



SEM-GB Cross Border Trading.

Decision Paper

SEM-23-012

February 2023

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1. Introduction

On 28 February 2022, the SEM Committee published a Consultation Paper (SEM-22-005)¹ on SEM-GB cross-border trading arrangements. That paper presented an analysis of prices and volumes traded in the SEM and GB markets in both the coupled and decoupled markets, pre- and post- January 2021, and invited industry to respond to a series of questions focusing on the arrangements. The closing date for responses was the 1st April 2022.

Sixteen consultation responses were received from Bord Gáis Energy (BGE); EirGrid Interconnector DAC; EirGrid and SONI TSOs; Energia; EPEX SPOT; ESB Generation and Trading; FloGas / Budget Energy; Moyle Interconnector; National Grid Electricity System Operator (ESO); Nord Pool; Panda Energy; PowerNI; PrePayPower; Single Electricity Market Operator (SEMO); Scottish and Southern Electricity (SSE); and Wind Energy Ireland (WEI) & RenewableNI (RNI).

Allocation of interconnection capacity produces winners and losers. Interconnector owners receive congestion revenue whenever price differentials between the two connected markets are higher than the transmission losses. Consumers (and suppliers) benefit from interconnection imports as it gives access to lower price zones while, on the other hand, exports tend to increase local demand which pushes prices up. Generators benefit from exports as they result in generation that otherwise would have been curtailed or out of merit, to be in the market while imports have the reverse effect.

The dynamic outlined above explains the lack of consensus on the market participants' responses in terms of adjustments, if any, to the current cross border trading rules between SEM and GB.

The SEM Committee, in coming to a decision in relation to the SEM-GB trading arrangements, is acutely aware of the impetus of the European Commission and the UK Government in reaching agreement on a workable solution to couple the GB's market with the other borders of the European Internal Energy Market.

¹ <https://www.semcommittee.com/publications/sem-22-005-consultation-sem-gb-cross-border-trading-arrangements>

This paper focuses on the potential introduction of cross border forward hedging instruments, not the current coupling arrangements at the SEM spot market, with the later expected to be covered by the enduring solution defined in the Trade and Cooperation Agreement (TCA). The SEM committee will continue to monitor the progress of the Multi Regional Loose Volume Coupling (MRLVC) solution.

The subsequent section will discuss in detail the views submitted by the industry in relation to the current SEM-GB trading arrangements. The SEM Committee have taken in consideration the responses from market participants to the following questions:

1. What impacts have market participants seen since 1st January 2021 of decoupling in the Day-Ahead timeframe? What are the most significant impacts identified, if any?
2. Have market participants changed their trading behaviour as a result of the transition to the fallback arrangements (i.e., implicit coupling in the Intraday timeframe)? If there was to be a substantial delay in the implementation of MRLVC, would this cause market participants to change their trading behaviour (further)?
3. How well are the fallback arrangements (i.e., implicit coupling in the Intraday timeframe) working? Is there a need for change to the existing fallback arrangements? If there was to be a substantial delay in the implementation of MRLVC, would there then be a need for a change to the existing fallback arrangements?
4. What improvements could be made to the fallback arrangements in advance of the implementation of MRLVC? Could these improvements continue to bring benefit once MRLVC is implemented?
5. Would the introduction of PTRs in advance of the implementation of MRLVC be beneficial, and to what extent?

2. Summary of Consultation Question Responses

To aid analysis of the responses, submissions have been subdivided into three groups – Market Participants (including generators and suppliers), Interconnector Owners and TSOs/MOs (including System and Market Operators).

2.1 Question 1: Responses from the industry

What impacts have market participants seen since 1st January 2021 of decoupling in the Day-Ahead timeframe? What are the most significant impacts identified, if any?

Market Participants

BGE stated that the most obvious negative impact of decoupling in the day ahead has been the increase in DAM prices in SEM which does not bode well for consumers. Furthermore, the prices in DAM on both sides of the ICs have resulted in much more inefficient IC flows and unpredictable prices.

PowerNI thought that interconnector flows had become much less predictable now as they were based on markets with much smaller volumes to trade when compared to the Day-Ahead Market. Even with a 200% increase in the uptake of IDA1 volumes, they were still considered much less than would have been expected. As the flow could now largely be determined by assetless units and, with no pre-IDA1 schedule, they argued that it was strategically difficult to determine an IDA1 strategy.

Prepay Power stated that the decoupling at the Day-Ahead level and the removal of FTRs has removed 950 MW of Interconnector capacity for hedging and reduced already “scant” competition for power hedges in the ISEM. This has a direct impact on the end consumer. Another issue raised was the impact of auction timings on competition. Prepay Power stated that as both GB Day-Ahead auctions were run well in advance of the SEM auction, SEM generators know the price of their competition in advance so they can adapt their own pricing to bid up to the GB price.

SSE stated that the fallback arrangements currently in place are less than ideal. They

have been tolerated on the understanding that they would be an interim step towards MRLVC implementation. SSE highlighted the following impacts:

- Increased cost to consumers due to sub-optimal flows of energy between markets
- Reduced liquidity in forward markets
- Less predictable market price references which in turn increases risk on offering energy contracts.
- Significant interconnector curtailment
- Muted wholesale price signals for generation and network investment

Energia are of the view that since the decoupling of DAM, efficient outcomes have continued to be derived in the market as collectively market participants (including Assetless Units) have adapted their trading behaviour.

ESB highlighted the increase in volumes being traded in the IDA timeframe and the shorter timeframe for TSOs to make dispatch decisions which are linked with the allocation of IC capacity.

Wind Energy Ireland/RenewableNI held the view that the current arrangements have led to an increase in the volumes traded in the IDA1 and that IC flows have been allocated efficiently.

Interconnector Owners

EDAC was of the view that the current arrangements are producing reasonably efficient flows on the interconnectors and that ICs continue to produce a close correlation between direction of flows and wind output in the island of Ireland.

Moyle stated that it was a reasonable expectation that price increases and/or price divergence between the SEM and GB Day-Ahead markets may, in part, be due to the loss of market coupling, however they had not seen significantly different trends between the coupled and uncoupled markets. They believed that the rapidly increasing price of wholesale gas was the primary driver of the increase in SEM Day-Ahead electricity prices post 1st January 2022 and considered that the impact of the fallback

arrangements on consumers and interconnector businesses had not been as significant as anticipated prior to 1st January 2021.

TSOs/MOs

National Grid ESO believed that the increase in interconnector capacity allocation in the IDA1 brought challenges as the volumes cleared were insufficient to fully utilise the cross-border capacity available on both EWIC and Moyle. Furthermore, they pointed out that the SEM-GB arrangements for IDA1 meant that the first interconnector profile was available at 18:00hrs while for those interconnectors linking Great Britain to Continental Europe, their first profile was around 13:00hrs. This difference made it difficult for some TSOs and market participants to plan their strategic decisions.

From an operational perspective, the joint response by SONI/EirGrid stated that the lack of an interconnector schedule at the Day-Ahead stage meant indicative operations schedules often had to be made based on either zero or estimated interconnector flows. As a result, TSOs were having to make unit commitment decisions based on 'fictional' interconnector schedules for long notice plant. With new interconnector schedules being produced at the intraday timeframe, further indicative operations schedules could differ significantly from those at the Day-Ahead stage and, in order to manage this risk of changing interconnector schedules, plant decommitment decisions could be delayed. This has a significant impact on the TSOs and other market participants who rely on those Indicative Operations Schedules for purchasing gas and making decisions based on anticipated running.

