

DATED _____ **201[]**

UK POWER NETWORKS (OPERATIONS) LIMITED (1)

and

[] (2)

POWER POTENTIAL DER FRAMEWORK AGREEMENT

UK Power Networks
Energy House
Carrier Business Park
Hazelwick Ave
Three Bridges
Crawley
West Sussex
RH10 1EX

This **AGREEMENT** is made on the [] day of [] 201[]

BETWEEN:

1. **UK Power Networks (Operations) Limited (“UKPN”)** a company registered in England with number 03870728 whose registered office is at, Newington House, 237 Southwark Bridge Road, London, SE1 6NP (“UKPN”, which expression shall include its successors and/or permitted assigns); and
2. [] **Limited** a company registered in England with number [] whose registered office is at, [], (“**Provider**”, which expression shall include its successors and/or permitted assigns);

(together, the “**Parties**”).

WHEREAS:

- (A) **UKPN** has, together with National Grid Electricity Transmission Plc, been awarded funding for the **Power Potential Project** through the **Authority’s** Electricity Networks Innovation Competition and is undertaking the **Trial** for the purposes of that project.
- (B) The **Provider** is the operator of the **DER Unit** and agrees to make **Available** the **DER Unit** for the provision of **Reactive Power Response**, and to deliver **Reactive Power Response** and (only if desired by the **Provider**) **Active Power Response**, for the purposes of the **Trial** in accordance with the terms and conditions of this **Agreement**.

1. DEFINITIONS AND INTERPRETATION

1.1. Words and expressions set out in Schedule 1 shall have the meanings set out therein.

1.2. In this **Agreement**:

1.2.1. unless the context otherwise requires, all references to a particular clause or schedule shall be a reference to that clause or schedule in or to this **Agreement**;

1.2.2. headings are inserted for convenience only and shall be ignored in construing this **Agreement**;

1.2.3. references to the words “include” or “including” are to be construed without limitation to the generality of the preceding words;

1.2.4. references to a month are to a calendar month;

1.2.5. unless the context otherwise requires any reference to an Act of Parliament or any part or section or other provision of or section to an Act of Parliament shall be construed, at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, order or regulations then in force and made under or deriving validity from the relevant Act of Parliament;

1.2.6. references to the masculine shall include the feminine and references in the singular shall include the plural and vice versa and words denoting persons shall include any

individual, partnership, firm, company, corporation, joint venture, trust, association, organisation or other entity, in each case whether or not having separate legal personality; and

1.2.7.any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organisation or other entity, in each case whether or not having separate legal personality.

1.3. In the event of a conflict or inconsistency between (i) the provisions of the **DER Technical Requirements Document** or the **Market Procedures** and (ii) the provisions of this **Agreement**, the provisions of this **Agreement** shall prevail.

2. CONDITIONS PRECEDENT

2.1. This **Agreement** (other than this clause 2, clause 4.1 and clause 9.7, each of which shall take effect on the date of execution) shall in all respects be conditional on the following conditions precedent being satisfied in full or waived by **UKPN** by not later than 31 December 2019:

2.1.1.demonstration by the **Provider** to the satisfaction of **UKPN** that the **Provider’s DER Unit** complies with the requirements of the **DER Technical Requirements Document** by successfully completing all **DER Commissioning Tests** in accordance with the **DER Commissioning Test Procedure**;

2.1.2.demonstration by the **Provider** to the satisfaction of **UKPN** that the outcome of the **DER Commissioning Tests** is consistent with the **Service Parameters** set out in Schedule 3 (*Service Parameters*);

2.1.3.agreement (as evidenced in an email exchange) between the **Parties** of **Mandatory Technical Trial Windows**; and

2.1.4.publication by **UKPN** and the **System Operator** of the final **Market Trial Calendar** specifying the **Actual Trial Commencement Date**.

3. COMMENCEMENT AND TERM

3.1. This **Agreement** (other than clause 2, clause 4.1 and clause 9.7, which shall take effect on the date of execution) shall commence on the date falling 5 days after the date on which the requirements of clause 2.1 have been satisfied, and shall continue, subject to clause 12 (*Suspension and Termination*), in full force and effect until the **Expiry Date**.

3.2. The **Expiry Date** shall be extended automatically if the term of the **Power Potential Inter-Operator Agreement** is extended by agreement between **UKPN** and the **System Operator** in accordance with clause 3.2 thereof, subject always to the consent of the **Authority**, in any of the following circumstances:

- 3.2.1. by reason of any suspension of the respective rights and obligations of **UKPN** and the **System Operator** under clause 12 (*Suspension and Termination*) of the **Power Potential Inter-Operator Agreement**; or
- 3.2.2. by reason of any suspension of the respective rights and obligations of **UKPN** and the **System Operator** under clause 18 (*Force Majeure*) of the **Power Potential Inter-Operator Agreement**.
- 3.3. Additionally the **Expiry Date** shall be extended automatically if the term of the **Power Potential Inter-Operator Agreement** is extended by agreement between **UKPN** and the **System Operator** in accordance with clause 3.2 thereof, subject always to the consent of the **Authority**.

4. GENERAL REQUIREMENTS

- 4.1. **UKPN** shall notify the **Provider** as soon as reasonably practicable if it is decided by the parties to the **Power Potential Inter-Operator Agreement** that the **Trial** will not proceed. If so, subject to the **DER Unit** having successfully completed all **DER Commissioning Tests**, **UKPN** shall reimburse the **Provider's** reasonable third party costs and expenses incurred in connection with the **DER Commissioning Tests** up to a maximum aggregate amount of £45,000. **UKPN** shall pay the amount due to the **Provider**, by the end of March 2019, subject to receipt by **UKPN** of the **Provider's** evidence of costs incurred in preparing for the **DER Commissioning Test**.
- 4.2. The **Provider** shall, throughout the **Trial Period**, operate, maintain and repair the **DER Unit** with a view to making the **Power Potential Services** available from the **DER Unit** in accordance with the **Service Parameters**.
- 4.3. The **Provider** may apply to **UKPN** to vary its **Service Parameters** from time to time. If **UKPN** in its absolute discretion approves any such variation, Schedule 3 (*Service Parameters*) shall be revised accordingly subject to any retesting of the **DER Unit** that **UKPN** requires in accordance with clause 10 (*Metering and Retesting*).
- 4.4. The **Parties** agree that version 2.5.1 of the document with the title "DER Technical Requirements" dated 10th August 2018 on National Grid's website <https://www.nationalgrid.com/uk/investment-and-innovation/innovation/system-operator-innovation/power-potential> is, subject to clause 1.3, incorporated in this **Agreement**.
- 4.5. Where a **Provider** has been given an **Active Power Instruction** in respect of a **Settlement Period** for which the **Provider** has been given a **Voltage Arming Instruction** and (where applicable) a **Voltage Set Point Instruction**, the **Provider** will prioritise the **Active Power Response** specified in the **Active Power Instruction** and then deliver **Reactive Power Response** to the extent possible at the resulting active power operating level.
- 4.6. **UKPN** will procure that the **System Operator** will:

- 4.6.1. publish a **Market Trial Calendar** no later than thirty (30) days before the **Actual Trial Commencement Date**, setting out the dates for the commencement and periods of **Wave 1** and **Wave 2** and the potential commencement date for **Wave 3**; and
- 4.6.2. by not later than thirty (30) days prior to the end of **Wave 2**, publish an updated **Market Trial Calendar**, confirming whether **Wave 3** is to proceed and, if so, the commencement date for **Wave 3**.
- 4.7. In order to participate in the **Trials**, the **DER Unit** must comply with all of the requirements set out in the **DER Technical Requirements Document**, and if the **Provider** is aware or suspects that the **DER Unit** is no longer compliant, the **Provider** must notify **UKPN** and may not participate in **Trials** until either it has notified **UKPN** that the capability of the **DER Unit** has been restored or, at **UKPN's** request, the **DER Unit** has been retested in accordance with clause 10 of this **Agreement**.
- 4.8. After any bid from the **Provider** in a **Power Potential Tender** has been accepted, if the **Provider** becomes aware that it can no longer expect to provide either the **Active Power Response** and/or **Reactive Power Response** (as the context requires) in the accepted **Settlement Periods**, the **Provider** shall as soon as reasonably practicable notify **UKPN** of the **Settlement Periods** for which the **DER Unit** will be unavailable for the **Power Potential Service** via the **DERMS Web Interface**, and take all reasonable steps to re-establish the capability of the **DER Unit** as soon as possible.
- 4.9. The **Provider** shall inform **UKPN** in writing of any changes to information held in Schedule 4 (*DER Unit Information*) or Schedule 5 (*Bank Account Details*) of this **Agreement** with reasonable prior notice.
- 4.10. All times specified in this **Agreement** are local time.

5. MANDATORY TECHNICAL TRIALS

Reactive Power Service and Active Power Service

- 5.1. The **DER Unit** must complete the **Reactive Power Service** elements of the **Mandatory Technical Trial** before it can participate in the **Optional Technical Trial** and offering **Reactive Power Response** in a **Power Potential Tender**. A **DER Unit** must complete the **Active Power Service** elements of the **Mandatory Technical Trial** before the **Provider** can offer **Active Power Response** in any **Power Potential Tender**.
- 5.2. In relation to the **Wave 1 Mandatory Technical Trial**:
- 5.2.1. **UKPN** shall notify the **Provider** of the intended **Mandatory Running Schedule** for the **DER Unit** by email on not less than seven (7) days' notice prior to the **Trading Day** on and from which the **Mandatory Technical Trial** is due to commence.
- 5.2.2. In relation to each **Trading Day** and for a **DER Unit**, **UKPN** shall confirm the intended **Mandatory Running Schedule** for that **DER Unit** by 12.00 on the **Day Ahead** to the **DER Provider** by email. Changes from the intended **Mandatory Running Schedule** will only be made because of operational restrictions on the **SPN Network** or **National Electricity Transmission System**;

5.2.3.the **Provider** shall notify **UKPN** by 14.00 on the **Day Ahead** through the **DERMS Web Interface** for each **Settlement Period** of its **Expected Operating Level, Maximum Active Power Parameter, Minimum Active Power Parameter, and Maximum Reactive Range**, in the **Mandatory Running Schedule**.

