



SP Manweb plc

and

XXX

AGREEMENT FOR CONNECTION TO THE DISTRIBUTION SYSTEM

**(Where the customer has generating plant and uses the
Distribution System for selling electricity or exporting energy)**

RELATING To: [SPM substation name/address]

THIS AGREEMENT is made the

day of

20

BETWEEN:

- 1) **SP Manweb plc** a company registered in England Wales with the registered number **02366937** whose registered office is at **Prenton Way, Prenton CH43 3ET** ("the Company"),

and

Company name, a company registered in England Wales with the registered number **XXXXX** whose registered office is at **address, post code** ("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, 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:
Commercial Manager SP Manweb plc Prenton Way Birkenhead Merseyside CH43 3ET Fax Number: 0151 609 2492	To be provided by customer

IN WITNESS the hands of the duly authorised representatives of the **Company** and **Customer** on the day and year first before written.

SIGNED by for and on behalf of the **Company**

Print Name Director/ Authorised Signatory

SIGNED by for and on behalf of the **Company**

Print Name Director/ Authorised Signatory

SIGNED by for and on behalf of the **Customer**

Print Name

In the presence of:

Witness

Print Name of Witness

Address of Witness

.....

.....

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

APPENDIX 1 – CONNECTION CHARGES

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 dated XXXXXX, is £XXXX (XXXX million, XXXX hundred and XXXX thousand, 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 Sites 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 changes.

Contracted operating Mode(s)/Commercial Service:

- | | | |
|---|-----------------------------|---|
| 1 | Frequency response services | Enhanced frequency response (EFR)/ Firm frequency response (FFR) |
| 2 | Reactive power services | Enhanced reactive power service (ERPS)/ Obligatory reactive power service (ORPS) |
| 3 | Reserve services | BM start up/Demand turn up/Fast reserve/Replacement reserve/Short term operating reserve/Super SELL |
| 4 | Demand side response (DSR) | |

APPENDIX 2 - GENERAL PARTICULARS OF THE CONNECTION

1. DEFINITIONS

For the purpose of this Appendix the following definitions shall apply;

- a) **"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.
- b) **"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 Points are the outgoing terminals of the Company's final cut-out fuse, isolator, switch, metering switch fuse or metering circuit breaker.
- c) **"Entry Point"** the point at which an Embedded Generator or other Users connect to SPEN distribution system where power flows into the distribution system under normal circumstances.
- d) **"Exit Point"** the point of supply from the SPEN distribution system to a User where power flows out from the distribution system under normal circumstances.
- e) **"G98/G99"** is the current Electricity Association Recommendation relating to the connection of embedded generating plant at the date of the Offer Letter.
- f) **"Point of Connection (POC)"** is the point (or points) of physical connection to our existing Distribution System.
- g) **"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.
- h) **"Protection Equipment"** is the automatic equipment installed by the Customer to comply with G98/G99, and listed in Appendix 2, Annexe 3.
- i) **"G5"** is the current Engineering Recommendation G5, "Limits for Harmonics in the United Kingdom Electricity Supply System.
- j) **"Interface Protection"** the automatic equipment installed by either the Customer or the Company at the Exit Point and listed in Appendix 2, Annexe 3.
- k) **"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 SPEN to flow into the Distribution System through the Connection Point (or the Connection Points collectively)
- l) **"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 SPEN to flow out of the Distribution System through the Connection Point (or the Connection Points collectively)
- m) **"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 G75 and the Distribution Code before Energisation.
- n) **"P28"** is the current Engineering Recommendation P28, "Planning Limits for Voltage Fluctuation caused by Industrial, Commercial and Domestic Equipment in the United Kingdom.
- o) **"P29"** is the current Engineering Recommendation P29, "Planning Limits for Voltage unbalance in the United Kingdom.
- p) **"S34"** is the current Engineering Recommendation S34, "A Guide for Assessing The rise Of Earth Potential At Substation sites".
- q) **"Unfirm"** the proposed method of electrical connection whereby the faulting, repairs, replacements or planned maintenance, of any single major item of plant, equipment or line, associated with the

connection (including items on the NGC transmission system, or the Distribution System) will cause the connection to be lost (i.e. the Customer will be unable to export or import to or from the Distribution System) until repairs, replacement, maintenance or other works on that item of plant, equipment and lines, are complete.

