Informal feedback from Ofgem and Utility Regulator on the report of the UK and EU TSOs on further analysis and answers to additional technical questions requested by the SCE

Executive Summary

Following the completion and submission of the Cost-Benefit Analysis on potential design options for Multi-Region Loose Volume Coupling (the MRLVC CBA) to the relevant regulatory authorities and the Specialised Committee on Energy (the SCE) in April 2021, and pursuant to the SCE Recommendation issued in February 2023, the UK and EU Transmission System Operators (TSOs) jointly developed and submitted a preliminary report with further analysis and answers to the additional technical questions asked by the SCE (the MRLVC Report) to the relevant regulatory authorities in June 2023.

This document constitutes informal feedback of the UK Regulators[1] on the MRLVC Report and has been prepared jointly by Ofgem and Utility Regulator and does not make any assurance or representation as to the completeness or fitness for any purpose. It provides a high-level assessment of the presented material, whilst simultaneously identifying areas which require further consideration and development in the next phase of the project and any other relevant concerns, but should not be relied upon, forwarded or circulated for any purpose except as intended and agreed with Ofgem and Utility Regulator. The document does not restrain the discretion of Ofgem or Utility Regulator in providing a formal opinion on any further analysis or on the final set of technical procedures as required by the Trade and Cooperation Agreement (the TCA) under Article 317(3).

[1] Ofgem is the Office of Gas and Electricity Markets, and the energy regulator of Great Britain. Utility Regulator is the Utility Regulator of Northern Ireland. For the purpose of this joint feedback document, both are referred to together as "the UK Regulators". The terms "the UK Regulators", "we", "us" and "our" are used interchangeably in this document and reflect joint views and positions of Ofgem and Utility Regulator.

The UK Regulators provide the following opinions as informal feedback to the UK TSOs and to the Department for Energy Security and Net Zero (DESNZ) and the Department for the Economy (DfE):

- We recommend against pursuing the preliminary orderbooks option due to envisaged inefficiencies and risks related to potential market manipulation and difficulties in preventing such actions.
- Before any further firm feedback can be provided on the common orderbooks option, we recommend, as a matter of priority, investigating further and building a prototype of a Bordering Bidding Zone Flow Forecast Methodology (BBZFFM) tool to assess its accuracy and efficiency and associated potential impacts on welfare gains of MRLVC in comparison to explicit trading. It would also be beneficial to consult all interested parties, including UK and EU market participants, to provide scrutiny and broaden perspectives and evidence.
- Futureproofing of the MRLVC solution is key, therefore we recommend, as a matter of priority and in parallel to investigating the accuracy of the BBZFFM, examining in further detail how MRLVC could work with hybrid offshore projects/meshed grids in the North Sea, and what are the benefits, challenges and trade-offs between explicit allocation and MRLVC for these assets (as well as if and how these projects could be integrated within MRLVC).
- The Single Electricity Market (SEM) and GB border remains uncoupled at the day-ahead stage and there is no provision for explicit allocation. The UK Regulators observe persistent economically inefficient differentials between the dominant isolated SEM day-ahead and the smaller intraday market (which is coupled with GB). As such we consider it important that this dynamic be fully reflected in estimations of welfare benefits of MRLVC going forward.
- We consider that at a later stage of the project, and if MRLVC is chosen as the preferred way forward (subject to the key considerations on accuracy of BBZFFM), implications on timings, processes and procedures of both GB market and EU Single Day Ahead Coupling market (SDAC) should be further considered and robustly tested, including potential impacts of the introduction of 15-minute Market Time Unit (MTU) in SDAC and expanding more on the impacts of MRLVC on market participants and existing operational procedures in the GB market.
- Furthermore, we consider that the trade-offs between the timings and the quality of MRLVC forecasts and associated processes should be carefully explored, so that the reduction in quality of the MRLVC outcomes does not impact negatively on the overall market outcomes and welfare (e.g. by unintentionally increasing the risk of Flows Against Price Difference (FAPDs)). This also includes further careful considerations on the trade-offs of re-running the MRLVC calculations in case of operational incident scenarios.

- We consider other future development areas in both the UK and the EU, identified in the MRLVC Report, to be relevant and substantial and we agree that these should be considered when designing the final MRLVC solution. Nevertheless, we believe that the two core areas to be investigated as part of the immediate next phase of the project as the matter of priority are BBZFFM and interactions, efficiency and welfare analysis of MRLVC in relation to offshore hybrid projects and related market arrangements (bidding zone configuration).
- Furthermore, we would like to highlight that there are some other issues remaining, that were pointed out in the informal feedback on the MRLVC CBA provided by the UK Regulators in 2021 and also reiterated in this informal feedback, which should be investigated further once the accuracy of the BBZFFM and the efficiency of the MRLVC solution is known. This includes, but is not limited to, issues such as validation processes and fallback arrangements or alternative design options considered in the original MRLVC CBA to avoid FAPDs as well as governance procedures. We consider that validation processes and fallback arrangements are crucial in any market design and key to developing a robust MRLVC solution and therefore require additional research and further examination, taking into account the importance of the day-ahead price signals for the market.
- In terms of implementation and associated timelines, the UK Regulators recommend that the project plan should include regular reporting periods that give assurances to all parties that the project is on track to achieve its specific objectives. We would also like to highlight the need for a robust and transparent consultation process that should be included across relevant stages of implementation of MRLVC.
- In relation to the provided costs estimates, we are unable to fully comment on this matter and note that estimates of benefits and costs should be carefully weighed against each other once both are better understood following the further activities we recommend, for example developing a working prototype of the BBZFFM.
- When considering the final design, parties should take into account how the day-ahead MRLVC processes would interact with other timeframes (e.g. long-term and intraday capacity allocation) and processes (e.g. capacity calculation).