5.3. In relation to the **Mandatory Technical Trial for Reactive Power Response**:

5.3.1.**UKPN** shall issue a **Voltage Arming Instruction** (through **DERMS**) to the **Provider** necessary for the **DER Unit's** delivery of **Reactive Power Response** to meet the requirements of the **Mandatory Technical Trial**; and

5.3.2.the **Provider** must ensure that the **DER Unit** is **Available** and is capable of delivering **Reactive Power Response** in accordance with the **Mandatory Running Schedule** confirmed in accordance with clause 5.2.2.

5.4. In relation to the **Mandatory Technical Trial for Active Power Response**:

5.4.1.**UKPN** shall issue an **Active Power Instruction** (through **DERMS**) to the **Provider** necessary for the **DER Unit's** delivery of **Active Power Response** to meet the requirements of the **Mandatory Technical Trial**; and

5.4.2.the **Provider** must ensure that the **DER Unit** is capable of delivering the volumes of **Active Power Response** specified in the **Mandatory Running Schedule** confirmed in accordance with clause 5.2.2; and

5.4.3.Where a **DER Unit** is **Instructed** to provide **Active Power** during the **Mandatory Technical Trial**, the **Utilisation Price** will be £150/MWh.

6. REACTIVE POWER SERVICE

6.1. **UKPN** may monitor the performance of the **DER Unit** using the **DERMS Monitoring**:

6.1.1.if the **DER Unit** is included in the **Production Schedule**, to determine whether it is **Available**; and

6.1.2.if a **Voltage Arming Instruction** and (where applicable) a **Voltage Set Point Instruction** has been issued in respect of the **DER Unit**, to determine the level of **Reactive Power Response** delivered.

The **Parties** confirm that the level of **Availability** shall be specified in the **Power Potential Tender** and shall be verified through the **DERMS Monitoring**.

Optional Technical Trial

6.2. In relation to the **Wave 1 Optional Technical Trial**:

6.2.1.the **Provider** shall notify **UKPN** through the **DERMS Web Interface** of the **Settlement Periods** in which the **DER Unit** will be **Available**, together with per **Settlement Period** its **Expected Operating Level** and **Maximum Reactive Range** by 14.00 on the **Day Ahead**; and

6.2.2. **UKPN** may issue a **Voltage Arming Instruction** and/or **Voltage Set Point Instruction** through **DERMS** to the **Provider** necessary for the **DER Unit's** delivery of **Reactive Power Response** in each **Settlement Period** during the **Optional Technical Trial**.

6.3. The **Provider** shall be entitled in the **Wave 1 Optional Technical Trial** to **Participation Payments** calculated in accordance with Schedule 2 (*Payments*) by reference to the aggregate number of hours in which the **DER Unit** was made **Available** in accordance with a **Voltage Arming Instruction**, excluding any **Settlement Period** in which an **Availability Failure** occurred.

Power Potential Tenders

6.4. In relation to **Wave 2** and **Wave 3**, **UKPN** shall notify the **Provider** by email, on the **National Grid** website and via the **DERMS Web Interface**:

6.4.1. whether a **Power Potential Tender** for each **Trading Day** will take place, not later than five (5) days prior to the relevant **Trading Day**;

6.4.2. of the number of **Service Windows** on each **Trading Day** and their respective start and finish times that it initially requires for the purposes of the **Power Potential Services** by not later than thirty (30) days prior to the **Actual Trial Commencement Date**; and

6.4.3. of any changes to the timings of the **Service Windows** that it subsequently requires during **Wave 2** or **Wave 3** on not less than five (5) days' notice prior to the **Trading Day** on and from which such changes are to take effect.

6.5. In relation to each **Service Window** on a **Trading Day** in **Wave 2** and **Wave 3**, for which a **Power Potential Tender** has been confirmed in accordance with clause 6.4.1, the **Provider** shall notify to **UKPN** (through the **DERMS Web Interface**) by not later than 14.00 on the **Day Ahead**:

6.5.1. the **Settlement Periods** in the **Service Window** in which the **DER Unit** will be **Available** together with its **Maximum Reactive Range** (expressed in Mvar) per **Settlement Period** and **Expected Operating Level** per **Settlement Period** (expressed in MW); and

6.5.2. the **Availability Price** and **Utilisation Price** for **Reactive Power Response** it offers for each **DER Unit** for each **Service Window**.

6.6. In relation to each **Service Window** on a **Trading Day** in **Wave 2** and **Wave 3**, for which a **Power Potential Tender** has been held, **UKPN** shall notify to the **Provider** (through the **DERMS Web Interface**) by not later than 17.00 on the **Day Ahead**, which of its bids (if any) for **Availability** have been accepted in the **Power Potential Tender** in accordance with the **Market Procedures** (the '**Production Schedule**').

6.7. Where any bid from the **Provider** has been accepted, the **Provider** shall make the **DER Unit Available** as specified in the **Production Schedule**. After any bid from the **Provider** in a **Power Potential Tender** has been accepted, if the **Provider** becomes aware that it can no longer expect to provide the **Active Power Response** and/or **Reactive Power Response** in the accepted **Settlement Periods**, the **Provider** shall as soon as reasonably practicable notify **UKPN** of the **Settlement Periods** for which the **DER Unit** will be **Unavailable** for **Reactive Power Service** or unable to deliver for the **Active Power Service** through the

DERMS Web Interface, and take all reasonable steps to re-establish the capability of the **DER Unit** as soon as possible.

- 6.8. **UKPN** may issue a **Voltage Arming Instruction** and **Voltage Set Point Instruction** (through **DERMS**) to the **Provider**, if it has issued a **Production Schedule** for the **Trading Day** in respect of the **DER Unit**, by the commencement of a **Service Window** or at any time during the relevant **Service Window**.
- 6.9. Following receipt of a **Voltage Arming Instruction**, and (if applicable) a **Voltage Set Point Instruction**, from **UKPN** under clause [6.7], the **Provider** shall procure that the **DER Unit** delivers **Reactive Power Response** in accordance with the **Production Schedule** and the **Service Parameters**.
- 6.10. The **Provider** shall be entitled in **Wave 2** and **Wave 3** to:
 - 6.10.1. an **Availability Payment** calculated in accordance with Schedule 2 (*Payments*) in respect of each **Settlement Period** in which the **DER Unit** was made **Available** in accordance with the **Production Schedule**, save to the extent that an **Availability Failure** occurred in any **Settlement Period**; and
 - 6.10.2. a **Utilisation Payment** calculated in accordance with Schedule 2 (*Payments*) in respect of each **Settlement Period** in which the **DER Unit** delivers **Reactive Power Response** in accordance with a **Voltage Arming Instruction** and (where applicable) a **Voltage Set Point Instruction**.

7. ACTIVE POWER SERVICE

Power Potential Tenders

- 7.1. In relation to each **Service Window** on a **Trading Day** in which a **Power Potential Tender** has been confirmed in accordance with clause 6.4.1, the **Provider** shall notify to **UKPN** (through the **DERMS Web Interface**) by not later than 14.00 on the **Day Ahead**:
 - 7.1.1. the **Settlement Periods** in the **Service Window** in which the **DER Unit** will be able to provide **Active Power Response** together with its **Maximum Active Power Parameter**, **Minimum Active Power Parameter**; and
 - 7.1.2. the **Expected Operating Level** (expressed in MW) of the **DER Unit** in the **Settlement Periods**:
 - 7.1.2.1. notified in clause 7.1.1; and
 - 7.1.2.2. (where not otherwise covered by notification under sub-clause 7.1.2.1) relating to the hour immediately prior to each of the **Settlement Periods** notified in clause 7.1.1; and
 - 7.1.3. the **Utilisation Prices** for **Active Power Response** for each **DER Unit**, it offers for each **Service Window**.
- 7.2. **UKPN** may through **DERMS**, issue an **Active Power Instruction** (which shall constitute an acceptance of the **Provider's** bid) to the **DER Unit** on the **Trading Day**. The **Provider** must

procure that the **DER Unit** responds to this instruction within 2 minutes of receiving the instruction.

7.3. Following receipt of an **Active Power Instruction** from **UKPN** under clause 7.2, the **Provider** shall deliver the **Active Power Response** from the **DER Unit** by operating the **DER Unit** at the set point specified in that **Instruction** and in accordance with the **Service Parameters**.

7.4. The **Provider** shall be entitled to a **Utilisation Payment** calculated in accordance with Schedule 2 (*Payments*) in respect of each **Settlement Period** in which the **DER Unit** delivers **Active Power Response** in accordance with an **Active Power Instruction**.

8. INFRASTRUCTURE

8.1. **UKPN** shall, throughout the term of this **Agreement**, use reasonable endeavours to operate and maintain the **DERMS** and the **DERMS Web Interface** in full working order in accordance with **Good Industry Practice**.

8.2. The **Provider** shall, throughout the term of this **Agreement**, use reasonable endeavours to operate and maintain its interface with the **DERMS** at all relevant times in full working order in accordance with **Good Industry Practice**.

9. PAYMENT

9.1. **UKPN** shall not later than eight(8) **Business Days** following the end of each month during the **Wave 1 Optional Technical Trial, Wave 2 or Wave 3** trials are conducted (for the purposes of this clause (9), the "**Relevant Month**"), send to the **Provider** a statement (for the purposes of this clause 9, "**Monthly Statement**") setting out, in respect of the **DER Unit** and for each **Settlement Period** in which it provided the **Active Power Response** and/or **Reactive Power Response** service and for each **Trading Day** in the **Relevant Month**:

9.1.1.the **Voltage Arming Instructions** issued in the month and the **Availability** achieved by the **DER Unit**;

9.1.2.the **Voltage Set Point Instructions** issued in the month and the **Reactive Power Response** delivered by the **DER Unit** as derived from metering equipment;

9.1.3.the **Active Power Instructions** issued in the month and the **Active Power Response** delivered as derived from metering equipment; and

9.1.4.the total monthly payment due from **UKPN** calculated in accordance with the first formula in Schedule 2 (*Payments*), together with a breakdown of each part of that calculation.

9.2. If the **Provider** disagrees with the content of any **Monthly Statement** it may notify **UKPN** in writing, with the evidence upon which it relies in support of such disagreement, no later than sixty (60) **Business Days** after the date of receipt of that **Monthly Statement**, but in the absence of any such notification by such date, the **Monthly Statement** shall be final and binding on the **Parties**. For any revision to be reflected in the **Relevant Month's** payment,

the **Provider** must provide its notification and evidence to **UKPN** within eight (8) **Business Days** from the date of issue of that **Monthly Statement**, and **UKPN** must notify the **Provider** that it agrees or disagrees with the evidence by not later than the eighteenth (18th) **Business Day** of the month following the **Relevant Month**.