Annexe 1 - Line Diagram.

Annexe 2 - Location Plan.

Annexe 3 - Protection Details and Settings.

Annexe 4 - Schematic Diagram of Customer's Installation.

2. DETAILS OF PREMISES

(a)	Address	[SITE ADDRESS HERE]
	Import MPAN	[IMPORT MPAN HERE]
	Export MPAN	[EXPORT MPAN HERE]
(b)	Commencement Date	[DD/MM/YYYY]
(c)	Maximum Exit Capacity (Import to the Customer)	XXX kVA With effect from : DD/MM/YYYY
	Maximum Entry Capacity (Export from the Customer)	XXX kVA With effect from : DD/MM/YYYY

3. SUPPLY CHARACTERISTICS

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	[enter number]
(ii) Number of Phases	[enter number]
(iii) Current	[alternating current]
(iv) Voltage	[Enter Statutory Voltage kV \pm 6% / +10%/-6%]
(v) Frequency	[50 Hertz \pm 1%]

(b) Connection Point(s):

- (i) The Connection to the SPM distribution network (subject to any constraint requirements identified in Appendix 2, section 11 and Appendix 3, section 6) is provided as:

A Firm Connection

A firm connection provides an arrangement which, 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 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.]

An Automatic Firm Connection

An 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 Substation Accommodation or the Company's Distribution System feeding that arrangement, will maintain the Maximum Capacity.]

Alternative Switched Connection

An 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 Substation Accommodation or the Company's Distribution System feeding that arrangement.

A Single Circuit Connection

A 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 Substation Accommodation or the Company's Distribution System feeding that arrangement, Re-Energisation will be delayed until the completion of all necessary repairs.]

(ii) The Connection to the customer is provided as:

A Firm Connection

A firm connection provides an arrangement which, 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 for the generator to export energy into the distribution network subject to any requirements set out in appendix 3, section 6 Constraints.

An Unfirm Connection

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

The Customers Connection Point 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 Points are the outgoing terminals of the Company's final cut-out fuse, isolator, switch, metering switch fuse or metering circuit breaker.

and, for the avoidance of doubt, the Connection Points 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.

4. DESIGN FAULT LEVEL

AT THE CONNECTION POINT

33kV

OPENING DUTY

17.5KA THREE PHASE SYMMETRICAL RMS @ 90MS
 *17.5KA SINGLE PHASE SYMMETRICAL RMS @ 90MS
 * EQUIVALENT THREE PHASE

CLOSING DUTY

THREE PHASE – 2.5 TIMES OPENING DUTY
 SINGLE PHASE – 2.5 TIMES OPENING DUTY

5. COMMUNICATIONS EQUIPMENT AND DATA REQUIREMENTS

The following will be derived at the Customer at each Connection Point for input to the Company's communications system.

Real Time Analogues

- MW (0.1MW precision)
- MVA_r (0.1MVA_r precision),
- Amps (1Amp precision)
- Volts (0.1kV)
- Frequency (0.01Hz precision)

Indications

- Double point circuit breaker indication contacts (i.e. one open, one closed) shall be provided for the Customer's main 33kV circuit breakers on the Customer's installation.

Telephone circuits

- Protection intertripping
- SCADA (System control and Data Acquisition equipment)
- Power Quality Monitor (PQR)

6. OPERATION

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

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

The Customer should operate at the power factor stipulated in Section 12 below of this Agreement. The vector sum of the real and reactive power should not exceed the maximum capacity MVA limits specified in Section 2 above.

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

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

7. INTERFACE PROTECTION

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 33kV (**list any appropriate customer plant**) between the interface circuit breakers and the Customer's apparatus.