The UK Regulators recognise and wish to highlight the importance and the necessity of more efficient cross-border trading arrangements in facilitating competition, security of supply at lower costs to consumers, integration of renewable generation in electricity systems, future development of offshore hybrid infrastructure in the North Sea and helping to support more flexible energy systems.

We would like to take this opportunity and recognise and acknowledge the hard work undertaken so far by both the UK and EU TSOs when completing both the MRLVC CBA and the MRLVC Report.

We look forward to the SCE deciding at pace on the next steps of this project and we remain open for any discussions with, and providing further advice to, relevant parties and stakeholders within the UK and the EU.

Table of Contents

Executive Summary **1**

Introduction, context and scope **6**

Preliminary Orderbooks – orders and market manipulation issues **9**

Operational impacts of both Common Orderbooks and Preliminary Orderbooks **13**

Bordering Bidding Zone Flow Forecasting Methodology **17**

Timelines and costs **19**

Future developments and outstanding issues **21**

Conclusions and next steps **24**

Introduction, context and scope

On 24 December 2020, the United Kingdom (the UK) and the European Union (the EU) agreed on the Trade and Cooperation Agreement (the TCA)[2]. The TCA requires the UK and EU Transmission System Operators (TSOs) to develop new procedures for the implicit allocation of cross-border capacity on electricity interconnectors in the day-ahead timeframe, based on the concept of Multi-Region Loose Volume Coupling (MRLVC).

At the beginning of 2021, the UK and EU TSOs have jointly developed a Cost-Benefit Analysis on potential design options for MRLVC (the MRLVC CBA). The MRLVC CBA identified two main design options – preliminary orderbooks (POB) and common orderbooks (COB). The main difference between the two design options is that POB uses a snapshot of orderbooks from Bordering Bidding Zones (BBZs) within the EU Single Day Ahead Coupling market (SDAC) available 15 minutes before SDAC gate closure time (SDAC GCT), whereas COB assumes usage of complete orderbooks from both GB and SCAC markets and common GCT across the two markets. The MRLVC CBA also identified the importance of the accuracy of the Bordering Bidding Zone Flow Forecasting Methodology (BBZFFM) – which would forecast net positions between BBZs and the rest of SDAC - on efficiency of MRLVC and highlighted that further research is needed in that area, as well as in other areas such as futureproofing the design and extending the MRLVC design to hybrid offshore projects in the North Sea, such as Multi-Purpose Interconnectors (MPIs).

In April 2021, the UK and EU TSOs jointly submitted the MRLVC CBA to the relevant regulatory authorities for feedback. On 4 May 2021, Ofgem and Utility Regulator (the UK Regulators) provided their feedback on the MRLVC CBA to both the UK TSOs and to the Department for Business, Energy and Industrial Strategy (BEIS)[3] and the Department for the Economy (DfE). Similarly, on 3 May 2021, the Agency for the Cooperation of European Regulators (ACER) provided their informal opinion on the MRLVC CBA to the EU TSOs and the European Commission (the EC). Subsequently, between 26 April and 16 May 2021, the UK and EU TSOs carried out a public consultation on results of the MRLVC CBA[4].

[2] Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part. It was applied on a provisional basis from 30 December 2020 until it entered into force on 30 April 2021 at 11.00 pm UK time. We note that this date is known to our European stakeholders as 1 May 2021 (due to time zones difference). Links: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:22021A0430(01) and https://www.gov.uk/government/publications/ukeu-and-eaec-trade-and-cooperation-agreement-ts-no82021

[3] In February 2023, the Department for Energy Security and Net Zero (DESNZ) was established which took over energy policy responsibilities from the former Department for Business, Energy and Industrial Strategy (BEIS).

[4] https://consultations.entsoe.eu/markets/cost-benefit-analysis-of-multi-region-loose-volume/

On 7 February 2023, the Specialised Committee on Energy (the SCE)[5] adopted a recommendation (the SCE Recommendation) requesting the UK and EU TSOs to perform further analysis and provide answers to additional technical questions asked by the SCE[6]. These questions were related to a variety of issues, but predominantly focused on POB and exploring associated risks of market manipulation due to the use of partial orderbooks, impacts on SDAC timings in the context of COB and on key issues, principles, parameters and expected performance of BBZFFM, as well as implementation timelines and associated costs of MRLVC.

In June 2023, the UK and EU TSOs jointly submitted a preliminary report with further analysis and answers to the additional technical questions asked by the SCE (the MRLVC Report) to the relevant regulatory authorities for feedback pursuant to the SCE Recommendation.

