

Constraints Collaboration Project – *Q&A document*

7 August 2024



ESO Constraints Collaboration Project Final Webinar – Q&A

Questioner	Question	Answer
Simon Gill - The Energy Landscape	How was the Value for Money analysis carried out? Can you walk through the analysis for one or more options to give us an idea of what factors were considered and how they were modelled?	<p>The approach followed for the Value for Money analysis is outlined in the Baringa net consumer benefit analysis here. It can be summarised as followed:</p> <ol style="list-style-type: none">1. Counterfactual modelling: Based on existing ESO market modelling outputs under the FES 2023 Leading the Way (LW) scenario, we calculated unconstrained flows out of Scotland implied by the day-ahead market clearing. We then applied the B6 boundary capability (consistent with the ETYS Beyond 2030 report), to determine the volume of constrained flows that would have to be resolved in the balancing market (BM). However, this simple representation means we captured more constraints than that we'd expect to see across the B6 boundary. For example, we captured internal Scottish constraints that otherwise would have been resolved before the B6. We constructed a simple stack of bids and offers in the BM, consisting of available storage, renewable (RES) generation curtailment, and any demand-side response (DSR) north of the boundary, and available storage, dispatchable generation, and any DSR south of the boundary. We calculated bid and offer prices in line with: (i) estimated opportunity cost of each action for storage and DSR, based on projected 24-hour ahead wholesale market prices, (ii) short-run marginal costs (SRMCs) for dispatchable technologies, and (iii) technology-specific CfD-strike prices for RES curtailment. We also applied assumed mark-ups to all bids/offers, based on historical BM price analysis used in Baringa's internal BM model.2. Option modelling: Taking the Demand for Constraints (DfC) option as an example, we estimated procured volumes based on: (1) the forecasted volumes of constrained flows over the B6 boundary over the modelling horizon, (2) the available volumes of eligible flexible demand under the FES 2023 LW scenario. We then estimated how the use of available DfC volumes would reduce the volumes of constrained flows that would have to be resolved in the BM, and the resulting reduction in constraint costs as well as any other consumer cost implications (such as the increase in CfD support scheme costs from avoided curtailment).

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Simon Gill - The Energy Landscape	Will Demand For Constraints be developed to make sure it can be activated straight away in other boundaries other than B6? Given the anticipated constraints in the coming decade in other boundaries such as East Anglia export and the two-year lead time required for development.	In phase 2 we will look at other boundaries, particularly where constraint costs are expected to grow in near future. If feasible at other boundaries, we will consider introducing the scheme there too.
Simon Gill - The Energy Landscape	Long term Constraints Managements Markets is described as offering 1-year contracts only and procuring them Y-1 and Y-4. Firstly, procuring Y-4 for a 1-year contract seems excessive – how do you see the procurements and contract length working together? What type of technologies and project do you think would engage with and benefit from this model?	None of these options is decided and determining optimum contract lengths will be assessed in the next phase, including with regards to how they might interact with the demand for constraints scheme. Further industry engagement will be required to understand the timeframes for different technologies and the lead times can be set accordingly.
Simon Gill - The Energy Landscape	Long term Constraints Managements Market would be open to a range of providers providing turn up and turn down and potentially could operate both in front and behind a constraint. By contrast Demand for Constraints, which you propose could have a 10-year contract length, is only available for demand turn up behind a constraint. Does this imply that you feel that contracts longer than 1 year are only valuable for this specific set of provides (new demand behind a constraint)?	<p>The initial design choices for Demand for Constraints have been made to reflect the significant investment required in the deployment of very large industrial projects and the financial security needed behind them. We see additional benefits to incentivising new demand in Scotland, whereas new demand in front of the constraints could exacerbate the challenge.</p> <p>The long-term and short-term Constraint Management Market options would be intended to incentivise the participation of existing flexible demand and generation. Therefore the contract length up to one year has been chosen to minimise the risk of signalling siting decisions that would unintentionally exacerbate constraints.</p>

