



SP Manweb Plc

and

[XXXX]

AGREEMENT FOR CONNECTION TO THE DISTRIBUTION SYSTEM
(Where the customer has generating plant and uses the Distribution System for importing or exporting energy)

RELATING TO [Substation Name and Address]

THIS AGREEMENT IS MADE THE [DD] DAY OF [MONTH] 20[YY]

BETWEEN:

- (1) SP Manweb Plc a company registered in England and Wales with the registered number 02366937 whose registered office is at 3 Prenton Way, Prenton CH43 3ET (the "Company"), and
- (2) [XXXX] a company registered in [XXXX] with the registered number [XXXX] whose registered office is at [XXXX] (the "Customer")

WHEREAS

- A The Company is authorised by a licence granted under the Act to carry on the business of the distribution of electricity and under the terms of that licence is required (except in certain circumstances specified in that licence) to offer to enter into an agreement for connection to the Distribution System by any person requesting the same, subject to payment by the Customer of an appropriate charge.
- B The Customer has made such request to the Company for Connection.

NOW THEREFORE the Parties HAVE AGREED AND DO HEREBY AGREE as follows:

1. The Company agrees to the Connection of the Customer's Installation to the Company's Distribution System on the terms and conditions of this Bespoke Connection Agreement.
2. Subject to the express provisions of this Bespoke Connection Agreement, Section 3 of the National Terms of Connection (the "Applicable NTC Section") will apply as if it was set out in this Bespoke Connection Agreement, and as if references in the Applicable NTC Section to "this agreement" or to "this Agreement" were to this Bespoke Connection Agreement.
3. The National Terms of Connection are available in writing from the Energy Networks Association, 4 More London Riverside, London, SE1 2AU, or from the website at www.connectionterms.co.uk.
4. The Customer's attention is drawn specifically to the Applicable NTC Section, and the Customer confirms that it has read and fully understands the Applicable NTC Section.
5. Expressions used in this Bespoke Connection Agreement shall have the same meanings as is given to them in the Applicable NTC Section.
6. Details of the Premises, the Connection Points, the technical characteristics of the Connection Points and other matters are set out in the Appendices to this Bespoke Connection Agreement.
7. Both parties agree to comply with and be bound by the provisions of the Appendices to this Bespoke Connection Agreement.
8. The Parties may agree variations to this Bespoke Connection Agreement, which variations must be recorded in writing and signed by an authorised representative of each Party. Each Party shall negotiate in good faith the terms of any variation proposed by the other. If any

variation has not been agreed within 1 month of its being proposed, either Party may refer the matter to the Authority for resolution pursuant to section 23 of the Act. The Parties shall give effect to any such determination, and shall enter into any agreement as shall be necessary to give effect to any such determination.

9. Address for notices

(a) for the Company:	(b) for the Customer:
DCUSA Contract Manager SP Manweb Plc Prenton Way Birkenhead Merseyside CH43 3ET	Company Secretary, [XXXX]

IN WITNESS WHEREOF these typewritten presents on this and the 2 preceding pages, together with the Conditions and the three Appendices annexed hereto are executed as follows:

SIGNED at on the day of 20....
for and on behalf of SP Manweb Plc

by.....
Authorised Signatory

WITNESSED at on the day of 20....
for and on behalf of SP Manweb Plc

by
Authorised Signatory

SIGNED at on the day of 20....
for and on behalf of the Customer

by
Designation/Company

WITNESSED at on the day of 20....
For and on behalf of the Customer

by
Name

DEFINITIONS

For the purpose of this Agreement the following definitions shall apply:

"Alternative Switched Connection" provides an arrangement which will restore capacity by switching the availability of the Maximum Capacity following a fault on the Connection Equipment or one of the circuits forming part of the connection arrangement at the Exit Point or the Company's Distribution System feeding that arrangement.

"Authorised Person" is a person recognised by the Company or the Customer as having sufficient technical knowledge and/or experience to enable him to avoid danger, as referred to in the notes of guidance on the Electricity at Work Regulations 1989 relating to Regulation 16. This person may be nominated by the Company or the Customer to carry out specific duties.

"Automatic Firm Connection" provides an arrangement which, with the exception of a momentary De-Energisation resulting from the operation of Automatic Switching following a fault on any of the circuits forming part of the connection arrangement at the Exit Point or the Company's Distribution System feeding that arrangement, will maintain the Maximum Capacity.

"Connection Point" to the customer is the point where connection is provided from the Company's final cut-out fuse, isolator, switch, metering switch fuse or metering circuit breaker, unless otherwise stated in this Bespoke Connection Agreement the Connection Point(s) are the outgoing terminals of the Company's final bolted connection, metering circuit breaker or alternative, unless otherwise stated in this Bespoke Connection Agreement. For the avoidance of doubt, the Connection Point(s) may be remote from the Customer's Installation where third-party electric lines and/or electric plant provide the intermediate electrical connection from the Company's Distribution System to the Customer's Installation.