- 9.3. Where a disagreement is notified by the **Provider** pursuant to clause 9.2, the **Parties** shall discuss and endeavour to resolve the same in good faith, and any revisions to a **Monthly Statement** agreed as a result thereof shall be reflected in the **Monthly Statement** next following the date of resolution of the dispute. Disputes that cannot be resolved in this way shall, subject to clause 13.1 (*Dispute Resolution*), be referred to an **Expert**.
- 9.4. If the **Provider** can provide evidence that complying with an **Active Power Instruction** or **Voltage Set Point Instruction** is inconsistent with the **Service Parameters**, or could have caused a risk of injury to persons or damage to equipment, the failure to comply with the **Instruction** will not be treated as non-compliance with the **Instruction** or an **Availability Failure** by the **Provider**.
- 9.5. **UKPN** shall self-bill for the amount shown in the **Monthly Statement** by not later than the eighteenth (18th) **Business Day** of the month following the **Relevant Month**, indicating the amount to be paid to the **Provider** by issuing a copy of the self-bill invoice to the **Provider** on the same timescale.
- 9.6. In respect of the provision of the **Power Potential Service** during the **Trial**, **UKPN** shall pay to the **Provider** the self-billed amount in accordance with clause 9.4, together with any Value Added Tax properly chargeable, within twenty-four (24) **Business Days** following the **Relevant Month**.
- 9.7. If a decision is made not to proceed with the **Trial**, then in accordance with clause 4.1 and following receipt of evidence satisfactory to **UKPN** by no later than 30th April 2019, **UKPN** shall provide a statement of undisputed costs by the eighth (8th) **Business Day** of May 2019, then self-bill for any undisputed amount, together with any Value Added Tax properly chargeable in respect of the costs incurred by the **Provider**, by not later than the eighteenth (18th) **Business Day** of May 2019, indicating the amount to be paid to the **Provider** by issuing a copy of the self-bill invoice to the **Provider** in the same timescale. **UKPN** shall pay to the **Provider** the self-billed amount within twenty-four (24) **Business Days** from the beginning of May 2019. If the **Provider** disagrees with **UKPN**'s assessment of costs, the **Provider** must provide its notification and evidence to **UKPN** by the 12th **Business Day** of May 2019, and **UKPN** has the right to determine the amount to be paid to the **Provider** on the above timescales without further reference to an **Expert**.
- 9.8. All payments to be made under this **Agreement** will be made to the account specified for the payee **Party** in Schedule 5 or to such other account at a UK clearing bank as the payee **Party** may from time to time notify to the other.
- 9.9. All amounts specified in this **Agreement** shall be exclusive of any value added tax or other similar tax.

- 9.10. Interest shall be payable on late payments at the **Default Rate** from the date on which payment became due until (but excluding) the date of actual payment. Interest shall accrue on a daily basis.
- 9.11. If, following a disagreement being notified by the **Provider** under clause 9.2, it is agreed or determined that any further sum is payable by **UKPN**, the **Provider** shall be entitled to interest at the **Base Rate** from the date on which payment was originally due until (but excluding) the date of actual payment. Interest shall accrue on a daily basis.
- 9.12. Sums payable by one **Party** to the other pursuant to this **Agreement** whether by way of charges, interest or otherwise, shall (except to the extent permitted in this Clause 9 or as otherwise required by law) be paid in full, free and clear of and without deduction, set-off or deferment in respect of any disputes or claims provided that either **Party** shall be entitled to set off any payment due and payable by the other **Party** under this **Agreement** against any payment it makes to that **Party** under this **Agreement**).
- 9.13. The provisions of this clause 9 shall survive the termination or expiry of this **Agreement**.

10. METERING AND RETESTING

- 10.1. The delivery of **Active Power Response** and **Reactive Power Response** from the **DER Unit** shall at all times during the **Trial Period** be metered and monitored by **UKPN** in accordance with the **DER Technical Requirements** document.
- 10.2. At any time during the **Trial Period**, if there is any actual or planned change in a **DER Unit's** installed equipment, including those which would lead to a change in the agreed **Service Parameters** listed in Schedule 3, the **Provider** must notify **UKPN** with details in writing before or within seven (7) **Business Days** of such a change.
- 10.3. **UKPN** will determine whether the change would lead to a material change in the capability of the **DER Unit** to provide **Active Power Response** or **Reactive Power Response**, and shall notify the **Provider** if it requires the **DER Unit** to complete a retest in accordance with the **DER Commissioning Test Procedure**.
- 10.4. At any time during the **Trial Period** **UKPN** shall be entitled on not less than three (3) **Business Days'** notice to conduct investigations of the **DER Unit** in order to verify compliance by the **Provider** with its obligations under this **Agreement**. **UKPN** shall be entitled on not less than three (3) **Business Days'** notice to require a retest of the **DER Unit**, to be conducted in accordance with the **DER Commissioning Test Procedure**.
- 10.5. In the event that a retest is scheduled in accordance with clause 10.3 or 10.4, the **DER Unit** shall not participate in the **Trial** until:
- 10.5.1. it has completed the retest; and
- 10.5.2. if the results of the retest indicate a change in **Service Parameters**, **UKPN** and the **Provider** have agreed to update Schedule 3 of this **Agreement** and to update the **Service Parameters** via the **DERMS Web Interface**.

11. SUSPENSION AND TERMINATION

- 11.1. **UKPN** may by notice in writing or by email to the **Provider** suspend the **Power Potential Service** at any time if:
- 11.1.1. by reason of an outage on the **National Electricity Transmission System**, **UKPN** has been informed by the **System Operator** that the **Power Potential Service** cannot be utilised; or
 - 11.1.2. by reason of the **DERMS** or the **DERMS Web Interface** being unavailable, **UKPN** is unable to conduct the **Power Potential Tender**. In such circumstances, **UKPN** may extend the **Trial Period** by notice in writing to the **Provider** to the extent that the **Power Potential Inter-Operator Agreement** has been extended in such circumstances with the approval of the **Authority**.
- 11.2. This **Agreement** shall terminate automatically if at any time the **Power Potential Inter-Operator Agreement** terminates.
- 11.3. Either **Party** (the “**Non-Defaulting Party**”) shall have the right to terminate this **Agreement**:
- 11.3.1. forthwith on notice in writing to the other **Party** (the “**Defaulting Party**”) following the material breach of the **Defaulting Party** and which, in the case of a breach capable of remedy, has not been remedied within thirty (30) days following such notice from the **Non-Defaulting Party**; or
 - 11.3.2. forthwith on notice in writing to the other **Party** following the occurrence of an **Insolvency Event** in relation to the other **Party**.

12. LIABILITY

- 12.1. Subject to clause 12.2 and save where any provision of this **Agreement** provides for an indemnity or the payment of liquidated damages, the **Parties** agree and acknowledge that neither **Party** (for the purposes of this clause 12, the “**Party Liable**”) nor any of its officers, employees or agents shall be liable to the other **Party** for loss arising from any breach of this **Agreement** other than for loss directly resulting from such breach and which at the date hereof was reasonably foreseeable as not unlikely to occur in the ordinary course of events from such breach in respect of:
- 12.1.1. physical damage to the property of the other **Party**, its officers, employees or agents, provided that the liability of either **Party** in respect of all claims for such loss shall not exceed £5 million per incident or series of related incidents; and/or
 - 12.1.2. the liability of such other **Party** to any other person for loss in respect of physical damage to the property of any person, subject, for the avoidance of doubt, to the requirement that the amount of such liability claimed by such other **Party** should be mitigated in accordance with general law.
- 12.2. Nothing in this **Agreement** shall exclude or limit the liability of the **Party Liable** for death or personal injury resulting from the negligence of the **Party Liable** or any of its officers, employees or agents and the **Party Liable** shall indemnify and keep indemnified the other **Party**, its officers, employees or agents, from and against all such and any loss or liability

which such other **Party** may suffer or incur by reason of any claim on account of death or personal injury resulting from the negligence of the **Party Liable** or any of its officers, employees or agents.

- 12.3. Subject to clause 12.2 and save where any provision of this **Agreement** provides for an indemnity or the payment of liquidated damages, neither the **Party** liable nor any of its officers, employees or agents shall in any circumstances whatsoever be liable to the other **Party** for:-
- 12.3.1. any loss of profit, loss of revenue, loss of use, loss of contract or loss of goodwill; or
 - 12.3.2. any indirect or consequential loss; or
 - 12.3.3. loss resulting from the liability of the other **Party** to any other person howsoever and whensoever arising save as provided in clause 12.1.2 and clause 12.2.
- 12.4. Each **Party** acknowledges and agrees that the other **Party** holds the benefit of clauses 12.1.1, 12.1.2 and 12.3 for itself and as trustee and agent for its officers, employees and agents.
- 12.5. The rights and remedies provided by this **Agreement** to the **Parties** are exclusive and not cumulative and exclude and are in place of all substantive (but not procedural) rights or remedies express or implied and provided by common law or statute in respect of the subject matter of this **Agreement**, including (without limitation) any rights either **Party** may possess in tort which shall include actions brought in negligence and/or nuisance. Accordingly, each of the **Parties** hereby waives to the fullest extent possible such rights and remedies provided by common law or statute and releases the other **Party**, its officers, employees and agents to the same extent from all duties, liabilities, responsibilities or obligations provided by common law or statute in respect of the matters dealt with in this **Agreement** and undertakes not to enforce any of the same except as expressly provided herein.
- 12.6. For the avoidance of doubt, the **Parties** acknowledge and agree that nothing in this **Agreement** shall exclude or restrict or otherwise prejudice or affect any of the rights, powers, privileges, remedies, duties and obligations of the **Secretary of State** or the **Authority** under the **Act**, any **Licence** or otherwise howsoever.
- 12.7. Each of clauses 12.1, 12.2, 12.3 and 12.4 shall:-
- 12.7.1. be construed as a separate and severable contract term, and if one or more of such sub-paragraphs is held to be invalid, unlawful or otherwise unenforceable the other or others of such sub-paragraphs shall remain in full force and effect and shall continue to bind the **Parties**; and
 - 12.7.2. survive termination of this **Agreement**.
- 12.8. For the avoidance of doubt, nothing in this clause 13 shall prevent or restrict either **Party** enforcing any obligation (including suing for a debt) owed to it under or pursuant to this **Agreement**.

12.9. Each **Party** acknowledges and agrees that the provisions of this clause 12 have been the subject of discussion and negotiation and are fair and reasonable having regard to the circumstances as at the date hereof.

