GC0154

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

Meeting 2

17th February 2022

Terms of Reference

Workgroup to agree

nationalgridESO

Objectives and Timeline

Sally Musaka – National Grid ESO Code Administrator

nationalgridESO

Timeline for GC0154 V2 as of 06 December 2021

Milestone	Date	Milestone	Date
Proposal Presented to Panel	16 December 2021	Workgroup 9	11 August 2022
Workgroup 1 – (discussion of the proposal) and solution, agree timeline and review terms of reference	25 January 2022	Workgroup Report issued to Panel (5 working days	17 August 2022
Workgroup 2 (finalise solution to be consulted on and agree alternatives)	17 February 2022	Panel sign off that Workgroup Report has met its Terms of Reference	25 August 2022
Workgroup 3	17 March 2022	Code Administrator Consultation	01 September 2022- 30 September 2022
Workgroup 4	07 April 2022	Draft Final Modification Report (DFMR) issued to Panel	19 October 2022
Workgroup 5	12 May 2022	Panel undertake DFMR recommendation vote	27 October 2022
Work group 6(Consultation questions)	09 June 2022	Final Modification Report issued to Panel to check votes recorded correctly (5 working days)	31 October 2022
Workgroup Consultation (15 Working Days)	20 June 2022– 11 July 2022	Final Modification Report issued to Ofgem	07 November 2022
Work group 7- Assess Work group consultation responses	21 July 2022	Ofgem decision	TBC
Workgroup 8- Finalise solution(s) and legal text, agree that Terms of Reference have been met, Review Workgroup Report and hold Workgroup Vote	04 August 2022	Implementation Date	**10 working days after Ofgem decision**

Workgroup Responsibilities

Sally Musaka – National Grid ESO Code Administrator

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Expectations of a Workgroup Member

- Contribute to the discussion
- Be respectful of each other's opinions
- Language and Conduct to be consistent with the values of equality and diversity
- Do not share commercially sensitive information
- Be prepared - Review Papers and Reports ahead of meetings
- Complete actions in a timely manner
- Keep to agreed scope

Your Roles

- Help refine/develop the solution(s)
- Bring forward alternatives as early as possible
- Vote on whether or not to proceed with requests for Alternatives
- Vote on whether the solution(s) better facilitate the Code Objectives

Action Updates

Sally Musaka – National Grid ESO Code Administrator

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Action Number	Action	Owner	Due by	Status
1	Circulate ToR to workgroup members	SM	25 January 2022	Close
2	Workgroup members to review and comment	All	04 February 2022	Close
3	Workgroup members to agree Terms of Refernce	All	17 February 2022	Open
4	Workgroup members to provide responses to the questionnaire	All	28 January 2022	Close

Workgroup Alternatives and Workgroup Vote

Sally Musaka– National Grid ESO Code Administrator

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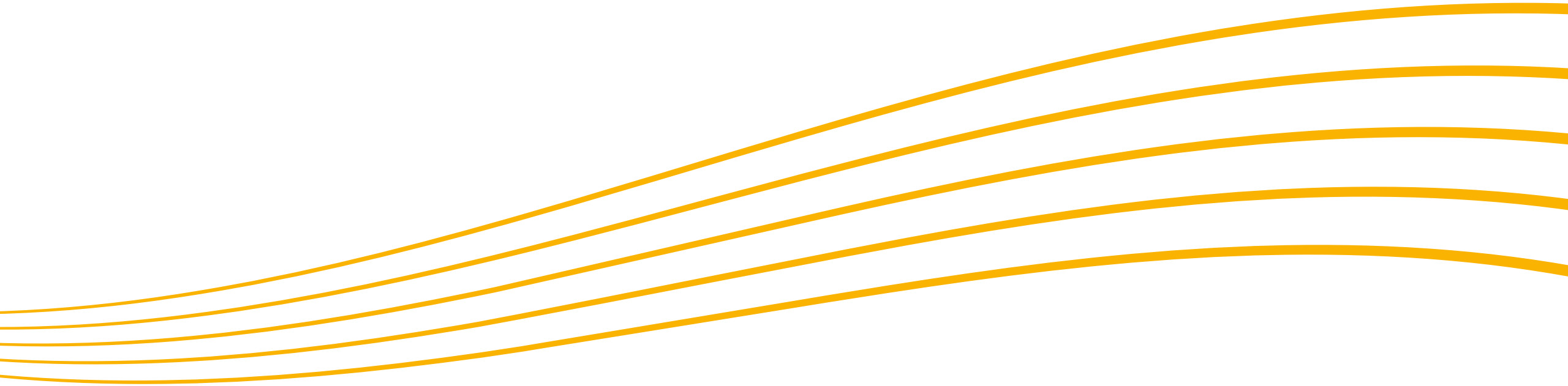
EU TSO Update

Tom Ireland



Drivers to change

Compliance : Current ramping arrangements based on CEGB legacy and subsequent bilateral arrangements. Interconnector ramping must be included in the Grid Code.

Operational: Increasing interconnectors to the system means we need to review the ramping arrangements to ensure secure and economic system operation.

Compliance drivers to change

We are compliant in that we have methodology text which states that we have bi lateral agreements. However Ofgem want these to be in the Grid Code, not in subsidiary documents.

