

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#1</b>	<b>Pro forma section</b>	<b>3</b>
<b>Question date</b>	<b>24/08/21</b>	<b>Answer date</b>	<b>26/08/21</b>
<b>Question summary</b>	<b>How long will the live network trial last please? – is it all of the period 01/05/25 until 30/06/26?</b>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

We will run a live network trial for a 13 month period from May 2025 to June 2026.

Though the overarching structure and objectives of the market will be implemented into the trial platform ahead of trading on the live network, we will be making incremental changes to the trial platform during the trial, in response to feedback we receive from the users interacting with it. Examples of potential changes include timeframes of instructions, visibility of data feeds, and removing friction in the sign up and integration experience. Adopting this approach provides a user-led design process, which we deem vital for the success of a bilateral trading market that is DSO-facilitated but not DSO-led. Moreover, we do not expect users to be ready to provide much of the detail of this feedback ahead of real-life interaction.

In the early stage of the live network trial, we expect the types of participants ready to engage will be 'early adopters' and therefore more technology-oriented, and likely to provide different

types of feedback and requirements as compared to the medium and later stage participants. It is necessary to allow for sufficient time in the live network trial for these medium and later stage participants to become proficient with the market and the technology.

Based on the published learnings from other network and curtailment trials (e.g. Energy Exchange, TraDER) we expect many of the potential participants will not join the live trials on day one. Unlike the early adopters, these participants will wait for news and feedback on the value and experiences of others. Therefore, by extending the trial over 13 months as planned, we expect to receive more valuable feedback from different categories of participant.

Finally, by running the live network trial over this period we have a much greater opportunity for necessary network constraints to manifest, particularly those associated with summer minimums and winter peaks.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#2</b>	<b>Pro forma section</b>	<b>4</b>
<b>Question date</b>	<b>26/08/21</b>	<b>Answer date</b>	<b>31/08/21</b>
<b>Question summary</b>	<p><b>Is the focus on curtailment or constraining off to relieve network constraints rather than overall saturation (which is a system-wide phenomenon)? Presumably at grid-level, connection agreements specify how constraining off generators will be paid (lost profit). Is that not the case on DNs?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Our Active Network Management (ANM) system manages network constraints. In addition to using inherent flexibility in the network, ANM uses the curtailment stack to determine the order in which generation output or demand consumed by flexible resources inside the constraint are to be curtailed in situations where the network capacity is considered insufficient to meet the demand.

BiTraDER will develop a market to allow flexible resources to trade their position in the curtailment stack, thereby optimising the stack and providing additional value to participants.

Our connection agreements specify the payment arrangements for flexible services which include an availability fee and a utilisation fee. We understand that trading of a curtailment obligation will have an impact on existing contractual obligations and, as such, we have included costs for legal support to amend, or create, the necessary agreements to facilitate the market.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#3</b>	<b>Pro forma section</b>	<b>4</b>
<b>Question date</b>	<b>26/08/21</b>	<b>Answer date</b>	<b>31/08/21</b>
<b>Question summary</b>	<p><b>Can you clarify what needs to be added to the existing ElectronConnect market platform to deliver the required services? How different are the proposed platform and ElectronConnect? Are there no other commercial providers of such platforms with the required capability if ElectronConnect is incomplete in this regard? If not, is there a potential market for developing and proving one and if so who collects the subsequent profits from the IP?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

To ensure value for money and avoid unnecessary duplication, we are seeking to implement the BiTraDER market rules into an existing energy trading product. We have chosen Electron because their product (ElectronConnect) is highly customisable and therefore ideally suited for use on the project.

We took this approach because:

- BiTraDER represents an innovative approach to trading and therefore the platform is likely to require development and subsequent configuration during the course of the project.
- We want to leverage existing energy trading products by incorporating BiTraDER within a platform proven elsewhere.
- ElectronConnect is a highly flexible trading platform that allows for less constraint in market design and scope.
- As demonstrated through its use on the SSE TraDER project, ElectronConnect was designed to enable the independent operations of many markets simultaneously – for example, to build multiple geographic and voltage stacks or align with ESO procured markets – and this functionality will prove invaluable for BiTraDER.

Within the scope of the BiTraDER project, the modifications to the ElectronConnect platform will focus mainly on the specifics of the market rules, which are still to be defined, and how they will be applied in the new market we are developing.

ElectronConnect is a comprehensive platform which has been proven on other related projects. Throughout development of the bid, Electron, as a partner, has demonstrated willingness to work with us on adapting the ElectronConnect platform to incorporate the requirements of the BiTraDER project. This gives us confidence that we have selected the correct partner, which is ideally suited to delivering the required capability, and therefore represents value for money.

The BiTraDER project, including the development of the market in ElectronConnect, fully complies with the default IPR arrangements. Our partner, Electron, fully understands the NIC project context in the industry and recognises the importance of maximising the potential re-use of the IPR created. All partner contracts will include the standard NIC default IPR clause.

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#4</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>What impact, if any, does Ofgem’s proposed reforms through the Access and Forward-Looking Charging Review have on this project?</b>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

As Ofgem has only recently published its Minded to Position (MtP) for the Access & Forward Looking Charges (A&FLC) Significant Code Review (SCR), which is a consultation, it is currently difficult to determine the impact on BiTraDER. It will only be possible to determine the impact, if any, on the BiTraDER project when we know the Ofgem decision in full, including the extent of changes to Distribution use of System (DuoS) charges.