13. DISPUTE RESOLUTION

13.1. Any dispute or difference of whatever nature howsoever arising under, out of or in connection with this **Agreement** (for the purposes of this clause 13, a “**Dispute**”), may in the first instance be referred to a director of each of the **Parties** by written notice from either **Party** to the other.

13.2. If a **Dispute** cannot be resolved by the **Parties’** director within thirty (30) days after its referral in accordance with clause 13.1, either **Party** may by written notice to the other:

13.2.1. if it is a **Dispute** expressly reserved for an **Expert**, refer it for final determination by an **Expert** in accordance with clause 14; or

13.2.2. otherwise, refer the **Dispute** to mediation in accordance with the Centre for Effective Dispute Resolution Model Mediation Procedure.

13.3. If a **Dispute** referred to mediation in accordance with clause 13.2.2 cannot be resolved, it may be referred by either Party to the English High Court.

14. EXPERT DETERMINATION

14.1. Where a provision of this **Agreement** expressly provides for the referral by a **Party** of any matter in dispute to an **Expert**, the following provisions shall apply:

14.1.1. the **Expert** shall act as an expert and not as an arbitrator and shall decide those matters referred to him using his skill, experience and knowledge, and with regard to all such other matters as he in his sole discretion considers appropriate;

14.1.2. if the **Parties** cannot agree upon the selection of an **Expert**, the **Expert** shall be determined by the President for the time being of the Law Society of England and Wales;

14.1.3. all references to the **Expert** shall be made in writing by either **Party** with notice to the other being given contemporaneously, and the **Parties** shall promptly supply the **Expert** with such documents and information as he may request when considering any referral;

14.1.4. the **Expert** shall be requested to use his best endeavours to give his decision upon the question before him as soon as possible in writing following its referral to him, his decision shall, in the absence of fraud or manifest error, be final and binding upon the **Parties**;

14.1.5. if the **Expert** wishes to obtain independent professional and/or technical advice in connection with the question before him, he shall first provide the **Parties** with details of the name, organisation and estimated fees of the professional or technical adviser

and he may then engage such advisers with the consent of the **Parties** (which consent shall not be unreasonably withheld or delayed) for the purposes of obtaining such professional and/or technical advice as he may reasonably require;

- 14.1.6. the **Expert** shall not be held liable for any act or omission, and his written decision will be given without any liability on the **Expert's** part to either **Party**, unless it shall be shown that he acted fraudulently or in bad faith;
- 14.1.7. save to the extent otherwise expressly provided herein, pending the determination by the **Expert**, the **Parties** shall continue to the extent possible to perform their obligations; and
- 14.1.8. the **Expert** shall at his discretion be entitled to order that the costs of the reference of a dispute to him shall be paid by the **Parties** in whatever proportions he thinks fit.

15. WARRANTIES

- 15.1. Each **Party** warrants and represents that it has full capacity and authority to enter into and perform this **Agreement** and that those signing this **Agreement** are duly authorised to bind the **Party** for whom they sign.
- 15.2. The **Provider** hereby warrants to **UKPN** that to the best of its knowledge and belief the entering into of this **Agreement** and the provision by it of **Power Potential Services** does not and will not cause the **Provider**:
 - 15.2.1. to be in breach of its duties (if any) under Section 9 of the Act;
 - 15.2.2. to be in breach of the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) or of any regulations made under Section 29 of the Act or of any other enactment relating to safety or standards applicable in respect of the business of the **Provider** or any operator of the **DER Unit**;
 - 15.2.3. to be in breach of any restrictions and conditions attaching to relevant authorisations of the Environment Agency; or
 - 15.2.4. to be in material breach of any other agreement or arrangement of whatever nature with any other person which could or may affect the performance of its obligations under this **Agreement** and any **Power Potential Tender**.

16. CONFIDENTIALITY

- 16.1. Subject to clause 16.2, and to the extent otherwise expressly permitted by this **Agreement**, neither **Party** shall, at any time, whether before or after the expiry or earlier termination of this **Agreement**, without the prior written consent of the other **Party**, divulge or permit its officers, employees, agents or contractors to divulge to any person or permit use by any person (other than disclosure to or use by officers or employees to the extent that reasonably required to enable such persons to carry out their duties in connection with this **Agreement**) of:

- 16.1.1. any of the contents of this **Agreement**; or
- 16.1.2. any commercially confidential information concerning the operations, contracts, commercial or financial arrangements or affairs of the other **Party** received in relation to this **Agreement**.
- 16.2. Each **Party** undertakes to use information referred to in clause 16.1 and disclosed to it by the other **Party** solely for the purposes of this **Agreement** and shall not use it for any other purpose.
- 16.3. The restrictions imposed by clause 16.1 shall not apply to the disclosure of any information:
 - 16.3.1. which is in or becomes part of the public domain otherwise than as a result of a breach of clause 16.1, or which either **Party** can show was in its written records prior to the date of disclosure of the same by the other **Party**, or which it received from a third party independently entitled to disclose it;
 - 16.3.2. which is required by law or regulatory authority to be disclosed;
 - 16.3.3. which is disclosed to a **Permitted Third Party**;
 - 16.3.4. to a court, arbitrator or administrative tribunal in the course of proceedings before it to which the disclosing **Party** is a party;
 - 16.3.5. pursuant to any licence of the **Party** concerned;
 - 16.3.6. to any parent, subsidiary or fellow subsidiary undertaking on a "need to know" basis only (having the meanings provided in sections 1159, 1161 and 1162 of the Companies Act 2006);
 - 16.3.7. required or expressly permitted to be disclosed under the terms of this **Agreement** or any other agreement or arrangement to which the **Parties** have agreed to be bound.
- 16.4. Subject to clause 16.5 and clause 16.6, neither **Party** shall make or cause to be made any public announcement or statement regarding the award, signature, performance or termination of this **Agreement** unless, before it is made, the other **Party** has been furnished with a copy of the announcement or statement and has approved it (such approval not to be unreasonably withheld or delayed).
- 16.5. Neither **Party** shall be prohibited from issuing or making any such public announcement or statement to the extent expressly permitted or otherwise contemplated by this **Agreement** or if it is necessary to do so in order to comply with any applicable law or the regulations of any recognised stock exchange upon which the share capital of such **Party** is from time to time listed or dealt in.
- 16.6. Without limiting clause 16.5 the **Provider** acknowledges and agrees that the **System Operator** may publish in such manner or form as it thinks fit details of this **Agreement**, **Instructions** given, bids accepted and rejected in the **Power Potential Tender** and payments made to the **Provider** from time to time under this **Agreement** for the purposes of publishing any or all of the statements required to be published from time to time pursuant to Standard Condition C16 of the **Transmission Licence** and for the purposes of providing

information to the providers of services in connection with the **Balancing Services Activity** generally.

17. FORCE MAJEURE

- 17.1. In so far as either **Party** (for the purposes of this clause 17, the "**Affected Party**") is prevented from performing any of its obligations under this **Agreement** due to an event or circumstance of **Force Majeure**, then, subject to compliance in full with the requirements of this clause 17, the **Affected Party** shall be relieved from such obligations for so long as and to the extent that the event or circumstance of **Force Majeure** continues to prevent such performance. For the avoidance of doubt, **UKPN** shall be treated as being prevented from performing its obligations under this **Agreement** by reason of **Force Majeure** where lightning strikes or similar weather or other natural phenomena are expected in the geographical area of the **SPN Network** and it is reasonably necessary for **UKPN** to suspend the **Power Potential Service** acting in accordance with **Good Industry Practice**.
- 17.2. The **Affected Party** shall notify the other **Party** in writing immediately upon becoming aware of an event or circumstance of **Force Majeure**, describing the **Force Majeure** (including, without limitation, the nature of the occurrence and its expected duration) and the obligations which it is prevented from performing and shall continue to furnish regular reports with respect thereto to the other **Party** during the period of **Force Majeure**.
- 17.3. The **Affected Party** shall take, at its own cost, all steps reasonably required to remedy the effects of the **Force Majeure** and restore its performance of its obligations in full.
- 17.4. For the avoidance of doubt the non-performance of either **Party's** obligations pursuant to this **Agreement** arising prior to the event or circumstance of **Force Majeure**, shall not be excused as a result of the event or circumstance of **Force Majeure**.
- 17.5. Either **Party** shall have a right to terminate this **Agreement** if the **Affected Party** has been prevented from performing its obligations due to an event or circumstance of **Force Majeure** for a continuous period of three (3) months or more.

18. OTHER SERVICES

- 18.1. The **Provider** will declare which service whether under this **Agreement** or any other it wishes to offer **Active Power** for in any **Settlement Period** in the **Day Ahead** or in the appropriate timeframe under other agreements with **UKPN** or the **System Operator** (other than **Regional Development Plan** services).
- 18.2. The **Provider** hereby warrants to **UKPN** in relation to the **DER Unit** and on a continuing basis that, it will not deliver **Active Power Response** in such a way as to impair delivery which it is committed to provide from the **DER Unit** under any other agreement or arrangement with **UKPN** or the **System Operator** (other than **Regional Development Plan** services).

- 18.3. The **Provider** will indemnify **UKPN, SPN** and the **System Operator** against any losses, liabilities, claims, expenses and demands which **SPN, UKPN** or the **System Operator** suffers as a direct result of a wilful breach by the **Provider** of the provisions of clause 18.2.
- 18.4. If the **Provider** at any time during the **Trial Period** breaches the warranty set out in clause 18.2, **UKPN** shall be entitled to terminate this **Agreement** forthwith by notice in writing to the **Provider**.

19. MISCELLANEOUS

19.1. Variations

No variation to this **Agreement** shall be effective unless made in writing and signed by or on behalf of both **Parties**.

19.2. Waiver

No failure or delay by either **Party** to exercise any right, power or remedy under this **Agreement** (including a partial exercise) will operate as a waiver of it nor will any partial exercise preclude any further exercise of the same, or of some other right, power or remedy.

19.3. Third Party Contract Rights

The **Parties** acknowledge and agree for the purposes of the Contracts (Rights of Third Parties) Act 1999 that no rights, powers or benefits are or shall be conferred on any person pursuant to this **Agreement** save that:

- 19.3.1. the **System Operator** shall be entitled to enforce the provisions of clause 16.6 (*Confidentiality*) and clause 20.1 (*EMR*) of this **Agreement**; and
- 19.3.2. **SPN** shall be entitled to enforce any of the provisions of this **Agreement** to the extent that they affect its rights as owner of the **SPN Network**, including the provisions of clause 12 (*Liability*).