The main findings of the MRLVC Report provided by the UK and EU TSOs are:

- POB option is associated with significant inefficiencies and risk of market manipulation, since orderbooks undergo material revisions 15 minutes before SDAC GCT, and no adequate solutions to prevent that risk were identified.
- COB design will impact SDAC timings in both normal conditions and under operational incident scenarios. Reducing time for MRLVC calculations and processes would likely come with trade-offs in quality of MRLVC results.
- Under certain assumptions and with relatively limited data available, MRLVC can potentially provide improved economic welfare compared to existing explicit allocation mechanisms in the range of approximately [redacted] per year. Nevertheless, this is highly contingent on the accuracy of the BBZFFM and does not include additional non-trivial considerations such as impacts on the TSOs – i.e. negative congestion income and unfunded financial pay-outs due to forecasted flows against price difference (FAPDs).
- The report confirms that the efficiency of the COB option would be significantly impacted by the accuracy of the BBZFFM and states that further refinement, development and testing of that tool will be crucial for achieving a sufficient level of confidence that MRLVC would not produce results leading to FAPDs.
- Implementation timelines are expected to be around [redacted] (with both POB and COB taking similar time). The overall high-level costs for the MRLVC implementation, excluding development of BBZFFM and local implementation costs, was estimated at around [redacted] (including 40% contingency).

[5] The SCE is a body established under the TCA which oversees the majority of the provisions agreed between the UK and the EU in the energy title (Title VIII) of the TCA, including implementation of MRLVC.

[6] The request for further analysis was expressed in Recommendation No 1/2023 of the SCE of 7 February 2023. Link: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22023D0425

- The MRLVC Report also provides a list of high-level questions/topics to be assessed before initiating any development of MRLVC, as provided by the UK and EU TSOs, including:
    - How MRLVC would work with offshore hybrid assets and offshore bidding zones;
    - Impacts of introduction of 15-minute Market Time Unit (MTU) in SDAC;
    - Impacts of a possible move to zonal or nodal market design in GB;
    - Effects on welfare if additional BBZs are included (e.g. Germany and Denmark);
    - Implications if some of the current bidding zones in the EU will be reconfigured as part of bidding zone review process;
    - Impacts of MRLVC on market participants and existing operational procedures in GB and regulatory framework of the GB market; and
    - Impacts of Carbon Border Adjustment Mechanism on MRLVC.

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Preliminary Orderbooks – orders and market manipulation issues

In *Section 4.1* of the report, the UK and EU TSOs consider the material inefficiencies and distortions introduced by the implementation of MRLVC using a 'preliminary' SDAC orderbooks captured 15 minutes ahead of SDAC GCT. It draws on new data supplied by Nominated Electricity Market Operators (NEMOs) on material revisions made to orderbooks during the final 15-minute window, allowing the UK and EU TSOs to consider the suitability of the approach. The UK and EU TSOs answer the following questions (in chronological order) from the SCE Recommendation: *Q1(a), Q1(b), Q1(d) and Q1(e) in relation to POB*.

The section reviews two set of inefficiencies introduced by the application of POB: those that may arise from normal trading activities in the run up to GCT and those that might stem from the unintended creation of new gaming strategies. It also explores how successfully these exploitations and inefficiencies may be mitigated. On balance, the UK and EU TSOs conclude that it would be difficult and resource intensive to prevent such outcomes or even identify manipulation. They conclude that the POB approach would be unfavourable compared to either fully coupled trading or the current trading approach utilising explicit auctions. It is clear, from the responses in this section, that the UK and EU TSOs are minded to reject the use of POB as part of any MRLVC implementation.

Review of orders placed by market participants

Q1(a), in the context of POB, asks about the proportion and significance of SDAC orders typically submitted during the last 15 minutes before GCT and about drivers behind the behaviour of bidding of market participants. To better understand the profile and timing of SDAC orders NEMOs operating in BBZs provided 2022 data on submissions received in the final 15 minutes immediately before SDAC GCT. Analysis of the data shows that, for most BBZs, material changes are made to the orderbooks in the final 15 minutes, with as many as 50% of orders being created, modified, or withdrawn during this period in the most extreme cases. However, the UK and EU TSOs acknowledge there is considerable variability across different BBZs and across different NEMOs/power exchanges, e.g. due to operational and system configuration differences, as well as limitations in the obtained data used for the analysis.

Further exploration of when orders are placed, through discussions with NEMOs and market participants, identifies that submissions are often made late in the process so as to capitalise on the latest available information (e.g. latest weather forecasts; actual availability of production assets, latest information from OTC or gas markets). Even where a strategy of placing bids early is adopted, a submitted bid may be continuously updated up to SDAC GCT. Participants were found to use a range of strategies, adjusted for other considerations such as organisational policies/conventions when timing their orders. The report suggests that

there is a strong rationale across a wide range of circumstances for participants placing orders during the final 15 minutes before GCT. Additionally, the report notes insight from the NEMOs that last-minute submissions are likely to increase with the transition to the 15-minute MTU in the near future, as the result of an increase in the complexity of optimization processes carried out by market participants.

Finally, the UK and EU TSO response explores the willingness or probability of market participants to change behaviours to finalise orders 15 minutes or more before GCT. They report that, amongst the market participants providing views, it was felt that the opposite would more likely be the case: that more orders would be placed or modified in the final minutes to utilise the latest available information and as part of strategies to gain a market advantage from the POB arrangement.

Q1(b) asks about impacts of the proportion of orders submitted in the final 15 minutes before SDAC GCT on interconnector flows being consistent with price spreads between day-ahead markets. In their answer, the UK and EU TSOs noted that under both POB and COB, flows might potentially be inconsistent with day-ahead prices in respective markets due to the fact that under MRLVC prices are not computed simultaneously with flows, non-BBZ orderbooks are not available (the MRLVC calculation is not using the same information as the SDAC calculation) and inaccuracy of the BBZFFM might lead to inconsistencies between prices and flow direction. The UK and EU TSOs further noted that POB "*induces an additional source of discrepancy because the BBZ orders used for MRLVC are not exactly the same as the BBZ orders used for SDAC*". Finally, they noted that quantitative assessment requires extensive simulations which are complicated and difficult to perform due to data availability and complexity and the speculative nature of such simulations.

