Code Administrator Consultation Response Proforma

GC0154: Incorporation of interconnector ramping requirements into the Grid Code as per SOGL Article 119

Industry parties are invited to respond to this consultation expressing their views and supplying the rationale for those views, particularly in respect of any specific questions detailed below.

Please send your responses to grid.code@nationalgrideso.com by **5pm** on **07 November 2023**. Please note that any responses received after the deadline or sent to a different email address may not receive due consideration.

If you have any queries on the content of this consultation, please contact catia.gomes@nationalgrideso.com or grid.code@nationalgrideso.com

Respondent details	Please enter your details	
Respondent name:	Louise Trodden	
Company name:	ESO	
Email address:	Louise.trodden@nationalgrideso.com	
Phone number:	07866 165538	
Which best describes your organisation?	☐Consumer body ☐Demand ☐Distribution Network Operator ☐Generator ☐Industry body ☐Interconnector	☐Storage ☐Supplier ☒System Operator ☐Transmission Owner ☐Virtual Lead Party ☐Other

I wish my response to be:
(Please mark the relevant box) ☒Non-Confidential ☐Confidential

Note: A confidential response will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the Panel or the industry and may therefore not influence the debate to the same extent as a non-confidential response.

For reference the Applicable Grid Code Objectives are:

a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity
b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity);
c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole;

d) *To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and*
e) *To promote efficiency in the implementation and administration of the Grid Code arrangements*

For reference, (for consultation questions 5 & 6) the Electricity Balancing Regulation (EBR) Article 3 Objectives and regulatory aspects are:

a) *fostering effective competition, non-discrimination and transparency in balancing markets;*
b) *enhancing efficiency of balancing as well as efficiency of national balancing markets;*
c) *integrating balancing markets and promoting the possibilities for exchanges of balancing services while contributing to operational security;*
d) *contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector while facilitating the efficient and consistent functioning of day-ahead, intraday and balancing markets;*
e) *ensuring that the procurement of balancing services is fair, objective, transparent and market-based, avoids undue barriers to entry for new entrants, fosters the liquidity of balancing markets while preventing undue market distortions;*
f) *facilitating the participation of demand response including aggregation facilities and energy storage while ensuring they compete with other balancing services at a level playing field and, where necessary, act independently when serving a single demand facility;*
g) *facilitating the participation of renewable energy sources and supporting the achievement of any target specified in an enactment for the share of energy from renewable sources.*

What is the EBR?

The Electricity Balancing Regulation (EBR) is a European Network Code introduced by the Third Energy Package European legislation in late 2017.

The EBR regulation lays down the rules for the integration of balancing markets in Europe, with the objectives of enhancing Europe's security of supply. The EBR aims to do this through harmonisation of electricity balancing rules and facilitating the exchange of balancing resources between European Transmission System Operators (TSOs). Article 18 of the EBR states that TSOs such as the ESO should have terms and conditions developed for balancing services, which are submitted and approved by Ofgem.

Please express your views in the right-hand side of the table below, including your rationale.

Standard Code Administrator Consultation questions			
1	Please provide your assessment for the proposed solution(s) against the Applicable Objectives?	Mark the Objectives which you believe the proposed solution(s) better facilitates:	
		Original	☒A ☒B ☒C ☒D ☒E
		WA(G)CM1	☐A ☐B ☐C ☒D ☐E
		Please see comments relating to the original	

a- Reducing the speed at which interconnectors ramp allows the ESO to better fulfil its licence obligations to operate the transmission system in an economical and efficient manner. The current interconnector ramp rates (100MW/min) often result in the ESO having to reposition units in the Balancing Mechanism (BM) at a cost to the GB consumer.

Work completed by Baringa quantified this reduction in speed/need to reposition with a saving over 7 years of £865m to balancing costs (reducing to 50MW/min). This repositioning of units frequently extends the run of reserve providing units that need to be available to manage fast ramping. When this occurs close to real time, this requires the use of fast reserves that are typically more expensive to instruct.