"Design Fault Level" The maximum permissible electrical current (including customers contributions) allowed to flow in the case of a short circuit condition.

"Entry Point" the point at which an Embedded Generator or other Users connect to the Company's distribution system where power flows into the distribution system under normal circumstances.

"Exit Point" the point of supply from the Company's distribution system to a User where power flows out from the distribution system under normal circumstances.

"Firm Connection" the proposed method of electrical connection such that in the event of a fault on, or the taking out of commission for maintenance or other purpose of, any one circuit forming part of the connection arrangement at the Exit Point or the Company's Distribution System feeding that arrangement, ensures continued availability of the agreed Maximum Capacity. This definition is to be regarded as unaffected by the fact that switching may be required to relieve a condition of overloading following the loss of one circuit or item of equipment, provided there is no De-Energisation resulting from such switching.

"G5" is the current Engineering Recommendation G5, "Harmonic voltage distortion and the connection of harmonic sources and/or resonant plant to transmission systems and distribution networks in the United Kingdom".

"G99" is the current Engineering Recommendation "requirements for the connection of generation equipment in parallel with public distribution networks on or after 27 April 2019".

"Interface Protection" the automatic equipment installed by either the Customer or the Company at the Exit Point and listed in Appendix 2, Annexe 4.

"Maximum Export Capacity" In respect of a Connection Point (or Points collectively), the maximum amount of electricity (expressed in kW or kVA) which is permitted by the Company to flow into the Distribution System through the Connection Point (or the Connection Points collectively).

"Maximum Import Capacity" In respect of a Connection Point (or Points collectively), the maximum amount of electricity (expressed in kW or kVA) which is permitted by the Company to flow out of the Distribution System through the Connection Point (or the Connection Points collectively).

"P28" is the current Engineering Recommendation P28, "Voltage fluctuations and the connection of disturbing equipment to transmission systems and distribution networks in the United Kingdom".

"P29" is the current Engineering Recommendation P29, "Planning limits for voltage unbalance in the UK for 132 kV and below".

"Point of Connection (POC)" is the point (or points) of physical connection to our existing Distribution System.

"Point of Supply" the point on the distribution system at which a supply of electricity may flow between the Distribution System and the Customer's Installation. The Point of Supply is the same as the Connection Point but relates to supply as opposed to connection.

"Power Systems Management Centre or (PSMC)" The Duty Engineer within the Company's Network Management Centre. The lines of communication with this centre will be defined and agreed with due regard to G99 and the Distribution Code before Energisation.

"Protection Equipment" is the automatic equipment installed by the Customer to comply with G99, and listed in Appendix 2, Annexe 4.

"S34" is the current Engineering Recommendation S34, "A guide for assessing the rise of earth potential at electrical installations".

"Single Circuit Connection" provides an arrangement such that in the event of De-Energisation occurring at the Exit Point as a result of a fault on the Connection Equipment or, the circuits forming part of the connection arrangement at the Exit Point or the Company's Distribution System feeding that arrangement, Re-Energisation will be delayed until the completion of all necessary repairs.

"Unfirm" the proposed method of electrical connection such that in the event of De-Energisation occurring at the Exit Point as a result of a fault on the Connection Equipment or, the circuits forming part of the connection arrangement at the Exit Point or, the Company's Distribution System feeding that arrangement or, import constraints are imposed from

monitoring and constrains schemes, Re-Energisation or an increase in the import of energy will be delayed until the completion of all necessary repairs, or constraints are removed.

SAMPLE

THESE ARE THE APPENDICES REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN THE COMPANY AND THE CUSTOMER

APPENDIX 1 – GENERAL PARTICULARS OF THE CONNECTION

1. CONNECTION CHARGES

These comprise the Connection Charges and (if applicable) the Use of System Charges:

Connection Charge	<p>The total charge for the Company's Works as specified in the Offer Letter, dated [DD/MM/YYYY], is £[XXXX], ([XXXX] million, [XXXX] hundred and [XXXX] thousand, [XXXX] hundred and [XXXX] pounds) plus VAT at the appropriate rate.</p> <p>The connection charge must be paid in full before the connection of the Customer's Installation can be made and energised. The initial Connection Charge may be subject to review in the manner set out in the Offer Letter for the connection made to and accepted by the Customer.</p>
Use of System Charges	<p>Such charges will be calculated in accordance with the Company's Statement of Use of System Charges for the time being in force and issued pursuant to Condition 14 of the Electricity Distribution Licence.</p> <p>So far as Use of System Charges are concerned, where another person is paying the charges for the import or export from the site, the Customer shall not be liable for such charges.</p>

2. LOSS ADJUSTMENT FACTOR

The Customer acknowledges and accepts that in signing this Agreement a site-specific loss adjustment factor is being requested from the Company. The Company shall calculate the site-specific loss adjustment factor in accordance with its Methodology Statement for Use of System Charges. It is a condition of the connection of the Customer's Installation that a site-specific loss adjustment factor is in place.