Market manipulation

Q1(d) asks whether provisions of Article 305 of the TCA are sufficient to mitigate risks of market manipulation identified under POB, while Q1(e) asks whether there are further actions, requirements, or obligations for various parties which could provide further mitigations of that risk.

In setting out the risks indicated in these questions, the UK and EU TSOs identify multiple potential strategies for market manipulation. These derive from the ability of BBZ parties to change their orders before and after the preliminary orderbooks are captured. Such manipulation can cause a misalignment between interconnector flows and GB-BBZs price spreads. The UK and EU TSOs also highlight a 'one way bet' opportunity for Long-Term Transmission Rights (LTTRs) holders to realise gains by flows not being nominated before the day-ahead market, potentially at the expense of reductions in overall welfare and loss of congestion revenues for TSOs.

The UK and EU TSOs suggest in this section that Article 305 of the TCA may provide a foundation for mitigating market abuses once identified. However, it also identifies significant shortcomings, particularly in discerning between legitimate and illegitimate bidding strategies. This is, in-part, attributed to poor definition of 'market manipulation' in this particular circumstance both legally and in practice. While REMIT is identified as one source of a market manipulation definition (seeking to prevent the placement of orders without the prior intention of executing them), the UK and EU TSOs felt this would not be adequate to cover the range of possible manipulations under the POB design. They express concern that introducing new rules that are too loose would be easily circumvented while overly strict regulations might lead to inefficient outcomes. Their report notes that taking action against such manipulations might require the exhaustive identification and review of all possible bidding strategies. Further, they note that even where abuse can be defined, a new enforcement regime might need to be devised, which may be highly challenging.

The report also indicates there would be broader challenges to identifying complex manipulation strategies because the organisations responsible for effective market operation and monitoring, such as NEMOs or relevant regulatory authorities, have only partial visibility of necessary market data. The UK and EU TSOs suggest that overcoming just this issue would require extensive cooperation between regulatory authorities, market participants, TSOs and market operators.

Informal feedback

The review of SDAC orderbooks data by the UK and EU TSOs demonstrates that, without mitigation, a significant number of orders would be placed or amended in the final 15 minutes before SDAC GCT, after the capture of the preliminary orderbooks data. We agree that the scale of such orders appears sufficient to result in market distortion.

We agree with the conclusion that the submission of orders in the final minutes before GCT is incentivised by the benefits of utilising the latest market data and that this incentive would only increase under a POB-based MRLVC model. We can see why there would be little appetite amongst participants to agreeing to voluntarily support the submission or finalisation of orders further from GCT.

Further, we recognise and agree with the UK and EU TSOs concerns over market manipulation. The ability of market parties in BBZs to change their orders before and after the preliminary order book data is captured may invite exploitative strategies. While some mitigations may currently exist, we agree with the UK and EU TSOs analysis that addressing the market manipulation risks introduced by the POB approach may require significant

additional collaboration, information sharing, new enforcement arrangements and potentially additional legislation.

Given that such mitigations may still not fully address the risk of market manipulation, we agree with the position taken by the UK and EU TSOs that the POB-based approach would likely be unfavourable compared to fully coupled trading or the current trading approach utilising explicit auctions. We are therefore supportive of the UK and EU TSOs conclusions of rejecting POB as part of any MRLVC implementation.

Therefore, the UK Regulators would like to provide the following feedback on this section to the UK TSOs and to DESNZ and DfE:

- **The UK Regulators see very limited benefits pursuing the preliminary orderbooks option any further due to envisaged inefficiencies and risks related to potential market manipulation and difficulties in preventing such actions.**

Operational impacts of both Common Orderbooks and Preliminary Orderbooks

In *Section 4.2* of the report, the UK and EU TSOs discuss operational impacts of both POB and COB approaches on SDAC processes. The UK and EU TSOs answer the following questions (in chronological order) from the SCE Recommendation: *Q3(a) on both POB and COB, Q2(a) and Q2(b) on COB and Q1(c) on POB*.

Summary of section

Q3(a) asks about the different processes required for performing MRLVC Market Coupling Operator (MCO) calculation and associated timelines, for both POB and COB. The UK and EU TSOs distinguished and explained in-depth eight process steps needed to run MRLVC under both design options (caveating that configuration of final end-to-end process depends on decision on POB or COB implementation and any processes running in parallel) and estimated associated timings as well as provided some proposals how these timings could be shortened. The UK and EU TSOs focused on exploring ways to reduce timings of the MRLVC calculation process by either stopping the calculation process at the first solution found or relaxing some solution requirements, noting that there are trade-offs between reducing timings and potential quality of outputs of the MRLVC process (as well as design of validation processes). Furthermore, they also provided estimated times for running end-to-end MRLVC process after submission of orderbooks (two estimates: 13-42 minutes or 20-40 minutes), with caveats that a more conservative and probable timing is at the tail end of the estimates and also depends on the aforementioned trade-offs. Nevertheless, the UK and EU TSOs also noted that "*it is difficult to estimate the time required to perform the MRLVC computation without performing simulations*".