In order to help frame an answer, if the MtP proposals on the change in connection boundary were implemented, this would affect aspects of the BiTraDER business case. More notably, the appetite of new customers to accept flexible connections might be influenced more by the proposed access reforms than by their ability to trade curtailment obligations bilaterally with other customers. The precise effects are difficult to estimate without further information on Ofgem's proposals for implementation of the reforms, how customer behaviours might be influenced by the reforms, and how the reforms might affect extant contracts.

Alongside other regulatory considerations, the impact of the A&FLC SCR decision will be considered as part of the regulatory assessments we will perform during delivery of the project.

Bilateral trading continues to be part of the Open Networks forward workplan even with the charging review taking place. Our discussions with representatives of the Open Networks confirmed that bilateral trading will remain part of the workplan and this is confirmed in the supporting letter from ENA included in Appendix H (page 88).



**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#5</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
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**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#6</b>	<b>Pro forma section</b>	<b>8</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>P42 On the customer engagement is this envisaged as being primarily generation assets or demand?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Our learning from previous projects has demonstrated that demand customers can be difficult to recruit, owing in part to their concerns about the risks associated with the trials and the limits on financial incentives available. However, BiTraDER offers potential for demand customers to trade their curtailment obligations on an ad-hoc basis, for example during times where they have no requirement for their allocated connection capacity. We believe the opportunity presented by this temporary route for offering flexibility services will be particularly attractive to these customers who might otherwise be concerned about long term obligations. Given this, our customer engagement has not been designed to engage primarily with one or the other, and we will endeavour to engage with all types of flexible resources and connections through our customer research on BiTraDER.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#7</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>For the cost per participant quoted on p57, is that charged to participants or born by the network? If the former what assessments have been done as to whether this remains an attractive proposition for customers?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

To present a mature assessment of the BiTraDER business case we chose to include for operating costs of the market. Whilst the precise costs and methods by which those costs will be paid is a matter for assessment during the Project, we chose to assume that these would sit with the participants.

Therefore, the cost per participant outlined on p57 of [REDACTED] is assumed to be a "membership" fee that will be paid by the participants for use of the platform.

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#8</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>Please provide more detail on how you will test with Open Networks the assumption that the high-level architecture will be transferrable to other DNOs. (pages 8, 31 and 68).</b>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Ensuring transferability of the solution is central to the BiTraDER project. Based on our experience of working with other DNOs previously, we now have a good understanding of the various methods adopted across UK DNOs for implementing ANM and similar systems. However, the landscape is continually evolving, and what we understand today might not reflect the situation in future. The Open Networks provides an ideal opportunity for us to test and refine our understanding in respect of BiTraDER and we have included meaningful engagement with appropriate groups throughout.

Early in the project, we will identify the precise methods for our engaging with Open Networks on BiTraDER and agree these with the appropriate Open Networks working groups (likely to be those aligned with Workstream 1A, Product 6), including for testing transferability. During bid development we established that the Design and Build phases are the most appropriate time to present findings and obtain the necessary steer from the Open Networks working groups, thus

ensuring what we are proposing, including high-level architecture, meets the objectives for transferability.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#9</b>	<b>Pro forma section</b>	<b>4</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<p><b>In the simulation phase and in choosing the Harker substation for the live trial, will you be including a sufficient number of customers providing flexible demand-side services? (For instance, how many of the expected 50 potential market participants and 10-15 connected resources will be demand-side?) If this is not possible, how will you ensure that your findings will be sufficiently applicable to the use of demand-side services in future?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

The network around Harker substation is considered ideal for the trial as it has the following characteristics:

1. There is a transmission system constraint restricting the ability of generation to connect to the distribution network.

2. There are several large industrial customers with existing flexible contracts.
3. There is a diverse mix of customer types covering different key industrial sectors, generation assets, large and flexible loads.
4. Owing to network constraints, there is currently a queue of customers (generators and loads) waiting to connect to the network, including batteries, and these customers will likely connect on flexible contracts.

We intend to sign up customers providing generation flexibility as well as customers providing demand side flexibility. Furthermore, given the network characteristics at Harker, we expect to sign up customers providing flexible demand-side services. In some cases, these customers may have more than one demand side asset in their portfolio able to participate in the trial (which could lead to more assets than customers signed up). Of the 10–15 connected resources, we expect the majority to be generation assets, but we expect at least 1 to be demand-side.

As part of getting customers to sign up for the trial, we will engage with up to 50 potential participants. We will target different 'types' of potential customer, with those providing flexible demand-side services (e.g. large industrial sites with flexible connections, new customers waiting to connect) being a key target group.

We will conduct detailed interviews with each of these potential participants to understand their current situations, pain points and, importantly, their interest in and willingness to participate in trading on such a platform to accelerate their connection to the network.

In the absence of a sufficient number of customers who can provide flexible demand-side services signing up to the trial, the detailed interviews with potential participants (many of which will be customers providing flexible demand-side services) will enable the project to capture relevant insights to ensure the results are applicable to the use of demand-side services in the future.

Although we have initially selected Harker for the live trial, there are alternative networks which also fit the selection criteria. The final site selection will be made during project delivery and further informed by customer engagement.



### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#10</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>Please reconcile the description of the scaling factor mentioned on page 18 with that appearing on page 50 (point 3).</b>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

The scaling factor on page 18 describes how we have scaled the BiTraDER rollout costs. From a DNO perspective we will need to integrate our Network Management Systems (NMS), specifically the Active Network Management system, with the market platform. As DNOs run one NMS for their company we only needed to scale the ENWL costs based on the number of DNOs in GB to understand the GB DNO cost to rollout.

The scaling factor on page 50 relates to the scaling of benefits to GB. The benefits were calculated on a Primary and BSP basis, where the potential reinforcement to be deferred was determined. To scale the benefits appropriately we need to use the proportion of these substations in ENWL compared to GB.

