

# Frequently Asked Questions (FAQ)

2<sup>nd</sup> Edition

## Introduction

On 30 October 2018, the Power Potential project hosted its first industry dissemination event. The team received a lot of questions throughout the day, which have been captured and answered in this document.

This document follows another FAQ document which can be found in the *Distributed Energy Resources Market Information* section on the project's [website](#). It includes all questions received to date at the time of publishing, and is split into technical, commercial and general questions.

For more information on this innovation project, please visit the website to review the requirements for participation and trial participation documentation.

## Technical questions

**How does Power Potential take into consideration inverter capabilities of a solar farm e.g. how do you make sure that the MW output of a provider is not impacted?**

In Power Potential's reactive power service, the expected reactive power will correspond to the active power output of the plant at the time. We are not encouraging reduction or curtailment of MW, and we are proposing a commercial framework for that. If the plant is operating at full output and the inverter is not designed to allow Mvar production, we are not expecting generators to reduce MW to generate Mvars. Power Potential will only change MW output if the provider has offered to participate in the active power service.

**Who will provide the Distributed Energy Resources Management System (DERMS) software? How come decentral service provision can't be facilitated by market participants e.g. aggregators?**

The DERMS developer is ZIV Automation. Service provision in Power Potential can be facilitated by aggregators who will need to interface with the DERMS. This central supervisory controller is needed (as opposed to a fully decentralised solution) to account for the distribution network status and to ensure no violation of any network constraint, while optimising the response that can be achieved at the Grid Supply Point (GSP) in a cost-effective manner. This is particularly important for reactive power services as they can significantly affect distribution network voltages that need to be monitored and controlled.

**How are you expecting to carry out the testing and integration of the presented control system?**

The testing of the DERMS and integration in UK Power Networks' systems will follow a sequential approach. It will start with the developer's internal testing of the DERMS's algorithms in a separate environment. This is followed by a series of staged acceptance and integration tests. This will conclude with an operational acceptance test in a live environment, after which National Grid Electricity System Operator (NG ESO) and UK Power Networks will sign off the solution. There will also be testing and commissioning of the integration of each DER controller with UK Power Networks' remote terminal unit (RTU), arranged with each participating DER, to allow each DER to interface with the Power Potential systems.

Is there any limitation in the number of System Operator (SO) instructions that DERMS can handle? What do instructions look like?

There are no limitations in the number of GSP instructions that the DERMS can handle. DER offer the service day-ahead before 1400 gate closure. Then during the service, instructions from a human operator in National Grid's control room will be processed after they are issued to DERMS, with DERMS recalculating around every 10 seconds. The DERMS is capable of handling simultaneous active and reactive power service instructions for a GSP too.

The messaging system and format of instructions between National Grid ESO's system and DERMS has been carefully defined. DERMS will then relay appropriate instructions to specific DER to deliver the overall service to National Grid e.g. voltage arming instructions and voltage set-points. Instructions to and from a DER controller are defined in the DER Interface Schedule on the project website. Information about the bids and acceptances will be visible to participating DER on their DERMS Web interface e.g. if their bid has been accepted.

Does the DERMS optimisation take account of the need for dynamic post-fault response, i.e. retain some headroom and legroom in the reactive range available?

Yes. The DERMS service calculation at the GSPs are based on the declared DER capabilities which quantify both lead and lag ranges (amongst other factors). The service is not singled out for lead or lag volumes, but for the whole reactive range. This is important in a dynamic voltage control service.

Could the commercial proposition reflect the DERMS's actual availability rather than the plant capability? Lead Lag Range does not reflect actual availability!

The commercial proposition for Power Potential is now final and was taken after extensive deliberation, considering that this is an innovation project, the need to accommodate providers with variable capability and encourage participation while not trying to favour any kind of technology. Considering this, availability payments will be based on the DER maximum reactive range capability. The validity of this payment approach is a learning that the project needs to produce.

With the G99 standard applicable from 27/4/2019, can the project team share their views on the lack of type tested equipment that can be installed after that time?

We acknowledge the existence of non-type tested equipment under G99. Regarding the implications for Power Potential, all DERs that would like to participate in the project trials will need to undergo a commissioning procedure to check that they can meet the project requirements. This provides some confidence in the DER performance and existing equipment.

## Commercial questions

For the 2nd/3rd project waves, how is auction transparency & competition with other reactive services going to be assured? With use of an independent platform?

We understand the need for transparency and are committed to meeting the market's expectations of this through publishing relevant market information such as successful bids and the associated sensitivity factor associated with that bid (subject to legal advice).

Has there been any thought as to what the next steps are if the trial is successful?

The project will explore what an enduring Power Potential solution might look like as part of delivering Successful Delivery Reward Criteria 9.6 in 2020. The lessons learnt from the Power Potential demonstration project will feed into the reactive power market improvement activity currently being undertaken by NG ESO (see our [Reactive Power Roadmap](#) for more details).

What is the success criteria needed from wave 2 to proceed with wave 3?