Q2(a) asks about options under COB allowing MRLVC to be run between SDAC GCT and publication of results (including on any processes that could be run in parallel with SDAC) and associated advantages and disadvantages as well as potential impacts on operations of SDAC and fallback processes and on TSOs, MCOs and market participants. The UK and EU TSOs presented an outline of relevant processes for SDAC (both normal and with operational incident scenarios), including a comparison of 'with and without' MRLVC being included, indicating that the impact of MRLVC on SDAC processes is expected to be unavoidable, but the degree depends on the estimates of timings indicated in the previous question. The UK and EU TSOs strongly highlighted uncertainty of impacts of envisaged introduction of 15-minute MTU in SDAC (both normal processes and under operational incident scenarios), indicating that this could lead to a delay to SDAC timelines by 20-50 minutes (without accounting for MRLVC). Nonetheless they simultaneously noted that "*the impact of 15-minute MTU on SDAC processes and timelines could be considerable, but detailed evaluation is not possible yet*". In this section, the UK and EU TSOs also assessed in detail impacts on TSOs,

MCOs and market participants, including mainly impacts in terms of extended timings, under a variety of operational incident scenarios, e.g. second auctions, partial decoupling, and technical issues with MRLVC, by also comparing current SDAC timings with combined SDAC and MRLVC timings (including re-runs of the MRLVC calculation).

Q2(b) asks for further analysis on advantages and disadvantages of changing timing of either SDAC GCT or publication of SDAC results under COB, including impacts on processes prior to and after SDAC processes (e.g. capacity calculation or intraday and balancing timeframes) as well as for impacts of increased time between SDAC GCT and publication of SDAC results on TSOs, MCOs and market participants. The UK and EU TSOs see the main benefit of moving SDAC GCT being that it would free up some contingency time for SDAC processes, nevertheless they also report that the extent of moving that GCT would depend on the total run-time of the MRLVC process. In this section, the UK and EU TSOs also provide impacts of an earlier GCT, including feedback from market participants – this is mainly related to impacts on timings of other processes that run prior to SDAC or impacts on data/forecasts the market is currently utilising when placing bids & offers. The UK and EU TSOs reiterated the importance of 15-minute MTU considerations and highlighted that impacts of introduction of 15-minute MTU are likely to have a greater cumulative impact on SDAC timelines than MRLVC alone (both under normal processes and operational incident situations).

Q1(c) asks whether POB would fully mitigate timing issues identified in COB or whether there would still be impacts on SDAC processes under this design option. According to the UK and EU TSOs, based on timings estimated earlier above and assuming some degradation in quality of MRLVC calculation and acceptability of some operational risks, POB have the potential to mitigate impacts on current SDAC timings under normal conditions (and also potentially in the case when 15-minute MTU is introduced in SDAC). Nevertheless, the UK and EU TSOs point out that POB would only partially mitigate these impacts in the case of operational incidents (e.g. when re-running of MRLVC is required) or delays in computation: a) if an incident only arose in SDAC processes, it would be detected after the MRLVC process is completed and thus POB would not mitigate the impacts within SDAC; while b) if the incident arose in MRLVC, it would be identified earlier than in COB thus giving some more time to resolve such an incident. The UK and EU TSOs conclude by reiterating the importance of considering the 15-minute MTU development – they believe that in such a scenario, POB would not provide a material mitigation of associated timing issues under operational incident situations (and that SDAC GCT might be moved to accommodate these developments).

Informal feedback

The UK Regulators note that the UK and EU TSOs proposed various trade-offs between shortening timings and, broadly speaking, accuracy of various processes such as BBZ forecasts or MRLVC calculations, by alleviating usage of the latest data, reducing quality of

calculations (e.g. iterations needed for arrival to a final solution) or relaxing constraints of calculations. Furthermore, we note that the UK and EU TSOs concluded that "*it is difficult to estimate the time required to perform the MRLVC computation without performing simulations*" and that "*the impact of a shortened calculation time on MRLVC performance and SDAC contingency can, however, only be evaluated quantitatively through further investigation in the future which includes proper modelling and simulation*". The UK Regulators also note and acknowledge the issues, additional challenges and risks and impacts on TSOs, MCOs and market participants highlighted the UK and EU TSOs, which could result from not re-running the MRLVC calculations in the case of operational incident scenarios. The UK Regulators believe that any such trade-offs should be carefully considered in the future so that any reduction in quality of the MRLVC outcomes would not impact negatively on the overall market outcomes and welfare (e.g. by unintentionally increasing the risk of FAPDs).

It is clear that MRLVC would have relatively substantial impacts on SDAC timings, but we recognise that the inclusion of 15-minute MTU would equally require further amendments to SDAC timings and procedures (for example fallback arrangements in operational incident scenarios) and would have implications for overall SDAC design. We note that the UK and EU TSOs indicated that "*the impact of 15-minute MTU on SDAC processes and timelines could be considerable, but detailed evaluation is not possible yet*" and we recognise that further work would be needed in this area in the future.

The UK Regulators note that in the original MRLVC CBA, the EU and UK TSOs looked at options for fallback arrangements and identified an alternative to running shadow auctions for MRLVC, namely setting MRLVC-determined flows to zero and allocating capacity in the intraday timeframe while re-running the GB day-ahead market in an isolated fallback mode. The UK Regulators acknowledge that in the MRLVC Report, the UK and EU TSOs also explored some options around validation processes and fallback arrangements, in the context of shortening the time needed for end-to-end MRLVC process. The UK and EU TSOs very briefly explored parallel and sequential validation processes and briefly mentioned some options for fallback arrangements, including an option to ignore results of MRLVC and use as inputs to GB MCO and SDAC flows at zero values, flows equal to long-term nominations or flows based on historical values instead. It is our view that proper validation procedures and appropriate fallback arrangements will be key in developing a robust MRLVC solution and should be developed in the future with careful consideration.