The two scaling factors are scaling different aspects of the business case appropriately.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#11</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>Will the simulation trials include trials in which stack optimisation takes account of carbon intensity?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Yes, we will include trials where the initial stack optimisation values carbon intensity, ensuring that a carbon intensive resource is used before a low carbon resource with equal curtailment. We will produce a methodology for this during trial design ahead of demonstration in the trial phases. The nature of the trials will allow this methodology to be adapted as the trials progress, producing a final version which will be suitable for business as usual stack optimisation.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#12</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>07/09/21</b>	<b>Answer date</b>	<b>09/09/21</b>
<b>Question summary</b>	<b>Will the expected reduction in generation investment and load related expenditure arising from BiTrader generate carbon benefits (deferring or obviating use of embodied carbon)? If so, why have you chosen not to estimate this benefit?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

The carbon benefits presented in the BiTraDER business case concentrate on operational carbon savings, including the reduction in carbon emissions of increased RES generation (via a reduction in curtailment). Whilst this presented a conservative estimate of the potential benefits, owing to current limitations in data availability, we believe this provides a robust assessment of carbon reduction.

We acknowledge the probability of carbon reduction associated with the BiTraDER market in addition to what we have presented, including those associated with a reduction in generation investment and load related expenditure. However, as the level of these benefits is uncertain

and difficult to estimate with any accuracy, we have excluded them from our initial carbon assessment.

Our initial business case assessment should be considered a starting point for a more detailed assessment to be undertaken during the project. We will treat the assessment as a 'living' document and update it as the required data becomes available during the project and based on our research of robust methods for assessment, allowing for improvements in the robustness of both the financial and carbon assessments.

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#13</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>14/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<b>What learning regarding the DNO/DSO/ESO interaction will be gained from this project beyond that from the NIC funded Power Potential project?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

DSO/ESO interaction was investigated in the NIC-funded Power Potential project, and their solution was for UKPN to gather the commercial availability, capability and bids from each connected resource, and to assess the availability of each service at the Grid Supply Points (GSPs). The DNO then presents the results of its assessment to NGESO at day-ahead. Based on the DSO assessment, NGESO would decide the level of services to be procured and, on the day, instruct UKPN who would, in turn, instruct the connected resource. In this scenario, all interaction issues are resolved by the DSO.

BiTraDER will adopt a fundamentally different approach to the issue of interaction between DSO/ESO. In bringing localised information into a neutral market, the ESO, DSOs and DER can better understand the economic value of the trade-offs they face. In doing so, BiTraDER will help to increase short term benefit in terms of managing the interactions and potential conflicts

between ESO and DSO through market rules, as well as longer term benefit through price signals that encourage more flexible and economic provision of services.

Specifically, we will explore the various models that enable DSO/ESO conflicts to be resolved by the market platform, including:

- Identifying and trialling methods that enable the ESO and flexible resources connected to the DNO network to procure services independently of the DSO.
- Establishing the timeframes for the procurement of services such that conflict might be mitigated.
- Where this is insufficient, establishing and iterating additional conflict mitigation rules as appropriate.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#14</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>14/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#16</b>	<b>Pro forma section</b>	<b>2,3</b>
<b>Question date</b>	<b>14/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p>██</p> <p>██</p> <p>██</p> <p>██</p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#17</b>	<b>Pro forma section</b>	<b>3</b>
<b>Question date</b>	<b>14/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Has the requirements for communication infrastructure been determined? Can the BiTraDER market platform effectively operate without any communication infrastructure upgrades, particularly for legacy systems? What communication protocol will be used. e.g., utilisation of IEEE2030.5 might require significant infrastructure upgrade?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

As appropriate, in BiTraDER we assume that existing communications infrastructure suffices to allow the market platform to operate effectively and therefore have not included costs for upgrade of infrastructure or legacy systems during rollout. Today, as part of the process for establishing a flexible connection, we require customers to install approved communications and control equipment, complying with ENWL policy and standards. Similarly, as a condition of contract, existing flexible response customers are required to install compliant systems.

As a result, during the BiTraDER project we will instruct connected resources to provide a response using existing infrastructure where it is present. However, for new customers (i.e. customers not currently providing any flexibility and therefore unlikely to have existing infrastructure), we will investigate the use of standard Application Programming Interfaces (APIs) over a range of interfaces during delivery of the project, selecting the most appropriate one as a deliverable of the project. The communications infrastructure, including protocols, required to allow the data exchange between the DNOs and the market platform will be investigated as part of the project.

In both the BiTraDER Project and in rollout, market participants will access the BiTraDER market platform via a web interface.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#18</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Page 64 states you envisage three types of constraint being traded (constraints that arise from having a flexible connection, flexibility service obligations to the DNO, service obligations to the ESO). For the latter two, please can you confirm if contract rules allow for these service obligations to be transferred to another party? If not, please can you describe the impact of this on the project.</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

At present, it is likely that not all contracts will support the types of actions we envisage in BiTraDER to resolve constraints. This means that an important part of the project will be to determine the appropriate contract rules that would be needed for economically efficient trades to take place.



We've included for money in the project for suitably qualified legal support to work with us and stakeholders to determine options on how to address these challenges. This will be informed by our engaging with a range of stakeholders on these issues, and we will prepare draft contracts as part of the project.

In this case, where the trades are limited to those arising from flexible connections or flexibility service obligations to the DSO, there is need for work to understand how the contracted party is able to transfer, or otherwise deliver, this obligation via a third party, especially where the third party has no contractual relationship with the DSO.