Interface protection is installed on the incoming 33,000volt circuit breakers. The Company's protection equipment and settings are detailed in Appendix 2, Annexe3.

Interface protection is installed on the incoming 33kV circuit breakers. The Company's protection equipment and settings are detailed in Appendix 2, Annexe3.

Customer's Protection

It is the Customer's responsibility to protect the whole of the Customer's Installation including any plant/apparatus connected between the metered interface 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, that is the detection and clearance of 132kV phase & earth faults within 120ms and 33kV phase & earth faults within 200ms.

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 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 G98 and 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.

8. POWER QUALITY

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 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 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.

The Customer shall ensure that the Customer Installation has sufficient steady state, voltage and transient stability in order to prevent power quality disturbances to others. During fault conditions, where the combination of generation output, and through flow levels leads which lead to circuit overloading, the Customer should rapidly disconnect or constrain their Generating Plant."

The Customer shall ensure that their demand has sufficient steady state, voltage and transient stability in order to prevent power quality disturbances to others. During fault conditions, where the combination of demand requirements and through flow levels leads to circuit overloading, the Customer should rapidly disconnect or constrain their demand.

9. 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 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 4.

Both parties shall ensure that all persons carrying out operations on their installation or equipment are authorised and competent. Details of the both parties Authorised Persons can be obtained through the Communication Channels detailed in Appendix 4. 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 1 and that there is no electrical interconnection with any adjacent premises or installation.

10. 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).

11. CONSTRAINTS

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.

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 Bilateral Connection Agreement for **XX** 132kV substation, the Company only has a right to import energy from the GB Transmission System. Should NGET 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.

12. POWER FACTOR/ VOLTAGE CONTROL

Subject to the requirements of Appendix 3, section 6 Constraints – 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 and 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 his generation to ensure that the voltage at the Exit Point remains between the statutory limits of $\pm 6\%$.

13. GENERATOR INSTALLATION CHARACTERISTICS

A requirement of the Agreement is that the new 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.

14. Frequency Range Requirements

The generator shall meet the Distribution Planning And Connection Code (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.

15. SPECIAL AUTOMATIC FACILITIES

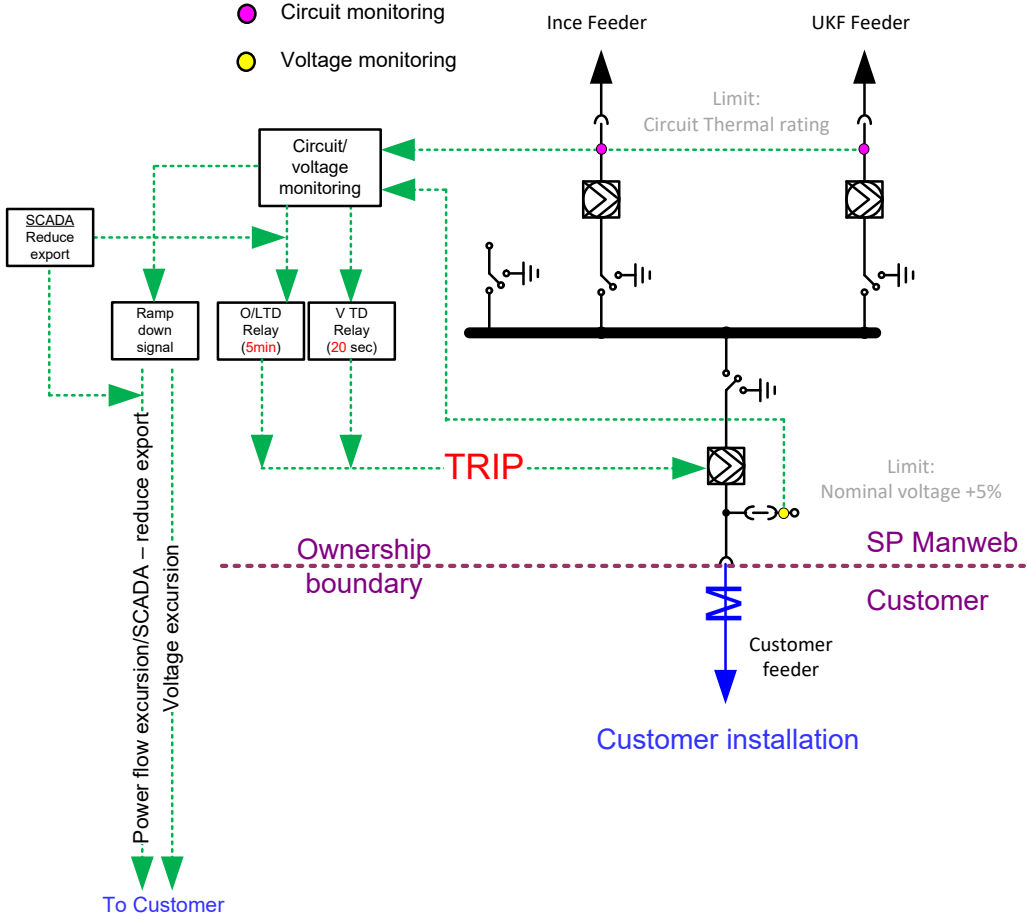
An emergency trip facility connected to the Company's metering 33kV switchgear for use by the Customer. The emergency trip facility will be installed at an agreed location within the Customer's area of the Substation building.

