# Power Potential webinar

**Thank you for joining our webinar.**

**The call will begin at 1 pm. You are on mute and will remain muted until we open the session for Q+A.**
**If you have any questions, please send them to box.PowerPotential1@nationalgrid.com**

# Power Potential webinar

Webinar for interested parties

26 March 2018

box.PowerPotential1@nationalgrid.com

Hosted by: Amy Boast & Tatiana Ustinova

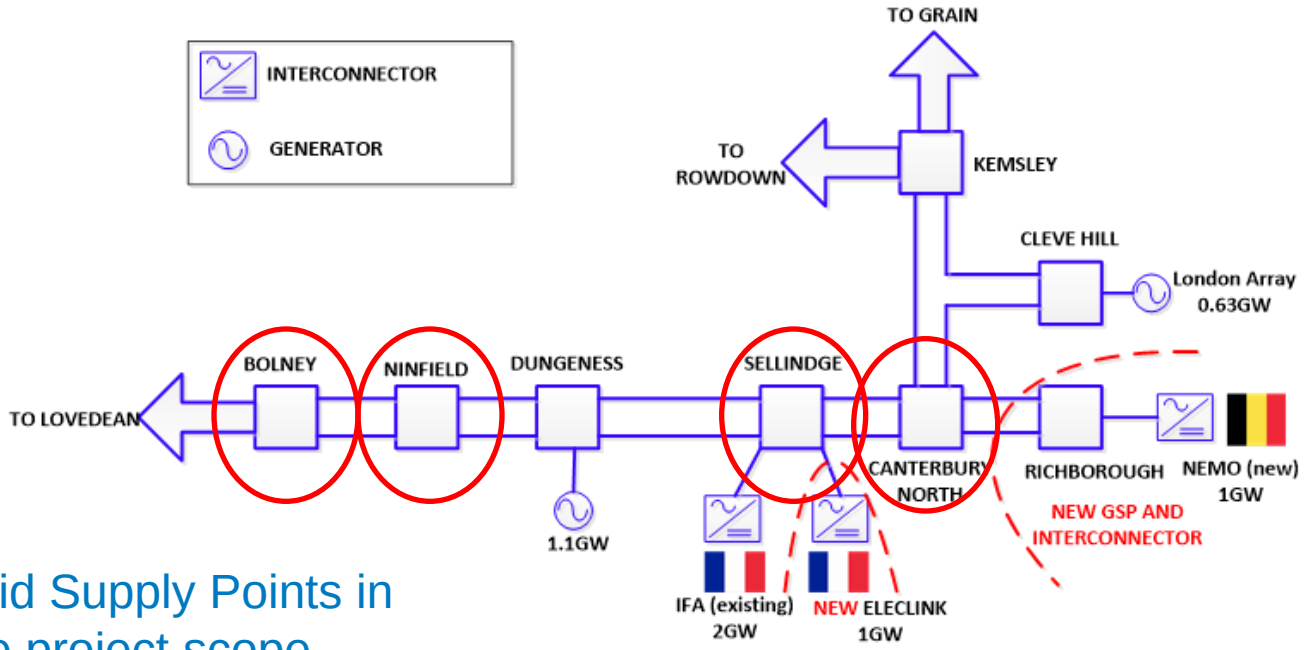
# Agenda

1. Introductions and objective
2. Update on project progress
3. Addressing technical queries
4. Addressing commercial queries
5. Next steps

# Power Potential in a nutshell

The project will create a regional market for Distributed Energy Resources (DER) connected to the distribution network to provide the following services to the System Operator:

1. Dynamic voltage support (MVAr for low and high volts)
2. Active power support for constraint management and system balancing




Grid Supply Points in the project scope

# Agenda

1. Introductions and objective
2. Update on project progress
3. Addressing technical queries
4. Addressing commercial queries
5. Next steps