A119 Methodology text to map to codes	Supporting paper reference	Route to compliance
1. Rules for ramping restrictions on the active power output of each HVDC interconnector between a LFC Block of another synchronous area and the GB LFC block, in accordance with SOGL Article 137(3):	N/A	
a. The ESO, and the connecting TSOs supervising a LFC block of an HVDC interconnector shall have the right to determine common ramping restrictions in the form of ramping periods and/or maximum ramping rates and shall enter into agreement with the TSOs responsible for operating the interconnector, to determine the processes and mechanisms by which these restrictions will be put in place. These ramping restrictions shall not apply to imbalance netting, frequency coupling, cross-border activation of FRR or cross-border activation of RR. These ramping restrictions shall not apply to any service aimed at maintaining or returning one of the connected electricity systems to a normal system state.	The ESO has sought to maintain simplicity of application in that compliant regimes already exist on all GB connecting HVDC interconnectors, where the ramping restrictions and manner in which they are applied is agreed and defined in the operational agreements	• Could include the current agreements with IC (taken from Bi laterals) into the code. - But: - there was no CBA done to support any of the current arrangements (legacy 1986) - no guidance for future interconnectors, i.e., full CBA required for each new interconnector

Above table shows the methodology and minimum route to compliance

Compliance drivers to change

We are compliant in that we have methodology text which states that we have bi lateral agreements. However Ofgem want these to be in the Grid Code, not in subsidiary documents.

A119 Methodology text to map to codes	Supporting paper reference	Route to compliance
b. The ramping restrictions for each interconnector shall be applied in a non-discriminatory manner. The ESO shall ensure alignment of ramping restrictions between all HVDC interconnectors linking the same two synchronous areas, taking into account the technical capabilities of each HVDC interconnector;	The ESO wants to demonstrate that all interconnector parties are being treated fairly, but highlights that rules between different synchronous areas may differ as ramping-restrictions imposed from another synchronous area may, if more onerous that those sought by the ESO, result in different rules for those particular interconnectors.	• Specify the connecting synchronous areas in text/reference material
c. A summary of the ramping-restrictions to be applied to HVDC interconnectors connecting to the GB LFC Block, shall be published by the ESO on its website at least one week before the rules are enforced, in accordance with the obligations in SOGL Article 8;	Transparency and fairness is demonstrated by publishing a summary of the ramping-restrictions being applied to GB interconnectors on the internet.	• Include these rates in the code, or a reference to an area on the ESO website

Above table shows the methodology and minimum route to compliance

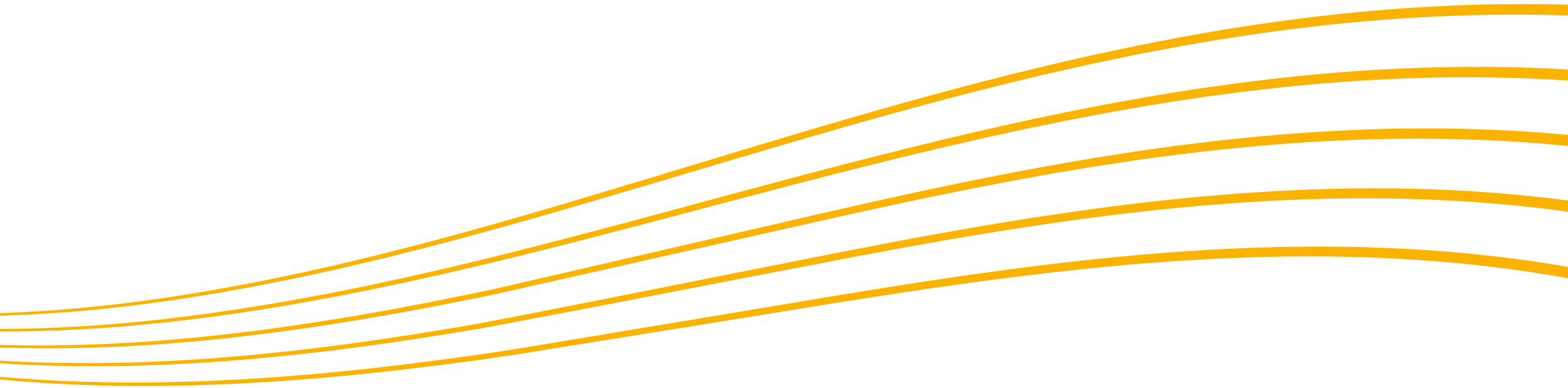
Compliance drivers to change

We are compliant in that we have methodology text which states that we have bi lateral agreements. However Ofgem want these to be in the Grid Code, not in subsidiary documents.

A119 Methodology text to map to codes	Supporting paper reference	Route to compliance
d. The ESO, in order to prevent the GB LFC block from entering into an emergency state, may restrict equitably the ramp rates of GB interconnectors between GB and the same connecting synchronous areas, in coordination with the affected national TSOs and affected interconnector operators according to the terms referred to paragraph (a) of this Article;	There is a need to be able to reduce the ramping-rates being applied to interconnectors when there is a current need or anticipated situation which, without action, would result in Great Britain entering an emergency state. Under these circumstances, the ESO will follow procedures to be determined in the operational agreements between parties to apply reduced ramp-rates to all market-based transfer programs on all the affected interconnectors.	• Ramp management tool could be used to reduce ramping if required in an emergency situation
e. Within 30 calendar days of an incident which restricted one or more of the HVDC interconnectors, under the process referred to in paragraph (d), the ESO shall prepare a report containing an explanation of the rationale, implementation and impact of this action and submit it to the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC and neighbouring TSOs, and also make the report available to all significantly affected system users.	For transparency purposes, the ESO will publish information on the circumstances leading up to the need to reduce ramping-rates and the actions followed until operations were returned to normal ramping-rules.	• Publish details relating to a specific event which resulted in use of the Ramp management tool defined for use in (d)

Above table shows the methodology and minimum route to compliance

Operational Analysis



Operational Drivers to change

What is the operational issue that the ESO faces with IC ramping?