3. CONTRACTED CUSTOMER OPERATIONAL REGIME

The Customer acknowledges and accepts that in signing this Agreement, the operational regime, and the trading agreement that are in place at the time of energisation of the Connection Point are in accordance with that stated in the original application for connection.

The customer also acknowledges that if they require or are considering any change to their operational regime and/or the Site's trading agreement, if it has or may have an impact on the SPM distribution network, it shall not be modified, altered or changed in any way without prior consultation with SPM and the formal submission of a Modification Application to SPM, providing full details of any required / proposed changes.

4. NETWORK UNAVAILABILITY REBATES

If the Customer has requested and accepted an independent, unfirm connection to the Distribution System, the network unavailability rebate will be zero. Details of the Company's policy regarding rebates can be found in the Company's Methodology Statement detailing the Basis of Use of System Charges of the Electricity Distribution Licence, as published from time to time.

5. COMPENSATION PAYMENTS

In the event that the Company has (under the provisions of any other agreement or legislation or arrangement of any kind) to make a payment in respect of any restriction, outage or constraint to the Customer (or to any other person and the Customer, directly or indirectly, receives any such payment or part of it) then the Customer shall refund the same to the Company.

The Customer acknowledges and accepts a connection which is subject to the restrictions Outages and constraints referred to in this Agreement, and that it is not entitled under the provisions of this Agreement or otherwise to the payment of compensation from the Company in respect of any such restriction Outage or constraint unless otherwise agreed by the parties in writing pursuant to clause 15.4 of Section 3 of the National Terms of Connection.

6. CONTRACTED DETAILS OF PREMISES

(a)	Address	[SITE ADDRESS HERE]
	Import MPAN/MSID	[IMPORT MPANS/MSID HERE]
	Export MPAN/MSID	[EXPORT MPANS/MSID HERE]
(b)	Commencement Date	[COMMENCEMENT DATE DD/MM/YYYY HERE]
(c)	Maximum Import Capacity	[XX] kW ([XX] kVA) With effect from: [DD/MM/YYYY]
	Maximum Export Capacity	[XX] kW ([XX] kVA) With effect from: [DD/MM/YYYY]

7. SUPPLY CHARACTERISTICS AND SECURITY

Except as set out in paragraph 2 below, the characteristics of the connection(s) shall be as follows:

(a) Characteristics of supply:

(i) Number of feeders	[Number]
(j) Number of Phases	[Number]
(ii) Current	[Alternating current]
(iii) Voltage	[132,000 \pm 10% / 33,000 \pm 6% / 11,000 \pm 6% Volts]
(iv) Frequency	[50 Hertz \pm 1%]

(b) *Connection Point(s):

(i) The Connection to the SPM distribution network is provided as:

[A Firm Connection (secure for first circuit outage)]

[An Automatic Switched Alternative Connection]

[A Manually Switched Alternative Connection]

[A Single Circuit Connection]

The connection to the customer is provided as [a/an Firm/Unfirm] connection with supply via [single circuit/double circuit/ Automatic Switched Alternative Connection / Manually Switched Alternative Connection (specify the type of connection arrangement)] arrangement.

*For a more detailed description of the Connection Point(s), see 'Definitions'.

8. POWER FACTOR / VOLTAGE CONTROL

Your generator is required to be able to operate at a power factor of between 0.95 leading and 0.95 lagging and you shall have the ability to adjust your target power factor if requested to do so by Our Control Engineer.

The Customer shall operate within the power factor range Unity and 0.95 (importing reactive power) averaged over a half hour period with a power factor averaged over a four-week period targeted at unity power factor at all times measured at the Connection Point. Unless the generation is subject to a Flexibility Agreement (within which bespoke operating parameters for the site will be specified) with SPM, the generation shall not operate with a lagging power factor without prior agreement with the Company or unless required to do so by the Company for operational reasons.

The Customer must control their demand / generation to ensure that the voltage at the Exit Point remains between the statutory limits of plus [6%/10%] or minus [6%/10%].

POWER FACTOR

The parties agree:

When importing:

The Customer shall at all times maintain the Power Factor of any supply of electricity taken by the Customer at or as near to unity as practicable and in any case between unity and 0.95 Power Factor lagging.

When importing: [BESS SITE]

The Customer shall at all times assist in maintaining the Voltage of any supply of electricity supplied by the Customer at or as near to 1.0 per unit at the Connection Point (or other voltage specified by the Company within the range of 0.95pu to 1.05pu) as practicable as long as this does not require the MVAR output to exceed the range required by Appendix 2. The Customer shall comply at its own expense with such requirements as the Company may make to ensure that the required Power Factor is available.

When exporting:

The Customer shall at all times assist in maintaining the Voltage of any supply of electricity supplied by the Customer at or as near to 1.0 per unit at the Connection Point (or other voltage specified by the Company within the range of 0.95pu to 1.05pu) as practicable as long as this does not require the MVAR output to exceed the range required by Appendix 2. The Customer shall comply at its own expense with such requirements as the Company may make to ensure that the required Power Factor is available.