# Update on Project Progress

**Design**
- Jan17 – Dec 17

**Build**
- Jan 18 – Jun 18

**Test**
- Jul 18 – Dec 18

**Trial**
- Jan 19 – Dec 19

DER trial requirements

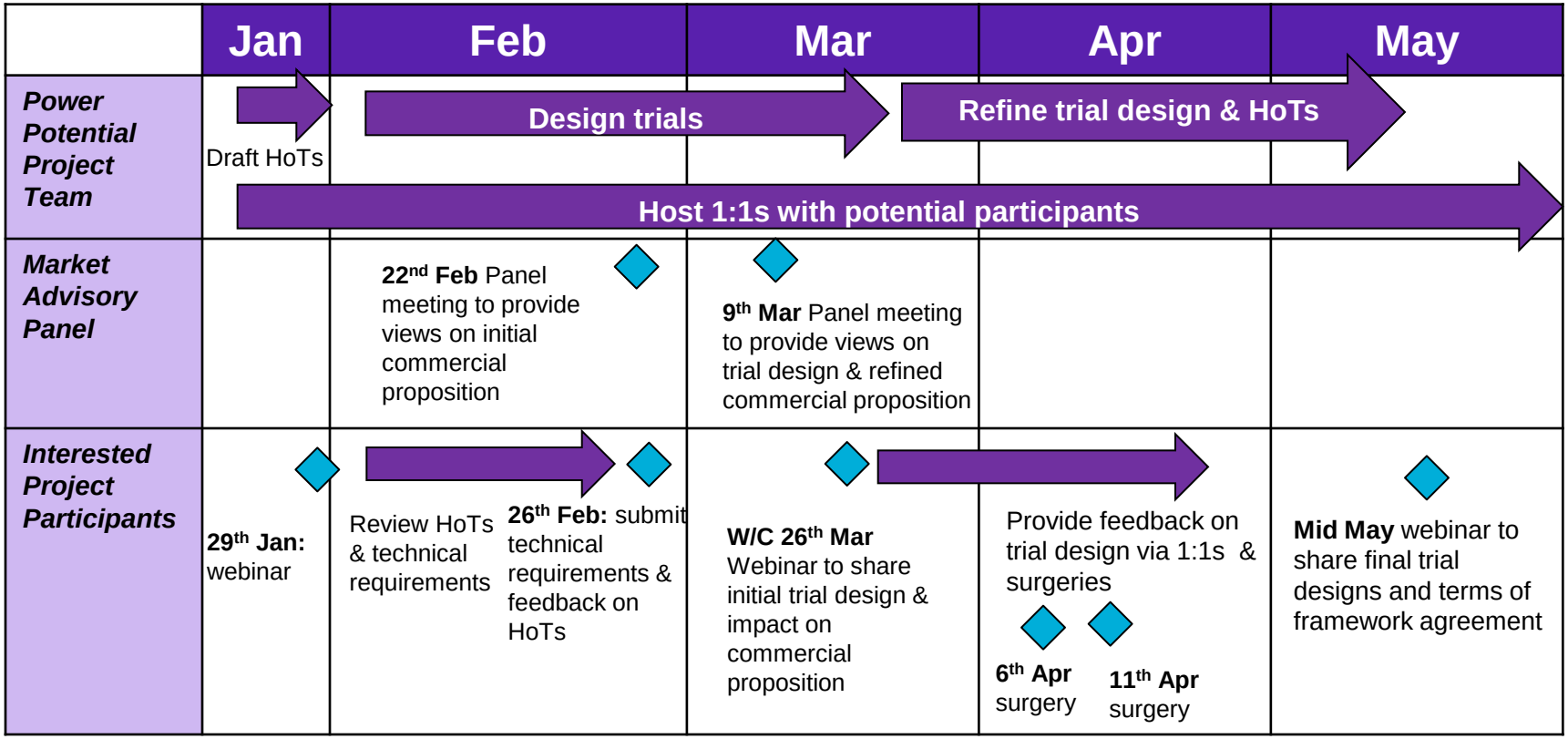
Trial recruitment

Testing of the solution

Commercial arrangements

Trial participation

# Update on Project Progress

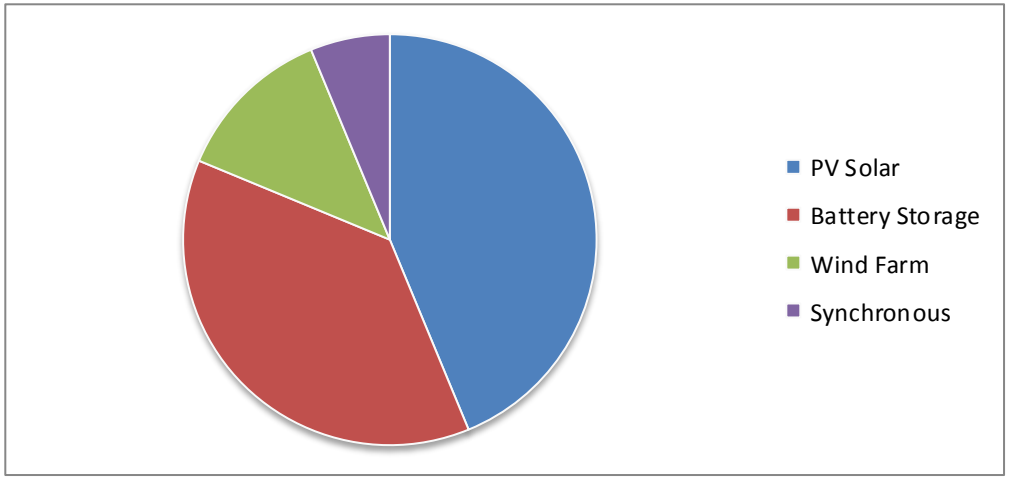



Heads of Terms (HoTs)

Technical Characteristics Submission Spreadsheet (TCSS)

# Update on Project Progress

- 13 submissions, representing 18 sites, from varying technology
- Confidence in reactive volumes at DER level of **79.3 MVar (lead)** and **69.3 MVar (lag)**




**We continue to welcome submissions of technical characteristics from sites within the trial region looking to participate in Power Potential**