For existing customers with a firm connection who are willing to participate in BiTraDER, we may add a temporary or other suitable contract variation to enable them to trade that position in a secondary market. We will look at a variety of options in BiTraDER to identify which is likely to create the best incentives.

For the ESO service contracts, we are starting from the principle that we will not create a situation in which connected customers are asked to take any actions that conflict with the intent of ESO contracts. However, we recognise the potential additional value that could be delivered if it were possible to remove any potential barriers on flexible providers in their contracting with the DSO in situations where they have existing commitments to the ESO. As such, BiTraDER will look to identify opportunities where parties can trade their obligations to reach a more efficient outcome. As above, this is likely to require some changes to ESO contracts for service providers, allowing them to pass on an obligation to a third party with the same technical and commercial effect as if the third party had contracted with the ESO.

We will work alongside the ESO and other stakeholders to explore the issues of how flexibility providers' accessing the secondary market interacts with their existing commitments/requirements for the ESO, and determine options for how these can be better satisfied through this access.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#19</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Page 64 states you envisage three types of constraint being traded (constraints that arise from having a flexible connection, flexibility service obligations to the DNO, service obligations to the ESO). For the first two types, any trade still has to solve the original distribution network constraint – how do you ensure this? For the last type, any trade still has to meet ESO requirements – how do you ensure this?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

For the first two types of constraint trades – flexible connection and flexibility service obligations – we will need to ensure that the traded stack is such that it remains valid after gate closure, and that if called upon, the resources within the stack are able to resolve the original network constraint that gave rise to the creation of the original stack. There is work for us to do in the project to understand how best we can deliver this requirement, but we anticipate that the

34

market matching mechanism will be location specific, with each asset linked to a specific DNO network constraint. When a customer with a firm connection trades its obligation, the mechanism (and the market rules it executes) will ensure that the replacement asset has the appropriate technical characteristics to resolve the constraint, but with the benefit of an economic gain from trade.

We intend to operate the BiTraDER market as close as possible to real-time, which would require this validation to be automated as much as possible. We could perform trade validation as part of the individual trade (i.e. trade by trade) or by assessing the revised stack as a whole after gate closure. The precise mechanics of this will be a matter for the project during delivery.

For ESO services, the ElectronConnect platform will allow us to aggregate constraints up to GSP level, building on the trade and merit order changes at DNO level. The methodology we build will help identify potential conflicts by looking at progressively higher levels of aggregation. An important feature of BiTraDER (and built into the ElectronConnect platform) is that it allows the ESO to issue instructions to customers newly in-merit, in much the same way as with its current customers contracted at distribution level. The precise rules for how this is done will be key project development work and will also be built into the potential contract variations described in our response to SQ 18. Structuring the problem in this way will allow the ESO to access a broader range of assets capable of meeting its service needs in a way that will not conflict with its network stability objectives.

We will work alongside the ESO and other stakeholders to ensure that the BiTraDER market does not affect the ability to resolve network constraints.

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#20</b>	<b>Pro forma section</b>	<b>8</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Pg 42 states that the design and simulation phases of the project will target two groups of customers. Why are these two phases of the project limited to this subset of customers (especially when benefits may arise from three groups of customers (G1-3, pg 17) across three types of tradable constraint (pg 64))?</b></p>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

As noted in the question, we envisage the benefits associated with BiTraDER will be realised from three key customer groups, defined as follows:

- *Participation group (G1):* represents existing and future resources with contracted flexibility arrangements in the absence of BiTraDER.
- *Participation group (G2):* represents resources without contracted flexibility arrangements (or existing customers with flexibility arrangements for part of their capacity) who might be willing to offer (additional) capacity to BiTraDER on an ad hoc basis.

- *Participation group (G3)*: represents resources who might in future accept a contracted flexibility arrangement in the knowledge that there are ad hoc arrangements in place to trade their curtailment obligations.

Customers are divided into these groups for the purpose of defining the benefits for the CBA only. The groups enable us to explain whether benefits are positive or negative for the different customer types across a number of sensitivity scenarios in Appendix A.1, and allow us to outline the assumptions we have used for each customer type when calculating the benefits in Appendix A.2. Please see pages 50-58 for more detail.

To put these definitions simply: G1 represents customers with flexibility agreements, G2 represents customers with only partial/no flexibility agreements, G3 represents customers who might accept flexibility agreements in future.

In Section 8, p.42, we define two customer groups that we intend to engage with as part of our customer research:

- 1) Customers with existing firm connections
- 2) New customers with flexible connections

The customer types included within the two customer engagement groups will overlap with the customer types defined in G1, G2 and G3. Customers with existing firm connections are represented in G2 and G3 (i.e. customers without flexible connections/agreements, and customers who might consider flexible agreements going forward), and new customers with flexible connections are represented in G1 and G2 (i.e. customers with flexible connections/agreements, and customers with partial flexible agreements).

As part of the customer research, connected resources in the two defined customer engagement groups are all considered potential market participants. We plan to engage with these customers to ensure that BiTraDER's Method and Solution meet customers' requirements to enable maximum participation in the flexibility market. A detailed Customer Engagement Plan outlining how this engagement will take place will be issued to Ofgem in May 2022.