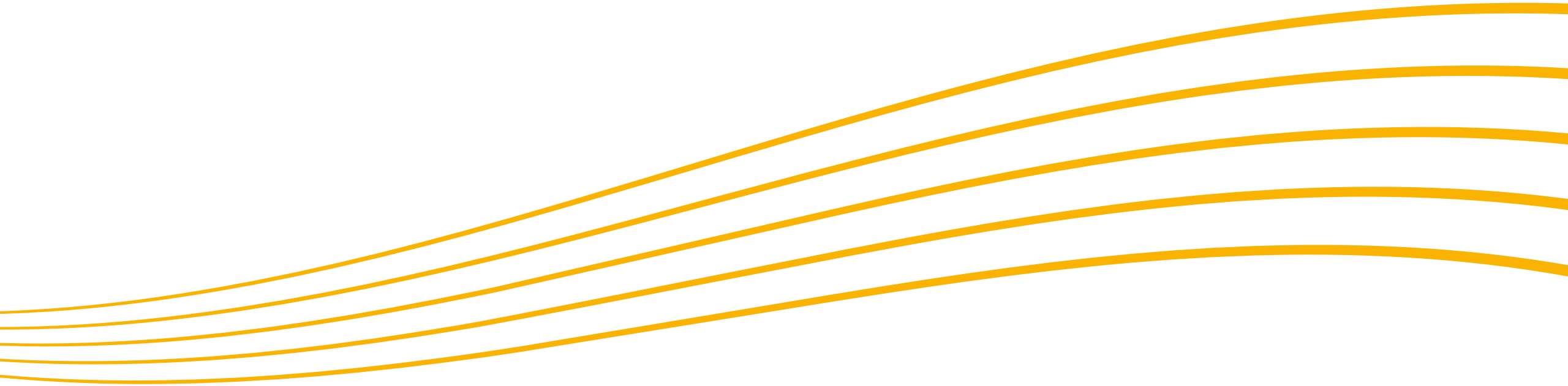
Placeholder for operational analysis – slides to follow

Operational Drivers to change

Feedback from session 1: Data provided by ESO currently can't demonstrate a case to allow the workgroup to make the decision, particularly:
Data provided didn't demonstrate the concern that more interconnectors link to an increased level of large ramping. i.e. based on ESO data, the frequency of hourly changes are at a similar level from 2019 to 2021, despite there are two new interconnectors (IFA2 and NSL) has been commissioned in 2021
Data provided doesn't exclude the changes at the Day Ahead stage, which ESO can take actions ahead of time.
There is no explanation on what actions that ESO has taken to manage the situation and why those actions are not sufficient. And there are some interconnector ramping management tools already provided, they do not appear to be utilised efficiently.
Interconnectors have provided cheap and clean energy to GB as well as CE when required. Market liquidity doesn't support a sudden change on simultaneous ramping on all ICs at the same time. This is confirmed by ESO own analysis that there is no significant change of pattern between 2019 and 2021 despite the IC capacity to CE having increased from c 4GW to c 5.4 GW in 2021.