# You Said…

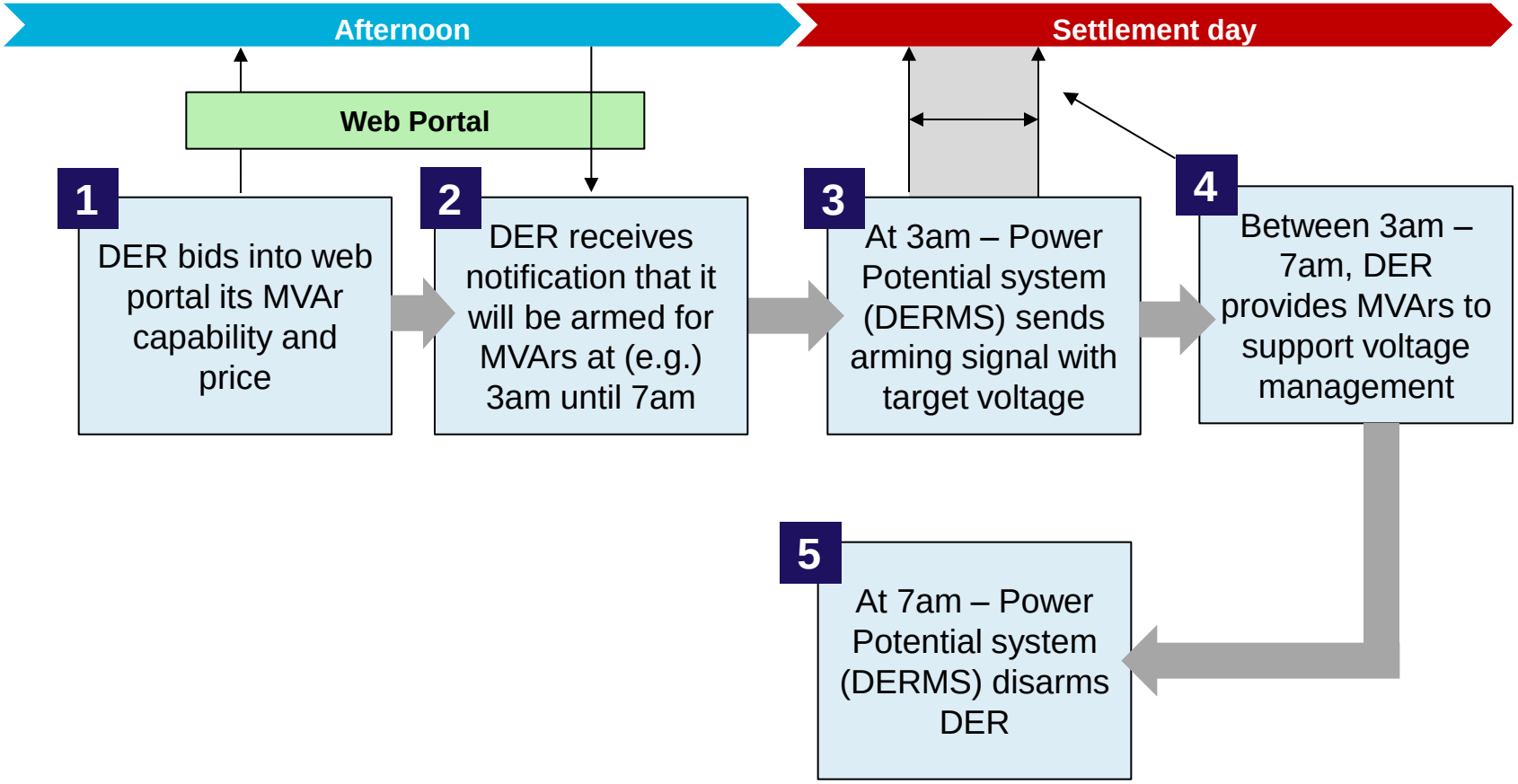
- “We welcome day ahead procurement”
- We need further clarity on **technical** aspects of the project:
  - Prequalification and testing requirements
  - Metering requirements
  - How often instructions will be sent?
- We need further clarity on **commercial** aspects of the project:
  - Interaction with the provision of other balancing services
  - Need to recover costs related to the participation – to avoid incurring losses in the trial

# Agenda

1. Introductions and objective
2. Update on project progress
3. Addressing technical queries
4. Addressing commercial queries
5. Next steps