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Simon Gill - The Energy Landscape	Do you envisage all three Constraint management market options being used together? In the next stage of analysis will you be considered alternative arrangements e.g. only implementing one or two of the sub-options, or combining them?	In principle, we could combine the options if they demonstrate value for money, foster competition and maintain coherency. However, the combined benefits are expected to be considerably lower than the sum of the individual benefits, as the resources required to deliver multiple markets would be reduced and the interactions between the markets (particularly the two variants of CMM) could significantly reduce the benefits of having two services.
Harry Parsons - SSE	As part of the technical study for the grid booster solution proposals will the ESO be looking into international markets that have introduced grid boosters e.g. Germany and how associated response and reserve market requirements evolved?	<p>We are aware of grid boosters contracts in other countries such as Germany, Australia and others. However, grid booster contracts tend to solely secure one specific circuit. So, they work better in systems that are highly dependent on single circuits.</p> <ul style="list-style-type: none"> - The GB system is highly meshed which leads to more complex constraints over multiple circuits and nested constraints. As a result, buying a service to protect a single circuit would be less cost effective. - Also, stakeholders in the UK expect their assets to participate in various markets and provide multiple services, rather than being limited to a single function. Thus, grid boosters in places like Germany appear to be more aligned with a transmission asset approach rather than a market-based service. - Additionally, GB is a low inertia system so to manage this, we procure a significant amount Dynamic Containment (DC) to stabilise frequency and maintain grid stability. As a result, intertripping wind is cheap and effective solution because we already hold sufficient DC for other purposes. - These considerations along with the coherency and deliverability issues we highlighted in our assessment means we must conduct further in depth analysis of impact on the system before progressing with commercial design. We will also look at international market learnings on grid boosters.

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Jasmeet Rowley - E.ON	We think describing this report as ‘final’ could be misinterpreted on the basis that ESO haven’t made a decision on which solutions would be implemented. Can the project team clarify if there will be a further webinar/report to discuss the decisions ESO will make on the solutions shortlisted (after further detailed work, technical assessments and quantification work has been completed)?	Fair point - it's final for the first stage of the project, not the second, more detailed stage. We will continue to keep you all updated on each of the different workstreams, using already planned events such as the markets forums as well as other teams webinars, like the ones we've run before in this project. The engagement plan is still being finalised and we don't want to have meetings for the sake of meetings, but I expect a monthly cadence to be about right. We will update you all as our work progresses as well as ask for your input when needed.
Natasha Ranatunga	The Constraints Collaboration Project was a 7-month project with an objective to “Generate a shortlisted set of potential solutions, co-designed with industry, which can quickly progress to detailed scoping and delivery phase, with the intention to be introduced in the short-term”. The ESO has not set out its preferred options which was its stated objective in January; what options are the ESO keen to take forward at pace?	We have identified that there is potential value from the 3 categories of market options - DFC and CMM, and we will be bringing these forward to detailed scoping and cost benefit analysis. The technical grid options have complex interactions with how we operate the system, so will need further work to understand if there is potential value there when everything is considered.
Deepa Shaji Kumar	Hi Team ESO, Thank you for this opportunity to engage. May I please ask if any TOs were part of the industry engagement in this project? Also, Active Network Management was recommended as a means of non-firm connections in transmission behind thermal constraints. Ideally TANM would be a techno-commercial optimal intelligence. How would ANM fit into this roadmap?	We did not hear from any TOs during this stage of the process, but are very keen to talk to them in the next phase of the process, and discuss how ANMs could be part of the solution for constraint management.
Natasha Ranatunga	Further detail and explanation is needed on the gaming risk that the ESO has identified.	This is something we need to explore in the next phase, but providing advance warning of constraints to assets that could bid in the DA or the RT markets brings risks of gaming. Not saying these risks are insurmountable, but they need to be fully explored.

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<p>Natasha Ranatunga</p>	<p>ESO analysis provided is at a high-level and heavily caveated to note interactions with the market. These interactions are not new, were not discussed in depth at the workstreams and the CCP should not be contingent on delivery of other workstreams. ESO cited TNUOS reform as an area for action but doesn't explain why nor is it referred to in the Baringa Report. TNUoS reform programme has been ongoing for 2+ years and is being taken forward by Ofgem and industry in a separate workstream; it should not hinder the advancement of CCP - please provide details for the new and unforeseen TNUoS issues.</p>	<p>'Interactions with other existing markets need to be fully explored and quantified before implementation, which is the same as with any other balancing service. The modelling for this phase did not look at these interactions and this will form part of the next phase of work.</p> <p>TNUOS reform is an ongoing project, which is considering options with the potential to influence constraints in the longer term. This is not hindering CCP in any way but we need to make sure that any reform to TNUOS is accounted for in the designs we are considering through CCP.</p> <p>All of this feeds into the 'coherency' principle that we must adopt for any market design.</p>
<p>Grahame Neale</p>	<p>Are there any thoughts yet as to how these options could interact with the connections process? (i.e. could participation in a service be a requirement for a connection or facilitate earlier connections for others?).</p>	<p>Connections reform is an ongoing programme of work across the industry. There are potential synergies between these options and the connections process, but we have not analysed those in detail yet. We will be doing this in the next phase.</p> <p>This is an example of a broader question for connections reform - some connections are more beneficial for the system than others. This could be reflected in the connections queue, but currently it is not. But this would be a significant change in the connections process, some connectees would benefit from it but others would be disadvantaged. So this would need a lot of industry consultation before any changes are made.</p>
<p>Natasha Ranatunga</p>	<p>How many phases of the CCP will there be? In the context of REMA this work should be accelerated so that it can form part of the counterfactual package to zonal pricing. Ofgem and DESNZ are likely to find this analysis to be valuable so to deliver this after a REMA decision is expected to be taken (summer 2025) seems odd.</p>	<p>The next phase of CCP should result in a decision to either implement a commercial service straight away, possibly in future or not at all. There will be no further phases to the project.</p> <p>We are feeding this analysis into the REMA process on a regular basis.</p>