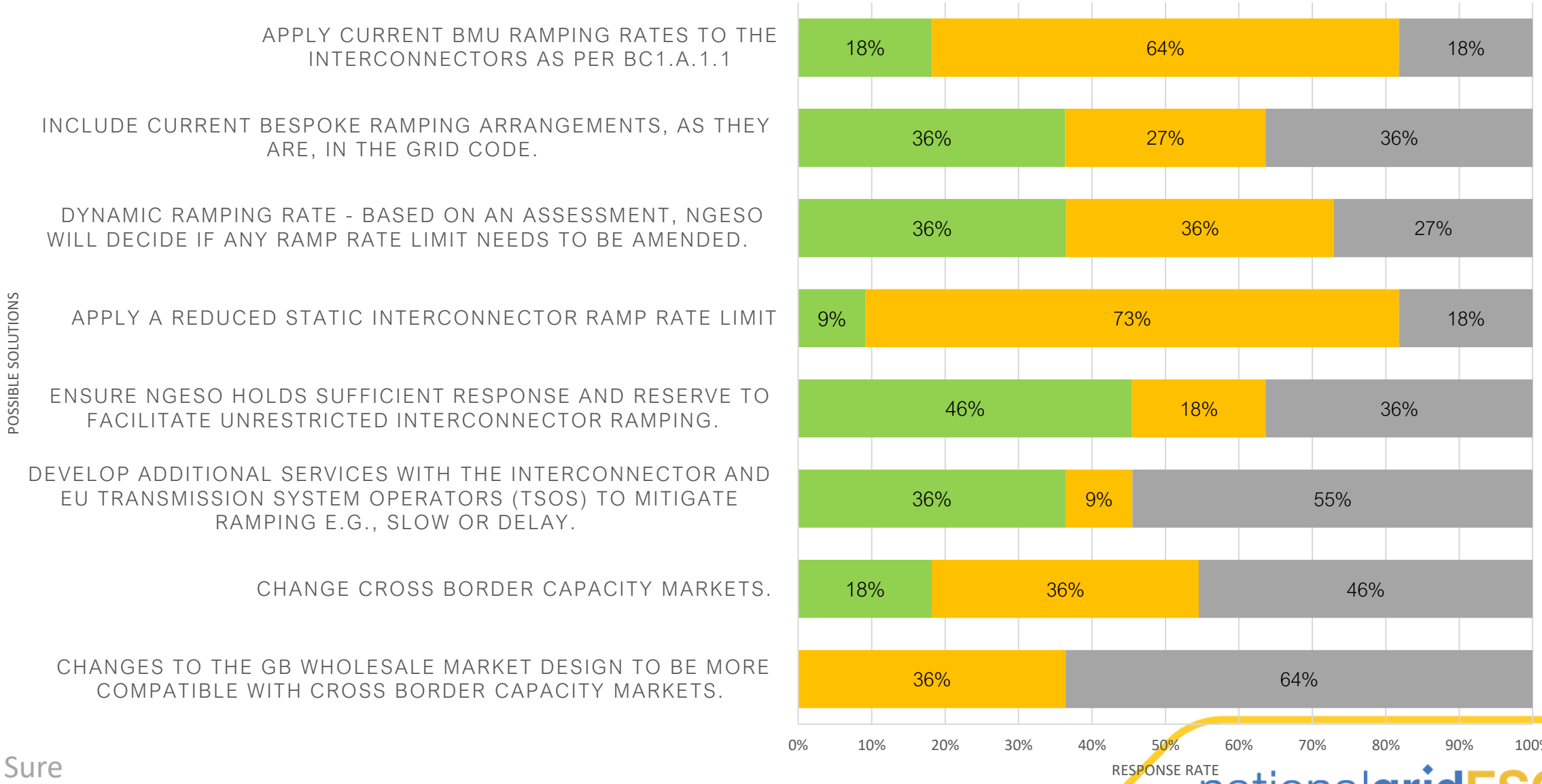
Discussion to be had in the workgroup

Feedback from solutions reviewed in WG 1



Feedback

DO THESE SOLUTIONS MEET THE OBJECTIVES SET OUT IN THE PRESENTATION?



These possible solutions only consider I.EC.BOM.Article 1 (a) in relation to SOGL Article 119.1(c)

Response to survey and feedback

- Feedback so far does not highlight a specific preference on a solution
- All options are still on the table at this time
- We welcome alternate solutions to be presented
- Key point is that we want to be sure that we focus time on developing the right options which are resilient for the future of the transmission system

- Question for the WG
- Considering the possible solutions we reviewed in the last session. What can we do to turn the not sure responses, into a yes or a no?

Response to survey and feedback

Questions/thoughts raised around the possible solutions	ESO response
Should we have a markets based solution?	We already use market based solutions to manage ramping. This ask is to consider system operation guidelines (SOGL) requirements and include in the Grid Code
Will we run CBA on this process? Inclusive of all stakeholders and consumers	We will conduct CBA to support identifying suitable solutions. We will want to include technical analysis and operational feasibility within this.
We feel there is a strong case for codifying the current IC ramping limit of 100 MW/min.	This could be a way forward should the workgroup feel it is right and the CBA shows the most efficient way forward
Consider using a mix of tools to manage ramping	This could be a way forward should the workgroup feel it is right and the CBA shows the most efficient way forward
Why do the existing ramp management tools not work	Changes to GC time mean this is not possible to use Not available on all IC Expensive instructions Also does not fit the requirements in the methodology text

Response to survey and feedback

Questions/thoughts raised around the possible solutions	ESO response
Interaction of operational, technical and commercial issues need to be considered more fully.	Consider the 3 points in solution development- could use these for some of the assessment criteria in developing the right solution. This is the point for the working group to consider.
To consider if EA procedures could be used	SOGL states: *'these ramping restrictions shall not apply to any service aimed at maintaining or returning one of the connected electricity systems to a normal system state'.* This would assume that the current EA route would not enable compliance. Ramp management products are being reviewed, but these can not be used to manage ramping (unless emergency instructions are required) Arguably more expensive, manual process and can cause an issue further down the line as ramping in these situations are usually faster.

Response to survey and feedback

Alternative possible solutions	
We are keen to work with ESO for a suite of tools and systems to allow ESO to manage the ramping more effectively particularly to help the possible changes in the future. This includes: - Working with ESO, to understand how the new technology (i.e. battery) and new market design can help ESO manage ramping for ICs and other generation assets - Effective utilise and design additional services with ICs and other technologies - A dynamic overall ramping rate, is only derived based on a verified market condition if above market solution doesn't work. - Change of GB wholesale market design and IC capacity market which might be the enduring solution	Could be considered in the working group as this would help scope the operational drivers. Group to consider how this fits into the work with the TCA and Cross Border Balancing work?
Establish cross border Frequency response on all borders through the ICs	Could this be a product like MARI or TERRE, or developed through TCA and Cross Border Balancing work
Change to a 5 minute settlement period to address the root cause. Not an easy change!	Question: Is this a GB MTU suggestion? Or is this the IC MTU suggestion?
Create a market for ramp rates. NGESO set a maximum ramp rate for each period of the day and then interconnectors bid for the use of this ramp rate.	Question: what is the max ramp rate – GB ramp or IC?
We feel there is a strong case for codifying the current IC ramping limit of 100 MW/min.	Question: What is the benefit of 100MW/min?