In terms of volumes traded in the Day-Ahead timeframe, SEMO also thought that these were similar to those seen pre-Brexit, even with decoupling while EPEX Spot also agreed that the IDAs worked effectively as a fallback arrangement with the prices shown being, on average, in-line with the DAM.

Question 1: SEMC Comments

From the responses pointing out issues with the arrangements in place since 1st January 2021, the key issues raised were:

- I. Loss of market efficiency leading to higher prices;
- II. Reduction of forward hedging opportunities and
- III. Shorter timeframe for the system operators to react to allocation of interconnection flows.

I. Loss of market efficiency leading to higher prices;

The current arrangements now uses interconnection capacity to link smaller markets than it was the case before 1st January 2021 as interconnection capacity is only exercising direct influence in the price formation of the SEM intraday markets which respond to circa 10% of the volumes traded.



Figure 1: Share of volumes traded in the different SEM ex-ante markets

The SEMC is of the view that the price increases observed from the second half of 2021 are primarily due to factors which are mostly unrelated with the allocation of cross border capacity between the SEM and GB. Figure 2 below clearly shows the correlation between Day Ahead Prices in SEM and GB vs. the prevailing gas prices.

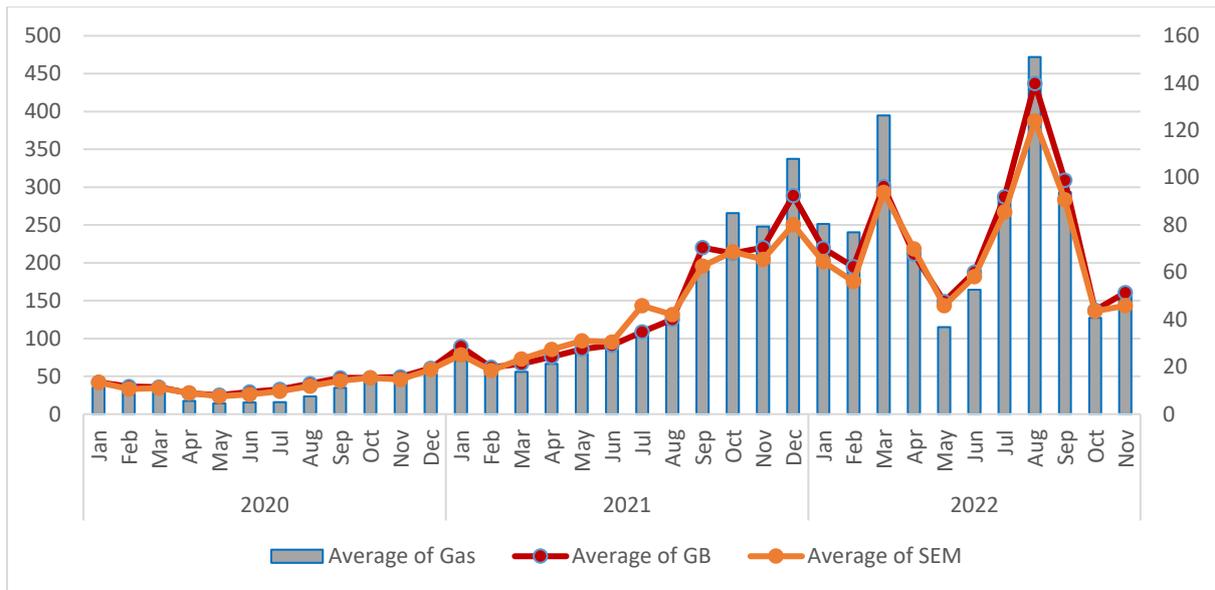


Figure 2: Day Ahead Prices SEM, GB vs. Gas €/MWh

II. Reduction of forward hedging opportunities

The SEMC acknowledges that the suspension of the sale of FTRs (referenced to the SEM-GB DAM prices) reduced, to some extent, the availability of forward hedging instruments for market participants. In coming to a decision in terms of changes to the current arrangements, the SEMC will have the promotion of forward hedging liquidity as a key aspect of the decision.

III. Shorter timeframe for the system operators to react to allocation of interconnection flows.

Finally, the SEMC acknowledges the point made by the TSOs in relation to the shorter timeframe for managing the dispatch of the power system after the allocation of cross border capacity which now takes place at 17:30 (instead of 11:00) in the day before the physical delivery which starts at 23:00. This arrangement poses additional challenges for the TSOs to manage the system, and this challenge will be aggravated further as additional interconnectors between SEM and GB are made operational.

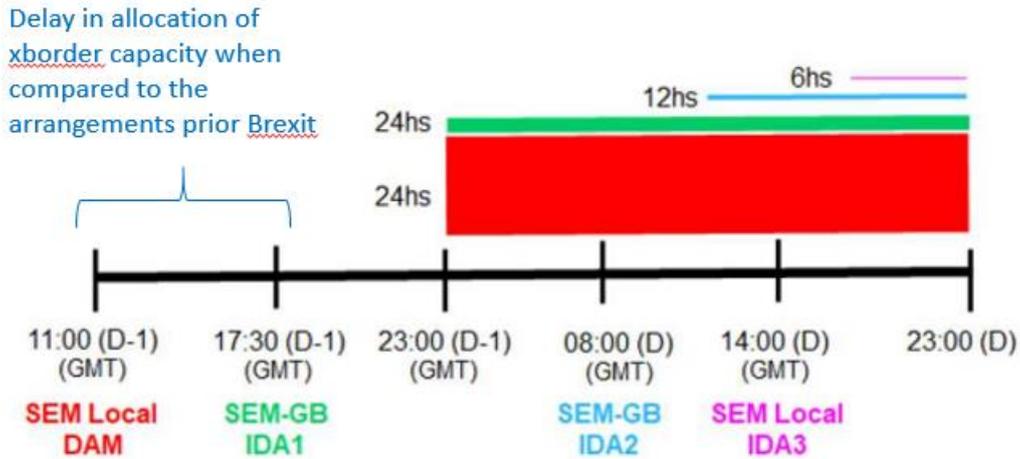


Figure 3: SEM Trading Timeframes (ex-ante auctions)

2.2 Question 2: Responses from the industry

Have market participants changed their trading behaviour as a result of the transition to the fallback arrangements (i.e., implicit coupling in the Intraday timeframe)? If there was to be a substantial delay in the implementation of MRLVC, would this cause market participants to change their trading behaviour (further)?

Market Participants

Prepay Power noted that while they have not substantially changed their trade strategy, they have observed an increase of assetless traders operating in the market. From their perspective, Prepay Power thought that the level of trade seen in the IDA1 was already approaching a natural maximum given the arrangements on both sides of the auction. With most GB positions being shaped and traded out at the 3:30 Intraday auction in GB, it was thought that there was limited appetite for cross-border trades after this point. Thus, while selling transmission rights at the IDA1 time frame may increase trade somewhat, it is questionable as to whether sufficient trading volume exists on the GB side.

Energia also pointed out that there had been an increase in assetless trading which, in their view, has helped to narrow the spread between the auctions and markets.

Energia did not believe that a delay would mean that current trading patterns would be altered greatly.

ESBGT believed that, should there be a substantial delay to the implementation of the MRLVC, it was unlikely to be a hindrance to the efficient allocation of interconnector volumes.

BGE was of the view that market participants now had very little choice but to construct proxy hedges in order to help mitigate risk for consumers. As proxy hedges often had erratic correlations with Irish power prices, this could lead to volatile cost bases.

SSE stated that changes to its trading strategies have been revised in light of the new arrangements and if the introduction of the MRLVC is further delayed, changes should be made to the current fallback arrangements.