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Adam Roston	Can the workings of the Baringa modelling be made available so industry can review the specific assumptions made?	Yes you can access the report on our website https://www.nationalgrideso.com/document/323801/download .
Grahame Neale	Are these options (especially the technical options) only being assessed against cross-boundary constraints or are they are also being reviewed for 'within boundary' (i.e. local) constraints	Our analysis has focussed on flows of electricity between Scotland and England as an illustrative example of a boundary as a proof of concept. This captures constraint volumes and costs of constraints between Scotland and England. We want to work more closely with DNOs in the next phase to make sure that we're aware of local constraints and the potential impact from these measures.
Harry Parsons	Given that the benefits of CMM/DfC are in part driven by a reduction in BM premiums (bids and offers) - are Baringa able to provide further detail on the 15% & 25% assumed premiums in the counterfactual and underlying generation cost assumptions?	The assumed bid/offer price premia are based on technology-specific historical BM price analysis used in Baringa's internal BM model. The benefits of the CMM option are indeed largely driven by the assumed reduction in these premiums. But DfC benefits are not directly related to premiums (though premiums do influence the absolute magnitude of the benefits) – instead, they are driven by avoided BM actions north of the B6 boundary.
Charles Mnyanjagha	Network Operators are issuing a growing number of nonfirm connection agreements using intertrips and in some cases ANM schemes. How will the CMM if implemented in real time impact on connection agreements and those with intertrip schemes? Will these schemes be required if CMM is implemented?	CMM would be intended to address residual constraint volumes ahead of the Balancing Mechanism. The use of non-firm connection agreements can provide an alternative option for managing network constraints. We will continue to manage the system working increasingly closely with DNOs/DSOs to manage these constraint challenges using the best option available optimising system security and consumer value. As part of the further analysis we will be conducting in our CMM design considerations we will continue to consider coherency with ESO and other markets and services or schemes.
Deepa Shaji Kumar	Several non-firm connections have been offered to customers for access to transmission, to connect behind thermal constraints. Did the scenarios analysed here consider interactions with any potential flexible schemes/intelligence for e.g. TANM, under these non-firm connections offered ?	In short no - but we will consider this in the next phase of investigation, as per the above answer.

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Katrina Nielsen	We have question over the potential extension of the intertrip scheme. It was noted as 'successful' in the report however, our view is that there has been limited utilisation of the current scheme. Will the plan of extension concretely enable more cost-effective system operation? Will it be sufficient to increase uptake of scheme utilisation/provide enough value to justify extension?	<p>We are currently reviewing the usage of the Scotex intertrip on B6, undertaking an internal deep-dive to understand how far we can push the capabilities of the current scheme, and optimise usage of the current scheme. We need to do this before we can plan to expand the volume of generation, we arm to intertrip.</p> <p>With regards to expanding the intertrip to below and above B6, we are actively working with NGET to expand the monitored circuits in the B6 scheme to the B7 boundary and other circuits in the North of England. Additionally, we are exploring options for increasing the monitored circuits in Scotland North of B6, and the potential for adding other generators to the scheme.</p>
Niall Stuart	Hi, I was surprised that the modelling found lower levels of savings for demand for constraints than other options, as this is modelled at +£5MWh rather than just essentially less negative prices in other potential solutions. Is that because it is only currently conceptualised as applying to additional demand north of B6 whereas other solutions also reduce offers to generate to South of B6?	Correct – the DfC option assumes demand additionality (in line with ESO guidance on eligibility), which means that using the DfC only avoids actions north of the B6 boundary only. The CMM option on the other hand delivers savings both sides of the boundary.
Grahame Neale	At the end of the next phase of the project, it'd be good to see how these services will interact with the investment cases for cross-boundary reinforcement (i.e. when would these options be deployed instead of building reinforcement?)	Thank you for flagging this - we will consider this for the next phase.
Iain McIntosh	If P462 comes into force, will this not negate the need for these proposed services? The "network costs" will be reduced significantly if the subsidy element is removed from the bid prices of renewable generation. Therefore it will only be the energy balancing element that will remain, which will be non-locational.	Arguably the moderate improvement of prices will have a marginal effect on the CBA value from generation turn down within the constrained region. It is not clear p462 would affect the CBA value for the replacement energy e.g. south of the B6 but we will consider this in more depth. It is important to note, that in terms of value to the end consumer, the subsidy is still being paid, just not via the BM, and any impact will be on the margin, which is hard to assess.