In Wave 3, the reactive power provided from Power Potential will be used to secure the system. This can only be done when there is full confidence in the service's ability to deliver the procured reactive power. Through all stages of the trials the intention is to ensure all market participants and interested stakeholders are kept informed using Market Information reports and published conclusions from each trial. The specific decision criteria will be published in 2019.

What are the specific reasons for cancelling / proceeding with wave 3?

As above

Will you continue into business as usual (BAU) as soon as the trial ends in this trial region, and under what commercial arrangements?

In the scope of the Power Potential project, we have planned a Wave 3; to transition to BAU. However, this does not mean that the project will continue after the trials as the learnings from the project will need to be evaluated before proceeding. The commercial arrangements in a potential BAU scenario will not necessarily be the same as the ones considered for the project.

How is Power Potential different from Power Responsive, which is another National Grid ESO project?

Power Responsive is a stakeholder-led programme, facilitated by National Grid ESO, to stimulate increased participation in the different forms of flexible technology such as Demand Side Response (DSR) and storage. It brings together industry and energy user, to work together in a co-ordinated way. A key priority is to grow participation in DSR, making it easier for industrial and commercial businesses to get involved and to realise the financial and carbon-cutting benefits. The Power Potential Project is somewhat supporting this objective, trialing the ability of distributed energy resources (DERs) to effectively participate in providing reactive support and creating a potential route to market.

How does Power Potential project interact with System, Needs and Product Strategy (SNAPS) work, looking to reform reactive power service for transmission connected resources?

The Power Potential project is supporting the SNAPS work by exploring the provision of reactive power services from DERs to complement the reactive capability provided by transmission connected assets. Through SNAPS and the Power Potential project, we are working closely with distribution networks to understand how to facilitate a joined up – whole system - approach to managing the network, ensuring parties at all levels of the system have the appropriate access and routes to market. The lessons learnt from the Power Potential demonstration project will feed into the reactive power market improvement activity currently being undertaken by the NG ESO (see our [Reactive Power Roadmap](#) for more details).

In New York, Reforming the Energy Vision (REV) is backed by a very comprehensive cost based analysis (CBA) to develop Distribution System Implementation Plans, should the UK follow this example?

A cost benefit analysis (CBA) was completed as part of the Power Potential submission for the Network Innovation Competition (NIC). The project, as part of its obligation under the NIC funding mechanism will work with Cambridge University to undertake a CBA to quantify the benefits of considering the contribution of DERs in supplying reactive power and voltage support in the South-East of England instead of the conventional approach. The results of the CBA will be shared with the industry at the end of the project in 2020.

What needs to change in regulations to unlock network assets to compete in markets equally with DERs?

Work is ongoing to review National Grid ESO's current services for procuring reactive power. For example, we are working with existing transmission connected assets to replace the existing Enhanced Reactive Power Service with a better functioning market for reactive power. We would like to be able to tailor our requirements area by area and procure from the most cost effective solutions in each area. We believe that in the medium term, this could spur new providers or help build the case for new asset based solutions. Power Potential is enabling DERs access to a regional reactive power market as part of the trial.

How many DERs are you currently confident will participate? What technology types are they?

As shared in our Power Potential Market Procedures Document, we have set ourselves a target to recruit at least 7 DERs to participate in the trial, with a minimum volume of 40 MVAr of reactive power across the four GSPs. Based on current engagement we are confident we will achieve this target, with participation expected from a range of technology types including wind, solar, battery & synchronous generation.

Any risk that Power Potential gets taken into Ofgem's charging review or access reforms?

Like all NIC projects, Power Potential enables evidence to be gathered that can inform the future direction of industry and identify barriers that need to be overcome as we de-carbonise the networks. Any learning that is relevant to industry reform will be fed into the relevant workstreams accordingly.

How will you address conflicts of services / can a DER have a Firm Frequency Response (FFR) contract and do Power Potential?

Where possible, we wish to encourage participants to offer the Power Potential service alongside existing balancing services. Reactive power provision under Power Potential can be provided in conjunction with a Balancing service such as FFR. However active power provision under Power Potential cannot be offered if a provider is contracted to provide an active power balancing service such as short term operating reserve (STOR) or firm frequency response as this would negate the curtailment action needs of the Power Potential service.

For further information see clause 18 of the [DER Framework Agreement](#) on 'other services'.

### What is the role of distribution active network management in the enhancing of the market solution?

Distribution Active Network Management (ANM) is responsible for managing distribution network constraints. Traditionally, the networks have been managed with a 'fit and forget' approach with unutilised capacity locked in the network. ANM enables the latent capacity to be unlocked using 'fit and flex' approach and ensures the integrity and security of supply enabling the new market services to be implemented. The Power Potential DERMS is not being used to manage constraints on the distribution network, so is not an ANM system as defined above – it will offer services to transmission based on checking that the network is secure before offering a service. In future, the DERMS is likely to work in conjunction with an ANM system which takes any required action to secure the distribution network before offering service to transmission.

### What is the role of distribution active network management across the world? What would be the most applicable to Power Potential and which elements would be useful?