Baringa concluded that as the number of interconnectors increases, the likelihood of actions taken to manage fast ramping will also increase. And the cost of these actions will increase, not linearly with the number of interconnectors, but exponentially. Extra frequency response units will also be required to manage these frequency deviations, again at a cost to the GB consumer.

b- Reduction of the ramping arrangements that are currently in place brings the interconnectors more in line with the current ramping arrangements in place for generators, facilitating the competition amongst all BMUs.

c- Security of supply is high priority for the ESO. With increased interconnection connecting to the grid in the near future, a slower ramp rate means that there is more control over actions which impact system security. Reducing ramp rates reduces the number of short-term instructions for frequency control and individual actions required on units to manage the change in flows across the interconnectors. Having to take less actions reduces the complexity of managing the system, increases system security and reduces GB balancing costs by a significant amount.

d- This change allows the ESO to be compliant with the ramping requirements within SOGL.

e- Including ramping arrangements in the Grid Code aids transparency of operations for all parties, eliminates the need for this requirement to be specified in bilateral agreements, delivers consistency in approach and responds to the requirements from both retained EU law (SOGL) and Ofgem who requested that these arrangements are included in the relevant code.

Please see comments relating to the **alternate**:

a) and c) **Negative** The current arrangements, as proposed by the alternate, do not promote an efficient, coordinated or economical system. The study completed by Baringa shows that the current arrangements contribute to an increase in balancing costs, which in turn incurs a cost to the GB consumer. The original proposes to save

		£865m against the alternate. It is not clear where the benefit is to consumers with the alternate. b) **Negative** Interconnector ramp rates at 100MW/min is double what the other BMUs are allowed to ramp at, creating misalignment and unfairness in the Grid Code between generating units based on the type. *d)* **Positive**- This change allows the ESO to be fully compliant with the retained EU Law and relevant SOGL articles. e) **Neutral** As with the original, including ramping arrangements in the Grid Code aids transparency of operations for all parties, eliminates bilateral agreements and responds to the requirements from both retained EU law (SOGL) and Ofgem who requested that these arrangements are included in the relevant code. However, the alternate suggests that further work will be undertaken, after 100MW/min is added to the Grid Code. This does not promote efficiency of the process as these discussions have already taken place over 14 workgroups and other possibilities have not been worked up into an alternate solution to date. The first workgroup was held in January 2022 and previous engagement was conducted in late 2021 at JESG and GCDF before the mod was raised in December 2021.
2	Do you have a preferred proposed solution?	☒Original ☐WA(G)CM1
		The Original proposal is preferred by the ESO, supported by the independent consultant CBA and confirmed by the second consultant analysis.
3	Do you support the proposed implementation approach?	☒Yes ☐No
		We support a 10-day implementation period from the date of a decision by Ofgem to implement this proposal. Should additional system requirements be identified through the consultation process, this may require further consideration.
4	Do you have any other comments?	As part of the ongoing engagement for this workstream, The ESO met with the EU TSO's in October. This meeting was scheduled as part of the Inter-Synchronous Area (ISA) working group. We shared the updates from the previous workgroups prior to the consultation. The discussion was related to the following points: • AFRY report • Ramping periods • Frequency control report

The views of the ESO in these areas have been stated below as they are relevant to the consultation as a whole.

AFRY Report

The ESO had not been made aware of the work the interconnector companies commissioned with AFRY, so was not able to supply any information or inputs to this work. There had been discussion that there was a possible CBA being completed, but this was not confirmed, and the scope was also not shared. This is disappointing as it could have presented opportunity to collaborate with the interconnector companies and present a second independent report to further the work that Baringa had completed. The CBA that Baringa completed had inputs from all workgroup members and was conducted as part of a tender process. It is also not clear how the new consultant AFRY was allocated to this work. The analysis presented very briefly at the concluding workgroup meeting was missing a formal report, but also demonstrated, like Baringa's analysis, that ramping rate reductions still present a large saving to the GB consumer and that this therefore reduces balancing costs. The AFRY analysis does not use the same input data to model balancing costs as the Baringa CBA therefore the outputs will differ slightly. The overall message is still clear that reduced ramping will benefit the GB consumer by decreasing balancing costs and does not impact other parties.

Baringa's assessment reported a 55% reduction on balancing costs attributable to IC ramping by reducing the maximum ramp from 100MW/min down to 50MW/min. This is a reduction of £865m. AFRY in turn studied 8 different cases changing the assumptions of the cost of energy, reserve and response, but agreed with Baringa that a maximum ramp of 50MW/min instead of 100MW/min would still attract a 55% reduction of balancing costs attributable to IC ramping. So, it has been proven by the 2 independent consultants that there is an absolute benefit to the GB consumer.

The below table depict the above and use the data in the CBA reports.