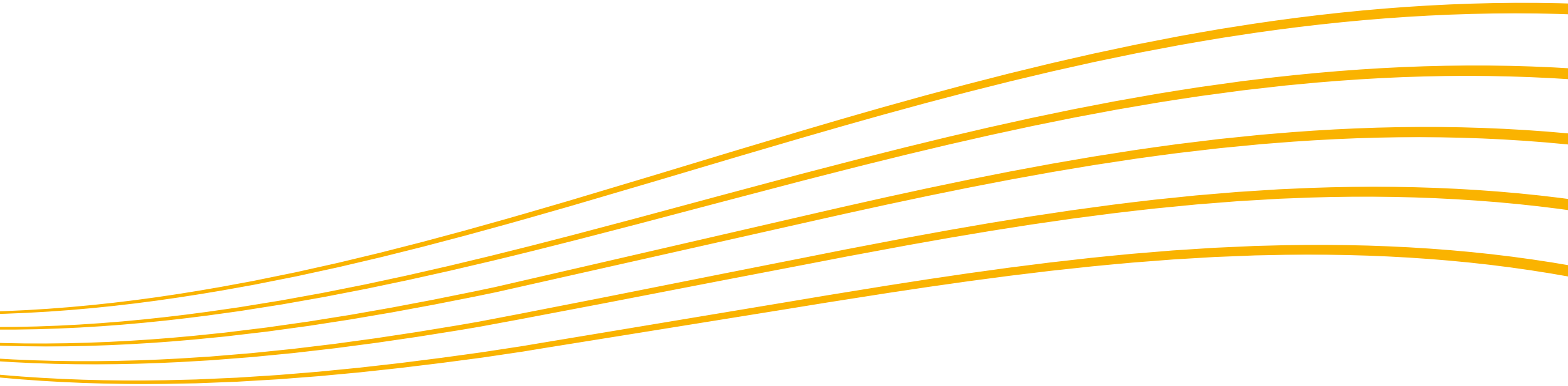
Concerns raised in Feedback form

Concerns	ESO Response
Real concern over any solutions that require agreements with external TSOs on an ongoing basis. Experience to date is that this is very difficult.	Tom Ireland to have meetings in line with these sessions and feedback to each group. We will record as a risk to monitor.
Transparency & fairness - prefer a solution that is not bespoke and can be published, rather than individual arrangements.	Transparency fits the requirements in SOGL- *A summary of the ramping-restrictions to be applied to HVDC interconnectors connecting to the GB LFC Block, shall be published by the ESO on its website at least one week before the rules are enforced, in accordance with the obligations in SOGL Article 8*
NGESO must not be imposed to higher balancing costs which would be imposed by holding more response, changing the GB market etc.	The ESO are committed to looking to keep security of supply at a minimum cost – keeping the balance between reliability and affordability for the end consumer
A slow, static rate, will sometimes hinder system operation and lead to additional costs.	This is logged as a con in our solutions table
The existing IC ramping regimes are not tenable in the medium term, once additional IC connect, and will increase the overall cost to consumers.	Our operational drivers shared highlight that we are mindful of this impact

Concerns raised in Feedback form

Concerns	ESO Response
Options 1, 3 and 4 will: - lead to additional imbalance exposure for merchant ICs	Will need to be reviewed in Cost Benefit Analysis (CBA)
-shift operating costs that should be borne and managed by NGESO to the merchant ICs which is unacceptable and legally challengeable	Will need to be reviewed in CBA
-large system changes would be required and currently these options are not feasible	Will need to be reviewed in CBA
-limiting ramp rates cannot be considered as efficient for the market and does set wrong balancing incentives	Will need to be reviewed in CBA
-will disincentives and will create additional issues for the development of a north sea offshore grid and incorporation of Multi-Purpose-Interconnectors (MPIs)	Consider this in our CBA. This may depend on definition of what MPI is?
Not at this stage but it still feels that the workgroup isn't fully aligned on what the problem is that is trying to be solved so we need to really clearly define the scope.	Compliance is to include ramping into the code. Operationally and to make this resilient for now, and the future, the current arrangements need to be reviewed

Possible solutions to review- updated with stakeholder feedback



Apply current BMU ramping rates to the interconnectors as per BC1.A.1.1

ESO View	Stakeholder views
PRO	PRO
• We already have ramping requirements in the Grid Code which apply to BMU's. To extend these to the interconnectors would be a more simplistic change in the Grid Code • This would give parity to all Grid Users with the same ramping requirements for all parties	
CON	CON
• The requirements in the Grid Code are slower than that currently agreed with some interconnectors • The arrangements in the Code are not reflective of the current generation mix and will be reviewed this year- could be amended post another code change • There is not a permanent need to slow ramping down, it is just when the system needs it for security of supply • EU TSO's would not support it	Lower IC ramp rates should only be applied in those periods when there is an actual system need (i.e. no lower fixed ramping rates) - ramps rates are very restrictive (40-50MW/min) option 1- these rates would impact current interconnectors and penalise their current market dynamics- would also limit opportunities available for faster ramping- i.e. the profiling of ramping within the hr discussed earlier, and scenarios when ramping e.g. at time of margin stress/ offsetting the ramping of others is desirable. option 1 -would also require controller redesign to set multi ramp rates for given profiles

Current Grid Code legal text – BC1 BM Unit data

BC1.A.1.1 Physical Notifications

For each **BM Unit**, the **Physical Notification** is a series of MW figures and associated times, making up a profile of intended input or output of **Active Power** at the **Grid Entry Point** or **Grid Supply Point**, as appropriate. For each **Settlement Period**, the first "from time" should be at the start of the **Settlement Period** and the last "to time" should be at the end of the **Settlement Period**.

The input or output reflected in the **Physical Notification** for a single **BM Unit** (or the aggregate **Physical Notifications** for a collection of **BM Units** at a **Grid Entry Point** or **Grid Supply Point** or to be transferred across an **External Interconnection**, owned or controlled by a single **BM Participant**) must comply with the following limits regarding maximum rates of change, either for a single change or a series of related changes :

- for a change of up to 300MW — no limit;
- for a change greater than 300MW and less than 1000MW — 50MW per minute;
- for a change of 1000MW or more — 40MW per minute,

unless prior arrangements have been discussed and agreed with **The Company**. This limitation is not intended to limit the Run-Up or Run-Down Rates provided as **Dynamic Parameters**.