19.4. Severance of Terms

If any provision of this **Agreement** is or becomes or is declared invalid, unenforceable or illegal by the courts of any jurisdiction to which it is subject or by order of the Commission of the European Communities or by order of the **Secretary of State**, such invalidity, unenforceability or illegality shall not prejudice or affect the remaining provisions of this **Agreement**, which shall continue in full force and effect notwithstanding such invalidity, unenforceability or illegality.

19.5. Entire agreement

This **Agreement** contains or expressly refer to the entire agreement between the **Parties** with respect to the subject matter hereof and expressly excludes any warranty, condition or other undertaking implied at law or by custom. Each of the **Parties** acknowledges and confirms that it has not, in entering into this **Agreement**, relied on any representation, warranty or other undertaking not fully reflected in the terms of this **Agreement**.

19.6. No partnership/no agency

19.6.1. Nothing in this **Agreement** is intended to, or shall be deemed to, establish any partnership or joint venture between the **Parties**, constitute either **Party** the agent of the other **Party**, or authorise either **Party** to make or enter into any commitments for or on behalf of the other **Party**.

19.6.2. Each **Party** confirms it is acting on its own behalf and not for the benefit of any other person.

19.7. **Assignment**

This **Agreement** is personal to the **Parties** and neither **Party** shall assign, transfer, mortgage, charge, subcontract, or deal in any other manner with any or all of its rights and obligations under this **Agreement** without the prior written consent of the other **Party** (such consent not to be unreasonably withheld or delayed).

19.8. **Notices**

19.8.1. For the purposes of this **Agreement**, unless and until otherwise notified by the relevant **Party** to the other, any notice or other communication to be given by **UKPN** or the **Provider** to the other under, or in connection with matters contemplated by, this **Agreement** shall be delivered by hand or sent by first class pre-paid post to the following postal address and/or email address and marked for the attention of the person named below:

UKPN:

[]

For the attention of: []

Copy to: []

Email: []

Provider:

[]

For the attention of: [NAME OF INDIVIDUAL]

Email: []

19.8.2. For the purposes of clause 19.8.1, a notice shall be deemed to have been received:

19.8.2.1. in the case of delivery by hand, when delivered;

19.8.2.2. in the case of delivery by first class pre-paid post, on the second Business Day following the day of posting; or

19.8.2.3. in the case of email, at the time of transmission (where transmission occurs before 17.00 hours on the day of transmission) and in any other case on the day following the day of transmission.

19.9. **Counterparts**

This **Agreement** may be executed in counterparts, each of which shall be an original, and which together shall constitute one and the same agreement.

19.10. **Anti-Bribery**

19.10.1. Each **Party** shall:

19.10.1.1. comply with all **Anti-Bribery Laws**;

19.10.1.2. not engage in any activity, practice or conduct which would constitute an offence under sections 1, 2 or 6 of the Bribery Act 2010 if such activity, practice or conduct had been carried out in the United Kingdom;

19.10.1.3. have and shall maintain in place, throughout the **Trial Period**, its own policies and procedures, including **Adequate Procedures**, to ensure compliance with the **Anti-Bribery Laws** and this clause 19.10, and will enforce them where appropriate; and

19.10.1.4. procure and ensure that all of its **Associated Persons** and/or other persons who are performing services in connection with this **Agreement** comply with this clause 19.10.

19.10.2. If either **Party** breaches this clause 19.10 then, without prejudice to any other rights or remedies, the other **Party** may immediately terminate this **Agreement** on written notice to the **Party** in breach.

20. **EMR (Electricity Market Reform)**

20.1. Notwithstanding any confidentiality obligations and any restriction on the use or disclosure of information set out in this **Agreement**, the **Provider** consents to the **System Operator** using or disclosing information or data supplied to it in any year under this **Agreement** only to the extent necessary to enable the **System Operator** to carry out its **EMR Functions**.

20.2. The provisions relating to the resolution of disputes set out in this **Agreement** are, in respect of disputes under this clause 20, subject to any contrary provision of an **EMR Document**.

20.3. Where for the purposes of this provision only:-

“**AF Rules**” has the meaning given to “allocation framework” in section 13(2) of the Energy Act 2013;

“**Capacity Market Rules**” means the rules made under section 34 of the Energy Act 2013 as modified from time to time in accordance with that section and The Electricity Capacity Regulations 2014;

“**EMR Document**” means The Energy Act 2013, The Electricity Capacity Regulations 2014, the Capacity Market Rules, The Contracts for Difference (Allocation) Regulations 2014, The Contracts for Difference (Definition of Eligible Generator) Regulations 2014, The Contracts for Difference (Electricity Supplier Obligations) Regulations 2014, The Electricity Market Reform (General) Regulations 2014, the AF Rules and any other regulations or instruments

made under Chapter 2 (capacity market) or Chapter 4 (investment contracts) of Part 2 of the Energy Act 2013 which are in force from time to time; and

“**EMR Functions**” has the meaning given to “EMR functions” in Chapter 5 of Part 2 of the Energy Act 2013.

21. DATA PROTECTION

21.1. Notwithstanding any other provision of the **Agreement** the **Parties** as a data controller shall:-

- 21.1.1. observe and comply with such of the provisions of the Data Protection Act 2018 as shall apply to them in relation to any and all personal data which may be disclosed to or acquired by it as a result of or in connection with this **Agreement**;
- 21.1.2. ensure that its staff members are appropriately trained to handle and process the personal data in accordance with the technical and organisational security measures together with the data protection legislation, as amended from time to time and any guidance and have entered into confidentiality agreements relating to the processing of personal data;
- 21.1.3. ensure that the personal data it processes is processed fairly and lawfully with legitimate grounds for the duration of this **Agreement**;
- 21.1.4. ensure that all such personal data is adequate, relevant and not excessive in relation to the purposes for which it is held, used or disclosed by them, such purpose being necessary for the purposes of the **Agreement** and, insofar as is practicable, shall ensure that the data is accurate; and
- 21.1.5. exercise appropriate security and other measures to prevent unauthorised access to or accidental or unauthorised alterations, disclosure, destruction or loss of such personal data.

22. GOVERNING LAW/JURISDICTION

- 22.1. This **Agreement** shall be governed by and construed in all respects in accordance with English law.
- 22.2. The **Parties** irrevocably agree that the courts of England shall have exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with this **Agreement** (including non-contractual disputes or claims) and the **Parties** waive any objection to proceedings in such courts on the grounds of venue or on the grounds that proceedings have been brought in an inappropriate form.

IN WITNESS WHEREOF the hands of the duly authorised representatives of the Parties hereto at the date first above written

SIGNED BY:	
Print name:	
for and on behalf of UK POWER NETWORKS (OPERATIONS) LIMITED	
Date:	
SIGNED BY:	
Print name:	
for and on behalf of [PROVIDER]	
Company name:	
Date:	

“Act”	means the Electricity Act 1989;
“Accepted Maximum Reactive Range”	means the value of the Maximum Reactive Range in a Settlement Period when the DER Unit has been accepted for a Power Potential Tender as indicated by a Production Schedule ;
“Active Power”	is equal to $IV \cos \varphi$ where φ is the phase angle between current and voltage;
“Active Power Instruction”	means an instruction issued by UKPN for delivery of Active Power Response from the DER Unit in accordance with clause 7 (<i>Active Power Service</i>);
“Active Power Response”	means, in relation to the DER Unit and in relation to a Settlement Period for which it has offered the Active Power Response service, the increase or decrease of active power output (expressed in MW) of the DER Unit by reference to the Baseline ;
“Active Utilisation Payment”	means a payment due from UKPN to the Provider for the delivery of Active Power Response in accordance with an Active Power Instruction ;
“Actual Reactive Power Delivery”	means the delivery of Reactive Power Response (expressed in Mvarh) actually achieved by a DER Unit when operating in voltage control or voltage droop control mode;
“Actual Trial Commencement Date”	means the date on which the Trial commences;
“Adequate Procedures”	shall be determined in accordance with section 7(2) of the Bribery Act 2010 (and any guidance issued under section 9 of that Act);
“Anti-Bribery Laws”	means all applicable laws, statutes, regulations, and codes of mandatory application relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;
“Apparent Power”	is power measured in Mega Volt Ampere or Volts x Ampere;
“Associated Persons”	has the meaning ascribed to it in section 8 of the Bribery Act 2010 and shall include but is not limited to any employees, agents and/or subcontractors of UKPN or the Provider as applicable in relation to the provision of the Power Potential Services ;

“ Authority ”	means the Gas and Electricity Markets Authority established by section 1 of the Utilities Act 2000;
“ Available ”	<p>in relation to the DER Unit and in respect of any Settlement Period in which the Provider has offered to hold the DER Unit ready for a Voltage Arming Instruction (and UKPN has accepted such offer), means that the DER Unit is capable of providing Reactive Power Response over the Maximum Reactive Range at the Expected Operating Level provided that:</p> <ul style="list-style-type: none"> (i) in the case of a Non-synchronous DER Unit, it is online with an active communications link as indicated by the DERMS Monitoring, in voltage droop control mode, and the Provider has notified UKPN through the DERMS Web Interface an Expected Operating Level for active power (which could be zero); or (ii) in the case of a Synchronous DER Unit, it is online with an active communications link as indicated by the DERMS Monitoring, in voltage control mode, and the Provider has notified UKPN through the DERMS Web Interface an Expected Operating Level for active power (which could be zero), <p>and the terms “Availability” and “Unavailable” shall be construed accordingly;</p>
“ Availability Failure ”	<p>means, in relation to the DER Unit:</p> <ul style="list-style-type: none"> (i) any failure of the DER Unit to respond to a Reactive Utilisation Instruction within the Maximum Reactive Range; (ii) any failure of the DER Unit to pass a retest conducted pursuant to clause 10.3 or clause 10.4; or (iii) any failure of the active communications link between the DER Unit and the DERMS as determined through DERMS Monitoring;
“ Availability Payment ”	means a payment by UKPN in consideration of the Provider making the DER Unit Available in Wave 2 and Wave 3 as calculated under Part 2b of Schedule 2 (<i>Payments</i>);
“ Availability Price ”	means, in relation to the DER Unit , the price (expressed in £/Mvar/hour) for making the DER Unit Available , being, in relation to Wave 2 or Wave 3 , the price tendered by the Provider and accepted by UKPN subject to and in accordance with the Market Procedures in a Power Potential Tender ;
“ Availability Threshold ”	means the proportion of Settlement Periods in which the DER Unit was Available (expressed as a percentage) during the Optional Technical Trial