		CBA Assessment	Iteration 1	Iteration 2	Iteration 3	Iteration 4	Iteration 5	Iteration 6	Iteration 7	Iteration 8
		Baringa study case	Afry case 1	Afry case 2	Afry case 3	Afry case 4	Afry case 5	Afry case 6	Afry case 7	Afry case 8
Baseline	Cost Static 100MW/min ramp	£1,570m	£1,097m	£915m	£843m	£754m	£883m	£811m	£714m	£522m
Cost 1A	Cost Ramp Management	£1,142m	£798m	£665m	£613m	£549m	£642m	£590m	£519m	£379m
Saving 1A	Savings Ramp Management vs 100MWmin	(£428m)	(£299m)	(£250m)	(£230m)	(£205m)	(£241m)	(£221m)	(£195m)	(£143m)
%saving1A	%Savings Ramp Management vs 100MWmin	27%	27%	27%	27%	27%	27%	27%	27%	27%
Cost 2B	Cost Static 50MW/min ramp	£705m	£493m	£411m	£378m	£339m	£397m	£364m	£321m	£234m
Saving 2B	Saving Static 50MW/min ramp vs 100MW/min	(£865m)	(£604m)	(£504m)	(£465m)	(£415m)	(£486m)	(£447m)	(£393m)	(£288m)
%Saving2B	%Saving Static 50MW/min ramp vs 100MW/min	55%	55%	55%	55%	55%	55%	55%	55%	55%
Cost 3.1	Cost Dynamic Ramp	£773m	£540m	£450m	£415m	£371m	£435m	£399m	£352m	£257m
Saving 3.1	Saving Dynamic Ramp vs 100MW/min	(£797m)	(£557m)	(£465m)	(£428m)	(£383m)	(£448m)	(£412m)	(£362m)	(£265m)
%saving3.1	%Saving Dynamic Ramp vs 100MW/min	51%	51%	51%	51%	51%	51%	51%	51%	51%

Frequency control report

The ISA mentioned that GB has good performance reporting in the Frequency Control Report and questioned why this was needed for system security. GB has been managing the fast ramping of interconnectors by repositioning other units and this has a cost to the GB consumers. The ESO advised that it maintains its frequency to high standards and, as we are an

island, we need to ensure that we have this strong focus. We do not have the flexibility as EU countries with the AC system connections. It is also key to note that the overall rolling average frequency is not the most important statistic. The ESO manage the frequency to ensure there are no frequency events which cause issues to the GB electricity system. High ramp rates have the potential to trigger large frequency excursions when transfers are changing – this is the problem that needs to be solved and is not related to the average frequency values.

With new technology, this brings additional uncertainty. The lack of controllability with new technology means that there is a greater obligation on the system operator to ensure it has the right arrangements in place. More certainty and visibility is key to having a safer and secure system. We must operate in the most efficient and economical manner as part of our licence condition, and therefore are required to reduce balancing costs where possible. Reducing ramping reduces both the balancing costs to consumers, and also allows the control room the ability to manage ramping of interconnectors now, and as more connect in the coming years.

<u>Recent examples</u>
Frequency events continue to be regularly experienced on the system on a weekly basis, where the rate of interconnector ramping is the main contributory factor. For example, on 3/10/23 there was a frequency deviation to 49.687Hz at 19:00hrs and on 10/10/23 there was a deviation to 50.310Hz at 23:00hrs. In both of these recent examples, there were large and fast interconnector swings occurring at the time. As previously demonstrated, occurrence of events like this have been frequent and are expected to increase with more interconnectors connecting to the GB system. It is worth noting that there is a new interconnector, Viking Link (1.4GW), due to go-live in the new year adding another 100MW/min rate.

<u>Ramping rates</u>
The ESO has asked the ISA group why it is concerned by the proposal to reduce ramp rates to 50MW/min. It is not clear why other Synchronous Areas connecting to the same borders with Continental Europe operate with slower ramping limits and this is deemed acceptable, but slowing ramp rates to GB would cause a problem. It is yet to have the answer to this question.

The 50MW/min ramp rate that GB recommends, is lower than the current arrangements for the Continental Europe connected borders. This is however larger than that of the 5MW/min ramp rate on the Irish border and that of the 30MW/min on the border to Norway. There has been concern that the reduced ramping rate will cause issues with imbalance with the connected TSO, however, as this is a fixed number this allows for clarity and the varied arrangements which the GB SO accommodates highlights that it is possible to have different ramping arrangements on opposing borders.