PowerNI did not change their trading strategies substantially but pointed out that trading at the IDA1 was very limited due to the absence of new information at that trading timeframe. PowerNI was also concerned with the potential of further delays in the implementation of the MRLVC.

Interconnector Owners

Moyle noted that pre-January 2021, traders had been the most active participants in the FTR market with regard to the Moyle interconnector and that this implied that much of the FTR trading was unrelated to hedging a supply position in the SEM. With the cessation of FTRs post-January 2021, revenue from the allocation of cross-zonal capacity had now accrued to interconnector owners and that ultimately, as they were a mutual business, this would be in the interest of consumers.

In their assessment, EIDAC believed that macro-economic factors such as commodity prices were more likely to be the drivers for changes to trading behaviour than a delay to MRLVC. They thought that adjusted trading behaviour, including assetless related trades, had resulted in comparable volumes of trading in the DAM prior to and post January 2021 and that this was a positive sign of the market's ability to adjust and optimise trading positions in the event of change.

TSOs/MOs

SEMO believed that the market had seen a significant increase in the trading activity of assetless units with post-Brexit cleared volumes of assetless units increasing 30% and 150% in the Day-Ahead and Intraday timeframes respectively. This suggested that assetless units were identifying arbitrage opportunities between the Day-Ahead and Intraday timeframes which may be helping to offset any residual inefficiencies caused by a de-coupled DAM.

Their response also referred to possible trading behaviours in GB and proposed that for GB parties, or parties with interests in both the SEM and GB, the combination of the split of liquidity into the separate GB Day-Ahead markets and the GB DAM auctions now running ahead of the SEM DAM, may have provided a set of conditions that could have changed the trading strategies of GB related parties. This in turn might have impacted on the SEM price formation.

EPEX Spot suggested that any change to the SEM should also consider the impact on market arrangements in GB. They stated that currently, there was a fragmentation in the GB DAM and an absence of overarching governance arrangements. This was exemplified by the market coupling on the North Sea Link (NSL) which imposed a split in the market due to the exclusive arrangements required through the procurement design.

Question 2: SEMC Comments

The SEMC notes that most market participants have not changed substantially their trading strategies since the introduction of the new arrangements in January 2021. This fact is illustrated by the share of volumes traded in each ex-ante market as shown in the Figure 1.

The SEMC also notes the increase in assetless traders in operation in the market. Assetless traders exploit the price arbitrage between the SEM DAM and IDA markets, where trades made in one of the markets are typically reversed in the subsequent one in order to eliminate exposures to the balancing market. Assetless traders should theoretically reduce the price differential between the SEM DAM (decoupled) and the IDA1/2 (coupled) markets which in turn reduces the loss of efficiency between the

current and pre-Brexit arrangements. Figure 4 shows the evolution of price differentials between the SEM IDA1 and DAM markets in 2020 (before the introduction of the new arrangements post-Brexit), 2021 (after the introduction of the new arrangements) and 2022.

The Figure 4 groups the trading periods by price differential between the SEM IDA1 and DAM. As it can be seen, the higher concentration of price differentials are situated in the intervals [-10%, 0%] and [0%, 10%]. -10% indicates that the IDA1 price is lower than the DAM price for the same trading period and so on so forth.

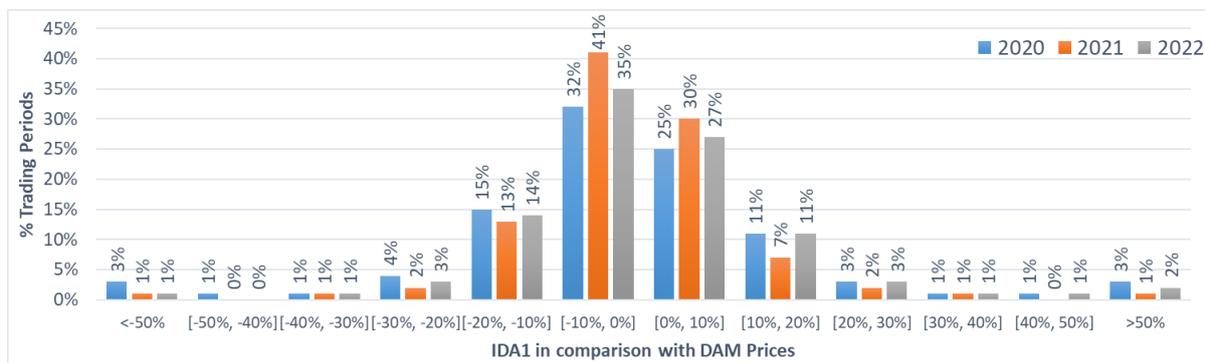


Figure 4: IDA1 vs. DAM - Histogram of Price Differentials

From the histogram chart above, it can be observed that the IDA1 prices have been lower than the DAM more often than not. The interval [-10%, 0%] has consistently been the most common price differential interval across the period assessed. The data does not show a clear trend of price convergence as a consequence of assetless traders operating in the DAM/IDA1 markets. Some of the convergence observed from 2020 to 2021 has been reversed in 2022.

The SEM Committee also notes the point made by Moyle IC in relation to the accrual of Congestion Revenue by IC owners. Figure 2 shows the evolution of price differentials between SEM and GB. These price differentials are the key variable (multiplier) to determine IC revenue (i.e. Congestion Revenue = absolute price differential times the IC flows).

Until December 2020, ICs accrued congestion revenue based on the price differentials between the SEM and GB DAMs, but from January 2021, the IDA1 markets were used to determine the IC congestion revenue. Figure 5 takes this change into consideration, the basis for the formation of congestion revenue for interconnector owners has

increased substantially during 2021/2022. While this increase is mostly caused by the nominal price increases on both markets (due to higher gas prices), it also occurred while the post-Brexit arrangements were in place.

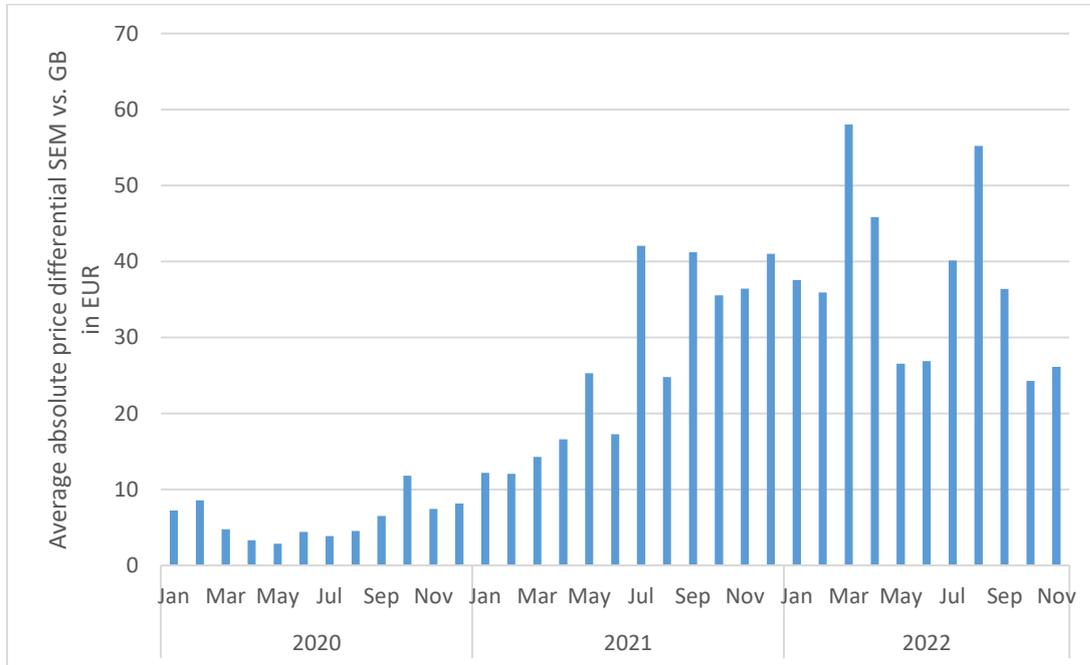


Figure 5: Absolute price differences SEM vs. GB (i.e. $ABS[GB-SEM]$) DAM used prior 2021 and IDA1 afterwards

2.3 Question 3: Responses from the industry

How well are the fallback arrangements (i.e., implicit coupling in the Intraday timeframe) working? Is there a need for change to the existing fallback arrangements? If there was to be a substantial delay in the implementation of MRLVC, would there then be a need for a change to the existing fallback arrangements?