Therefore, the UK Regulators would like to provide the following feedback on this section to the UK TSOs and to DESNZ and DfE:

- **It is our view that, at a later stage of the project, and if MRLVC is chosen as the preferred way forward (subject to the key considerations on accuracy of BBZFFM), implications on both GB market and SDAC market in terms of**

timings, processes and procedures should be further explored and robustly tested, including potential impacts of introduction of 15-minute MTU in SDAC and expanding more on impacts of MRLVC on market participants and existing operational procedures in GB market.

- **Furthermore, the UK TSOs should carefully explore the trade-offs between the timings and the quality of MRLVC forecasts and associated processes, so that the reduction in quality of the MRLVC outcomes does not impact negatively on the overall market outcomes and welfare (e.g. by unintentionally increasing the risk of FAPDs). This also includes further careful consideration of the trade-offs of re-running the MRLVC calculations in the case of operational incident scenarios.**
- **In addition, the validation processes and fallback arrangements are very important procedures in any market design. These processes will be key in developing a robust MRLVC solution and therefore should be developed in the future with careful consideration of the potential impacts, and might require further examination, especially considering the importance of the day-ahead price signals for the market.**

Bordering Bidding Zone Flow Forecasting Methodology

In *Section 4.3*, the UK and EU TSOs explore the importance of forecast accuracy of BBZFFM on outcomes of MRLVC. The UK and EU TSOs answer the following questions (in chronological order) from the SCE Recommendation: *Q3(b)(1), (2) and (3)*. Q3(b)(1) asks to establish an outline proposal for the BBZFFM, including key issues, principles and parameters (including input data and use of outputs in the MRLVC process), while Q3(b)(2) asks about the timescales within which the methodology could be established. Finally, Q3(b)(3) requires a preliminary assessment of BBZFFM performance in conjunction with MRLVC, including comparison to explicit capacity allocation.

Summary of section and informal feedback

All parties acknowledge that the effectiveness of MRLVC is significantly determined by the accuracy of the BBZFFM.

In their analysis the UK and EU TSOs have sought to quantify the benefits of MRLVC using a modified off-the-shelf tool to estimate the benefits that MRLVC could bring to cross-border trading. The analysis was carried out for just one year (2022) and suggested benefits in the order of [redacted] (excluding UIOSI pay-outs) welfare gain, on a subset of relevant borders in the analysed year, compared to explicit capacity allocation. The result was heavily caveated noting that the analysis itself was a simple simulation, that the forecasting tool was allowed enough time to complete its modelling, and that the tool did not capture the cross border-capacity allocation complexities. The analysis also only explored the impacts of trade over the French, Belgian and Dutch borders due to the lack of explicit data on the Danish, Norwegian and Irish borders. The report also notes that the accuracy of the BBZFFM was worse than what was assumed in the 2021 MRLVC CBA suggesting that the MRLVC benefits may have been over-estimated.

The risk of FAPDs is clearly a major concern and poses a significant financial risk to interconnector TSOs (rather than market participants that are already exposed to FAPDs in explicit auctions). FAPDs already exist in the explicit regime and according to the data can be as high as 20% of hourly intervals on some interconnectors (though it is unclear the extent to which this is driven by system operators counter-trading versus trader nomination/forecasting error). Furthermore, the UK and EU TSOs estimated that the current aggregate welfare loss for explicit auctions from inefficient flows on existing interconnectors in the Channel region amounted [redacted] between May 2022 and April 2023. This is most likely to arise when the price spread between GB and BBZs narrows and the direction of flow becomes harder to forecast and can lead to substantial welfare loss. The report does not outline how accurate the BBZFFM would need to be in order to be more efficient than explicit

trading, but simulated MRLVC using commercial forecasts indicates substantially lower incidence of FAPDs versus explicit auctions.

When answering Q3(b)(1), the UK and EU TSOs clearly presented five main principles that should guide the design, implementation and operation of BBZFFM, namely: respecting physical constraints, supporting MRLVC and SDAC processes to maximise socio-economic welfare, clearly explaining operations of BBZFFM including choice of inputs and impact on results, demonstrating repeatability of forecasts and providing transparency of BBZFFM. We welcome and agree the principles outlined in the report emphasising both transparency and reporting of the outputs of the BBZ net position forecasts as these aspirations will drive continuous improvement in forecast accuracy.

In the absence of a working prototype it is not possible to categorically conclude whether MRLVC is substantially more efficient than explicit trading, though the initial analysis suggests substantial benefits may be possible. It would therefore seem appropriate that as a next step the UK and EU TSOs should be asked to develop a working prototype so that the tool's effectiveness can be properly estimated under a range of scenarios, and its accuracy understood. Assurance can also be provided on whether the tool can deliver within, and be integrated with, the SDAC time constraints that are also discussed within the document.

