILED DESIGN STAGE

By signing this form, you acknowledge and represent that the information provided is true and correct to your knowledge.

Print Name: …………………………………………Title:…………………………………………………….

Signature: …………………………………………… Date: ………………………………………………….