16. DEROGATION FROM DISTRIBUTION CODE

Neither Party is required to comply with the provisions of the long term planning phase as detailed in DOC 2.6.

ANNEXE 1 LINE DIAGRAM

Time delays indicated are 'generic standards' and apply to all sites. The exception to this is when site specific requirements dictate different settings. These 'different' settings will be determined by the system design engineer in collaboration with a protection & control engineer



series circuit breaker required adjacent to SPM substation if customer equipment is >100mtrs away from PoC or cable route runs into other third party owned/public land

ANNEXE 2 LOCATION PLAN

ANNEXE 3 PROTECTION DETAILS AND SETTINGS

(To be provided by SPM Commissioning engineer and customer commissioning engineer)

ANNEXE 4 SCHEMATIC DIAGRAM OF CUSTOMER'S INSTALLATION

To be provided by customer

APPENDIX 3 – SITE SPECIFIC TECHNICAL CONDITIONS

1. INTERFACE PROTECTION

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 and G75 Equipment and which is closed by the Customer's Synchronisation Equipment.

One/Two 33kV metered circuit breaker(s) at the Connection Point belong to the Company with standard protection and control settings, full details of which have been given to the Customer and receipt of which the Customer hereby acknowledges.

2. OPERATIONAL AND SAFETY ASPECTS

The Company's means of connection and disconnection of the Connection is the [NO.] XXkV Company customer metered circuit breakers in the Substation Accommodation. The Customer will be provided with an emergency trip facility that will open the [NO.] XXkV circuit breakers and disconnect the connection.

The Customer's means of connection and disconnection are is the Customer's XXkV circuit breaker in the Customer's XXkV substation.

3. SPECIAL AUTOMATIC FACILITIES

The company have installed a scheme to monitor the 33kV feeder loads and 33kV busbar voltage at the Substation Accommodation. Should the power flows exceed the continuous thermal ratings of the circuits or the busbar voltage exceed 33kV plus 5%, the Customer XXkV metered circuit breaker will open automatically after a pre-determined time delay

In addition, 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 by the Company's Control Engineer (which may be zero); otherwise the connection will be automatically disconnected from the system.