Market Participants

BGE thought that measures to improve forward liquidity should be implemented as soon as possible, however, given the planned introduction of MRLVC, any changes made at this stage should be relatively easy, fast and economical to implement.

SSE argued that the fallback arrangements were suitable for an interim period in the expectation of an enduring solution in the form of MRLVC. However, in the absence of MRLVC there was now a good opportunity to augment the existing, less-than-ideal arrangements.

PowerNI thought that while the current arrangements were adequate from a security of supply perspective, from a commercial perspective, the current arrangements are suboptimal given the growing disparity between SEM and GB prices and that this had an impact on both long-term and short-term trading strategies.

Panda Power are in favour introducing changes to the current arrangements with the view to improve forward liquidity.

Budget Energy/FloGas shared the same view, as they believe that changes should be introduced to promote forward liquidity.

Energia did not share this view and instead stated that there was no need or justification for making changes to the current fallback arrangements given the efficient market outcomes that were being produced. Based on this, they did not support any change to the current arrangements.

Interconnector Owners

Moyle and EIDAC interconnector owners considered the allocation of interconnector capacity to be largely efficient. Moyle pointed out that since the fallback arrangements came into operation, there has generally been sufficient liquidity in both coupled markets to fill the cross-zonal capacity in the SEM to GB direction (where onshore restrictions on Moyle mean overall cross-zonal capacity is lower). However, capacity in the GB to SEM direction is often not filled, although the impact of this is mitigated somewhat as the issue is most obvious during periods where market spreads are lowest. Based on this, EIDAC was of the view that the fallback arrangements offered the most optimal interim design option for the SEM and that the very low levels of 'Flows Against Price Differences' were indicative of this efficiency.

TSOs/MOs

National Grid ESO did not share the interconnector owners' opinions that capacity was being efficiently allocated, as they argued that the average volume cleared in IDA1 was insufficient to fully utilise the cross-border capacity on both EWIC and Moyle.

EirGrid/SONI believed that interconnector flows had, at times, exacerbated challenges in relation to the system security situation. Due to the lack of a Day-Ahead interconnector schedule, the TSOs had, at times, notified a reduction in interconnector capacity in advance of any cross-border auctions taking place for the security of the system. Even after the auctions had completed, it may still be necessary for them to reduce the interconnector capacity. For example, during periods of expected system shortfall or high market prices, the SEM may be "capped at" the Strike Price and this can have the unintended consequence of the SEM appearing cheaper than GB and resulting in significant interconnector exports from SEM to GB in the Intraday time frame. During these events the TSOs, where possible, arrange trades with the agreement of National Grid to reduce the flow of energy from SEM to GB. If trades cannot be agreed, then the only option remaining is for the TSOs to reduce the interconnector capacity to maintain system security and to avoid entering an Alert state.

Although historically there had been a strong correlation between SEM and GB Day-Ahead prices through price coupling, SEMO thought that the change in timings of GB auctions to now be ahead of SEM auctions, may have led to GB prices becoming even more influential on the SEM price formation. The combination of the changes in market fundamentals and the changes in some market participant bidding behaviour (as evident by the Assetless Units) makes the like-for-like comparison of pre- and post-Brexit market results difficult, and the magnitude of any impact of a decoupled day-ahead timeframe even more difficult to quantify.

Question 3: SEMC Comments

The SEMC notes two key messages coming from the industry in relation to the arrangements in place since January 2021. The first is related to the reduction in

forward hedging opportunities with the interruption of the sale of FTRs by IC owners. The second point is related to the efficiency of allocation of interconnector flows since 2021.

I. Forward Hedging Liquidity

The SEMC is of the view that the reduction in hedging opportunities, particularly to suppliers is a loss for the market efficiency and ultimately for consumers. In coming to a decision the SEMC will have the promotion of forward liquidity as a key decision factor.

II. Efficiency in allocation of interconnection capacity

The level of market efficiency of interconnector flows can be measured by the proportion of time that the direction of flows of the SEM interconnectors are set against the price differential between the SEM and GB Markets. Interconnector flows should always be set in the direction of the higher price market for a given trading period. Whenever this is not the case, we can flag that specific trading period as Flowing Against the Price Differential (FAPD).

Given the way the allocation of interconnector flows are determined (i.e. via an optimization algorithm which automatically set the flows in the direction of price differentials), the only factors causing FAPDs are ramping constraints which prevent the ICs from adjusting the flows at the same speed that prices may change from one trading period to another. This process for determination of IC flows has not changed since the introduction of the new arrangements in January 2021. Two things have changed though: The market being coupled (now the IDA1 instead of DAM) and the granularity of the trading periods (the IDA1 is a half hourly auction instead of hourly like the DAM).

On that basis, we have assessed the percentage of time that the ICs have produced FAPDs for the last four years (i.e. 2019/2020 before the new arrangements and 2021/2022 after the new arrangements). Figure 6 shows the share of FAPDs for each interconnector, and as we can see, there is no meaningful deterioration of allocation of flows after the new arrangements. Moyle presents a higher rate of FAPDs, and this

is possibly related to the fact that Moyle has lower loss factors and has its capacity allocated under a lower price spread between the two markets which in turn can increase the changes in price direction.

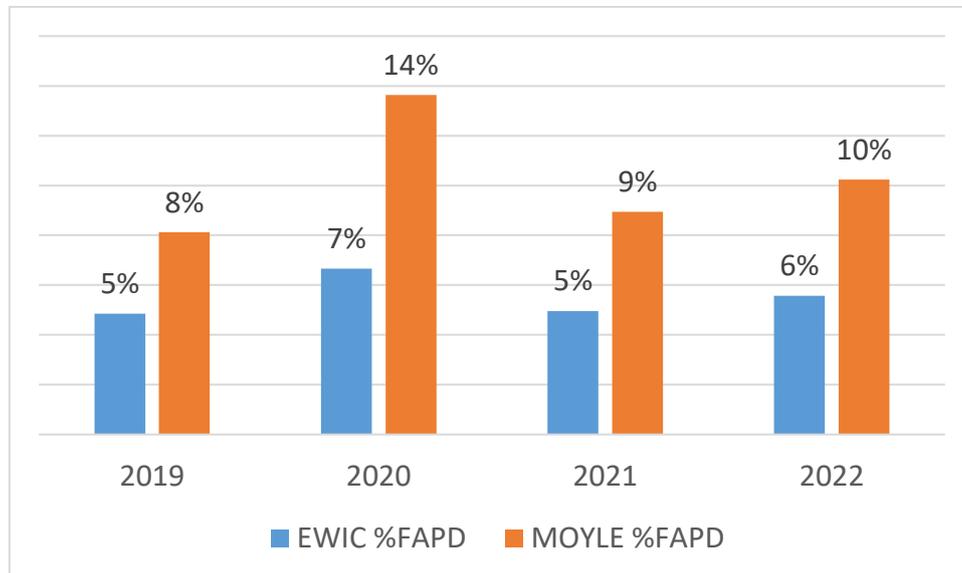


Figure 6: % of flows against price differentials

In terms of volume of flows, there is no clear indication that the IC flows have been hampered by the new arrangements in place since January 2021. Figure 7 shows that imports from GB have actually increased in 2021 when compared to 2020. Exports have also increased in 2022 when compared to 2019. There are other factors playing a role in the determination of the annual flows such as outages on both interconnectors and the price differential between the two markets.