The two sets of groups described above, whilst containing the same customer types, are defined differently in the submission document because they have different purposes within the project.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#21</b>	<b>Pro forma section</b>	<b>4</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>If successful, the project will result in customers operating at a different demand/generation levels compared to if they had not traded their obligation. Given these trades may happen very close to real-time, there may be an impact on suppliers (placed in imbalance) and/or other wholesale market participants. Has this impact already been considered? Please can you explain how you will explore any such impact during the project.</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Operating markets closer to real time leads to more efficient markets, owing to there being more time for prices to reflect true value as uncertainty reduces. Given this, we believe it's important to understand how near real time BiTraDER can operate. The impact of any interaction of the BiTraDER market with existing and potential future markets will be explored during the

project. However, in deciding to include examining the potential for BiTraDER to operate as close to real time as possible, we understand the need to consider the possible interactions with wholesale and other markets. National Grid is responsible for managing the electricity system in real time and takes out contracts with industry parties to achieve this objective; with National Grid only managing the imbalance between demand and generation. Prior to gate closure, suppliers hold contracts with generators to provide the required electricity from their portfolio. If a generator is not able to provide the contracted amount of electricity to the supplier, and the supplier, in turn, is not able to procure the contracted amount of electricity for National Grid, they are said to be in imbalance. In such instances, National Grid will make up the shortfall by procuring electricity from the balancing market, which is expensive. The cost of doing this is born by the out-of-balance supplier.

Because the penalty for being placed in imbalance is high, suppliers typically try to avoid being “short” in the market, or not procuring the contracted amount of electricity. Standard practice is for suppliers to “over-procure”, buying more electricity than contracted, thereby mitigating exposure to the imbalance risk.

As such, the supplier’s “long” market position effectively enables them (or the associated generators) to “turn down” as they are carrying excess electricity, and to sell this spare capacity into other markets, such as the DSO market.

By allowing trades to take place near real time, BiTraDER will enable suppliers to make an assessment of the available rewards, as they will be able to see what price they could get if they were to sell into the secondary market versus their risk of imbalance in the wholesale market, etc. In addition, they can assess their commercial position more accurately, as they will have visibility of both markets, meaning that they will be better able to understand whether they are carrying excess, and may be more prepared to take the risk of a shortfall.

As indicated in the question, bilateral trading of curtailment obligations will indeed alter the physical generation/demand position of customers relative to what they would otherwise have been. The potential for this to create an imbalance exposure for parties with settlement responsibilities for the relevant customers is acknowledged as a potential consequence of secondary trading.

Given this, some of the design features that we intend to explore through trials and then to provide recommendations on from the project include:

- **Timeframes:** The timeframe for secondary trading and its interaction with gate closure in the wholesale market are important design choices. The DNO is expected to provide the non-traded stack in forward-trading timescales, and then to be notified of the revised traded stack after gate closure. If the customer is acting independently, this could still allow customers to notify retailers or aggregators acting on their behalf ahead of wholesale market gate closure, potentially providing opportunities to trade out any deviations. The project will test different timeframes to help understand implications for the efficiency of secondary trading and for other parties who may be affected.
- **Data/notifications:** Data flows/notifications stemming from secondary trades can help to inform other potentially affected parties. Trading will be conducted on a transparent platform, with results visible to all. In addition, we expect to consider the need for specific notifications of trades to directly affected parties such that they have the potential to manage resultant variations in positions.
- **Participation:** Circumstances will vary but we would expect that in many cases the participation of the customer will be via their supplier or a third-party aggregator, in which case the nature of the information flow would be more straightforward.



**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#22</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>The success of the project depends on customers participating in this market. Given the absence of any customer engagement on this project/concept to-date, please can you provide more detail why you are confident that customers will participate (non-participation is given a probability score of 1 in Appendix F)? Please explain the assumptions around customer participation, e.g. what proportion of eligible customers will participate and how often?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

Given the potential value BiTraDER will bring to operators of connected resources, we are confident that customers will participate in the project. From our relationship with existing customers, we know that signing up to long term curtailment obligations can undermine the business case for some connected resources; particularly for low carbon generation, many of

which are unable to accept a connection agreement that carries with it curtailment obligations. BiTraDER will provide an opportunity to reduce these risks, and could make all the difference for these customers.

There is an opportunity for customers currently waiting to connect to our network – we currently have a queue of customers (generators and demand) waiting to connect – through participation in this project, some of them may be able to accelerate the process and connect to the network quicker.

Other benefits that we believe will encourage customers to participate include:

- We will listen to the needs and requirements of participants and take these into consideration when designing the market and its operation.
- Participants will have the opportunity to inform the design of the trading platform – potentially enabling alignment with their internal processes / IT systems.

Additionally, there are many large customers in our region that have flexible contracts, and therefore a relationship with us. Our project partners also have relationships with several of these companies. We are confident that we can leverage these existing relationships to encourage customers to participate.

We have also included a budget to cover the time that will be invested by participants in the project.

The key assumptions we have made around customer participation are:

1. We will be approaching up to 50 potential participants, with the aim of signing up at least 10-15 connected resources to participate in the trials. This could be one asset from 10-15 individual customers, several assets from a smaller number of customers, or a combination.
2. In years 1 and 2, we will engage with participants 2-3 times per year via workshops and telephone calls.
3. During the simulation trial (August 24-May 25), participants will engage directly with the trading platform through a series of “war games” scenario workshops. These workshops will interact with the trading platform, testing ease of access, functionality and trading rules.

4. During the live trial (May 25-June 26) participants will trade their curtailment obligation based on real network constraints. The level of participation at this stage will depend on the number of constraints to be resolved.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#23</b>	<b>Pro forma section</b>	<b>10</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Page 50 explains that the most influential factor in the CBA is the assumed level of “% share of flexible resources which have additional combined service offering to DNO and Capacity Market”. Please could you provide a simple explanation of what this means, and why it has such an influence on the CBA.</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

The interaction between flexibility services and the concept of ‘revenue stacking’ is at the heart of the BiTraDER concept. Flexibility resources have the potential to create multiple streams of value to the extent that there are synergies between the services, but these value drivers may conflict under other circumstances.