	specified in part 2a of Schedule 2 for the purposes of determining the amount of the Participation Payment ;
“Balancing Services Activity”	has the meaning given to it in the Transmission Licence ;
“Base Rate”	in respect of any day, means the rate per annum which is equal to the base lending rate of HSBC Bank plc as at close of business on the immediately preceding Business Day ;
“Baseline”	means the baseline AOLij in the case of the Active Power Service , and has the meaning given to it in part 1 of Schedule 2;
“Business Day”	means a week-day other than a Saturday on which banks are open for domestic business in the City of London;
“Conditions Precedent”	means the conditions precedent set out in clause 2.1;
“Connection Agreement”	means the agreement between SPN and the Provider in respect of the connection of the DER Unit to the SPN Network ;
“Day Ahead”	means, in relation to a Trading Day , the next following Trading Day ;
“Default Rate”	in respect of any day, means the rate per annum which is 3 per cent above the base lending rate of HSBC Bank plc as at the close of business on the immediately preceding Business Day ;
"DER Commissioning Test"	means, in relation to a DER Unit , a test to be carried out in accordance with the procedure set out in the DER Technical Requirements Document ;
"DER Commissioning Test Procedure"	means the document defining the detailed test procedure to be followed by UKPN to verify that a DER Unit meets the requirements set out in the DER Technical Requirements Document ;
“DER Connection Point”	means the point at which the DER Unit connects to the SPN Network ;
"DER Technical Requirements Document"	means the document described in clause 4.4;
“DER Unit”	means the generating facility or storage facility owned and/or operated by the Provider with a single Connection Agreement to the SPN Network , that is capable of providing one or more of the Power Potential Services , as described in Schedule 4 (<i>DER Unit Information</i>);

“DERMS”	means the distributed energy resource management system procured by UKPN for the purposes of the Power Potential Project ;
“DERMS Web Interface”	means the web interface developed by UKPN associated with the DERMS ;
“DERMS Monitoring”	means inputs and outputs from the DERMS Web Interface , SCADA measurements and watchdog signals collected by the DERMS from a DER Unit to determine both its general availability and Availability ;
“EMR”	means Electricity Market Reform as defined in clause 20;
“Expiry Date”	means the date on which the Trial Period ends;
“Expected Operating Level”	means the forecast MW output of a DER Unit indicated to UKPN by the Provider for the relevant Settlement Period via the DERMS Web Interface ;
“Force Majeure”	means, in relation to either Party , any event or circumstance which is beyond the reasonable control of such Party (not being, without limitation an event or circumstance caused by the negligence or lack of care and attention of that Party or its officers or employees) but subject thereto including act of God, strike lockout or other industrial disturbance, act of the public enemy, war declared or undeclared, threat of war, terrorist act, blockade, revolution, riot, insurrection, civil commotion, public demonstration, sabotage, act of vandalism, lightning, fire, storm, flood, earthquake, accumulation of snow or ice, lack of water arising from weather or environmental problems, explosion, government restraint, Act of Parliament, other legislation, bye law and Directive (not being any order, regulation or direction under Section 32, 33, 34 and 35 of the Act);
“Good Industry Practice”	means, in relation to a Party , the exercise of that degree of skill, care, prudence, foresight and operating practice which would ordinarily and reasonably be expected from time to time of a skilled and experienced operator (engaged in the same type of undertaking as that of that Party);
“Grid Code”	means the Grid Code drawn up pursuant to the Transmission Licence as from time to time revised in accordance with the Transmission Licence ;
“Insolvency Event”	in relation to a Party , any of the following events occurring in relation to that Party : <ul style="list-style-type: none"> a) an order of the High Court is made or an effective resolution passed for its insolvent winding-up or dissolution; or b) a receiver (which expression shall include an administrative receiver within the meaning of section 29 of the Insolvency Act 1986) of the

	<p>whole or any material part of its assets or undertaking is appointed; or</p> <p>c) an administration order under section 8 of the Insolvency Act 1986 is made or any other steps are taken to appoint an administrator or if a voluntary arrangement is proposed under section 1 of that Act; or</p> <p>d) it enters into any scheme of arrangement (other than for the purpose of reconstruction or amalgamation upon terms and within such period as may previously have been approved in writing by the Authority);</p> <p>e) it is unable to pay its debts (within the meaning of section 123(1) or (2) of the Insolvency Act 1986 save that such section shall have effect as if for £750.00 there was inserted £250,000 (and a Party shall not be deemed to be unable to pay its debts if any demand for payment is being contested in good faith by it with recourse to all appropriate measures and procedures);</p>
“Instruction”	means an Active Power Instruction, Voltage Set Point Instruction or Voltage Arming Instruction as the case may be;
“Licence”	means a licence granted under section 6(1) of the Act ;
“Mandatory Running Schedule”	means the combination of Instructions and Settlement Periods planned for running the Mandatory Technical Trial for each DER Unit ;
"Mandatory Technical Trial"	means the trial conducted in Wave 1 for the purposes of verifying the capability of the DER Unit to provide Reactive Power Response and Active Power Response in response to simulated conditions on the network;
"Mandatory Technical Trial Window"	means the Settlement Periods agreed with the Provider for conducting the Mandatory Technical Trial ;
“Market Procedures”	means the document of that name detailing how the Trial and market tenders will run as published from time to time by UKPN and the System Operator ;
“Market Trial Calendar”	means the intended running schedule of the Trial , as published from time to time by UKPN and the System Operator ;
“Maximum Active Power Parameter”	means the maximum MW output the DER Unit can be increased to during a Service Window ;
“Maximum Reactive Range”	means a constant value in each Settlement Period across a Service Window :

	<p>(i) the DER Unit's maximum Mvar range, summed across both lead and lag directions, determined by reference to the P-Q capability curve specified in Schedule 3 (<i>Service Parameters</i>) i.e. the same value for all Settlement Periods; or</p> <p>(ii) other than during Wave 1, such other Mvar range of the DER Unit (not exceeding that specified in paragraph (i)) as the Provider may notify to UKPN through the DERMS Web Interface pursuant to clause 6.5.1;</p>
"Minimum Active Power Output Parameter"	means the minimum MW output the DER Unit can be decreased to during a Service Window ;
"Monthly Statement"	has the meaning given to it in clause 9.1;
"National Electricity Transmission System"	has the meaning given to that term in the Grid Code ;
"National Grid website"	means the website at the address: https://www.nationalgrid.com/uk/investment-and-innovation/innovation/system-operator-innovation/power-potential ;
"Non-synchronous DER"	means a DER Unit that is not a Synchronous DER Unit ;
"Optional Technical Trial"	means the trial to be conducted during Wave 1 to verify the capability of the DER Unit to provide Reactive Power Response in response to network conditions, taking place during the times outlined in the Market Trial Calendar ;
"Participation Payments"	means a payment by UKPN in consideration of the Provider making the DER Unit available for participation in Wave 1 , as calculated under Part 2a of Schedule 2 (<i>Payments</i>);
"Performance Factor"	has the meaning given to that term in Schedule 2 (<i>Payments</i>);
"Power Potential Inter-Operator Agreement"	means the agreement dated [2 nd August 2018] and made between the System Operator and UKPN in connection with the Trial ;

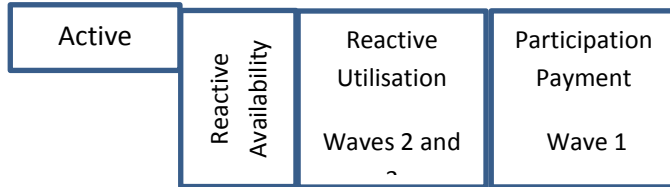
“Power Potential Project”	means the project described in the submission by UKPN and the System Operator for the Authority’s Network Innovation Competition under the title “Transmission & Distribution Interface 2.0 (TDI 2.0)”;
“Power Potential Services”	means the services of making the DER Unit Available for Reactive Power Response and delivery of Reactive Power Response and/or Active Power Response in accordance with the provisions of this Agreement ;
“Power Potential Tender”	means the daily tender process to be conducted by UKPN during Wave 2 and Wave 3 for the provision of Power Potential Services ;
“Production Schedule”	has the meaning given to that term in clause 6.6;
“Reactive Lag MVAR”	is equal to $IV \sin \phi$ where ϕ is the phase angle between current and voltage and ϕ is positive (current lags the supply voltage)
“Reactive Lead MVAR”	is equal to $IV \sin \phi$ where ϕ is the phase angle between current and voltage and ϕ is negative (current leads the supply voltage)
“Reactive Power Response”	means, in relation to the DER Unit and in relation to a Service Window , the delivery of reactive power (expressed in Mvarh) from the DER Unit ;
“Reactive Utilisation Payment”	means a payment due from UKPN to the Provider for the delivery of Reactive Power Response in accordance with an Instruction ;
“Regional Development Plan”	refers to the constraint management service under development between the System Operator and UKPN for the South East of England coastal area to identify the potential for distributed energy resources to contribute to unlocking additional network capacity and managing system constraints;
“Relevant Month”	means, in relation to Monthly Statements , a statement of delivered Power Potential Services and associated payments across a particular calendar month;
“Scaling Factor”	has the meaning given to it in Schedule 2;
“Scheduled Trial Commencement Date”	means the date on which the Trial is scheduled to begin as at the date of signing this Agreement , the 11 th March 2019;
“Secretary of State”	has the meaning given to that term in the Act ;
“Service Parameters”	the parameters set out in Schedule 3;