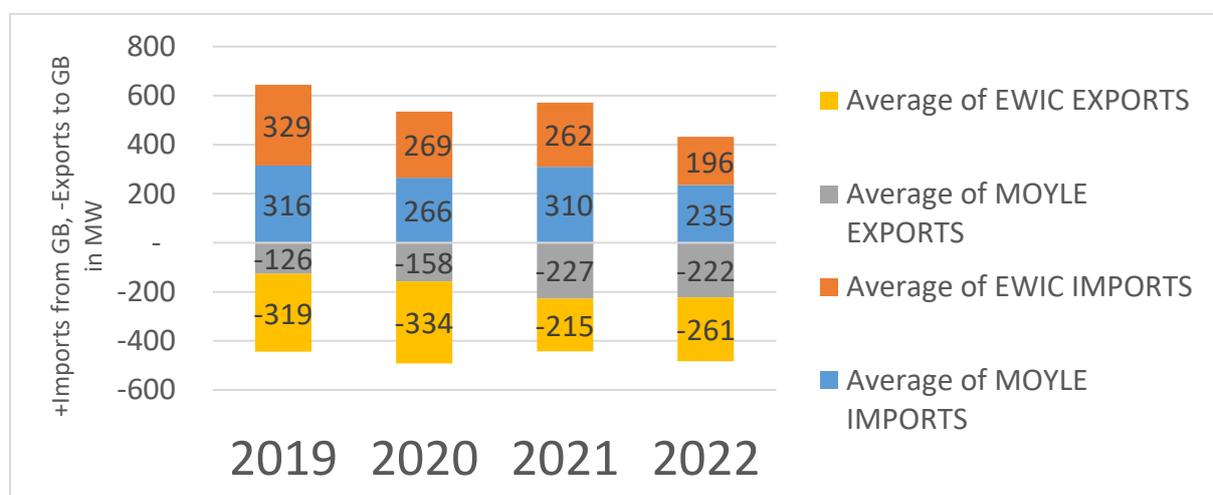


Figure 7: Average volume of IC flows

2.4 Question 4: Responses from the industry

What improvements could be made to the fallback arrangements in advance of the implementation of MRLVC? Could these improvements continue to bring benefit once MRLVC is implemented?

Market Participants

BGE is of the view that the introduction of FTRs at the IDA1 is the best course of action.

Panda Power is of the view that the key issue to be solved is the poor liquidity in the forward market. While FTRs should not solve this problem entirely, it would be a relatively simple change to implement and a step in the right direction.

PowerNI agreed that there were a number of possible changes that could be made to the current arrangements but that it was difficult to assess these without clarification around the timeframes being proposed.

Prepay Power stated that while the introduction of FTRs could be an improvement to the current arrangement, it would not address the losses in market efficiencies at the day ahead market post decoupling.

SSE was supportive of an examination and further consultation on possible options to enhance the current implicit allocation of capacity between SEM and GB.

Energia and ESB stated that the current arrangements are producing market results and interconnector flows which are efficient and, given the plan to introduce the MRLVC in the future, they are of the view that no change should be made to the current arrangements.

Wind Energy Ireland/RenewableNI noted the significant number of projects required to be delivered by the Market Operator/System Operators over the coming years. In their opinion these projects should take priority over the development and implementation of interim measures for SEM-GB trading before the return of MRLVC.

ESBGT cautioned on the implementation of improvements to the current arrangements, maintaining that it was unclear if substantial arrangements would need

approval from the EU and UK given that the TCA was agreed upon at the policy governance level of those jurisdictions. As a result, these jurisdictions may need to negotiate any further changes because of this and any alterations deemed to be long-term effecting would need to be compliant with MRLVC and future interconnection between the SEM and other EU markets.

Interconnector Owners

Moyle suggested that there may be some benefit to introducing an earlier coupled market than the current IDA1 – particularly if it would result in more liquidity and competition in the market. It was proposed that this auction could be coincident and coupled with one of the GB Day-Ahead markets, although it would not be a recoupling of the SEM Day-Ahead market. The auction could either use the existing Intraday auction framework but run at an earlier time of the day, or it could be similar to arrangements for the North Sea Link (NSL) between GB and Norway which efficiently allocated capacity via a coupled auction between the GB Nord Pool Day-Ahead market and one of the Norwegian zonal markets at the Day-Ahead stage.

EIDAC suggested that should MRLVC be significantly delayed and, in advance of the delivery of future interconnection in Ireland, the SEM Committee should examine the wider market parameters that influence interconnector performance. This would include the use of loss factors for scheduling, ramping constraints, policy on the appropriate use of curtailment by TSOs and the ability of interconnector owners to directly trade out imbalances in the SEM as a balance responsible party.

TSOs/MOs

National Grid TSO suggested other improvements to manage the flows on the interconnectors. These could include improvements to the suite of SO-SO services used by the TSOs so that GB and SEM could manage flows for balancing and system purposes. It was proposed that changes should be transparent to the market and reflective of market prices with a longer-term, market-based solution being proposed for cross-border balancing (which is a requirement under the TCA). The same respondent also stated that the SEM CRM strike price can result in artificial flows between GB and Ireland and they thought that the strike price should be reviewed.

EirGrid/SONI and SEMO were not in favour of making changes to the current arrangements. SEMO recommended that any intervention would need to: ensure that it would be implemented in a timely manner; was compatible with longer term market coupling design; did not impact the delivery of other priority SEM changes such as those required under the Clean Energy Package or the introduction of further interconnection; and did not split SEM liquidity any further. EirGrid/SONI expressed similar views with the respondents believing it was in the best interest to retain the existing arrangements until the implementation of MRLVC. Although the fallback arrangements weren't perfect, there was a concern that changes could have an unknown impact on interconnector scheduling and could potentially exacerbate security of supply issues. In this opinion, the focus should be on the implementation of the Clean Energy Package as well as further interconnection between SEM, GB and continental Europe.

Question 4: SEMC Comments

From the market participants seeking changes to the current arrangements, the introduction of FTRs referenced to the IDA1 prices was defended on the grounds that it could be a relatively quick adjustment which could remediate to some extent the reduction of forward hedging instruments.

The SEMC notes the response from Moyle Interconnector to the question 1 stating that pre-January 2021, assetless traders had been the most active participants in the FTR market and that this implied that much of the FTR trading was unrelated to hedging a supply position in the SEM.

The SEMC also notes the share of trading volumes in the DAM and IDA1 which can be attributed to assetless traders. Figure 8 shows the share of these markets by unit types.