The value of secondary trading arises if new flexibility resources are brought forward, or if existing flexibility resources, which also have a value, e.g. in the capacity market (and/or to provide balancing services), can gain additional value from flexibility provision towards the DSO.

However, if participation in BiTraDER is at the expense of participation in the capacity mechanism (or other balancing services) then the incremental value is diminished. The 'additional combined service offering' parameter reflects the extent to which the resources participating in BiTraDER may also participate in the capacity mechanism (which is a proxy for the capacity credit of the resources and the ability to reduce generation investment).

Figure A.2.4 in the full submission document, shows that the benefit item with the highest 2030 cumulative NPV value is "Reduced Generation Investment". Despite the fact that it drops to the second place for 2040 and 2050 behind "Reduced Curtailment of RES", the sensitivity analysis shows that the "% share of flexible resources which have additional combined service offering to DNO and Capacity Market" is the most influential parameter which produces the widest gap between the Central view and the High / Low sensitivities compared to other parameters used in the sensitivity analysis (see Figure A.2.7 for "Reduced Generation Investment" sensitivity analysis and Figure A.2.8 for 'Reduced curtailment of RES' sensitivity analysis). This implies that this parameter has a relatively higher impact on the final NPV value compared to the key parameters of other benefits.

Obviously the High and Low sensitivity assumptions determine how big the impact will be (e.g. for the G2 participation group we assumed that there will be a +/-10% difference for this parameter) and it should be noted that the % sensitivities reflect the opinion of our project partner, AFRY, and are built around their market knowledge with a certain degree of uncertainty involved due to the lack of any data that we can build our assumptions on.

To quantify this benefit, we assume that a % share of flexible resources can also contribute to the Capacity Market (CM), in both the Base and Method cases. Observed capacity market prices are used as a proxy to determine the level of cost saved per MW of capacity offered, adjusted for an assumed de-rating factor.

### Network Innovation Competition 2021 Supplementary Answer form

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#24</b>	<b>Pro forma section</b>	<b>2</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p><b>Pg7/8 states “the high-level architecture proposed by BiTraDER will be easily transferrable across the UK DNO population.” This is important (otherwise the solution is just applicable to ENW), so how will you ensure this?</b></p>		

### **Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

We understand the importance of ensuring BiTraDER is transferable across the UK.

We will do this primarily through stakeholder engagement: we are partnering with Electron, who have recent experience working alongside other DNOs, including on innovation projects similar to BiTraDER; we have support from National Grid ESO, who have extensive experience working with other DNOs, alongside a commitment to act as a technical consultant through participation in our Project Steering Group, which will include their assessing any proposed BiTraDER architecture specification; and we plan to engage extensively with ENA through the Open Networks project, specifically via Product 6, Work Stream 1A.

Besides our engaging with industry stakeholders, we have previously developed extensive intelligence of the various implementations by UK DNOs of systems for actively managing networks. We work closely with all UK suppliers of such systems, including ZIV automation and Smarter Grid Solutions (SGS), and will ensure that this existing business understanding of wider systems is brought into the BiTraDER project and at an early stage, allowing it to inform how we progress with all elements, not just the high level architecture.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#25</b>	<b>Pro forma section</b>	<b>2, 3</b>
<b>Question date</b>	<b>16/09/21</b>	<b>Answer date</b>	<b>20/09/21</b>
<b>Question summary</b>	<p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p> <p>[Redacted]</p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**



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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#26</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

[Redacted]

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#27</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

[Redacted]

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#28</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	<p>██</p> <p>██</p> <p>██</p> <p>██</p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#29</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

[Redacted]

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#30</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	[Redacted]		

Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)

[Redacted]

[Redacted text block consisting of multiple lines of blacked-out content]



**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#31</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>23/09/21</b>	<b>Answer date</b>	<b>27/09/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

[Redacted]

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**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#32</b>	<b>Pro forma section</b>	<b>2,3,4</b>
<b>Question date</b>	<b>07/10/21</b>	<b>Answer date</b>	<b>11/10/21</b>
<b>Question summary</b>	[Redacted]		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

[Redacted]

[REDACTED]

- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]

[REDACTED]

[REDACTED]

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#33</b>	<b>Pro forma section</b>	<b>4,5</b>
<b>Question date</b>	<b>13/10/21</b>	<b>Answer date</b>	<b>15/10/21</b>
<b>Question summary</b>	<b>Please can you explain how BiTraDER differs from and builds on other projects that Electron has been involved in with government funding including the Manchester Local Energy Market, Coventry Regional SO and TraDER?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

For clarification, of the three projects mentioned in the question, only the TraDER project has involved Electron in a software development and delivery capacity, alongside the use of its ElectronConnect platform.

TraDER's scope was to create the first near real-time market to operate and engage DER subject to local grid constraints. It provides the means by which flexible loads can react to price signals from constrained wind generation on an Active Network Management (ANM) network. TraDER went live in March 2020 in Orkney.

The project used the ElectronConnect platform to provide the means to co-ordinate between local flexibility and national markets. The project developed an 'ODFM-like' (Optional Downward Flexibility Market) product

called 'ANM Flex', allowing assets at the distribution level to receive payments when asked by National Grid for downward flexibility in the form of Demand Turn Up and Turn Down in near real-time.

While BiTraDER builds on some of TraDER's learning (and this is reflected in Electron's resourcing plan), the product to be traded and methodology is different (for example, in respect of bilateral trading). Moreover, BiTraDER will take the learning from TraDER a few stages further by integrating a market platform with real-time systems and facilitating a live network trial.