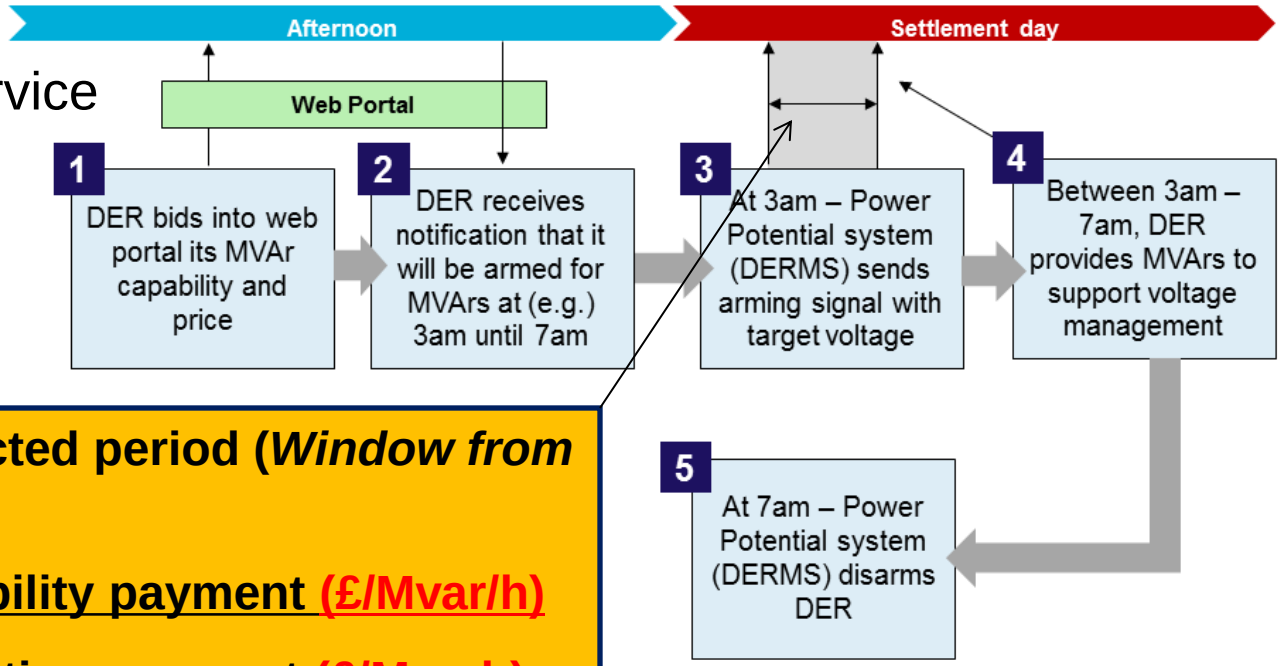
# Reactive Power: example

- Reactive Power service process:



# Reactive Power service: expected payments

- Reactive Power service process:




- **For the contracted period (*Window from 3 am to 7 am*):**
  - **Secured availability payment (£/Mvar/h)**
  - **Potential utilisation payment (£/Mvarh)**

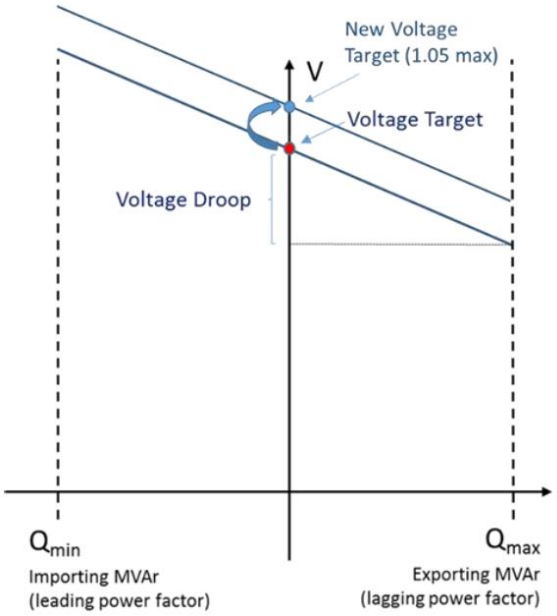
**Example:**

- Availability payment: 20 Mvar available for 4hr @£1/Mvar/hr = £80
- Utilisation payment: 5 Mvar used for 30 mins @£2/Mvarh = £5
- **Total payment:** 20*1*4 + 5*0.5*2 = £80 + £5 = **£85**

# Reactive Power service: DERMS instructions

- DERMS instruction to DER for availability:
  - DER armed in voltage droop control mode for the contracted window: *droop slope (4%) and voltage set-point.*
  - DER is kept operating at nominal level (DERMS adjust set-points if needed).

- DER Utilisation scenarios:
  - **NG instruction via DERMS:** *change in DER voltage set-point to achieve a NG request.*
  - **Dynamic response to system event:** *DER automatic response to voltage change followed by change in DER voltage set-point to maintain support.*