9. LOCAL MONITORING SCHEME

A local monitoring scheme has been installed to identify any [XX]kV system thermal or voltage issues on the Company's distribution network. Based on alarms and indications provided the Company will, for the following operational conditions, carry out an automatic trip of the Customer [XX]kV metered circuit breaker(s):

- [Any operational situation where any of Our [XX]kV feeders at the Substation Accommodation substation experiences a power flow above [XX]amps ([XX]MVA).]
- [Any operational situation whereby the voltage on the [XX]kV busbars at Substation Accommodation exceed [XX]volts [+5%/+9%] for a period greater than 70 seconds.]

The scheme is designed such that if a reduction signal is received but not acted upon for any reason, the SPM [XX]kV feeder circuit breaker will open after [XX] minutes for a thermal issue and/or 20 seconds for a voltage issue isolating the Site from the SPM's distribution network.

[Your management scheme is required to monitor the [XX]kV busbar voltage at Your connection point and to reduce export (to a level which may be zero) if the voltage rises to [XX]kV [+XX]%, ensuring a maximum of [XX]kV [XX]% is not exceeded at any time.]

10. SPECIAL AUTOMATIC FACILITIES

An emergency trip facility is connected to the Company's metering [132/33/11]kV switchgear for use by the Customer. The emergency trip facility will be installed at an agreed location.

11. DESIGN FAULT LEVEL

At the Connection Point

[132kV]

Opening Duty:

20kA Three phase symmetrical RMS @ 70MS

25kA Single phase symmetrical RMS @ 70MS

Closing Duty:

Three Phase – 2.5 times opening duty

Single Phase – 2.5 times opening duty]

[33kV]

Opening Duty:

17.5kA Three phase symmetrical RMS @ 90MS

17.5kA Single phase symmetrical RMS @ 90MS

Closing Duty:

Three Phase – 2.5 times opening duty

Single Phase – 2.5 times opening duty]

[11kV]

Opening Duty:

13.1kA Three phase symmetrical RMS @ 90MS

13.1kA Single phase symmetrical RMS @ 90MS

Closing Duty:

Three Phase – 2.5 times opening duty

Single Phase – 2.5 times opening duty]

12. COMMUNICATIONS AND DATA REQUIREMENTS

The following will be provided by the Customer at each Connection Point for input to the Company's communications system. This will be at an 'interface' panel located in the Substation Accommodation.

Analogues

- Total generated MW per technology type (0.1MW precision)*
- Total generated MVAR per technology type (0.1MVAR precision)*
- Total Amps (1 Amp precision)*
- Volts (kV)
- Frequency (0.01Hz precision) per Connection Point
- Anemometer reading of wind speed and wind direction for any turbine or cluster of turbines

*Where the total capacity is >1MW and there is more than one technology applied on the site e.g., battery and solar, the above analogues shall be provided for each technology type.

Indications

- Double point circuit breaker indication contacts (i.e., one open, one closed) shall be provided for the Customer's main incoming [132,000/33,000/11,000] volt circuit breaker(s) on the Customer's installation.

Telephone circuits

- Public Switched Telephone Network (PSTN) or SP approved equivalent
- Protection intertripping
- SCADA (System Control and Data Acquisition equipment)
 - Power Quality Monitor (PQR)

13. SAFETY

The Customer, in accordance with Engineering Recommendation S34, must establish whether the substation is a "hot" site, having a rise of earth potential exceeding the present limit of 650V for any earth fault on the site. If the substation is declared "hot" then the Customer must install appropriate barrier and isolation facilities in all wiring and communication circuits which may be referred to as a remote earth potential. It will also be necessary to ensure that appropriate safety procedures are used when working on these facilities.

As indicated in the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) Regulation 26 (as amended) has to be complied with and the detail is outlined in Schedule 3. In this case application is made on the basis of Part I and Part II, but in general Part II will apply, since parallel operation will be the normal method of operation.

Synchronisation will be automatic and controlled by the Customer on its own circuit breakers.

The Company will maintain records of plant maintenance and failure of the Company's equipment and the Customer will maintain records of plant maintenance and failure of the Customer's Equipment.

The normal method of communication between both parties will be through the Communication Channel detailed in Appendix 3.

Both parties shall ensure that all persons carrying out operations on their installation or equipment are authorised and competent. Details of both parties Authorised Persons can be obtained through the Communication Channels detailed in Appendix 3. The Customer's Shift Manager will keep a record of any condition, occurrence or incident which could affect the safety of the Company's personnel and inform the Company. The Company's Control Engineer will keep a record of any condition occurrence or incident which could affect the safety of the Customer's personnel and inform the Customer.

The Customer shall ensure that all Plant and/or apparatus under its control is capable of withstanding the prospective fault current associated with all sources of electrical energy.

