Mersey Long Term RFI Interactive Guidance Document

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Version Control

Version	Date published	Page No.	Comments
1.0	29/03/2019		
1.1	01/04/2019	36	Link to proforma fixed.

How to use this guide

- This document aims to provide current and potential Reactive Power providers with clear, simple and transparent guidance on the service. It pulls together FAQs on the service and provides links to related documents, such as testing guidance and Market Information Reports.
- A menu button on each page allows access back to the main menu, or section menu where required:

 Return to main menu  Return to section 3.2

A toolbar runs along the bottom of every page, allowing for quick navigation to section menus. Coloured icons allow navigation to relevant sections of the document.

1. Market information	2. Reactive overview	3. Requirements	4. Assessment principles	5. Contract Options	6. How to participate

- Sections of the guidance are colour-coded, for ease of use.

- Please contact box.networkdevelopment.roadmap@nationalgrid.com if you have any questions or feedback.

Note: icons on this page are for illustration only - links do not work.

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Main Menu

1. Market information

2. Reactive overview

3. Requirements

4. Assessment principles

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6. How to participate

Key Documents

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1. Context and Market Information

1.1 Context

1.2 Wider Activities Impacting Reactive Power

1.3 How information will be used

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1.1 Context

Why are we doing this?

- We have been running a case study through the ENA Open Networks project to expand the Network Options Assessment (NOA) approach to consider transmission voltage needs and assess options to meet those needs.
- We are focusing on system needs to control high voltage as we have seen an increasing need to absorb MVArs in recent years resulting in increased costs to voltage management overall.
- This Request for Information (RFI) is the next step in expanding the process for voltage solutions to include the assessment of market-based options against Network Owner options.
- The outcome of the expanded process will be a recommendation of the most economic and efficient whole system solution which should be taken forward.
- The recommended solution could consist of only market-based options, only Network Owner options or a mix of market-based and Network Owner options.
- For the avoidance of doubt, an outcome could be that we accept no market tender and/or no Network Owner options if none of the options considered in the process provides benefits against forecast Balancing Mechanism (BM) cost to control high voltage.

1.1 Context

Aims

We would like to understand through this RFI:

- The ability of the market to provide alternative options to Network Owner options to meet the identified Reactive Power needs to control high voltage
- The level of interest to provide a Reactive Power service to meet the identified long-term needs
- The likelihood of achieving a more economic and efficient overall solution by considering a wider range of options
- The delivery timescale of market-based options
- The Potential framework restrictions

We would also like to seek feedback on:

- Assessment criteria and principles
- Contract options

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1.2. Wider Activities Impacting Reactive Power

There are a significant number of activities on-going to review the Reactive Power ancillary service. This is part of the Electricity System Operator's review of Balancing Services, aiming to create balancing service markets that meet our changing system needs.

The Product Roadmap for Reactive Power provides detailed information on the developments within the ancillary service. Developments that directly impact this RFI are:

- Product Roadmap for Reactive Power
- Applying a 'Network Options Assessment' to Voltage
- Power Potential
- Increased transparency within MBSS
- Proposed CUSC modifications to remove/enhance ERPS
- Short Term Tender for Mersey

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1.3. How information will be used

We will use the information received to inform our decision on next steps, which include:

- Decision to tender
- Assessment criteria and principles
- Contract options and structures

We will publish an anonymised summary of the findings of the RFI and our decision on next steps by 30 June 2019. At this stage, no commercially sensitive information will be published.

For information on our planned activities / key dates related to this RFI, please refer to the Timeline.

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2. Reactive overview

2.1. Voltage and Reactive Power

System Operator Obligation	■ The ESO has a statutory obligation to maintain the National Electricity Transmission System (NETS) voltages within limits. This obligation also applies to voltage step change limits. These limits are defined within the NETS SQSS.
System Voltage	■ System voltage is continuously changing and is variable across the system. ■ Voltage is a localised property of the system. ■ There are differing requirements across areas of the system due to this variability. ■ System voltage is managed by a combination of installed network assets (e.g. capacitors and reactors) and through the use of generation with reactive capability.
Reactive Power	■ The ESO maintains the voltages by managing the Reactive Power flows across the system. ■ Voltage constraint contracts have been historically used to procure additional reactive capability paid at ORPS rate. ■ Voltage constraints are locational and as such assets have different effectiveness i.e. different ability to resolve the operational challenges depending on the point of connection.