# Technical feedback from 1:1 meetings

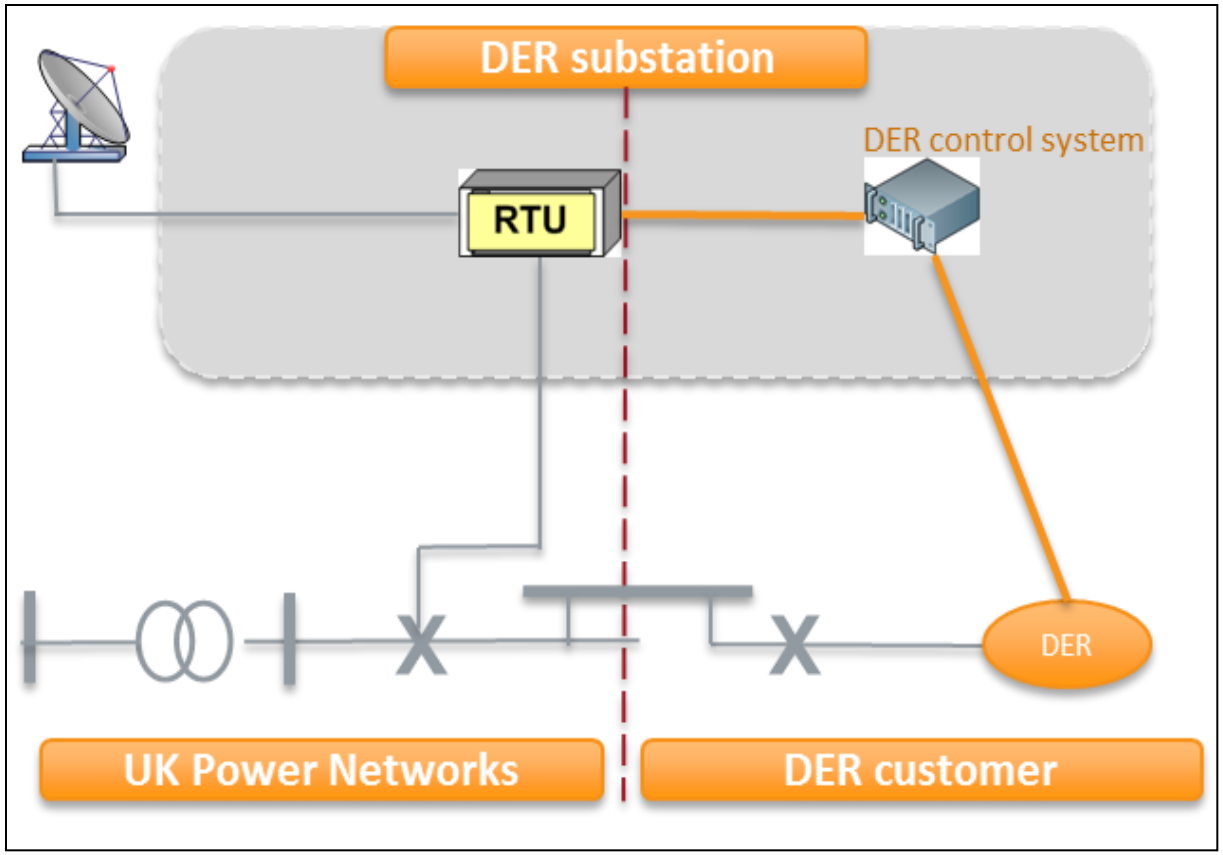
- UK Power Networks-DER interface
- Testing

# DER interface requirements specification

- Scope of document
  - **System architecture and responsibilities**
  - **Functional requirements**
    - E.g. active power and voltage set point
  - **Non-Functional requirements for DER substation interface**
    - E.g. interface to DER substation / communications protocol

We will publish this specification via our website after Easter

# Substation DER interface



# DER interface requirements and DER web-portal

| Question | Answer |
|---|---|
| **How will I be metered?** | UK Power Networks Remote Terminal Unit at the DER Point of Connection (POC) |
| **Who is paying for the RTU?** | Power Potential project covers costs such as Remote Terminal Unit (RTU) installation or upgrade |
| **Which communications protocol is used to communicate with the UK Power Networks RTU?** | **New installations:** DNP3 over TCP/IP.<br>**Existing installations:** Agreement for different approaches subject to approval. |
| **What type of cable is used to communicate with the RTU?** | CAT5e or optical fibre cable depending on the distance or cable routings. This falls under customer's responsibility. |
| **How can I enter my bids?** | Via web-portal (designed as webpage or mobile app) provided by the project. Internet connection is sufficient |
| **Does web-portal affect my control system?** | DER web-portal is not related to and does not affect DER control system. |

# Testing

- Testing will be carried out in the 2nd half of 2018 and take 2 -3 days.