Therefore, the UK Regulators would like to provide the following feedback on BBZFFM to the UK TSOs and to DESNZ and DfE:

- **Before any further firm feedback can be provided on the common orderbooks option, we recommend, as a matter of priority, investigating further and building a prototype of the BBZFFM tool to assess its accuracy and efficiency and associated potential impacts on welfare gains of MRLVC in comparison to explicit trading. It would also be beneficial to consult all interested parties, including UK and EU market participants, to provide scrutiny and broaden perspectives and evidence.**

Timelines and costs

In *Section 4.4*, the UK and EU TSOs analyse potential implementation timelines and associated costs of MRLVC. The UK and EU TSOs answer the following questions (in chronological order) from the SCE Recommendation: *Q3(c)(1), (2) and (3)*. Q3(c)(1) asks about detailed steps to implement either POB or COB, including processes to test and verify the performance of MRLVC before full operation, roles and responsibilities of TSOs, MCOs and market participants as well as about how the content of technical procedures could best support efficient implementation. Q3(c)(2) considers provision of realistic timelines for implementing each solution, including the processes required (as mentioned in the previous question, but also highlighting for example stakeholder consultations, testing phases and governance processes). Finally, Q3(c)(3) asks about anticipated direct costs of implementing and operating MRLVC, including breakdown of different roles and functions.

Testing, verification and how structures can best support implementation

The proposals to test and verify performance of the MRLVC are comprehensive, however we think more should be done to give assurances that MRLVC is performing against statutory requirements set out in the TCA, especially in Annex 29. Therefore, we believe that the project plan should have regular reporting periods that give assurances to all parties that the project is on track to achieve its specific objectives.

Roles and responsibilities of TSOs, MCOs and market participants

The MRLVC Report contains references to the roles and responsibilities of different parties, however we recommend that these roles and responsibilities be explicitly stated so the remit of each party is clear, transparent and beyond reasonable doubt.

How aspects of the project can be implemented in the shortest possible time

Splitting the projects into separate streams that can be developed in parallel is an appropriate approach to deliver aspects of the process in the shortest possible time. We do note however that more could be done to bring out the detail of interdependencies, so these are clear to relevant regulatory authorities and the SCE. It is difficult to rely on the timelines provided given that key provisions of the timeline (SDAC and local projects) are out of scope.

Timeline for implementation and related steps

We consider the timeline for implementing the MRLVC solution is broadly reasonable, however we do not think enough information has been provided to cover the following aspects of the technical questions:

- Stakeholder consultation – stakeholders must have appropriate insight into the development of MRLVC processes; and

- Governance – there should be clear and regular reporting and verification of performance of aspects of the MRLVC development to relevant regulatory authorities and the SCE on performance against the provisions in Annex 29 of the TCA.

Costs for implementing and operating MRLVC

In this section, the UK and EU TSOs provided some cost estimates for implementing MRLVC, amounting in total to around [redacted] (including 40% contingency margin). This does not include costs associated with development of BBZFFM, local implementation costs and costs associated with implementing updated fallback procedures as well as operational costs of either of the elements (partially due to the fact that NEMOs/power exchanges, who are envisaged to be MRLVC MCOs, are competing entities and thus are not sharing detailed information). The estimation of costs is driven by the timescales for the implementation of the MRLVC solution. The UK and EU TSOs also provided a reasonable break-down of costs to categories and associated elements and activities.

The UK Regulators are unable to fully comment on this matter and note that estimates of benefits and costs should be carefully weighed against each other once both are better understood following further activities we recommend, for example developing a working prototype of BBZFFM.

Therefore, the UK Regulators would like to provide the following feedback on this section to the UK TSOs and to DESNZ and DfE:

- **The UK Regulators recommend that the project plan should include regular reporting periods that give assurances to all parties that the project is on track to achieve its specific objectives.**
- **We would also like to highlight the need for a robust and transparent consultation process that should be included across relevant stages of implementation of MRLVC.**

Future developments and outstanding issues

Futureproofing MRLVC – offshore hybrid assets and other issues

In the MRLVC CBA, the UK and EU TSOs explored to a limited degree the potential impact of MRLVC on future offshore hybrid assets in the North Sea, including Multi-Purpose Interconnectors (MPIs), and noted that it would be very difficult for the current explicit arrangements to support the efficient flows needed to make best use of these assets. In the feedback on the MRLVC CBA, the UK Regulators stressed that these projects will play a crucial role in securing the pathway to net zero targets and efficient trading arrangements, including efficient energy pricing and capacity utilisation, and will be essential in developing and operating such projects.

Although not in scope of the SCE Recommendation, the UK and EU TSOs provided some initial thoughts and highlighted some further questions that should be explored in terms of the interactions between MRLVC and offshore hybrid assets, including offshore bidding zone (OBZ) configuration. This includes issues such as price formation in OBZs, capacity utilisation for wind and cross-border volumes, and impacts on business cases for future MPIs. The UK Regulators note that the EU and UK TSOs provided some preliminary views on this matter, nevertheless, we believe that these views are limited and not based on sufficient evidence/expanded on in sufficient detail and thus we are unable to provide comprehensive feedback at this stage. The UK regulators therefore consider that, in addition to developing the BBZFFM prototype, further detailed and robust research and analysis (both qualitative and quantitative) is required in this area.

The Single Electricity Market (SEM) and GB border remains uncoupled at the day-ahead stage and there is no provision for explicit allocation. The UK Regulators observe persistent economically inefficient differentials between the dominant isolated SEM day-ahead and the smaller intraday market (which is coupled with GB). As such we consider it important that this dynamic be fully reflected in estimations of welfare benefits of MRLVC going forward.