2.2. Network Assets for Voltage Management

General	■ Voltage can be managed through the use of reactive assets, such as shunt reactors, capacitors and SVCs. ■ Assets are purposefully built in areas identified to be difficult for voltage management to ensure they are most effective. ■ These assets are typically owned by Transmission Owners. ■ Options implemented by Transmission Owners are being considered as part of this process.
Capital Cost	■ The installation of a regulated asset – such as reactor – is typically paid for through TNUoS. ■ These assets have an agreed rate of return defined by Ofgem. ■ Transmission Owners submit the capital cost for regulated asset in spend profile.
Operational Cost	■ Maintenance costs form part of the TO regulatory framework agreement. ■ There is no direct utilisation cost associated with using a regulated asset.

2.3. Voltage Constraint Services

General	■ In addition to network assets, the Electricity System Operator also uses the reactive capability provided by generators connected to the networks for voltage management. ■ Services have typically been limited to BM providers. ■ Dispatch of Reactive Power completed through electronic instruction. ■ Instruction is either via Reactive Power or Voltage Set point instruction.
Availability	■ A large portion of Reactive Power requirements have been procured through purchasing Active Power. This has been facilitated through Voltage Constraint contracts, Trading and BM Actions. ■ Constraint Management contracts, such as the Optional Voltage Contracts have achieved this. ■ Availability reported through 'Constraint' part of MBSS.
Utilisation	■ After the reactive capability has been procured – through Active Power payments - Reactive Power dispatch is paid at ORPS rate as outlined in the CUSC. ■ Reactive Utilisation is reported through 'Reactive' part of the MBSS.

Key documents for more information

2.4. New Reactive Power Services

Availability	■ Availability payment for reactive capability ■ Procure only Reactive Power – providers are expected to manage any Active Power actions required to achieve the Reactive Power output required.
Utilisation	■ Reactive Power to be dispatched as required and paid as per contract structure (see section 5) ■ The service is to manage Voltage in the Mersey, so only actions that will impact this area would be considered.
Providers	■ The service is open to any providers who can meet the requirements (see section 3) ■ Providers can offer other balancing services in conjunction with Reactive Power services, as long as this does not impact the reactive range tendered. However, the benefits of the additional services provided will not be considered as part of this tender. ■ There must be a single point of dispatch or a method by which the total output of the combined services can be monitored to demonstrate that it is available.

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3. Requirements

3.1 Market Information

3.2 Location Requirement

3.3 Technical Requirements

3.1 Market information for 2021 to 2031

Information is being sought on the potential of service provision from 2021/22 financial year onwards. This information will be compared with potential Network Owner options as part of a NOA-style assessment to establish the most economic and efficient solution to meet control requirements for high voltages.

Long-term requirement is sensitive to uncertainty over future assumptions. Based on the high voltage analysis we have carried out, at this point in time we will consider procurement for the following Reactive Power capabilities:

- Procurement options will be considered for a maximum of 10 years between 2021/22 and 2030/31.
- We would require availability year-round between 28 March 2021 and 30 March 2031; Actual utilisation will vary across the times of day and year and will depend on system conditions.
- Reactive Power (lead) requirement of up to 200MVAr. This is the requirement post the application of any effectiveness assessment and as such this may lead to procurement of volume in excess of 200MVAr.
- The reactive requirement is measured from selective sites in the transmission system, and volumes depend on the exact location of the reactive capability required.

The above information refers to the procurement options we will consider at this stage, having considered the uncertainty associated with long-term requirements of the system. This does not necessarily represent the full reactive requirement of the system in this region.