The Customer shall post a copy for inspection near the Exit Point and keep up to date the following information as required by Schedule 3 Part II section 3(h) of the Regulations and the Distribution Code DPC5.4.3;

- 1) A System Diagram.
- 2) A Schedule showing the Control Engineer, Occupier, Safety Rules and ownership applicable to the control and maintenance of electrical plant.
- 3) A Schedule of agreed protection settings and the result of tests.
- 4) A Responsibility schedule for equipment at the Exit Point.

Electrical Interconnection

The Customer must ensure that the Customer's Electrical Installation does not extend beyond the Premises boundary defined in Appendix 2, Annexe 3 and that there is no electrical interconnection with any adjacent premises or installation.

14. OPERATIONAL RESTRICTIONS

The Company reserves the right to instruct the Customer to reduce or curtail power export and power import during time of operational difficulties, Emergency situations or during Outages (or as so directed by our Control Engineer).

15. BEHAVIOUR DURING NETWORK FAULTS

It is a condition of Connection that the Customer's Installation shall not adversely affect the security and quality of supply to existing customers during transient faults on the Transmission and Distribution System. To ensure these requirements are met, it is normal industry practice to carry out system studies to determine the effect of connecting the Customer's Installation to the Distribution System. If these studies have not been carried out due to the Customer's failure to provide a comprehensive static and dynamic model of the Customer's Installation, then should additional works be required to enable the Customer's Installation to conform to the standards specified above, it will be the Customer's responsibility to fund the whole cost of any additional cost and expenses that the Company may incur as a result.

[If applicable]

16. DISTRIBUTION OPERATING CODE (DOC)

[In line with the requirements of DOC2.6.2 and DOC2.6.3 the Embedded Generator, where the DNO reasonably considers it appropriate will provide the DNO with information in accordance with DOC 2, Appendices 2 and 3, to allow the DNO to satisfy their requirements of DOC2.6.1 (long term planning)]

SAMPLE

APPENDIX 2 – TECHNICAL CONDITIONS

PART 1 – GENERAL TECHNICAL CONDITIONS

The Customer connecting to the Distribution System shall comply with the requirements of the Distribution Code. This details the requirements of the Customer's plant, and the exchange of data between the Customer and the Company.

Any Power Station (as defined in the Grid Code) classed as a Large Power Station by the Grid Code shall also meet the requirements of the Grid Code.

Any Generating Equipment (e.g., standby generation) connecting to the Distribution System only for the purpose of routine testing shall comply with the requirements of the Distribution Code. However, such Generating Equipment does not need to meet the additional requirements of Part 1 or 2 of this Appendix but does need to comply with the requirements as per Section 7.3.4. in Engineering Recommendation G99 ("EREC G99").

All Customers (unless connecting to the Distribution System only for the purpose of routine testing) shall comply with the additional requirements detailed in Part 1 and 2 of this Appendix.

1.1. Compliance with Standards and Supply Security

The Customer shall ensure that the Customer's Installation is operated within the limits detailed in Engineering Recommendations G5, P28 and P29.

The Customer shall ensure that the connection of their Generating plant and any associated plant must not cause the levels of harmonic voltage distortion measured at the point of common coupling to exceed the appropriate levels given in Engineering Recommendation G5. Particular attention should be made to avoid any resonant condition caused by a mix of unloaded cable capacitance and transformer reactance. The Customer shall ensure that the connection of the Customer Installation and any associated plant must not cause any harmonic current injection into telephony and communication networks.

The Customer shall ensure that the Customer Installation and any associated plant will not create voltage disturbances assessed against Engineering Recommendation P28. The effect of Step Voltage Changes caused by the connection and disconnection of the Generating Plant from the Distribution System must not impose unacceptable voltage changes. Limits for Step Voltage changes caused by the connection and disconnection of Generating Plants from the Distribution System, are $\pm 3\%$ for infrequent planned switching events or outages (in accordance with Engineering Recommendation P28) and $\pm 10\%$ for unplanned outages such as faults. If necessary, the Customer shall carry out a phased energisation of the Site in order to maintain compliance with the requirements of P28.

[If applicable]

[The connection shall be restricted from instantaneous / rapid power swings and the charging and discharging rates of the Battery shall be limited to ensure compliance of the 132kV / 33kV Distribution network to EREC P28 and statutory voltage limits as stipulated in the Distribution Code and ESQCR Schedule 27. You will be required to operate in Voltage control mode to ensure voltage compliance.]

The Customer shall ensure that the Customer Installation and any associated plant should be capable of performing satisfactorily under the network unbalance conditions defined in

Engineering Recommendation P29. Voltage unbalance should not normally exceed 2% during any one minute period but 1% may exist continuously.

The Customer's generator operational regime must comply with the principles of G99 where applicable.

The Customer shall operate at the power factor stipulated in Appendix 1, Section 8 of this Agreement. The vector sum of the real and reactive power shall not exceed the maximum capacity kVA limits specified in Appendix 1, Section 6 of this Agreement.

The Customer must ensure that the generator is stable under all required operating conditions.

The Customer shall comply with the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time).