With regards to Coventry, Electron is providing consultancy support to a research-led Regional Energy System Operator (RESO) project, but no software solution is being built as part of this project. Electron's scope is to identify future local market options that Coventry Council might introduce to reduce energy costs and support decarbonisation within its region. Electron is designing a set of market rules that would support this and attempting to quantify the benefit that these markets might deliver under various future energy scenarios. The relevant parts of this learning on future local-authority led markets will be carried into BiTraDER, although this will be limited given RESO's scope.

More generally and as appropriate, Electron has sought to construct its scope of work and associated resource plan for BiTraDER in such a way as to be wholly complementary and additive to all other of its publicly funded projects.

To-date, Electron has had no involvement in the Manchester Local Energy Market. ENWL, however, have previously worked alongside both GMCA and CADENT on this project.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#34</b>	<b>Pro forma section</b>	<b>3,4</b>
<b>Question date</b>	<b>13/10/21</b>	<b>Answer date</b>	<b>15/10/21</b>
<b>Question summary</b>	<p><b>Building on information provided in your answers to SQs 6,7 and 9, and in Slide 7 in Bilateral 2, what further reassurance can you provide to the Panel that, at GB scale, the occurrence of curtailed and/or demand side customers is sufficient to justify the scaling up of benefits in the manner described?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

We are confident that this is a problem shared by all DNOs and is not unique to ENWL. We have spoken to the other DNOs about BiTraDER prior to submitting it to Ofgem, including raising the project for discussion with ENA's Electricity Innovation Managers group. At no point did anyone raise any concerns regarding how applicable the solution might be in their regions. On the contrary, the feedback has been overwhelmingly positive and highly encouraging.

We discussed the project with ENA's Open Networks project team and SPEN, who each provided us with a letter of support. ENA confirmed that BiTraDER aligns with its plans under Product 6, Workstream 1A, and SPEN confirmed that BiTraDER will facilitate important learning, addressing the significant challenges of future flexibility.

In addition, we discussed the project with UKPN, which has done work on flexibility on the Energy Exchange project. This project is also looking at trading, but is fundamentally different to BiTraDER as the DNO will take on the role of processing the bids and offers made between customers, and will therefore not be completely neutral. As part of its work on Energy Exchange, UKPN has engaged with customers to demonstrate that they want this type of market.

Customers involved with SSE's Transition project have also expressed a wish to get involved with this type of trading. The LEO trials, run by Innovate UK, form the physical trials for Transition, and customers involved have reported that they see peer to peer services as more beneficial than selling services to the DSO. This was reported in a TEF project meeting, and confirms our understanding of the customer benefit of BiTraDER.

The work from SSE and UKPN demonstrates that customers across GB are interested in a market of this nature, but reveals the current ambiguity around what customers actually want from this market and the nature of its operation.

We can only gain confidence in what customers want by showing them what the market is, or can be, encouraging them to interact with it, and watching how they react. If, for example, it is too complicated and they don't understand what the market is or how to leverage value from it, we expect that customers will be hesitant to get involved. Demonstrating the benefit of BiTraDER through a live trial will provide evidence to all customers that it is beneficial for them and those customers that operate in other DNO regions will insist on having BiTraDER-like functionality in those regions.

In summary, there are three key reasons we are confident that the occurrence of curtailed and/or demand side customers is sufficient to justify the scaling up of the benefits as described in the submission.

First, as described above and evidenced in the letters of support included in the full submission document, this Problem is shared by all DNOs.

Second, the tone of ENA's letter confirming that BiTraDER aligns with their work, included in the appendix of our full submission, was deliberately reserved. They were in fact very enthusiastic about the project, but were concerned that by expressing a strong preference for one DNO's



project they would appear to be favouring one NIC bid over the others, and could set an unfair precedent.

Third, despite being unsuccessful in our considerable attempts to sign up the ESO as a project partner due to their concerns over availability, they were very interested in BiTraDER. This was evidenced by their letter of support, provided in the appendix to the full submission document, and the agreed scope of works for their involvement in the project, as discussed at the second bilateral. In addition, National Grid ESO were involved in the development of the bid and recognised that this was something that is in the roadmap for flexibility.

As a result of the discussions we have had with National Grid ESO, SPEN, SSE, UKPN and ENA, we are confident that this is a problem recognised and shared by the industry.

When scaling the benefits for BiTraDER to GB, we have adopted an approach consistent with that which we and other DNOs have used in previous NIC business cases; scaling on the basis of network size. As this problem is shared across GB DNOs, we believe that our approach to scaling up of the benefits from BiTraDER to GB is appropriate.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#35</b>	<b>Pro forma section</b>	<b>3,4</b>
<b>Question date</b>	<b>13/10/21</b>	<b>Answer date</b>	<b>15/10/21</b>
<b>Question summary</b>	<b>In what circumstances, taking a GB view, could a more economic selection of resources for curtailment lead to increased use of non-RES (higher carbon) sources?</b>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

It is technically possible that a more economic selection of resources could lead to increased curtailment of non-RES, but we can't conceive a circumstance where this would happen.

The selection of connected resources by an Active Network Management (ANM) system does not currently favour low carbon over higher carbon or vice versa. Instead, the selection is based upon the extent of any network constraint and the cumulative total of curtailment in the relevant merit order stack. Starting with the resource with the greatest curtailment liability, ANM selects resources from the merit order stack sequentially until the network constraint is resolved. The initial order of resources in the merit order stack is based on the commercial terms for their connection and the extent and frequency of previous curtailments.