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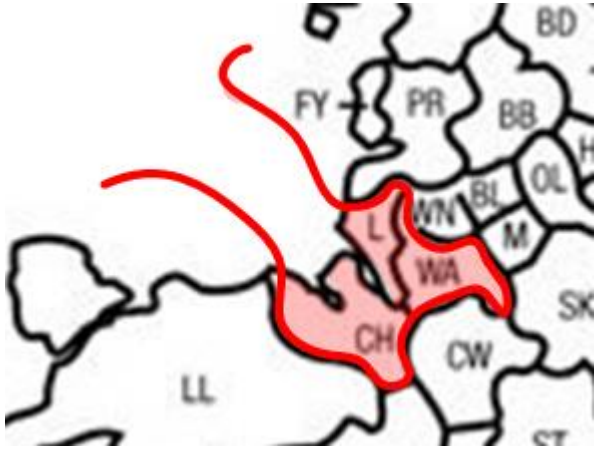
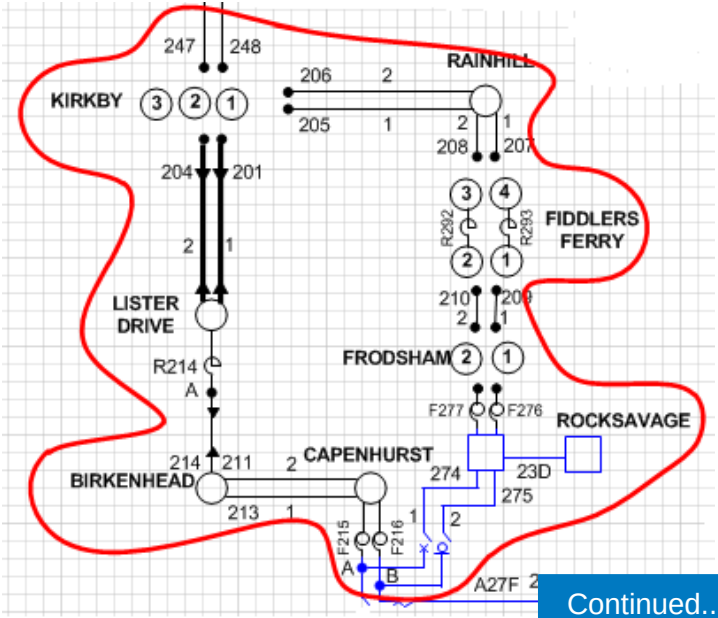
3.2. Technical requirements - Location

Prospective Reactive Providers must be within the red boundary:





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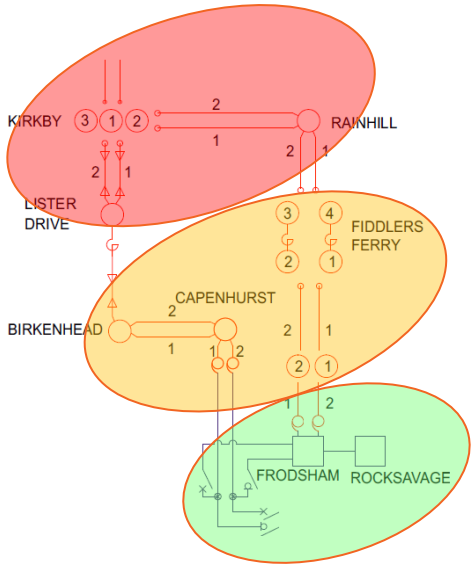
3.2. Technical requirements - Location

Indicative Site Effectiveness

Least Effective



Most Effective

Typical Effectiveness at various voltage levels*

Least Effective — Most Effective

33 kV
66 kV

132 kV
275 kV
400 kV

* Actual effectiveness depends on site by site assessment

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3.3. Technical Requirements

Prospective Reactive Providers must meet the following technical requirements:

Minimum size	• Minimum Reactive Power absorption is 15MVAr and connected at 33kV or above. This can be from a single unit or aggregated from several smaller units which are all within the highlighted boundary.
Maximum size	• Maximum size of a solution is restricted by the voltage step change limits defined by NETS SQSS. The exact size restriction will depend on the point of connection and will form part of the assessment.
Dispatch	• There must be a single point of dispatch. • Depending on the technologies of the providers, it must be possible to respond to dispatch request on instruction and it would be expected to reach a target MVAr level within two minutes. • Dispatch should be achieved through NGESO computer systems. • Providers must have capability of receiving instructions 24/7 for the duration of the contract period.
Location	• All providers must be within the location described in slide 19. Where providers are connected at distribution level, you may wish to confirm where you are connected on the transmission network. • Where postcode and technical drawings differ the technical diagram is seen as the authority.

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4. Assessment Criteria and Principles

4.1 General Assessment Information

4.2 Proposed Reactive Tender Assessment Process

4.3 Feedback

4.1. General Assessment Information

The criteria for selection include but are not limited to:

- The proposed service must meet the minimum requirements
- Provider effectiveness
- Earliest in Service Date (EISD)
- Cost
- Flexibility to accept contract for only part of the reactive power capability available
- Active Power Range – if applicable, the ESO prefers a lower minimum Active Power level to deliver the reactive range.

All commercial options that meet the requirements will be assessed against the alternative Network Owner options. This will be done by a cost-effectiveness comparison.

4.2. Proposed Reactive Tender Assessment Process

Step 1: Ensure tender compliance

All submissions will be assessed against the requirements. Any submissions which do not meet these requirements will not be progressed further in the assessment.

Step 2: Effectiveness Assessment

The first step in the assessment process is to establish through system studies the effectiveness of each option. The effectiveness of options will impact the total volume of Reactive Power procured. Options in different locations, connected at different voltage levels have different impacts on the transmission system voltage. Therefore an effectiveness factor needs to be established for each option. If an option is not effective, it will not be considered for further assessment. Using the effectiveness factor, the effective MVAr provided by each option will be calculated.