1.2. Interface Protection

1.2.1. Company Protection

The function of this equipment is to enable compliance with our responsibilities under the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) and to provide back up to the Customer's G99 protection.

The Company will allow the Customer to use a company current transformers and a trip signal for the customer to use to protect the short length of the customer's busbar or equipment between the interface circuit breakers and the Customer's apparatus.

Interface protection is installed on the incoming metered circuit breakers. The Company's protection equipment and settings are detailed in Annexe 4.

1.2.2. Customer Protection

In accordance with the Company's recommendations which the Company considers to be Good Industry Practice, the Customer should at its own expense, install:-

- (a) protection for the Customer's Installation so as to prevent Danger (as defined in the Regulations) and not to cause damage to or interference with the Distribution System or the supply of electricity to others;
- (b) Synchronisation Equipment at a circuit breaker forming part of the Customer's Installation;
- (c) Install, maintain and operate a circuit breaker forming part of the Customer's Installation which is opened by the Customer's G99 Equipment and which is closed by the Customer's Synchronisation Equipment.

It is the Customer's responsibility to protect the whole of the Customer's Installation including any plant/apparatus connected between the metered interface circuit breakers at the Substation Accommodation and the Customer's installation.

The performance of the Customers protection for the Customer's Installation should not compromise the security and quality of supply of customers connected to the Company's Distribution System. To this end we expect the Customer to install a unit protection scheme on their incoming feeder(s) from the Company's metering circuit breaker(s) and for it to perform within the same operating criteria that the Company applies for its distribution system protection, as set out in 1.2.3 below.

The Customer shall perform system studies to support the settings to be applied to the loss of mains relays. It is recommended that these studies form part of the dynamic modelling of the whole installation. The Company will provide the necessary data regarding the distribution system to facilitate this.

All the Customer's equipment beyond the Connection Point including cables, overhead lines or busbars and all plant, including circuit breakers, reactors, capacitors or windings of transformers owned and operated by the Customer are to be deemed as part of the Customer's Installation and therefore the protection of this equipment is to be covered by the above protection requirements.

Following correct operation of the Customer's Protection Equipment, the Customer's interface circuit breaker shall not be closed in parallel with the Company's Distribution System until the incoming supply has been proved sound and correct on all phases for a period not less than 5 minutes, or so determined by consultation with the PSMC.

The Customer shall perform periodic testing of the Protection Equipment at regular intervals. The Company shall have the right periodically (at reasonable times and on reasonable notice) to, require the Customer to demonstrate that the Protection Equipment continues to function correctly.

In accordance with the Company's recommendations which the Company considers to be Good Industry Practice, the Customer is responsible for providing at its own cost and expense:-

- (a) protection for the Customer's Installation so as to prevent Danger (as defined in the Regulations) and not to cause damage to or interference with the Distribution System or the supply of electricity to others and
- (b) install maintain and operate adequate quantity of circuit breakers forming part of the Customer's Installation which are opened by the Customer's G99 Equipment and which are closed by the Customer's Synchronisation Equipment.

Any synchronisation Equipment shall be at a circuit breaker forming part of the Customer's Installation.

The Customer shall comply with Section 10 of EREC G99. The Customer shall install EREC G99 protection to trip their generator breaker in the event of loss of mains supplies. The EREC G99 settings shall be agreed with the Company before the generator is energised, and shall not be subsequently changed without the agreement of the Company in writing.

1.2.3. Operation of Protection

The performance of the Customers protection shall perform within the same operating criteria that the Company applies for its distribution system protection, that is the detection and clearance of phase & earth faults within the prescribed time periods listed below:

[Protection for 132,000 volt Circuits (If applicable)]

For multi-phase and earth faults the main protection, which initiates fault clearance by a switching device, shall operate in less than 70 milliseconds. This is to achieve a total fault clearance time from fault inception to arc extinction of 120 milliseconds. On feeder circuits the target for the maximum clearance time of back-up protection that initiates fault clearance by a switching device shall be 800 milliseconds.]

[Protection for 33,000 volt Circuits (If applicable)]

For multi-phase and earth faults the main protection, which initiates fault clearance by a switching device, shall operate in less than 100 milliseconds. This is to achieve a total fault clearance time from fault inception to arc extinction of 200 milliseconds. On feeder circuits the target for the

maximum clearance time of back-up protection that initiates fault clearance by a switching device shall be 750 milliseconds.]

[Protection for 11,000 volt Circuits (If applicable)]

For multi-phase and earth faults, the main protection, which initiates fault clearance by a switching device, shall operate in less than 500 milliseconds. This is to achieve a total fault clearance time from fault inception to arc extinction of less than 600 milliseconds. On feeder circuits the target for the maximum clearance time of back-up protection that initiates fault clearance by a switching device shall be less than 1,500 milliseconds.]

1.3. GENERATOR INSTALLATION CHARACTERISTICS

A requirement of this Agreement is that the connection should not have a detrimental effect on the stability of the distribution system and should not cause voltage steps, harmonics or other disturbances on the Company's system outside the values laid down in the relevant documents.