		The Nordic Synchronous Area (which Norway belongs to) recently undertook a similar exercise that GB has been going through – to review ramping arrangements. Norway is also a smaller system operator in its own synchronous area and in order to manage its system security, it reduced the ramping rates to ensure a safe secure system. This explanatory document can be reviewed here and methodology document here. The Nordic SA concluded in their analysis that '*The main objective of ramping restrictions is ensuring security of supply in general and most specifically related to the Nordic frequency quality and the FRCE quality in both the Nordic LFC blocks and in each LFC area. Ramping restrictions especially reduce the size of steps in schedules and therefore limit the size of deterministic changes in both system balance and network loading. Hence, ramping restrictions contribute to mitigating the deterministic frequency deviations (DFDs) and consequently meeting the targets for frequency quality and FRCE quality. Maybe even more important, ramping restrictions may prevent for very large frequency deviations in the Nordic synchronous area and play an important role in safeguarding the network stability.'* *'In addition, ramping restrictions shall limit the need for corrective measures in real-time. I.e. in 'normal operation' the ramping restrictions shall prevent the FCR and aFRR activation for deterministic imbalances, counter trading/redispatch using FRR resources and 'five minutes production shifts'. In the ideal situation, corrective measures will only to be used in unexpected situations'.* *'To sum up, the TSOs consider ramping restrictions on HVDC interconnectors and production BRPs an efficient tool for mitigating large minute-by-minute imbalances at hour shifts, at least until the introduction of the new Nordic Balancing Model and the 15 minutes MTU. However, the assessment also provides some indication that ramping restrictions may be improved and better adapted to the increasing number of HVDC interconnectors.'* These points taken from the Nordics analysis demonstrate that the change that GB recommends is in line with the approach other synchronous areas have implemented and that by reducing ramping rates, this benefits not only the GB consumer by reduced real time balancing actions, but also improves system security in GB and across the rest of European Synchronous Areas. <u>Other</u> The ESO is also keen to note that the workgroup did not have any other parties such as consumer groups, generators, Renewables or DNOs and the view of the ESO versus the other workgroup members was the opposite in most instances. The number of interconnected parties greatly outweighed the System Operator in all discussions.

<table>
<tr><td>5</td><td>Do you agree with the Workgroup's assessment that GC0154 does impact the Electricity Balancing Regulation (EBR) Article 18 terms and conditions held within the Grid Code?</td><td>☒Yes
☐No

This change has an impact on the balancing section of the grid code due to the positioning of ramping rates in the Grid Code.</td></tr>
<tr><td>6</td><td>Do you have any comments on the impact of GC0154 on the EBR Objectives?</td><td>☒Yes
☐No

By including the original proposal into the Grid Code in BC1, this will impact the following EBR objectives
<table>
<tr><td>A</td><td>fostering effective competition, non-discrimination and transparency in balancing markets;</td><td>Positive – slower ramping arrangements means that the ESO has more time to react to changes in interconnector flows. This creates the possibility that other BM units may be able to support any changes, rather than use fast response close to real time.</td></tr>
<tr><td>B</td><td>enhancing efficiency of balancing as well as efficiency of national balancing markets;</td><td>Positive – slower ramping arrangements means that the ESO has more time to react to changes in interconnector flows. This creates the possibility that other BM units may be able to support any changes, rather than use fast response close to real time.</td></tr>
<tr><td>C</td><td>integrating balancing markets and promoting the possibilities for exchanges of balancing services while contributing to operational security;</td><td>Neutral</td></tr>
<tr><td>D</td><td>contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector while facilitating the efficient and consistent functioning of</td><td>Positive slower ramping arrangements means that the ESO has more time to react to changes in interconnector flows. This creates the</td></tr>
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	day-ahead, intraday and balancing markets;	possibility that other BM units may be able to support any changes, rather than use fast response close to real time and increase system security
E	*ensuring that the procurement of balancing services is fair, objective, transparent and market-based, avoids undue barriers to entry for new entrants, fosters the liquidity of balancing markets while preventing undue market distortions;*	**Positive** Reducing ramping means that there is less potential for instructing more costly BM units to manage fast ramping, which in turn could inadvertently result in undue market distortions that may then be passed to the end consumer
F	*facilitating the participation of demand response including aggregation facilities and energy storage while ensuring they compete with other balancing services at a level playing field and, where necessary, act independently when serving a single demand facility;*	**Neutral**
G	*facilitating the participation of renewable energy sources and supporting the achievement of any target specified in an enactment for the share of energy from renewable sources.*	**Positive** Interconnectors can still provide energy from renewable sources and support the goal of net zero