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4.2. Proposed Reactive Tender Assessment Process

Step 3: Cost Assessment – Comparison against other options

All tenders are compared against the BM counterfactuals and TO options (i.e. transmission asset build).

The assessment team considers how much it would cost to procure the equivalent of the tender reactive capabilities in the Balancing Mechanism (BM), allowing for cost variabilities in the BM. The BM cost considered comprises two parts 1.) forecast constraint which is consistent with the NOA Methodology and 2.) estimated utilisation which is informed by our analysis and assumed to be paid at ORPS rate.

The assessment includes consideration of how often and how the market may deliver the reactive power capabilities without intervention from the Electricity System Operator.

The team also considers how much it will cost to provide the equivalent capabilities by commissioning new network asset(s) on the transmission network by Transmission Owner (TO options).

The benefits that each solution provides will by discounted at the social time preference rate as laid out in the Treasury Green Book.

Continued...

4.2. Proposed Reactive Tender Assessment Process

Step 3 (cont'd): Cost Assessment – Comparison against other options

Options are compared by their cost per effective MVAr in each year in the tender period.

$$Present\ Value\ Cost\ per\ eff.MVAr = PV\ Capital\ Cost\ per\ eff.MVAr + PV\ Operational\ Cost\ per\ eff.MVAr$$

For TO Network Options:

- Capital Cost is captured in the spend profile and the relevant weighted average cost of capital (WACC) is applied.
- Operational Cost includes any maintenance, system access and other relevant on-going costs.

For Tender Options:

- Capital Cost is the cost of connecting any new asset (if applicable) to the electricity (transmission or distribution) system.
- Operational Cost includes the availability and utilisation payment for procuring an option to provide the contracted Reactive Power service.

Continued...

4.2. Proposed Reactive Tender Assessment Process

Step 4: Selection to meet voltage control requirements

Once all the cost per effective MVAr per year are calculated, the overall most economic and efficient solution (or combination of options) over the entire tender period will be considered for acceptance.

A provider may submit an optimal bid in one year, but this does not guarantee the bid will be optimal in subsequent years if lower cost options are available.

Consideration will be given to options which are flexible to accept a contract for only part of their reactive capability to achieve lower overall cost for voltage control by avoiding over-procurement of services.

Additional factors will be considered when options present similar benefits, such as:

- Consideration weighting will be given to options that result in reactive capability being delivered from multiple reactive power sources.
- Where the provision of Reactive Power also comes with Active Power, consideration will be made as to whether this may result in the need to take any further balancing actions.

4.3. Feedback on Assessment Principles

We would like to seek feedback on:

- Proposed assessment criteria and principles

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5. Contract Options

5.1 Contract Option 1

5.2 Contract Option 2

5.3 Feedback

5.1. Contract Option 1

Payment Structure	■ Provider expected reactive capability to be available for every period for the duration of the contract with the exception of technical outages ■ Provider Paid a fixed fee for periods of availability ■ Utilisation paid at ORPS or equivalent rate
Contract Structure	■ Availability payment is a £/h against an agreed Reactive volume for periods of availability ■ Utilisation paid at ORPS or equivalent rate ■ For sites with multiple generators units reactive range can be delivered from any unit, as long as the contracted reactive range is maintained ■ Reactive Range must always be delivered from the agreed contract location
Feedback On	■ Preferred duration of contract, e.g. 1 year, 2 years, 5 years, etc. ■ Restrictions on use, e.g. available 24/7, only overnight, etc. ■ Fixed availability payments for different seasons, e.g. summer and winter

5.2. Contract Option 2

Payment Structure	■ Provider expected reactive capability to be available for every period for the duration of the contract with the exception of technical outages ■ Provider paid a fixed amount for the availability – that is a single payment to include both the availability and utilisation of MVAr for the whole period
Contract Structure	■ Availability is a £/h against an agreed reactive volume regardless of how often and how much Reactive Power is provided (within contract limits) ■ There is no payment for utilisation ■ For sites with multiple generators units reactive range can be delivered from any unit, as long as the contracted reactive range is maintained ■ Reactive range must always be delivered from the agreed contract location
Feedback On	■ Preferred duration of contract, e.g. 1 year, 2 years, 5 years, etc. ■ Restrictions on use, e.g. available 24/7, only overnight, etc. ■ Fixed availability payments for different seasons, e.g. summer and winter

5.3. Feedback on Contract Options

We would like to seek feedback on:

- Preferred duration of contract
- Utilisation payment at ORPS rate
- Restrictions on use
- Other contract options – please let us know if there are any other contract options that you would consider

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6. How to Participate

6.1 Timeline

6.2 How to submit information

6.1. Timeline

Mersey Long Term RFI related activities timeline

- 29 March 2019 – Mersey Long Term RFI published
- 1 May 2019 – Webinar
  - We will host a webinar between 10:00 – 12:00 to answer your questions. Please email us to register if you are interested to join the webinar.
- 24 May 2019 – Deadline to submit information for Mersey Long Term RFI
- By 30 June 2019 – Decision on next steps (including decision to tender) published

6.2. How to submit information

Provider of Reactive Power in the Mersey for 2021 onwards

Interested Reactive Power providers are requested to submit information with an outline of their capability to provide a reactive power service including but not limited to:

- Technical description of the assets
- Reactive Range
- Control mode, if applicable
- Active Power Range required to deliver Reactive Range, if applicable
- Dispatch mechanism
- Date from which reactive range is valid
- Location of asset and connection point
- Contract Option preferred
- Duration of Contract preferred
- Any other relevant information

We kindly request indicative costs. This is optional.

We would also like to seek feedback on the Assessment Criteria and Principles and Contract Options.

Continued...

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6.2. How to submit information

Please use the below proforma when responding to the RFI.

Mersey Proforma

The deadline for submission of information is 24 May 2019.

NGESO will consider the submissions and publish the decision on next steps by 30 June 2019 with the decision to either tender or review alternative procurement options. The decision to tender will be announced ahead of any tender window opening.

Please send your responses via email to box.networkdevelopment.roadmap@nationalgrid.com by 24 May 2019.

If you have any questions please contact Hannah-Kirk Wilson (07500 779216), Djaved Rostom (07815 548097) or email to box.networkdevelopment.roadmap@nationalgrid.com.

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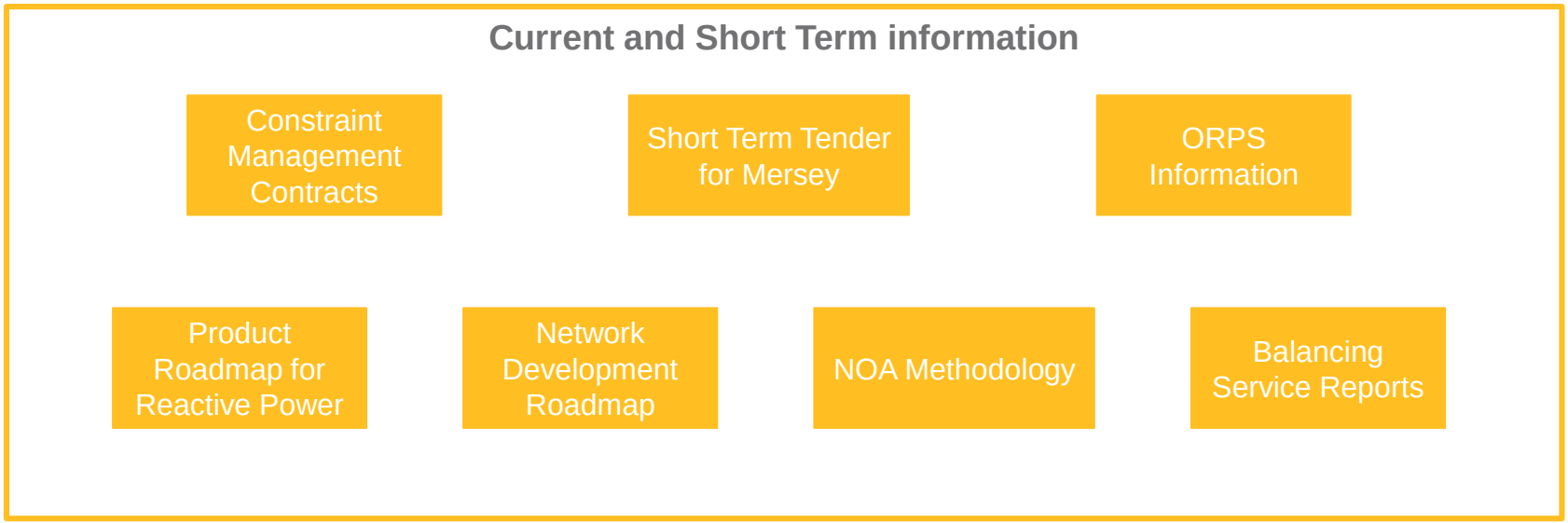
Key documents



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