- Dates will be agreed between UK Power Networks and the Customer to avoid/minimise disruption

- The tests will include, for example:
  - DER speed of response
  - Technical capability
  - Communications

We intend to publish our Testing Guidance Document over the next few weeks

# Agenda

1. Introductions and objective
2. Update on Project Progress
3. Addressing technical queries
4. Addressing commercial queries
5. Next steps

# Provision of multiple services

| Other service | Reactive Power (MVArs) | | Active Power (MWs) |
|---|---|---|---|
| **National Grid's Balancing Services (MWs)** | Provision of both Balancing Service and a reactive power service is possible, provided the performance of the existing Balancing Service is not compromised, e.g. by curtailing MW availability to provide MVArs | ▲ | Provision of both services **simultaneously** is **not** possible as the services would counteract each other. Conditional provision i.e. outside of any period where the plant is contracted to provide National Grid Balancing Services is possible. |
| | Can I Participate? | | |
| **Firm Frequency Response** | Yes | ▲ | Yes – Conditional outside of any period where the plant is contracted to provide FFR |
| **Short Term Operating Reserve** | Yes | ▲ | Yes – Conditional outside of any period where the plant is contracted to provide STOR |
| **Demand Turn Up** | Yes | ▲ | Yes – Conditional outside of any period where the plant is contracted to provide the DTU service |
| **Capacity Market Contract** | Yes | ▲ | Tbc – the service is not classed as a relevant balancing service and penalties could apply under CM rules |
| **Flexibility services to UKPN** | Yes – Conditional if Q reduces by change in active power | ▲ | Yes – Conditional if there is conflict of simultaneous signals regarding active power output |
| **Non-Firm Connections** | Non–firm embedded providers will be allowed to participate in the Power Potential trial. Under the active service the project is likely to be requesting a reduction in active power which is in line with services under ANM. | | |

# 2019 trials design

- The objectives of the Power Potential trials are to:
  - Demonstrate proof of concept
  - Establish the commercial viability of this approach
- Our principles are:
  1. **Market efficiency**
     i. Level of stimulus to DER – promote participation
     ii. Efficient allocation of budget & in line with project budget
  2. **Operational**
     i. Maintain system security by not utilising trial volume to secure system
     ii. Trials to follow operational profile requirements for reactive power
  3. **Continuous review of applicability to business as usual** – to provide projections for future use

# Designing trials for 2019: current thinking

A) Fixed fee for fixed number of hours

B) Price discovery

C) Transition to BAU

**Objective: Demonstrate proof of concept by:**

1) Simulating and measuring voltage response following a rapid change/drop of the voltage on transmission system
2) Measuring effectiveness of DER delivery at GSP

DER will receive a *fixed fee for a fixed number of hours* for this wave.

**Objective: Establish the commercial viability of this approach by:**

1) Fixing the number of hours we run daily auctions for
2) Applying learning from phase A by assessing bids in line with DER effectiveness

DER will compete with each other in day ahead auctions.

**Objective: Prepare DER to transition to current business as usual operations by:**

1) Fixing the number of hours we run daily auctions for
2) Applying a cap to the bids we accept in line with the mandatory price, with consideration of DER effectiveness

DER will compete with each other and the mandatory market in day ahead auctions.