[If applicable]

[For type B, C and D Generation Modules, the generator is required to meet the Distribution Planning And Connection Code (DPC) requirements section DPC7.4.4 and Energy Networks Association Engineering Recommendation G99 (ENA ER G99), sections 12.3 and 13.3, for fault ride through for faults on the DNO's distribution system without affecting the security and quality of supply to existing customers.]

1.4. FREQUENCY REQUIREMENTS

The generator shall meet the DPC requirements section DPC 7.4.1 Generating Plant Performance Requirements and (where applicable) the requirements of DPC 7.5 Technical Requirements for Medium Power Stations.

1.5. SPECIAL AUTOMATIC FACILITIES

An emergency trip facility is connected to the Company's metering switchgear for use by the Customer. The emergency trip initiation e.g., button or handle, will be installed at an agreed location within the Customer's area of the Substation building.

1.6. GENERAL CONSTRAINTS

For planned outages, system abnormal operational configurations or when the SPM distribution system is under stress a generation export reduction signal may be initiated by the SPM PSMC control engineer (when deemed necessary) via telecontrol using the SPM SCADA system.

When requested by the Company via automated signalling the generation shall be constrained to 50% of its maximum export capability or if contacted directly via telephone, to a reduced export level as defined the Company's Control Engineer (which may be zero); otherwise the connection will be automatically disconnected from the system after a pre-determined time period, set by the Company. The reduction in export shall be maintained for a period of not less than 1hr or for a period of time stipulated by the Company's Control Engineer. This will be enforced by the bay control unit logic being 'latched' for the required period of time.

In the event that the Company has (under the provisions of any other agreement or legislation or arrangement of any kind) to make a payment in respect of such restriction outage or constraint to the Customer (or to any other person and the Customer, directly or indirectly, receives any such payment or part of it) then the Customer shall refund the same to the Company and the Agreement shall contain specific details to this effect.

Under the terms of the CUSC and the Company's Bespoke Connection Agreement with the ESO for the GSP providing supplies for the area that this connection lies within, the Company only has a

right to import energy from the GB Transmission System. Should the ESO experience an export of energy from the Distribution System the Company reserves the right to instruct the Customer (who must implement a system and procedures acceptable to the Company) to reduce generation output to a point at which normal import power flows from the GB Transmission System are resumed.

1.7. SITE RESPONSIBILITY SCHEDULE

In order to comply with the DPC 5.4.3 of the Distribution Code and 14.3 of ENA EREC G99, a Site Responsibility Schedule (SRS) will be prepared by the Company in conjunction with the Generator.

The SRS will indicate the ownership, operational and maintenance responsibility of each item of equipment at the interface between the Distribution Network and the Power Generating Module and will include an operational diagram so that all persons working at the interface have sufficient information so that they can undertake their duties safely and to minimise the risk of inadvertently interrupting supplies.

The SRS will also record the agreed method of communication between the DNO and the Generator. Where the Power Generating Facility has a Registered Capacity of 50 kW (or 17 kW per phase) or less and is connected at LV then only compliance with ENA EREC G99, paragraph 14.3.3 is required (this includes Small Generation Installations).

1.8. TECHNICAL COMPLIANCE REPORT

This document is to be used to satisfy the Company that the generation plant will not cause danger to or interference with the Distribution System or other users of the distribution system. It consolidates information and confirms technical compliance of the connection in relation to the Distribution Code, the Grid Code, G5, G98/G99, P28, S34 and other obligations, in order to allow the Company to maintain its Licence and Regulatory obligations.

The site operator/owner (as the Customer) is responsible for preparing this document and agreeing it with the Company and it is therefore 'owned' by site operator/owner (as the Customer), who is responsible for document numbering, revisions, and other quality system issues.

PART 2 - SITE SPECIFIC TECHNICAL CONDITIONS

Immediately following the Connection of the Customer's Installation, the Customer shall make available a significant percentage of the Maximum Import/Export Capacity, to be determined by the Company, for the purpose of proving the stability of the new protection system. The commissioning load for this Connection will be a minimum of [XX] amps at [132,000/33,000/11,000] volts.

2.1. Customers Plant

2.1.1. Main Plant

Transformer Data	UNIT	
Number of identical units	No	
Voltage ratio	kV	
Rated Capacity	MVA	
Winding Configuration		
Tap Step	%	
Max ration tap	%	
Min ration tap	%	
Impedance Primary/Secondary	%	

2.1.2. Generating Plant Details

GENERATING UNIT DATA	UNIT	
Number of identical units to which this data applies	No	
Prime Mover	Text	
Electrical Machine type	Text	
Machine Rating	kVA kW	
Rated terminal voltage	V	
Rated Power factor at machine terminals	---	
Maximum Generation (per unit)	kW	
Minimum Generation (per unit)	kW	
*Maximum Demand (per unit)	kW	
*Minimum Demand (per unit)	kW	
GENERATOR TRANSFORMER DATA	UNIT	
Voltage ratio	kV	
Rated Capacity	MVA	
Positive sequence reactance (% on rated MVA)	%	

*BESS units only

2.1.3. Maximum Fault Contribution From Generation

The connection to the Company's Distribution System has been designed on the basis that the Customer's apparatus contributes a maximum prospective fault current at the Connection Point of:

The fault level contribution from the Customer's apparatus will be limited such that Company fault level limits detailed in Appendix 1, section 11 are never exceeded at any time.