The UK Regulators also recognise that the UK and EU TSOs provided other future development areas in both the UK and the EU that they also consider important and should be investigated:

- Impacts of a possible move to zonal or nodal market design in GB;
- Effects on welfare if additional BBZs are included (e.g. Germany and Denmark);
- Implications if some of the current bidding zones in the EU are reconfigured as part of bidding zone review process;
- Impacts of the Carbon Border Adjustment Mechanism.

We also consider these areas to be relevant and substantial and should be considered when designing the MRLVC solution. Furthermore, we believe that there are also other developments in the EU that should be added to the list, namely development of Advanced Hybrid Coupling (AHC) and associated impacts on MRLVC and the GB market. Nevertheless, we believe that the two core areas to be investigated as part of the next immediate phase of the project and as a matter of priority are BBZFFM and interactions, efficiency and welfare analysis of MRLVC in relation to offshore hybrid projects and related market arrangements (bidding zone configuration).

Therefore, the UK Regulators would like to provide the following feedback on futureproofing to the UK TSOs and to DESNZ and DfE:

- **Futureproofing of the MRLVC solution is key, therefore we recommend investigating further how MRLVC could work with hybrid offshore projects/meshed grids in the North Sea, and what are the benefits, challenges and trade-offs between explicit allocation and MRLVC for these assets (as well as if and how these projects could be integrated within MRLVC).**
- **The UK Regulators support the development of the MRLVC arrangements to help address some of the inefficiencies of the current SEM-GB arrangements. We consider it important that this dynamic be fully reflected in estimations of welfare benefits of MRLVC going forward.**
- **We do consider other future development areas in both the UK and the EU identified in the MRLVC Report to be relevant and substantial and we agree that these should be considered when designing the final MRLVC solution. Nevertheless, we believe that the two core areas to be investigated as part of the immediate next phase of the project as the matter of priority are BBZFFM and interactions, efficiency and welfare analysis of MRLVC in relation to offshore hybrid projects and related market arrangements (bidding zone configuration).**

<u>Outstanding issues</u>

The UK Regulators would like to take this opportunity to reiterate parts of feedback provided on the initial MRLVC CBA and solutions/ideas provided by the UK and EU TSOs. We want to highlight that in our view these issues are not a priority at present, but will be important design decisions at a later stage.

These issues include:

- TSOs proposals to substitute price-taking orders (PTOs) with either limit or common orders as 'contingency options' in order to minimise FAPDs. The UK Regulators believe that minimising the occurrences and impacts of the FAPDs is an important issue.

However, we consider a first step to seeking to achieve this is through the robust design of the BBZFFM.

- TSOs proposals to substitute the UIOSI principle to the UIOLI principle for LTTRs, or introducing a cap on UIOSI pay-outs in order to minimise FAPDs and the resulting consequences. We are concerned that the introduction of such alterations to the base-case design might result in lower hedging opportunities for market participants. Further research is needed to fully understand the needs case for these contingency options and the associated trade-offs.
- Verification procedures and fallback arrangements (already exhaustively discussed in previous sections).
- When considering the final design, parties should take into account how the day-ahead MRLVC processes would interact with other timeframes (long-term and intraday capacity allocation) and processes (e.g. capacity calculation).
- The importance of close involvement via frequent consultation processes with market participants and other relevant stakeholders (also mentioned earlier as part of this informal feedback) when reaching important milestones and conclusions (for example on BBZFFM).

Conclusions and next steps

The UK Regulators recognise and wish to highlight the importance and the necessity of more efficient cross-border trading arrangements in facilitating competition, security of supply at lower costs to consumers, integration of renewable generation in electricity systems, future development of offshore hybrid infrastructure in the North Sea and helping to support more flexible energy systems.

The UK Regulators would like to take this opportunity and recognise and acknowledge the hard work and determination undertaken so far by both the UK and EU TSOs when completing both the MRLVC CBA and the MRLVC Report.

We would like to reiterate that this document constitutes informal feedback of the UK Regulators on the MRLVC Report and does not make any assurance or representation as to the completeness or fitness for any purpose and should not be relied upon, forwarded or circulated for any purpose except as intended and agreed with Ofgem and Utility Regulator. The document does not restrain the discretion of Ofgem or Utility Regulator in providing a formal opinion on any further analysis or on the final set of technical procedures as required by the TCA under Article 317(3).

We see the following three main conclusions of this informal feedback for the UK TSOs and to DESNZ and DfE:

- **We recommend against pursuing the preliminary orderbooks option due to envisaged inefficiencies and risks related to potential market manipulation.**
- **Before any further feedback can be provided on the common orderbooks option, we recommend, as a matter of priority, developing a prototype of the BBZFFM tool to assess its accuracy, efficiency and associated potential welfare gains of MRLVC in comparison to explicit trading. It would also be beneficial to consult all interested parties, including UK and EU market participants, to provide scrutiny and broaden perspectives and evidence.**
- **Futureproofing of the MRLVC solution is key, therefore we recommend investigating further how MRLVC could work with hybrid offshore projects/meshed grids in the North Sea. This includes what are the benefits, challenges and trade-offs between explicit allocation and MRLVC for these assets (including how these projects could be integrated within MRLVC).**

We look forward to the SCE deciding at pace on the next steps of this project and we remain open for any discussions with, and providing further advice to, relevant parties and stakeholders within the UK and the EU.