Power Potential's DERMS is a real-time monitoring and control system and in that sense, it's like existing active network management (ANM) schemes. However, it is not an ANM scheme per-se as it will not curtail DER's generation. It is expected that the DERMS will work in parallel with the ANM system currently designed to manage distribution constraints in the South East by exchanging signals to avoid conflicts.

### Is the DSO model necessary for this to work? Can an aggregator not offer the TSO these services directly?

Technically, it is important that the impacts of this service are understood by the DNO so as not to violate any constraints on their network. Commercially, the project is trialing a back to back contracting approach however NGENO are committed to keeping all routes to market open including an aggregator offering these services directly.

### Is provision of reactive power service compatible with other ancillary service provision or are they mutually exclusive?

Where possible, we encourage participants to offer the Power Potential service alongside existing balancing services. Reactive power provision under Power Potential can be provided in conjunction with a balancing service if the existing balancing service is not compromised. However active power provision under Power Potential cannot be offered if a provider is contracted to provide an active power balancing service, such as STOR or FFR, as this would negate the curtailment action needs of the Power Potential service.

### How do you understand the trade-off between transmission investment and distribution services provided to the transmission system? Isn't the Transmission System Operator (TSO) wanting T investment?

The cost benefit analysis for the project addresses this by considering the Power Potential solution against the counterfactual of transmission asset investments. As National Grid ESO, we are committed to creating value for consumers through efficient network planning; our [Network Development Roadmap](#) published in early 2018 sets out our commitment to doing this and our ambition to invite commercial solutions as well as network solutions to our long term network needs.



Has the model been explored where a generator scheme is remunerated when it is curtailed (for example as FDG), but it provides Reactive Power services for free?

A key principle of Power Potential is not to curtail active power output in order to access reactive power as this is a costlier solution that would not be a competitive alternative to a transmission asset solution (which is the counterfactual for the project).

### General questions

When will you roll this out across GB?

First, the project need to demonstrate the validity of the technical and commercial solution before this concept can be rolled out across Great Britain. The learnings from the project trials will inform this decision. The possible roll out will not be a 'copy-paste' procedure, as different parts of the network may have different characteristics that will need to be considered.

Will you continue into business as usual (BAU) as soon as the trial ends in this trial region, and under what commercial arrangements?

In the scope of the Power Potential project, we have planned a Wave 3; to transition to BAU. However, this does not mean that the project will continue after the trials as the learnings from the project will need to be evaluated before proceeding. The commercial arrangements in a potential BAU scenario will not necessarily be the same as the ones considered for the project.

Does National Grid ESO have a preferred world?

We see a future where the ESO works with DSOs to facilitate flexibility markets.

At this stage of the project, if each of you could share your top lesson you have learnt, and what would you do differently if you knew what you know now?

From the beginning, we would define a minimum valuable product (MVP) solution that delivers the project objectives (vs. nice to have options) and try to avoid complexities and potential delays by sticking to this.

What are the secrets of a good working environment in a project team - where two businesses are involved and having to deliver a defined set of deliverables?

Collaboration and constant communication between both businesses is key. Listening and understanding the views of our companies, with different philosophies and cultures, is crucial. Ultimately, we have a keep us motivated when working together.

How do you ensure customers are at the centre of the project outcomes?

We do value this aspect significantly and we have extensively consulted with potential DER participants to shape the Power Potential commercial proposition, inputting their feedback into the final structure. The project has also established a Regional Market Advisory Panel to ensure a range of views across industry are put forward to shape the decisions taken during the project to ensure we maximize learning for the future. Simultaneously, the project is expected to bring benefits to end consumers by generating additional network capacity and reducing operational costs. This has always been a key driver for the project.

### What are Ofgem's views on this project and what effects could this project have on consumers?

Feedback provided by Ofgem so far in our SDRC deliverables and from our dissemination events has been very positive. The project bid was successful in obtaining Network Innovation Competition (NIC) funding as the value of this innovation project to end consumers was clear.

### Why was this area of the network been chosen for trials, what was the process?

The South-East region of the transmission network has been chosen as it is an area which is notably congested and would benefit from increased flexibility from embedded assets. This location has been experiencing a high penetration of distributed energy resources (DERs) and is also highly interconnected to Europe. These challenging conditions are causing voltage and thermal constraints, making this area of the network difficult to operate. Through Power Potential, DERs will be able to provide active power services and/or reactive power services to the ESO, relieving these constraints. These are the main reasons behind making this area of the network the trial zone for Power Potential.

### Could Power Potential improve the existing heat maps?

Heat-maps have been produced to provide quick visual guidance on the effectiveness of certain areas with respect to each grid supply point (GSP). We are not expecting to release new heatmaps but we will work on the image resolution of the existing ones. Effectiveness of each DER has been communicated to each participant individually.

### Why has Ofgem allowed the network options assessment (NOA) process to become a closed shop for the networks and exclude non-network solutions?

[NOA](#) is now exploring non-network solutions for future assessments.

**End**

If you have any other questions that haven't been included in this document, email:  
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