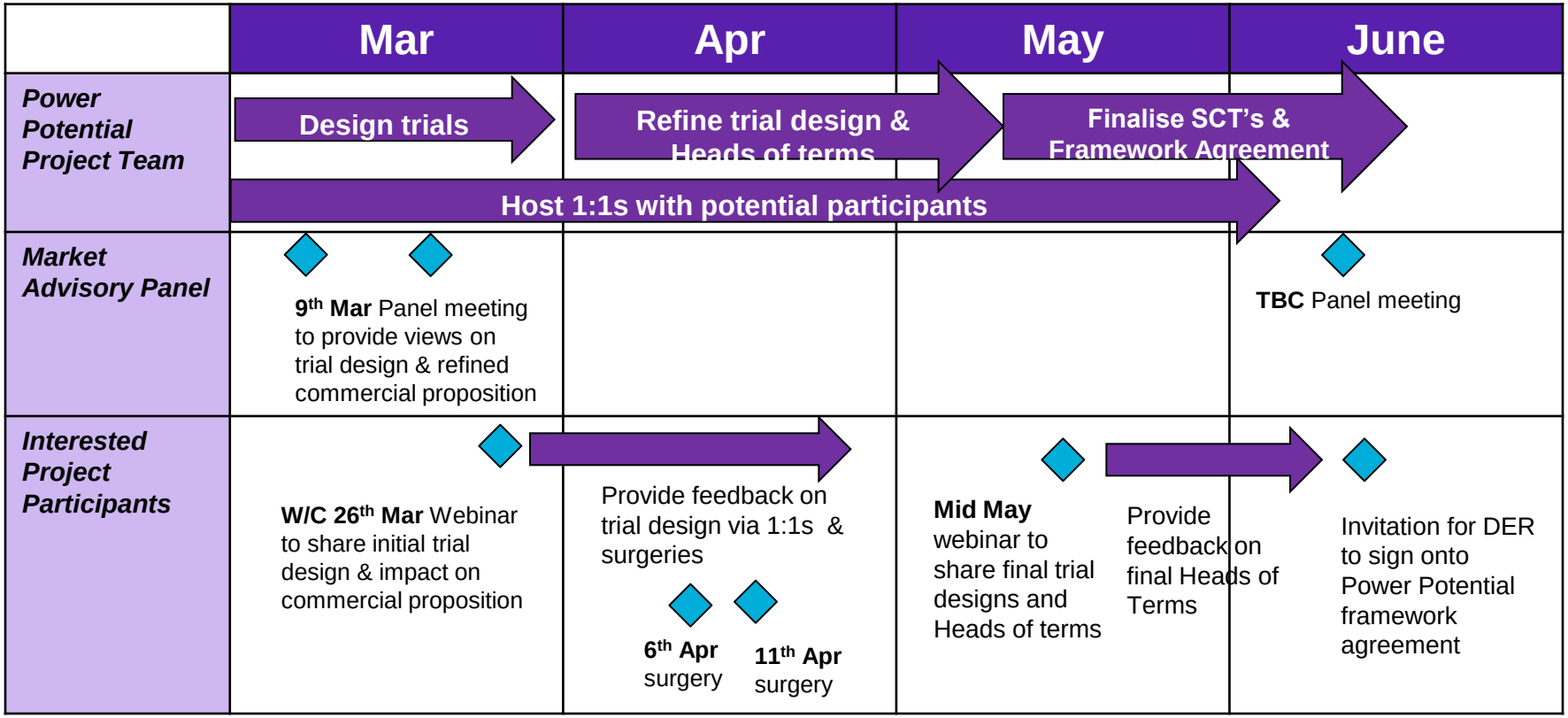
# Agenda

1. Introductions and objective
2. Update on Project Progress
3. Addressing technical queries
4. Addressing commercial queries
5. Next steps

# Ongoing work

- We continue to finalise several details and will share these with you as soon as possible. These include:
  - Power factor studies to investigate the potential for greater service delivery and the impact this might have on connection agreements
  - How to resolve any impact that delivering reactive power services may have on Distribution Use of System (DUoS) charges
  - DER interface requirements specification
  - Testing Guidance Document
  - Specific details on trials design (number of hours and fixed fees)

# Next Steps




Heads of Terms (HoTs)

Technical Characteristics Submission Spreadsheet (TCSS)

# Thank you for listening

**Box.powerpotential1@nationalgrid.com**

**www.nationalgrid.com/powerpotential**

# The project team

## National Grid

**Biljana Stojkovska**
Project Lead

**Kameesh Phillips**
Snr Commercial Analyst

**Amy Boast**
Commercial Lead

**Clare Maguire**
Communications Lead

**Inma Martínez Sanz**
Technical Delivery

## UK Power Networks

**Kellie Dillon**
Stakeholder Engagement

**Tatiana Ustinova**
Technical Delivery