The subsequent reordering of the merit order stack, occurring as a consequence of bilateral trades within the secondary market (BiTraDER) between connected resources, will be based on an economic assessment of the value of the trade by the individual resources, including the extent of their curtailment liability and the forecast marginal costs of curtailment.

Given that RES resources benefit from higher export tariffs versus non-RES resources and typically have a much lower marginal cost of production, we would consider it unlikely that an economic selection of resources for curtailment could lead to increased use of non-RES (high carbon) sources.

Furthermore, our current queues for connection to the network are made up of RES resources such as renewable generation, battery storage or other Low Carbon Technologies (LCTs), with non-RES resources having lower or no curtailment liability owing to their having connected much earlier when networks were typically less constrained or at a time before the introduction of flexible connection contracts.

BiTraDER will allow existing, firm connected resources to offer flexibility services on an ad hoc basis. Given many of the firm resources are non-RES, it is highly likely that they will trade with RES resources as, owing to the increasing instance of generation-constrained networks, it is RES resources who are more likely to be connected via a flexible connection with an associated curtailment liability. This situation will only increase as we move towards Net Zero and more renewables connect in favour of existing non-RES technologies, which will be discouraged through Government policy and as the UK energy fuel mix changes there will be fewer non-RES resources to offer flexible services.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#36</b>	<b>Pro forma section</b>	<b>3,4</b>
<b>Question date</b>	<b>19/10/21</b>	<b>Answer date</b>	<b>21/10/21</b>
<b>Question summary</b>	<p><b>Have you considered the impact of energy storage on the requirement to manage constraints, in particular against the backdrop of rapidly dropping BESS costs? If not, how sensitive is your CBA to the emergence of other mechanisms that influence availability to participate in these markets such as energy price fluctuations and management of flexibility through ESS?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

We have not conducted any specific analysis on the impact of energy storage on the requirement to manage constraints.

We see rapidly falling BESS costs as an opportunity for more potential sources of flexibility especially on the Low Voltage network as more domestic batteries are installed. In this scenario we would likely access these domestic resources through aggregators and we anticipate that aggregators will engage with the secondary market developed through BiTraDER. At higher

voltages, the input and output capability of energy storage would be considered in any connection agreement at site design and depending on network capacity may connect flexibly or firmly and behave in the same manner as a traditional load/generation site. The operators of these installations can interact with BiTraDER in the same manner as any other connected resource.

In the full submission, the business case is technology agnostic and is based on amounts of flexibility available irrespective of what energy source the flexibility comes from. We will return to the business case during delivery and will look to refine it such that it is possible to categorise the types of flexibility, including the various forms of energy storage.

In response to the questions posed for the second bilateral, we carried out a further sensitivity analysis on the impact of a change in amount of available flexibility. This sensitivity analysis used a 10% reduction in flexible connections as the lower sensitivity and an upper sensitivity of a 10% increase in flexible connections.

The figure below presents results for this sensitivity analysis, which demonstrates that a 10% reduction in number of flexible connections reduces the cumulative net benefit for 2050 by 19%, to £470.8m.

Participation groups \ % share of MW	High sensitivity	Low sensitivity
G1	+10%	-10%
G2	+10%	-10%
G3	+10%	-10%

GB-wide net benefit, 2050, £m NPV 2021 prices	Central view	High sensitivity	Low sensitivity
Total net benefit	581.4	692.1	470.8

The Project will consider a range of scenarios, including changes in the flexibility source and the business case will be reassessed as a result of the learning gained.

Finally, if energy storage is connected to the distribution network and, as is common, contracted to provide services to National Grid ESO, then resolving the ESO/DSO co-ordination issue becomes more important. Addressing this issue is one of the key drivers for doing BiTraDER.

**Network Innovation Competition 2021 Supplementary Answer form**

<b>Project Name</b>	<b>BiTraDER</b>		
<b>Question number</b>	<b>#37</b>	<b>Pro forma section</b>	<b>6</b>
<b>Question date</b>	<b>19/10/21</b>	<b>Answer date</b>	<b>21/10/21</b>
<b>Question summary</b>	<p><b>In follow up to SQ17, have you carried out any analysis of remote DER (mostly solar farms in this context) to determine if they have remote telecoms facility that allow active management beyond all/nothing control through disconnection of connecting circuit breakers or disconnectors?</b></p>		

**Answer (please retain document formatting and do not exceed 2 pages unless otherwise agreed with Ofgem)**

The communication links between the DER and the DNO's Active Network Management (ANM) system will be examined as part of the project, specifically those that do not currently have a link as they are not a flexible connection or resource. It is not expected that this will become a significant barrier to participation in BiTraDER. Naturally, however, should a resource wish to trade its obligation on the secondary market, it will be necessary for each trading entity to have first proven that it can receive and respond to signals from the ANM as appropriate.

As part of our ANM implementation, we have spoken to a number of DER including solar and wind farms and are currently trialling a solution with several connected resources to modify or

upgrade their existing telecoms facility to provide setpoint control. For smaller sites, where there are limited control capabilities it is generally acceptable to communicate with the site operator via a web interface although if we have an RTU fitted for control of the connecting circuit breaker this can easily be adapted to provide setpoint control. Larger sites tend to have more sophisticated systems that can be interfaced directly to our SCADA systems which allows the introduction of greater functionality including setpoint control.

This setpoint control will allow us to “turn down” the DER output to manage constraints on the network. Some other DNOs are already controlling DERs in this way via their ANM systems. BiTraDER adds to this by introducing the ability for the ANM to communicate with other DER, perhaps via an API or similar system and it’s reasonable to expect this to include the full range of options, including set point control.