An example of the format of **Physical Notification** is shown below. The convention to be applied is that where it is proposed that the **BM Unit** will be importing, the **Physical Notification** is negative.

Grid Code BC1 and appendix

Include current bespoke ramping arrangements, as they are, in the Grid Code BC1.A1.1

ESO View	Stakeholder views
PRO	PRO
• As there is already ramping set out in the Grid Code in BC1.A.1.1 for BMU's, we could include an additional annex for interconnector ramping, or section for interconnector ramping to be detailed • There would be no operational changes to the current processes for interconnectors • Transparency of all generation types ramping would be in the Grid Code	• Realistic to implement
CON	CON
• SOGL states agreed ramping should not discriminate when it's applied • A change to the Code may be required to include this for each new connected interconnector • This maintains totally bespoke arrangements for each interconnector • This is the do nothing option, just keep it as it, but publish the rates. Either as an annex or in the section of code – it does not solve the issues that are arising operationally with the increasing interconnector connections or fully comply with the methodology text which Ofgem have agreed	Option 2 could come with a market solution to a market issue? e.g. at the day ahead stage ESO could identify the cost impact of potential 60min ahead trades and reflect those costs into the imbalance cost reflected at an hr ahead. if at the same time, the opportunity both to reprofile ramping and obtain services from interconnectors to offset these impacts was known, would that not improve the capability to make efficient decisions- both on the interconnector and system operator sides- again I'm trying to think of something that is sustainable that could set a wider precedent across other areas of cumulative within day ramping we will face, that could be scaled.

Dynamic ramping rate - based on an assessment, NGESO will decide if any ramp rate limit needs to be amended

ESO View	Stakeholder views
PRO	PRO
• By having a dynamic ramp rate, this will allow new and existing interconnectors to ramp at a standard rate which suits current system capacity. Our thoughts to do this are to forecast this in advance, based on Physical Notification's (PN) • This could influence thoughts for ramping to suit other generation types and was a suggestion in a previous meeting • There is an opportunity to review how this works with other TSO who follow this approach	Seems future proof. A dynamic ramp rate can alter cross border flow to meet system conditions at the time. A close to real time ramp rate service/ tool, ensures that fine tuning is possible. An adjustment to capacity auctions may dramatically help this situation without leading to negative impacts elsewhere. Good for the consumer- flexibility on restrictions required by NGESO's balancing and system issues whilst still giving the interconnectors markets potential for a fast ramp rate and therefore better capacity markets available and flexible fast generation forms to the consumer Possibly acceptable as limits impact to only those hours where there is a need. However, - only acceptable if Nemo Link is kept financially firm for imbalances - ramping needs to be equally shared across all ICs that have capability -> no discrimination - solution would need to be agreed with EU TSOs/ ENTSO-E
CON	CON
• Current data provided to the ESO may not allow for enough time to forecast this accurately • Creates uncertainty of future operating conditions for a new interconnector or EU TSO • Consideration of a new section of the code for interconnectors may be required rather than to amend the current section to allow for compliance	

Apply a reduced static interconnector ramp rate limit

ESO View	Stakeholder views
PRO	PRO
• By applying a static rate that interconnectors can ramp at gives equal treatment to all interconnectors • This could be applied into the Grid Code in the Balancing code annex alongside ramping for other parties • Retains a certainty and transparency of the existing approach	
CON	CON
• Difficult to forecast the appropriate ramp rate- the optimum ramp rate changes with system conditions • Concerns over substantial imbalance costs • This could significantly damage the socio-economic benefit from the interconnector	• Not acceptable: - lower IC ramp rates should only be applied in those periods when there is an actual system need (i.e. no lower fixed ramping rates)

Ensure NGESO holds sufficient response and reserve to facilitate unrestricted interconnector ramping

ESO View	Stakeholder views
PRO	PRO
• Allows for existing interconnector protocols to be continued • Market-based solutions have been expressed as a way to solve this defect • Demonstrates the cross border value of interconnectors	• Realistic to implement
CON	CON
• Consequential operational risk- not enough reserves, inertia and voltage issues. What is Plan B? • Does not tackle the cause of the issue (IC ramps), it deals with the symptom. • Procurement cost would be high. Who would be able to pick up this cost and check it is cheaper overall for consumers?	

Develop additional services with the interconnector and EU Transmission System Operators (TSOs) to mitigate ramping e.g. slow or delay

ESO View	Stakeholder views
PRO	PRO
• Having commercial agreements with the interconnectors could support a range of system conditions • Allows ESO to value a user operating flexibly • Service would only be used when required	Assuming mandatory – seems future proof option 6 - i.e. to solve any predicted/actual system operability issues that stop short of an emergency situation by procuring the necessarily services on a commercial basis. This would provide the ESO with the price signals to make informed decisions about system operation without restricting ICs ability to efficiently operate their assets. Possible good thing- good for the ESO to manage balancing and system issues to alter in real time Additional services is likely to yield a more effective solution if sufficiently widely agreed Nemo Link supports to investigate this further. Could offer a market-based way for NGESO to perform ramping management.
CON	CON
• Introduces bespoke interconnector treatment • Requires active controls • Could create limited number of providers	• In real time this is not sufficient to solve the problem as there is a lot manual work to do by NGESO and the EU TSO involved

Changes to the GB wholesale market design to be more compatible with cross-border capacity markets