“Service Window”	means those periods on a Trading Day in which the Power Potential Service operates, as notified by UKPN to the Provider in accordance with clause 6.4;
“Settlement Period”	means a period of thirty (30) minutes ending on the hour or half hour in each hour during a Trading Day ;
“SPN”	means South Eastern Power Networks Plc a company registered in England with company number 03043097 and having its registered office at Newington House, 237 Southwark Bridge Road, London, SE1 6NP;
“SPN Network”	means the electricity distribution system operated by SPN in accordance with the SPN Licence ;
“SPN Licence”	means the Licence granted to SPN under section 6(1)(c) of the Act ;
“Synchronous DER”	means a DER Unit in which, under all steady state conditions, the rotor rotates at a mechanical speed equal to the electrical frequency of the National Electricity Transmission System divided by the number of pole pairs of the Generating Unit ;
“System Operator”	means National Grid Electricity Transmission Plc or any successor holding a Licence with responsibility for carrying out the Balancing Services Activity ;
“Trading Day”	means the Electricity Forward Agreement trading day;
“Transmission Licence”	means the Licence granted to National Grid Electricity Transmission Plc under section 6(1)(b) of the Act ;
“Trial Period”	means the period commencing on the Actual Trial Commencement Date and ending on the first anniversary of the Actual Trial Commencement Date , subject to extension in accordance with the Inter-Operator Agreement ;
“Trial ”	means the procurement and utilisation of Power Potential Services by UKPN in accordance with the Inter-Operator Agreement ;
“Utilisation Payment”	means an Active Utilisation Payment or a Reactive Utilisation Payment (as the context requires);
“Utilisation Price”	means, in relation to the DER Unit , the applicable price for the utilisation of Active Power Response or Reactive Power Response (as the context requires) from that DER Unit ;
“Voltage Arming Instruction”	an instruction from DERMS to the DER Unit to change from power factor operating mode to voltage droop control mode (in the case of a non-

	synchronous DER Unit) or to voltage control mode (in the case of a synchronous DER Unit);
“Voltage Set Point Instruction”	an instruction from DERMS to the DER Unit of a voltage set-point, for a DER Unit which has already received a Voltage Arming Instruction , with the purpose of instructing the DER Unit to deliver non-zero Reactive Power Response ;
“Wave 1”	means the Mandatory Technical Trial and Optional Technical Trial of the Power Potential Service , which is scheduled to take place across the periods specified in the Market Trial Calendar ;
“Wave 2”	means the commercial trial of the Power Potential Service and Power Potential Tender , which is scheduled to take place across the periods specified in the Market Trial Calendar ;
“Wave 3”	means the commercial trial of the Power Potential Service and Power Potential Tender , which is scheduled to take place across the periods specified in the Market Trial Calendar .

Total Monthly Payment =

$$= \sum_j^{month} (PAI_{ij} + PAE_{ij} + RPA_{ij} + RPI_{ij} + RPE_{ij}) + PPiM$$



Part 1 - ACTIVE POWER SETTLEMENT

Active Energy Delivered MWh per Settlement Period

Note 1: Payment is calculated per settlement period for each settlement period where the **DER Unit** is due to provide a service (where the unit is ramping and/or at full service delivery)

Note 2: **Active Power** losses are not considered under this agreement

Note 3: Payment is capped to Expected MWh (EXPI_{ij}), Delivered MWh based on EOL (DEL_EOL_{ij}), and Delivered MWh based on AOL (DEL_AOL_{ij}) (please see definitions of these parameters below).

Note 4: During Ramping periods Expected MW = Instructed MW * 0.5, and during Full Service Delivery Expected MW = Instructed MW. This is the same principle as is applied to STOR.

Note 5: All volumes are rounded to 3 decimal places and all payments to 2 decimal places.

$$RTU_MW_{ij} = \sum_{m=1}^{30} (RTU_MW_{ijm}) * \frac{1}{60}$$

RTU_MW_{ijm} is the Metered Output (expressed in MW) for **DER Unit i** in minute m in **Settlement Period j**

RTU_MW_{ij} is the total Metered Output (expressed in MWh) for DER Unit i over **Settlement Period j**

$\sum_{m=1}^{30}$ is the summation over all minutes in **Settlement Period j** if for any time during **Settlement Period** the **DER Unit** is due to be providing a service (i.e. ramping and/or a full MW)

And

$$DEL_EOL_{ij} = RTU_MW_{ij} - EOL_{ij}$$

$$DEL_AOL_{ij} = RTU_MW_{ij} - AOL_{ij}$$

And

$$AOL_{ij} = EOL_{ij} * SF_{ij}$$

Where:

DEL_EOLij is the Delivered **Active Power Response** (expressed in MWh) for **DER Unit i** in **Settlement Period j** calculated using EOLij as the **Baseline**

DEL_AOLij is the Delivered **Active Power Response** (expressed in MWh) for **DER Unit i** in **Settlement Period j** calculated using AOLij as the **Baseline**

EOLij is the Active Energy (expressed in MWh), that **DER Unit i** would have produced in the **Settlement Period j** if it were not instructed to deliver **Active Power Response**, based on DER submission of **Expected Operating Level** (expressed in MW) for **DER Unit i** in **Settlement Period j** (a positive value indicates the unit is exporting energy and a negative value indicates the unit is importing energy during the **Settlement Period**).

EOLij is the **Expected Operating Level***0.5, where 0.5 denotes conversion from MW to MWh over **Settlement Period j**.

SFij is a **Scaling Factor** calculated by dividing the average output (expressed in MW) of the **DER Unit** over the period 1 hour prior to the **Active Power Instruction** being initiated (or the last full 1 hour period when the **DER Unit** was not subject to an **Active Power Instruction**) by the **Expected Operating Level** (expressed in MW) for the same **Settlement Period**, submitted by **DER Unit i**.

AOLij is the Adjusted Operating Level (expressed in MW) for **DER Unit i** in **Settlement Period j**, defined as below so that the resulting **Baseline** must be within the maximum and minimum operating level of the plant (i.e. if the application of the scaling factor implies a **Baseline** outside of the DER's capability, the capability limit becomes the **Baseline**).

If

$EOL_{ij} * SF_{ij} \leq \text{Minimum Active Power Output Parameter},$

then $AOL_{ij} = \text{Minimum Active Power Output Parameter}$

If

$\text{Minimum Active Power Output Parameter} < EOL_{ij} * SF_{ij} < \text{Maximum Active Power Output Parameter},$

then $AOL_{ij} = EOL_{ij} * SF_{ij}$

If

$EOL_{ij} * SF_{ij} \geq \text{Maximum Active Power Output Parameter}$,

then $AOL_{ij} = \text{Maximum Active Power Output Parameter}$

Active Utilisation Payment per Settlement Period

The **Active Utilisation Payment** in respect of **DER Unit i** in **Settlement Period j** (APU_{ij}) shall be calculated as follows:

$$APU_{ij} = PAI_{ij} + PAE_{ij}$$

Where:

$$PAI_{ij} = ABS(CAPI_{ij}) * AI_{ij}$$

$$PAE_{ij} = CAPE_{ij} * AE_{ij}$$

And where:

$$CAPI_{ij} = If (EXP_{ij} > 0, 0, \min(\max(DEL_EOL_{ij}, DEL_AOL_{ij}, EXP_{ij}), 0))$$

$$CAPE_{ij} = If (EXP_{ij} > 0, \max(\min(DEL_EOL_{ij}, DEL_AOL_{ij}, EXP_{ij}), 0), 0)$$

$$EXP_{ij} = \sum_{rm \in j} INS_{im} * 0.5 * 1 / 60 + \sum_{fdm \in j} INS_{im} * 1 / 60$$

PAI_{ij} is the payment for Active Import $CAPI_{ij}$ for **DER Unit i** in **Settlement Period j**, in £

PAE_{ij} is the payment for Active Export $CAPE_{ij}$ for **DER Unit i** in **Settlement Period j**, in £

$CAPI_{ij}$ is the Capped Import Energy Delivered by **DER Unit i** in **Settlement Period j**, expressed in MWh

$CAPE_{ij}$ is the Capped Export Energy Delivered by **DER Unit i** in **Settlement Period j**, expressed in MWh

AI_{ij} is the **Utilisation Price** for Capped Active Import $CAPI_{ij}$ for **DER Unit i** in **Settlement Period j** (expressed in £/MWh)

AEij is the **Utilisation Price** for Capped Active Export CAPIj for **DER Unit i** in **Settlement Period j** (expressed in £/MWh)

EXPij is the Energy Expected to be delivered (expressed in MWh) by **DER Unit i** in **Settlement Period j**

INSij is the Instructed Power to delivered (expressed in MW) by **DER Unit i** in **Settlement Period j**

$\sum_{m \in j}$ is the summation over all ramping up and down minutes in **Settlement Period j**

$\sum_{fdm \in j}$ is the summation over all minutes during the **Instruction** that full delivery is expected within **Settlement Period j**

Part 2 - REACTIVE POWER SETTLEMENT

Part 2a - Wave 1 Optional Technical Trial (Reactive) Participation Payment

Wave 1 Optional Technical Trials will consists of 2520 hours of opportunity during the trial period for **DER Units** to be available. Every hour that a **DER Unit** is available will contribute towards its **Participation Payments**. **Participation Payments** will be made in line with a monthly settlement process where the cumulative number of hours for which a **DER Unit** was available will be calculated and settled accordingly, in line with the Table 1 below.

In any month where a **Provider** has already received payments in respect of a **DER Unit**, additional payments will only be made to reflect the additional hours the **DER Unit** was made available but have not yet been remunerated for. Specifically, the total number of hours a **DER Unit** has been available for will be summed, the **Participation Payments** deduced in line with these hours, and any existing payments made will be subtracted so that only the difference is paid to the **DER Provider**.

Table 1 Participation payments

Amount recoverable	Hours available
£36,000	>= 700, < 1000
£38,000	>=1000, < 1300
£41,000	>=1300, < 1500
£43,000	>=1500, < 1850
£45,000	>=1850

A **DER Unit**'s total **Available** hours during the **Optional Technical Trial** will be determined based on the definition of **Available** in this **Agreement**.

$$PPiM = TPDi - PTDi$$

Where

$$TPDi =$$

$$\begin{aligned} &IF (HTDi \geq 1850, 45000, 0) + IF (AND(HTDi \geq 1500, HTDi < 1850), 43000, 0) \\ &+ IF (AND(HTDi \geq 1300, HTDi < 1500), 41000, 0) \\ &+ IF (AND(HTDi \geq 1000, HTDi < 1300), 38000, 0) \\ &+ IF (AND(HTDi \geq 700, HTDi < 1000), 36000, 0) \end{aligned}$$

$$PTDi = \sum_s^{Month(n-1)} (PPiM)$$

PPiM **Participation Payments** due to **DER Unit i** in month M

TPDi Total payment due to **DER Unit i** for participating in the **Optional Technical Trial** based on **Available** hours per Table 1

PTDi Payment to date made to **DER Unit i** for participating in the **Optional Technical Trial** for the period from the start of the **Optional Technical Trial** up to and including the previous settlement month.

HTDi Hours **Available** for **Reactive Power Response** in the **Optional Technical Trial** to date

$$\sum_s^{Month(n-1)} \text{ Sum from the start of the } \mathbf{Optional\ Technical\ Trial} \text{ (denoted by } s) \text{ to month } (n-1)$$

Part 2b - Reactive Power Availability Payment in Waves 2 and 3

Note: 1 Payment is capped to Contracted Mvars, thus if a **DER Unit** is not declared **Available**, then there is no payment.