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Andrew MacNish	How is the ESO characterising gaming risks associated with CMMs/DfC in its feedback to the DESNZ REMA team?	In Demand for Constraints particularly if targeted at flexible demand, some form of baselining would be needed to ensure that flexible volumes are additive. Baselining exercise is challenging and subject to inaccuracy and gaming risk. We regularly engage with the DESNZ REMA team to ensure the risks of gaming is considered when evaluating Value for Money of the different options.
Tom Palmer	Why does Baringa in Appendix A assume higher costs in the South when MBSS clearly shows much higher costs for years in Scotland	<p>Higher costs in the South are not by assumption – rather they are a result of bid/offer prices in the BM stack. The comparatively higher prices in the South are driven by scenario-specific fuel and carbon price costs over our 2025-2035 modelling horizon and techno-economic parameters for different dispatchable technologies that help resolve most constraint flow volumes.</p> <p>While MBSS reports indicate higher costs in Scotland in several months historically this is not always the case. There are a number of reasons for differences between our modelling and MBSS reports, for example:</p> <p>(1) MBSS reports are backward-looking and reflect historical commodity and carbon prices, as well as the types of technologies/plants available to help resolve constraints. Our modelling is forward-looking and reflects commodity and carbon prices within the chosen scenario. The choice of scenario also influences the available volumes of each technology/type of plant that can be used to resolve constraints.</p> <p>(2) MBSS reports reflect all thermal constraints – whereas our modelling only reflects the B6 boundary, i.e., it does not reflect all within Scotland constraint costs due to other Scottish boundaries</p>
Nicholson Guy	Given the work to date, what is NESO's current view on the likely outcome of CCP? What will be the impact and when? e.g. Compared to one of the 2GW HVDC bootstraps on the B6 boundary.	We are unable to comment on the likely at outcome of the CCP at this stage. Our intention is to be able to make a decision about whether we can implement a constraints market or one of the technical solutions within the next 9-12 months. As for potential impact, Baringa's initial Cost Benefit Analysis provides a very high-level view of that. However, we can't provide an answer on the impact compared of HVDC bootstraps at this stage but this would be a useful comparison and we will consider that in the next phase.

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Natasha Ranatunga	Only received a part answer - how many phases of the CCP will there be? When will each phase start and be completed? And wrt feeding into REMA process - what does that actually mean? Are ESO sharing analysis with Govt and Ofgem?	As per answer above, this is the final phase of the CCP. Constraint management measures are one part of the operability workstream within REMA and we are working closely with the DESNZ REMA team, sharing our analysis from this process.
Niall Stuart	Apologies if a naive question, but are the options mutually exclusive or could you implement more than one?	No, not a naïve question but the options are not mutually exclusive, however they could impact one another. Assessing how they interact and affect the benefits case will be part of the next phase.
Tom Palmer	Can you please provide expected timeline and dates for next steps on both options progressed and those needing more technical review or will there be a short follow up webinar.	We have started setting up internal workstreams for DfC and CMM. Stakeholder engagement will begin in the autumn to gather industry feedback on service design and to ensure any key decisions are communicated as we work through the assessment. We will keep you updated with regards to a follow up webinar for technical options.
Deepa Shaji Kumar	Thank you for the opportunity to collaborate from a TO perspective. What would be the best way to participate or get in touch ?	We'll reach out to you directly if you'd like to talk more. Our email address for anyone else wanting to get in touch is: box.market.dev@nationalgrideso.com .
Alex Savvides	Is it possible to get the forecasted annual constraint hours for constraints of depth over 200MW that were used in the cost benefit analysis	ESO does not forecast annual constraint hours and depths. Baringa's analysis was based on our FES Leading The Way scenario data which can be found here and our ETYS data which can also find here . As the ESO, we also publish the following data on constraints: <ul style="list-style-type: none"> • 24-month forecast on the main boundaries in GB, with a granularity of 1 week. This document is released monthly and contains the boundary limits on a weekly basis for significant system boundaries. • 24-month-ahead constraint cost forecast, with a monthly granularity. This forecast is published to give assets an idea of what flows we expect on the transmission network. • Day Ahead Constraints Flows and Limits, which publishes the expected flows through 10 different boundaries in GB, one day in advance, with a granularity of 30 minutes.