- The connection to the SPM Distribution System has been designed on the basis that the Customer's apparatus contributes a maximum prospective fault current at the Connection Point of: [XX]kA @ [132kV/33kV/11kV] 3ph Symmetrical RMS (Ik) @ [70/90]mS
- [XX]kA @ [132kV/33kV/11]kV 3ph Asymmetrical Peak (Ip) @ 10mS

2.2. Supply Security and Constraints

2.2.1. Supply Security

It should be noted that the proposed method of connection for the Customer's Installation is based on a system analysis with a Maximum Export/Import Capacity [Firm / Unfirm] of [XX] kW onto a single [132,000/33,000/11,000] volt metered Connection Point.

[If applicable]

[The import and export capacity of Your connection may be curtailed or interrupted when any of the relevant parts of the Distribution or Transmission System are not intact. These could be due to planned outages, unplanned outages (faults), or maintenance on either Distribution or Transmission System assets. Under outages or abnormal running, the connected generation may be tripped off. Note this may be for a prolonged period (several weeks) under some conditions until outages or normal running can be restored.]

Planned Outages and unplanned outages on,

- a) the Company's [132,000/33,000/11,000] volt switchgear and ancillary equipment at [XX] [GSP/Grid/Primary Substation];
- b) the Company's [132,000/33,000/11,000] volt [XX] circuit and auxiliary cable circuit, between [XX] [GSP/Grid/Primary] Substation and [XX] [GSP/Grid/Primary] substation;
- c) the Company's 132,000/33,000/11,000 volt switchgear and ancillary equipment in [XX] [GSP/Grid/Primary] substation controlling the [XX] circuit; and
- d) the Company's, [Grid T1 / T2], [132,000/33,000/11,000] volt busbar in [XX] [GSP/Grid/Primary] substation,

shall require the Connection Point to be De-energised.

It may also be necessary to reduce the output of, or De-energise the Generating Plant for any 132kV network planned and / or unplanned outages and / or operational requirements of the Distribution System or GB Transmission System. We shall not be responsible for any loss deemed by You to have accrued during such occurrences.

2.2.2. Constraints

[If applicable – 1st & 2nd paragraphs relate to single 'unfirm' connection. 3rd paragraph relates to a 'firm' connection where a constraint could be imposed]

[The Customer has requested and accepted a single connection for the Customer's Installation (including the generating plant) to the Distribution System such that the Customer's Connection Point is fed via a single [132,000/33,000/11,000] volt circuit breaker.]

[The Customer acknowledges that in the event of any of the single connection equipment at the Substation (e.g., the [132,000/33,000/11,000] volt underground cable, [132,000/33,000/11,000] volt overhead line, [132,000/33,000/11,000] volt metered circuit breaker, associated protection or auxiliary equipment, or grid transformers being out of service at times of outages, maintenance, fault, extension, repair or during Planned Outages or other times, the Customer will not be able to export energy onto [or import energy] from the Distribution System during this period.)]

[The Customer also acknowledges that in the event of any of the Company [132,000/33,000/11,000] volt feeder circuit breakers or associated protection or auxiliary equipment at the Substation e.g., the [132,000/33,000/11,000] volt underground cable, [132,000/33,000/11,000] volt overhead line, [132,000/33,000/11,000] volt metered circuit breaker, associated protection or auxiliary equipment, or grid transformers being out of service at times of outages, maintenance, fault, extension, repair or during Planned Outages or other times, the Customer may be required to constrain the export [or import] of energy (which may be down to zero) onto the Distribution System during this period.]

ANNEXES TO APPENDIX 2

Annexe 1 - Line Diagram.

Annexe 2 - Location Plan.

Annexe 3 - Protection Details and Settings.

Annexe 4 - Schematic Diagram of Customer's Installation.

ANNEXE 1 LINE DIAGRAM

SAMPLE

ANNEXE 2 LOCATION PLAN

SAMPLE

ANNEXE 3 PROTECTION DETAILS AND SETTINGS

SAMPLE

ANNEXE 4 SCHEMATIC DIAGRAM OF CUSTOMER'S INSTALLATION

SAMPLE

APPENDIX 3 – COMMUNICATION CHANNELS AND AUTHORISED PERSONS

Communication Channels	
For the Company:	For the Customer:
DCUSA Contract Manager SP Manweb Plc Preston Way Birkenhead Merseyside CH43 3ET	[XXXX] Tel: [XXXX]
Authorised Persons:	
For the Company:	For the Customer:
As above	As above