Payment for **Availability** in month m (RPA_m) shall be calculated as follows:

$$RPA_m = \sum_{jem} RPAij_$$

Where:

$$RPA_{ij} = (RR_{ij} * 0.5) * RP_{ij} * PF_{im}$$

Note: Multiplying by 0.5 converts from hourly values to half-hourly settlement period values.

$$AP_{im} = \left(\sum_{j \in m} RAV_{ij} / \sum_{j \in m} RAC_{ij} \right)$$

$$PF_{im} = If(AP_{im} \geq 0.8, 1, AP_{im})$$

AP _{iM}	Availability Proportion in respect of DER Unit i in month M, over all Settlement Periods j in that month
PF _{iM}	is a Performance Factor of DER Unit i in month M, over all Settlement Periods j in that month
RPA _{ij}	Is the Availability payment for the Accepted Maximum Reactive Range in respect of DER Unit i in Settlement Period j
RR _{ij}	is the Accepted Maximum Reactive Range in the relevant Settlement Periods , in Mvar
RAV _{ij}	is the Accepted Maximum Reactive Range which is also Available for DER Unit i in Settlement Period j (where a value of 1 in a Settlement Period denotes accepted and Available , else 0)
RAC _{ij}	is the Accepted Maximum Reactive Range for DER Unit i in Settlement Period j (where a value of 1 in a Settlement Period denotes accepted, else 0)
RP _{ij}	is the Reactive Power Availability Price for Lead and Lag for DER Unit i in Settlement Period j

Part 2c - Reactive Lead and Lag Mvarh per minute

R_{lim} Reactive Import Mvarh delivered by **DER Unit i** in minute m

R_{Eim} Reactive Export Mvarh delivered by **DER Unit i** in minute m

$$RI_{im} = IF(RTU_MVAR_{im} - Q_{im} < 0, \text{Min}(\text{Max}(RTU_MVAR_{im} - Q_{im}, -RR_{ij}), 0), 0) * 1/60$$

$$RE_{im} = IF(RTU_MVAR_{im} - Q_{im} > 0, \text{Max}(\text{Min}(RTU_MVAR_{im} - Q_{im}, RR_{ij}), 0), 0) * 1/60$$

Where:

RTU_MVAR_{im} is the metered reactive power output Mvar for **DER Unit i** in minute m

And Where:

If $\cos\phi$ is fixed for a **DER Unit**, the value of Q_{im} is:

$$Q_{im} = S \times \sin\phi = S \times \sin(\arccos(\cos\phi))$$

And

$$S = P / \cos\phi$$

And where:

P is Active Power, measured in MW, and based on the actual power output of a **DER Unit** during minute m (i.e. the same as RTU_MW_{ijm})

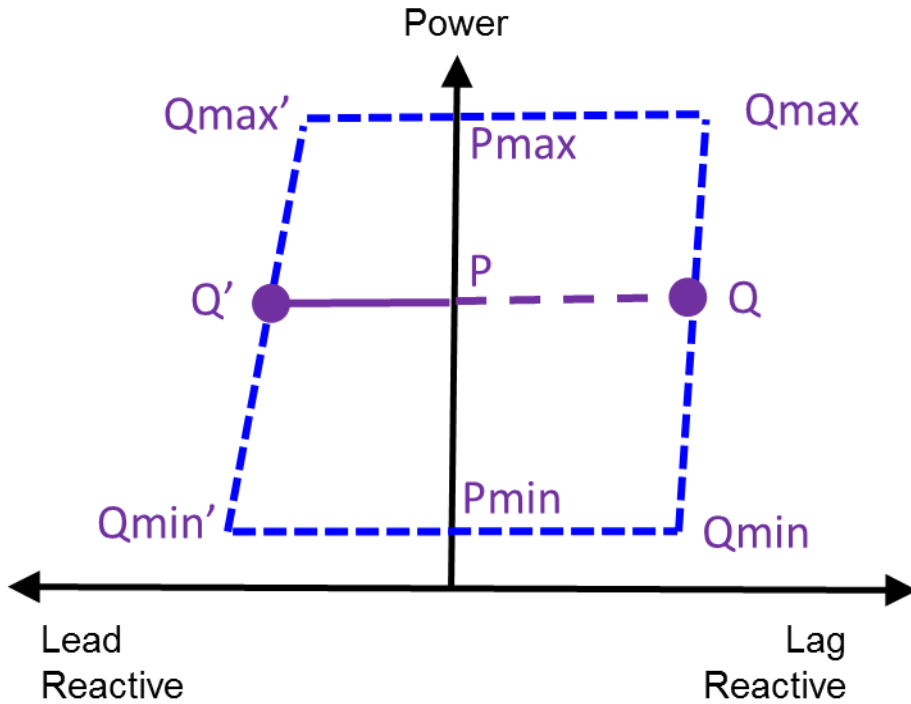
S is Apparent Power, measured in MVA

Q_{im} is Reactive Power of a **DER Unit** when in voltage droop/voltage control mode expressed in Mvar, that **DER Unit i** would have produced in minute m if it were not instructed for utilisation and is used as a baseline to assess the reactive energy delivered (RTU_MVAR_{im} – Q_{im}) capped by RR_{ij}*0.5 ,where

$\cos\phi$ is a fixed Power Factor specific to the **DER Unit i**

RR_{ij} is the **Accepted Maximum Reactive Range** for the **DER Unit i** in **Settlement Period j**, in Mvar

Else if there is not a fixed $\cos\phi$ power factor specific to the **DER Unit i**...



$$Q_{\text{available}} = Q' + Q$$

$$Q = \left[\frac{(P - P_{\text{min}})}{(P_{\text{max}} - P_{\text{min}})} \times (Q_{\text{max}} - Q_{\text{min}}) \right] + Q_{\text{min}}$$

$$Q' = \left[\frac{(P - P_{\text{min}})}{(P_{\text{max}} - P_{\text{min}})} \times (Q_{\text{max}}' - Q_{\text{min}}') \right] + Q_{\text{min}}'$$

Where

Pmax	DER Unit declared max output power for Power Potential service
Qmax'	DER Unit declared leading Q for Pmax output
Qmax	DER Unit declared lagging Q for Pmax output
Pmin	DER Unit declared minimum output power for Power Potential service
Qmin'	DER Unit declared leading Q for Pmin output
Qmin	DER Unit declared lagging Q for Pmin output
P	=RTU Meter value in MW for minute m
Q'	=Calculated Leading reactive power available at RTU metered power output
Q	=Calculated Lagging reactive power available at RTU metered power output
Qavailable	= DER Unit Reactive Power Availability at RTU metered power output

Part 2d - Reactive Power Utilisation Payment

Payment for Reactive Power Utilisation in month M (RPU_M) shall be calculated as follows:

$$RPU_M = \sum_{jeM} (RPI_{ij} + RPE_{ij})$$

Where:

$$RPI_{ij} = \sum_j ABS(RI_{im}) * RAPI_{ij}$$

$$RPE_{ij} = \sum_j RE_{im} * RAPI_{ij}$$

RPI_{ij} is the Reactive Utilisation Import payment for **DER Unit i** in **Settlement Period j**, in £

ABS is the absolute value

RPE_{ij} is the Reactive Utilisation Export payment for **DER Unit i** in **Settlement Period j**, in £

$RAPI_{ij}$ is the Reactive Utilisation Price £/Mvarh for **DER Unit i** for **Settlement Period j**

Reactive Power Capability

This table should be completed to reflect the combination of the **DER Unit's** capability and any limitation in the **DER Unit's Connection Agreement** with **UKPN**. Consistent with clause 10, if there is any change in the **DER Unit's** capability, an update of this schedule may be required.

Active Power Output (P)	Lead Reactive Power capability (Qmin)	Lag Reactive Power capability (Qmax)
100%		
95%		
90%		
85%		
80%		
70%		
60%		
50%		
40%		
30%		
20%		
15%		
10%		
5%		
0%		

Above capability plotted as a P/Q chart if available (Performance Chart)	
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Figure 1: Illustration of P/Q chart

Please refer to the examples in the Market Procedures when providing performance charts. PQ capability charts have to be defined at the point of connection (POC) for non-synchronous DER and at the generator terminals for synchronous DER.

Reactive Power Service Specific Characteristics

Time taken by automatic voltage droop control to change reactive	
--	--

power from 0 to 90% of maximum export (s) given a sufficiently large change in system voltage	
Time taken by automatic voltage droop control to change reactive power from 0 to 90% of maximum import (s) given a sufficiently large change in system voltage	
Excitation system details	<p>Please specify whether:</p> <ul style="list-style-type: none"> • Static/brushless exciter? • Capable of constant terminal voltage control? • Range of voltage set-point? • Any other relevant information on excitation system
Generator step-up transformer	<p>Please specify:</p> <ul style="list-style-type: none"> • Rated power (MVA), • Rated voltage (kV), • Positive sequence impedance (pu), • Tap changer range (+%, -% on MVA), • Tap change step size (% on MVA) • Any other relevant information on step-up transformer
Installed active power capacity (MW)	
Lead time from UKPN's instruction reception to DER instruction order	
Lead time from DER instruction to ramp-up/ramp/ramp-down start	
Maximum response duration (utilisation time) for MW response (mins)	
Recovery time (from end of delivery to when next available to deliver) for Active Power service	
Maximum active power (P) export	

Maximum active power (P) import	
Minimum active power (P) export	
Minimum active power (P) import	
Ramp Up Rate (MW/s)	
Ramp Down Rate (MW/s)	
Range of continuous ramping (MW)	

Technology-specific DER characteristics

If applicable - Storage Capacity (MWh)	
If Wind - Cut In Speed (mph)	
If Wind - Saturation Speed (mph)	
If Wind - Cutout Speed (mph)	
If PV Solar - Reference irradiation (W/m ²)	
If PV Solar - Reference cell temperature (degC)	
If PV Solar - Other cell module data (no. of modules and cells, module open circuit voltage, module short circuit current, module maximum power, ...)	

DER unit details	
DER Unit name	
Meter Point Administration Number Import Export	
Power Potential Unit Reference	
Site address	
Technical contact Name Job title Company Mobile phone number Email Address	
Site contact (name and details, including contact details of duty and standby personnel) Name Job title Company Mobile phone number Email Address	

Provider's Bank Account Details

Bank: []

Address: []

Sort Code: []

Account Number: []