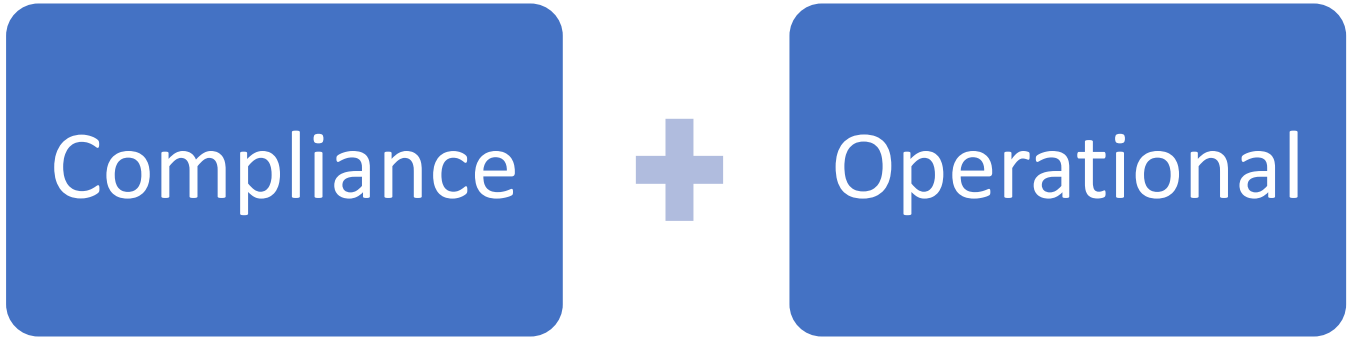
ESO View	Stakeholder views
PRO	PRO
• Could facilitate different ramp rates in the whole GB area • A forward looking, market-based approach • Could link in with the TCA cross-border balancing work	• Could be good to move the plus/minus 5 or 10 min around each MTU as it would allow for a longer ramp period meaning potential for slower ramp rates and therefore possible better balanced with actual demand whilst also not causing the So such a large balancing issue and high costs .
CON	CON
• Could be duplicating work in the TCA or could require rework through the TCA • Changes to the GB wholesale market is very complex • Could also require changes to the EU Markets	This solution (and solution 8) are not fully understood, but in general, adjusting DA/ID auctions to deal with ramping appears disproportionally costly and complex and may have a detrimental impact on our capacity auctions. Nemo Link does not support. The change of specific ramping with cross border MKT conditions could be the key to switch to the dynamic ramp rates and at the same time establish a compensation for the implied Ics

Change cross border capacity markets

ESO View	Stakeholder views
PRO	PRO
• An alternative auction design may also have other wider benefits • A forward looking, market-based approach • Could link in with the TCA cross-border balancing work	
CON	CON
• Not a decision that the ESO is able to easily influence • Could be duplicating work in the TCA or could require rework through the TCA • Could reduce the efficiency of interconnector capacity auctions	This solution (and solution 8) are not fully understood, but in general, adjusting DA/ID auctions to deal with ramping appears disproportionally costly and complex and may have a detrimental impact on our capacity auctions. Nemo Link does not support. With explicit auctions, I don't believe you could influence ramp rates at the auction stage given nominations happen separately and after the auction. Unless NGESO would raise DA/ID NTC restrictions in order to pre-empt big ramps (which would be very costly)

Summary and Next Steps

Q: Does the workgroup agree that there are 2 points to address?



Next steps

ESO to consider and review feedback received in meeting today
ESO to share a survey to gather views from stakeholders in relation to new solutions
Continue to evidence operational requirement for change
Align preferences of solutions to defect if possible
Start to consider what we need from the CBA

Annex

Assumptions

The aim is to map the requirements of Article 119 to the Grid Code as requested by Ofgem.

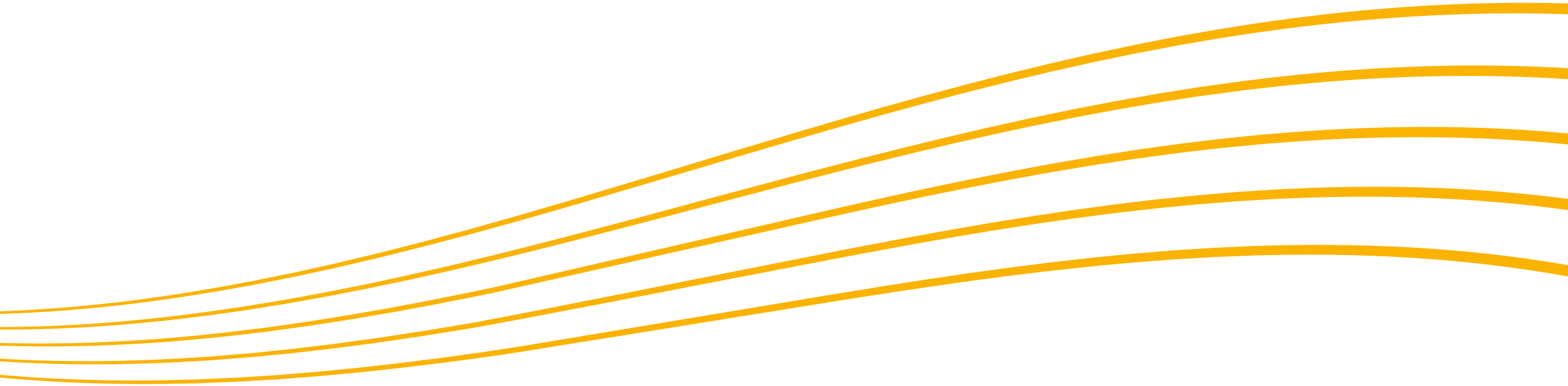
This will require the ESO and stakeholders to work collaboratively to find a solution that aligns with the text which has been written and approved.