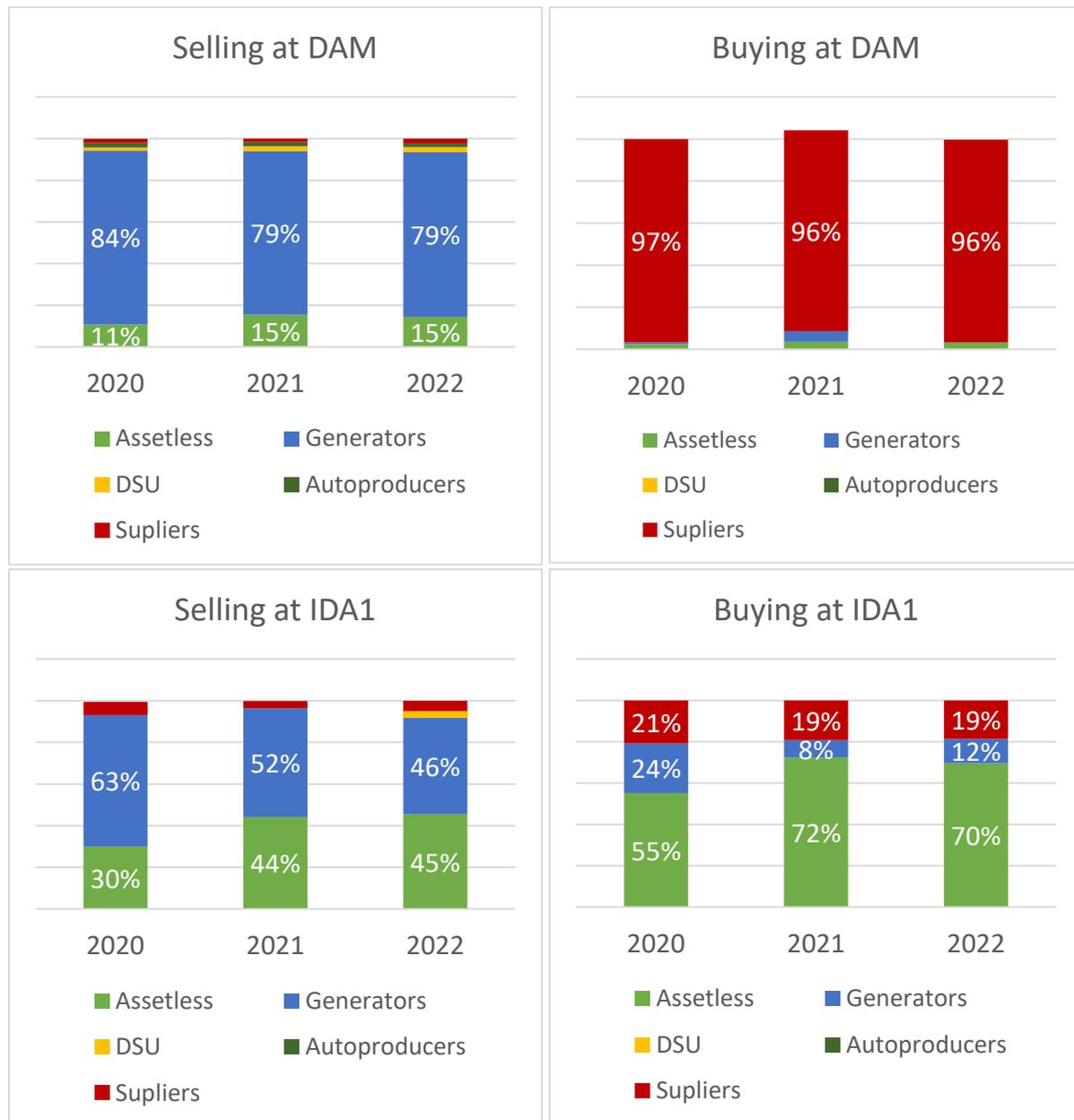


Figure 8: Share of market participation by type

From the charts above, it can be seen that suppliers are buying virtually the totality of their demand at the DAM (i.e. as shown in Figure 1, the IDA1 is only circa 10% of the ex-ante market). Assetless traders are the key buyers at the IDA1. Hence FTRs at the IDA1 may only have a very limited effect in providing forward hedging opportunities for suppliers.

2.5 Question 5: Responses from the industry

Would the introduction of PTRs in advance of the implementation of MRLVC be beneficial, and to what extent?

Market Participants

BGE was of the view that PTRs would produce theoretical benefits however the implementation timeframe would have to be taken in consideration. FTRs at the IDA1 should produce quicker gains.

ESB stated that the introduction of PTRs in advance of the implementation of MRLVC would bring about greater export and import capacities in the DAM, however the timeframe and costs associated to its implementation could be prohibitive.

Prepay Power believes that the introduction of PTRs would represent the best solution currently available to the ISEM prior to MRLVC. PTRs would be challenging to implement, more so than FTRs at IDA1, however they would improve both forward liquidity, the loss of competition and would directly dilute market power at the DA level.

Power NI stated that the introduction of PTRs in advance of the implementation of MRLVC would be a positive development, as in principle it may allow suppliers to manage their own positions and achieve more parity in GB and ISEM DAM markets. Although, further information in relation to the timeframe of implementation of MRLVC is required prior to making a holistic assessment.

SSE supports the introduction of PTRs (Use It or Sell It framework), according to SSE PTRs are a well-established approach and is already in operation between GB and other counterparts in Europe e.g., IFA, BritNed. SSE is also of the view that PTRs would allow market participants to have a product that can be utilised against the price reference they are exposed to, which is the Day Ahead price.

Energia was of the view that the introduction of PTRs would not produce positive market results and instead of that, resources should be allocated to the implementation of balancing platforms such as MARI and TERRE.

Wind Energy Ireland/RenewableNI mentioned the resources needed to implement such a change, often at the expense of progressing other critical work.

Interconnector Owners

Moyle was of the view that whilst PTRs would allow interconnector capacity to influence the DAM prices, the likely extent of any positive impact over and above the existing fallback arrangements is not clear, but the cost and effort involved with the introduction of PTRs would be significant.

EIDAC also raised a number of concerns about the potential re-introduction of PTRs including the risk of increased inefficiency (Flows Against Price Difference), the potential impact on Ireland's offshore development strategy (particularly in relation to market participants making forecasts of price spreads involving offshore zones) and the potential impact on MRLVC.

TSOs/MOs

SONI/EirGrid believed that this was a question best answered by market participants. They wanted to ensure that any changes would not exacerbate security of supply issues and that existing mechanisms available to the TSOs to change interconnector flows would not be impacted through the introduction of PTRs.

National Grid ESO, on the other hand, were in favour of their introduction and believed that PTRs at the Day-Ahead stage in advance of MRLVC would be beneficial in terms of maximising social welfare and reducing the average spread between SEM and GB. The interconnectors connecting GB and Continental Europe ran explicit Day-Ahead auctions, and although they were not as efficient as implicit coupling, they were still deemed to be better than not having a market at the Day-Ahead stage which was the most liquid and useful timeframe for market participants.

SEMO cautioned against comparing PTRs on the GB-Channel border with a similar implementation on the GB-SEM border, primarily due to the structural differences between the regions. SEMO also raised concerns over implementation costs.

Question 5: SEMC Comments

The SEMC notes the support for the introduction of PTRs from some market participants, however this support was often cautioned on the possible timeframe for implementation and costs.

While the market operations associated with the sale of FTRs are well understood by SEM market participants, the potential introduction of PTRs would have to be further assessed. In the subsequent paragraphs we will illustrate how PTRs could be implemented in the SEM-GB border.