4. GENERATING PLANT

[Insert more tables if required]

Generation Unit Data	Unit	
Number of identical units	No	(Customer To provide)
Prime Mover	Text	(Customer To provide)
Electrical Machine Type	Text	(Customer To provide)
Machine Rating	kVA/kW	(Customer To provide)
Rated terminal voltage	V	(Customer To provide)
Rated Power Factor at machine terminals		(Customer To provide)
Maximum Generation (per unit)	kW	(Customer To provide)
Minimum Generation 9per unit)	kW	(Customer To provide)
33/11 kV Transformer Data		
Number of identical units	No	(Customer To provide)
Rated Capacity	MVA	(Customer To provide)
Winding Configuration		(Customer To provide)
Tap Step	%	(Customer To provide)
Max ration tap	%	(Customer To provide)
Min ration tap	%	(Customer To provide)
Impedance Primary/Secondary	%	(Customer To provide)

5. MAXIMUM FAULT CONTRIBUTION FROM THE GENERATOR

The fault level contribution from the Customer's apparatus will be limited such that Company fault level limits detailed in Appendix 2 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:

- XXkA @ 132kV/33kV 3ph Symetrical RMS (Ik) @ 90mS
- XXkA @ 132kV/33kV 3ph Asymetrical Peak (Ip) @ 10mS

6. CONSTRAINTS

General [amend as necessary]

The Customer is requesting and accepting a connection via a single circuit breaker for the Customer's Installation (including the Generating Plant) to the Distribution System.

The Customer acknowledges that in the event of any of the single connection equipment at the Substation Accommodation (e.g. the 33kV underground cable, 33kV metered circuit breaker or associated protection or auxiliary equipment) 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 SPM 33kV feeder circuit breakers or associated protection or auxiliary equipment at the Substation Accommodation, or remote end substations 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 of energy (which may be down to zero) onto the Distribution System during this period.

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 XX minutes. 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.

Monitoring Scheme

A monitoring scheme has been installed to identify any 33kV system thermal or voltage issues on the Company's distribution network. Based on alarms and indications provided SPM will, for the following operational conditions, carry out an automatic trip of the Customer 33kV metered circuit breaker:

- Any operational situation where any of Our 33kV feeders at the Substation Accommodation substation experiences a power flow above XXX amps (XXMVA).
- Any operational situation whereby the voltage on the 33kV busbars at Substation Accommodation exceed 33kVolts +5% for a period greater than 70 seconds.

The scheme is designed such that in the event that if reduction signal is received but not acted upon for any reason, the SPM 33kV 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.

Power factor/voltage control

The Customer shall operate within the power factor range of unity and 0.95 leading (normally not exporting 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.

Your management scheme is required to monitor the 33kV busbar voltage at Your connection point and to reduce export (to a level which may be zero) if the voltage rises to 33kV +4.5%, ensuring a maximum of **33kV +5%** is **not** exceeded at any time.

7. COMMUNICATIONS EQUIPMENT AND DATA REQUIREMENTS

The following will be provided by the Customer at each Connection Point for input to the Company's communications system.

Analogues

- Active power* measured in MW to 0.1MW precision;
- Reactive power* measured in MVAR to 0.1MVAR precision;

*Per technology type (BSS, PV, etc.) and we should also request provision for MWh is also made in readiness for DSO.

Indications

- Double point circuit breaker indication contacts (i.e. one open, one closed) shall be provided for the main control/isolation point (there may be more than one) and bus section (if more than one main control/isolation point) and;
- Double point circuit breaker indication contacts (i.e. one open, one closed) shall be provided for the main control/isolation point (there may be more than one)for the Customer's generator/PV array/battery array circuit breaker on the Customer's installation.
- Anemometer reading of wind speed and wind direction for any turbine or cluster of turbines]

Telephone circuits

- Public Switched Telephone Network (PSTN) or SP approved equivalent.
- Any additional requirements to those detailed in appendix 2

APPENDIX 4 – COMMUNICATION CHANNELS AND AUTHORISED PERSONS

Communication Channels	
For the Company:	For the Customer:
Power Systems Management Centre (PSMC) SPManweb plc Prenton Way Birkenhead CH43 3ET Tel: 0151 609 4842 Fax: 0151 609 4940	To be provided by customer
Authorised Persons:	
For the Company:	For the Customer:
As above	To be provided by customer