The solution needs to consider the requirements of the transmission system now and be resilient enough for the future.

Cross –border ramping is a shared decision with the remote end EU System Operator. Therefore, their involvement and coordination with this process is key to ensure a mutually acceptable solution.

Ramping for BMUs will be considered outside this modification.

SOGL Articles to review



Ramping restriction for active power output - Article 119 (c)

LFC block operational agreements

1. By 12 months after entry into force of this Regulation, all TSOs of each LFC block shall jointly develop common proposals for:

   (a) where the LFC block consists of more than one LFC area, FRCE target parameters for each LFC area defined in accordance with Article 128(4);

   (b) LFC block monitor in accordance with Article 134(1);

   (c) ramping restrictions for active power output in accordance with Article 137 (3)* and (4)

*outstanding action

Text taken from the SOGL

Ramping restriction for active power output
Article 137 (3) & (4) of SOGL

	Code mapping
3. All connecting TSOs of an HVDC interconnector shall have the right to determine in the LFC block operational agreement common restrictions for the active power output of that HVDC interconnector to limit its influence on the fulfilment of the FRCE target parameter of the connected LFC blocks by agreeing on ramping periods and/or maximum ramping rates for this HVDC interconnector. Those common restrictions shall not apply for imbalance netting, frequency coupling as well as cross-border activation of FRR and RR over HVDC interconnectors. All TSOs of the GB synchronous area shall coordinate these measures within the synchronous area.	
4. All TSOs of an LFC block shall have the right to determine in the LFC block operational agreement the following measures to support the fulfilment of the FRCE target parameter of the LFC block and to alleviate deterministic frequency deviations, taking into account the technological restrictions of power generating modules and demand units: (a) obligations on ramping periods and/or maximum ramping rates for power generating modules and/or demand units; (b) obligations on individual ramping starting times for power generating modules and/or demand units within the LFC block; and (c) coordination of the ramping between power generating modules, demand units and active power consumption within the LFC block.	BC1.A.1.1

Highlighted to show gap to close

Text taken from the SOGL

LFC Block Operational Methodology for Article 119 (1) (c)

A119 Methodology text to map to codes	Supporting paper reference
1. Rules for ramping restrictions on the active power output of each HVDC interconnector between a LFC Block of another synchronous area and the GB LFC block, in accordance with SOGL Article 137(3):	N/A
a. The ESO, and the connecting TSOs supervising a LFC block of an HVDC interconnector shall have the right to determine common ramping restrictions in the form of ramping periods and/or maximum ramping rates and shall enter into agreement with the TSOs responsible for operating the interconnector, to determine the processes and mechanisms by which these restrictions will be put in place. These ramping restrictions shall not apply to imbalance netting, frequency coupling, cross-border activation of FRR or cross-border activation of RR. These ramping restrictions shall not apply to any service aimed at maintaining or returning one of the connected electricity systems to a normal system state.	The ESO has sought to maintain simplicity of application in that compliant regimes already exist on all GB connecting HVDC interconnectors, where the ramping restrictions and manner in which they are applied is agreed and defined in the operational agreements

Text taken from the LFC block operational agreement

LFC Block Operational Methodology for Article 119 (1) (c)

A119 Methodology text to map to codes	Supporting paper reference
b. The ramping restrictions for each interconnector shall be applied in a non-discriminatory manner. The ESO shall ensure alignment of ramping restrictions between all HVDC interconnectors linking the same two synchronous areas, taking into account the technical capabilities of each HVDC interconnector;	The ESO wants to demonstrate that all interconnector parties are being treated fairly, but highlights that rules between different synchronous areas may differ as ramping-restrictions imposed from another synchronous area may, if more onerous that those sought by the ESO, result in different rules for those particular interconnectors.
c. A summary of the ramping-restrictions to be applied to HVDC interconnectors connecting to the GB LFC Block, shall be published by the ESO on its website at least one week before the rules are enforced, in accordance with the obligations in SOGL Article 8;	Transparency and fairness is demonstrated by publishing a summary of the ramping-restrictions being applied to GB interconnectors on the internet.

Text taken from the LFC block operational agreement

LFC Block Operational Methodology for Article 119 (1) (c)

A119 Methodology text to map to codes	Supporting paper reference
d. The ESO, in order to prevent the GB LFC block from entering into an emergency state, may restrict equitably the ramp rates of GB interconnectors between GB and the same connecting synchronous areas, in coordination with the affected national TSOs and affected interconnector operators according to the terms referred to paragraph (a) of this Article;	There is a need to be able to reduce the ramping-rates being applied to interconnectors when there is a current need or anticipated situation which, without action, would result in Great Britain entering an emergency state. Under these circumstances, the ESO will follow procedures to be determined in the operational agreements between parties to apply reduced ramp-rates to all market-based transfer programs on all the affected interconnectors.
e. Within 30 calendar days of an incident which restricted one or more of the HVDC interconnectors, under the process referred to in paragraph (d), the ESO shall prepare a report containing an explanation of the rationale, implementation and impact of this action and submit it to the relevant regulatory authority in accordance with Article 37 of Directive 2009/72/EC and neighbouring TSOs, and also make the report available to all significantly affected system users.	For transparency purposes, the ESO will publish information on the circumstances leading up to the need to reduce ramping-rates and the actions followed until operations were returned to normal ramping-rules.

Text taken from the LFC block operational agreement

Summary and Next Steps