Capacity Allocation

In the same way that FTR auctions were previously held by the Joint Allocation Office (JAO)² on the Single Allocation Platform (SAP), PTRs can also be sold using the same platform. For example, BritNed and IFA hold Long-Term (LT) and Day-Ahead (DA) PTR auctions using the SAP (with BritNed also using its own bespoke platform called 'Kingdom' for auctioning intraday capacity).

LT explicit auction products include Annual, Quarterly, Monthly and Weekend products while DA auctions are for the next trading day. LT auctions are normally scheduled several months in advance with the DA auctions taking place the day before real time. The example shows BritNed's LT auction calendar for July 2021 (in the Netherlands to GB direction).

NL to GB (July 2021)						
Auction ID (JAO)	Auction Opens	Auction Closes	Auction Type	Product Starts	Product Ends	Capacity (MW)
BDL-NL-GB-E-BASE---210710-01	12:10 07 Jul 21	12:10 08 Jul 21	Weekend	10-Jul-21	11-Jul-21	25
BDL-NL-GB-Q-BASE---220101-05	12:10 08 Jul 21	12:10 09 Jul 21	Quarter	01-Jan-22	31-Mar-22	50
BDL-NL-GB-E-BASE---210717-01	12:10 14 Jul 21	12:10 15 Jul 21	Weekend	17-Jul-21	18-Jul-21	25
BDL-NL-GB-M-BASE---210901-01	11:40 15 Jul 21	11:40 16 Jul 21	Month	01-Sep-21	30-Sep-21	50
BDL-NL-GB-Y-BASE---220101-10	11:50 15 Jul 21	11:50 16 Jul 21	Annual	01-Jan-22	31-Dec-22	50

Figure 9: Source BritNed Website³

² <https://www.jao.eu/>

³ <https://www.britned.com/what-we-offer/capacity-auctions/auction-schedules/>

Capacity Nomination & Interconnector Scheduling

Once a market participant has been successful in a PTR auction and has obtained, for example a 10MW PTR across a month, they must, closer to real time, nominate the capacity that they wish to use.

This nomination is basically an instruction to the interconnector owner that the customer will be using some, or all, of their capacity rights. Crucially, it is important that a PTR holder has the electricity available in the market they are sending from as the interconnector will flow based on the position of all nominations for a particular period. This capacity could be from a PTR holder's own generation units, from power exchanges in the market or from bilateral contracts etc. In the case BritNed, any LT and DA capacity that isn't nominated is re-allocated to their own intraday auctions.

The diagram below illustrates the timeline for the Energy and Capacity markets in GB and shows the timings for the Day-Ahead capacity auctions and nomination gates for BritNed, IFA and ElecLink.

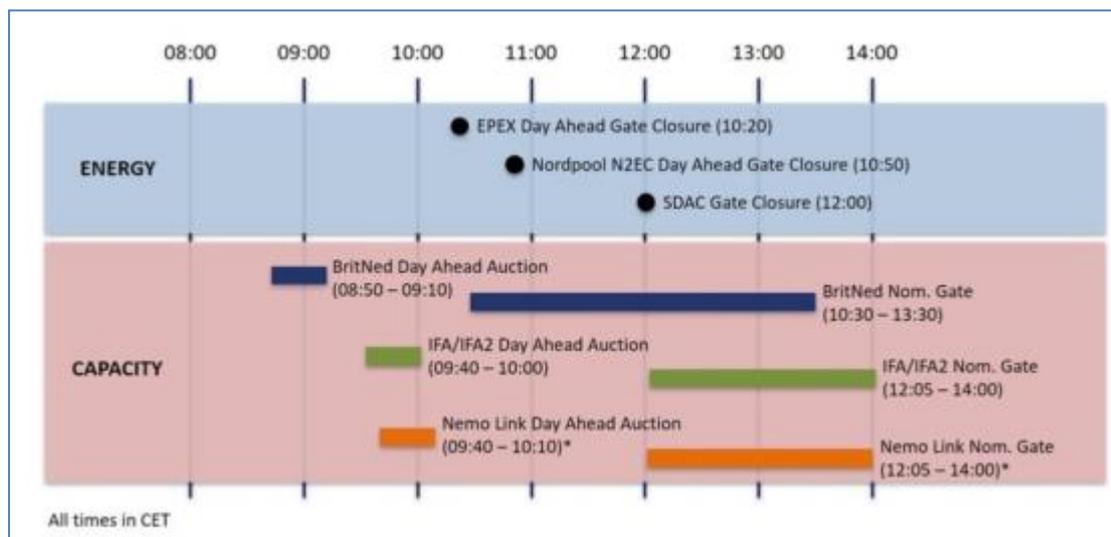


Figure 10: Source: IFA Website

In February 2019, a new Regional Nominations Platform (RNP) [designed and managed by Unicorn Systems] was implemented in order to help centralise the nomination process across the BritNed, IFA and NemoLink interconnectors. The system handles the central capacity management processes and, through its receipt of the capacity rights or nomination values from the external allocation platforms, generates a variety of data flows to interconnector operators, TSOs and others.

The RNP also provides the nomination values to the respective dispatch systems where each interconnector is controlled and thus instructed for actual operation (for example, the BritNed Control Point System the NEMO Dispatch System).

The interconnector owners themselves send Final Physical Notifications (FPNs) to the TSOs to reflect nominations and to give the TSOs advance notice of the proposed flow.

The diagram below shows an example of BritNed’s LT and DA nominated capacity in the RNP for the 4 August 2021.

Time (CET/CEST)	Aggregated Nominations [MW]		Netted Nominations [MW]	
	NLGB	GBNL	Flow	Direction
00:00 - 01:00	1,006,800	0,000	1,006,800	NLGB
01:00 - 02:00	1,006,800	0,000	1,006,800	NLGB
02:00 - 03:00	1,006,800	0,000	1,006,800	NLGB
03:00 - 04:00	1,006,800	0,000	1,006,800	NLGB
04:00 - 05:00	1,006,800	0,000	1,006,800	NLGB
05:00 - 06:00	1,006,800	0,000	1,006,800	NLGB
06:00 - 07:00	948,000	30,000	918,000	NLGB
07:00 - 08:00	930,000	855,000	145,000	NLGB
08:00 - 09:00	914,000	156,000	858,000	NLGB
09:00 - 10:00	1,006,800	0,000	1,006,800	NLGB
10:00 - 11:00	1,006,800	0,000	1,006,800	NLGB
11:00 - 12:00	1,006,800	0,000	1,006,800	NLGB
12:00 - 13:00	1,006,800	0,000	1,006,800	NLGB
13:00 - 14:00	1,006,800	0,000	1,006,800	NLGB
14:00 - 15:00	1,006,800	0,000	1,006,800	NLGB
15:00 - 16:00	1,006,800	0,000	1,006,800	NLGB
16:00 - 17:00	1,006,800	0,000	1,006,800	NLGB
17:00 - 18:00	1,006,800	0,000	1,006,800	NLGB

Figure 11: BritNed’s LT and DA nominated capacity in the RNP for the 4 August 2021.

If a PTR holder has nominated capacity but is unable to flow it, then they are subject to imbalance costs.

Settlement

Once an interconnector has flowed, the interconnector owner submits volumes to Elexon for settlement purposes. (Elexon implement and manage the Balancing and Settlement Code in GB).

Elexon can’t measure an individual customer’s volumes on an interconnector, only the total flow. Therefore, the data submitted from the interconnector owner (as “Deemed Meter Volumes”) reflects the meter volumes per customer. These are based on the PTR holder’s nominations and the values are used in the final settlement process.

Elexon aggregate the nominations and compare them to the actual metered volumes with any differences being allocated to an Error Administrator.

Data sent to Elexon comprises Production and Consumption BM Unit values. GB market participants need a Production BM Unit to enter energy onto the GB system and need a Consumption BM Unit to take energy off the GB system. The data is normally consolidated into one MWh value.

4. SEMC Final Considerations

Having assessed the consultation responses and carried out its own data analysis, the SEMC sees four key issues driving its decision:

- I. Allocation of Interconnection Capacity and Market Efficiency;
- II. Forward Hedging Liquidity;
- III. Market Power Implications and
- IV. Wider market developments taking place in GB and EU/SEM

I. Allocation of Interconnection Capacity and Market Efficiency

One of the key metrics for the measurement of the efficiency of capacity allocation across the SEM-GB interconnectors is the measurement of Flows Against Price Differentials (FAPD). The SEMC data analysis did not support the thesis that FAPD have increased due to the introduction of the post Brexit arrangements.

However this metric has its own limitations as there are significant differences in market design between the SEM and GB. While the SEM ex-ante volumes are cleared exclusively in the spot market (DA, IDM and BM), in GB the majority of the market is settled in the physical forward market, physical bilateral contracts are a key feature of the GB market. As a consequence the current coupling mechanism relies upon a very small price sample of both markets to set the direction of the interconnector flows.

Comparing the IC flows with the price differentials between the SEM and GB IDA1 markets may only lead to a partial conclusion in terms of how efficient our IC flows with GB have been in maximizing socio-economic welfare gains. Interconnectors contribute to these welfare gains in three important ways: By reducing SEM-GB price differential when they differ on its long term average. By reducing the daily and seasonal fluctuation on prices due to different demand profile in interconnected markets and finally by reducing the price volatility driven by unpredictable price spikes and troughs.

To maximize the socio-economic welfare gains, Ideally, interconnector flows should link the most representative markets within each interconnected zones. The drawback of the current arrangements is that prices in the DAM (our key market), since 2021,

have not been formed taking direct consideration to the cross border capacity and hence we are operating under a more constrained market under the post-Brexit arrangements. This reduces welfare gains on both markets.

II. Forward Hedging Liquidity

Forward hedging liquidity has been mentioned in a significant number of responses, particularly from suppliers. The SEMC, in coming to a view on the best way to use cross border capacity to promote forward liquidity, is taking in consideration the responses from the industry and its own data analysis.

Two instruments have been proposed by the industry: PTRs and FTRs associated to the IDA1 market. FTRs was the instrument chosen to form part of the I-SEM high level design while PTRs was the instrument being used prior to that.

Considering the responses from the industry, the volumes traded and the type of market participants trading in the IDA1, the SEMC is of the view that FTRs would not maximize the opportunities for forward hedging for suppliers. At the same time, FTRs should be easier to implement and have lower implementation costs than PTRs.

From the spot and forward market efficiency, PTRs should be a superior instrument given the current set of market arrangements prevailing in the SEM and in GB. However the timeframe for implementation and associated costs could pose unsurmountable challenges. If that is the case, FTRs could be the fallback alternative.

III. Market Power Implications

While FTRs, due to its financial nature, have no direct impact on the assessment of physical market power, the potential introduction of PTRs could affect the basis for the calculation of market concentration in the SEM. One of the key metric used to calculate market concentration is the Herfindahl-Hirschman Index (HHI).

$$HHI = \sum_{k=1}^n (MS_k)^2$$

Where MS is the market share of firm k in the market, and n is the number of firms. The higher the HHI index, the higher the market concentration.

Given its physical nature, PTRs would affect the market share of the market participant which holds a PTR. In the case of a generator nominating a PTR in the direction GB-SEM (Importing), its generation market share would increase, while a generator nominating a PTR in the direction SEM-GB (exporting), would reduce its generation market share in the SEM.

Generators should typically buy PTRs with a view to export its own generation, while the use of PTRs to import generation should typically be used to offset a balancing market exposure caused by an eventual outage.

The effect on the market concentration metric would depend upon how the PTRs are sold. If the PTRs (GB-SEM direction) are bought by a number of exiting market participants or by new independent companies entering the market, then the allocation of PTRs increases competition by reducing market concentration. On the other hand, if the import capacity of all interconnectors between SEM and GB are apportioned entirely to the dominant firm in the SEM, then this would affect the concentration metric negatively.

The situation above mentioned would be of particular concern if the dominant player in the SEM was also a dominant player in the GB market. In that case the interconnection capacity, if acquired, could re-inforce the dominance of this market participant on both markets. Currently, there are no market participant in the SEM which holds market dominance on both markets.

Nevertheless, if PTRs were to be implemented in the SEM, the SEM Committee would further consider whether specific market power mitigation measures should be introduced.

IV. Wider market developments taking place in GB and EU/SEM

Currently there are developments towards revising the pillars of market design prevailing in Europe and GB. Revision of the current marginal pricing system is under discussion in EU. In GB proposals for the introduction of zonal/nodal pricing is under consideration. These developments could substantially change the basis for the current SEM-GB trading mechanisms. The current market coupling at the IDA1 is heavily reliant on the current energy trading arrangement prevailing in both the EU

and GB. In turn, FTRs are heavily reliant on the current market coupling arrangements between SEM and GB.

In that sense, PTRs are less integrated and less reliant on the market coupling auctions and can instead take place more independently as a 'standalone' mechanism. In that sense, a solution for SEM-GB trading based on PTRs can be a more resilient way to allocate the capacity of the SEM ICs with GB.

5. SEM Committee Decision

While the technical and commercial implications of having FTRs between the SEM and GB markets are well known by the industry and Regulatory Authorities (virtue to the fact that FTRs was in in operation in the I-SEM market design since its inception).

The potential introduction of PTRs carries more uncertainty in terms of how this instrument could work alongside the current trading arrangements within the SEM.

The SEMC considers that it would be appropriate to have an additional assessment carried out by interconnector owners (“ICO”) for the implementation of PTRs on the SEM-GB border. This assessment will be progressed by the ICOs under instruction from the relevant Regulatory Authorities (RA’s) and the outcome will be considered by the SEMC. It should, as a minimum, address:

1. The design of potential PTR arrangements that are broadly compatible with the existing SEM and GB market arrangements (whilst recognising that ex ante and/or balancing market rule changes and system developments would be necessary in SEM to facilitate PTRs).
2. The full lifecycle investment costs associated with the implementation of PTRs on the SEM-GB border including:
 - i. Access Rules governing the use of these Rights;
 - ii. The procurement and development of a new SEM-GB framework for the sale of rights on the JAO Platform;
 - iii. The delivery of a Regional Nomination Platform (RNP) to allow the nomination of these rights by market participants;
 - iv. Implementation of SEM central system and market rule changes to support changes to interconnector scheduling, the clearing of Physical Nominations (PN’s) and settlement;
 - v. Full life cycle testing, transition and implementation of the change with Market Participants, NEMO’s and TSO’s in SEM and GB;
 - vi. Impacts on interconnector revenues

3. Following receipt and review of the assessment, the RAs and ICOs will consider next steps, which may include consultation on revision of the SEM-GB interconnector access arrangements.
4. A decision on ownership of the costs of this assessment and the associated implementation of any proposed solution will be considered by the RA's in due course.

The Regulatory Authorities will engage with the relevant ICOs with a view to have this analysis completed within 3 months after the publication of this decision paper.

The SEM committee will continue to monitor the progress of the Multi Regional Loose Volume Coupling (MRLVC) solution. In the coming months, while the ICOs carry out this analysis, it is expected that further progress should be made in relation to the design and implementation timeframe for the MRLVC.