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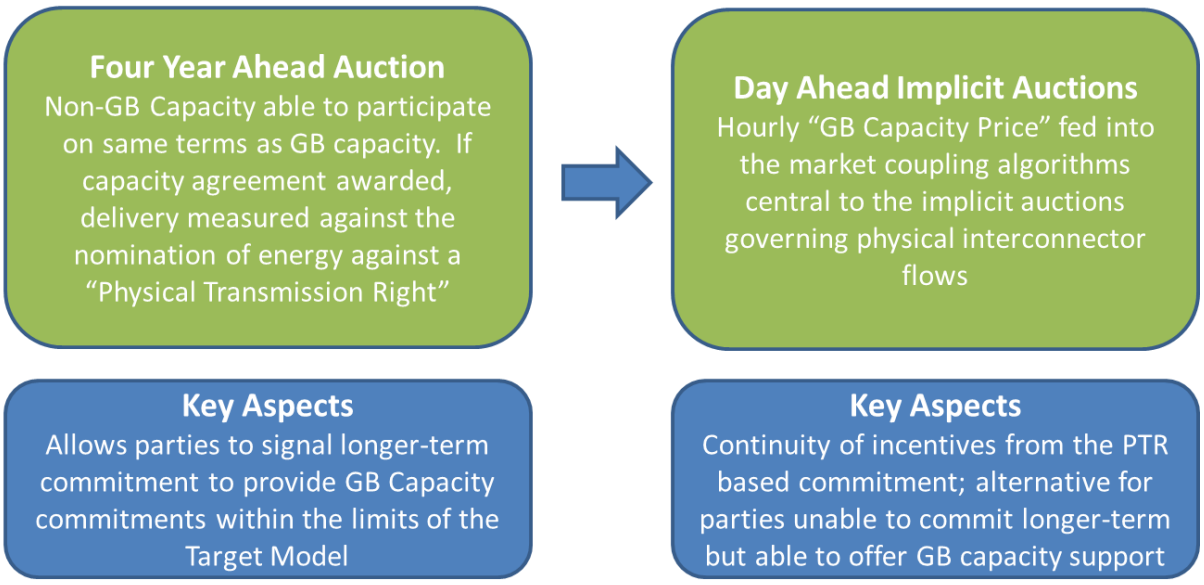
Treatment of non-GB capacity in the Capacity Market

Executive Summary

The difficulties of integrating non-GB Capacity within the Capacity Market are well known. This is primarily because the market coupling arrangements of the Target Model mean that energy flows across interconnectors are determined alone by spot energy prices. However, it is also clear that interconnection can and does offer security of supply benefits, and that its inclusion within the GB Capacity Market may help to retain appropriate incentives for interconnection as part of the further development of a single market for wholesale electricity across the EU.

The inclusion of non-GB capacity on ***exactly*** the same terms as GB Capacity is extremely difficult and so instead we seek to establish a broadly comparable basis for its inclusion. We set out a single model that has two discrete but complementary elements within it. We believe that this model provides an appropriate means of rewarding any security of supply contribution from non-GB capacity.

Figure 1: Summary of Model



The first element ("Incentives Element") is financial in character. This would seek to reward energy flows to the GB proportional to a statistical assessment of the likelihood of there being stress on the GB system. Conversely it would charge for the use of GB Capacity for exports out of GB proportionate to the same statistical assessment of stress. The participants to whom all payments or charges would accrue to under this Model are Interconnector Users.

The second element ("Auction Element") would adopt a number of features of the current proposals for the auction specifically related to delivery. This would enable generating units or Demand Side Response located outside of Great Britain to participate.

The proposed model cannot guarantee flow of interconnectors themselves during stress periods. However we are confident that it gives a very good set of pricing and commitment

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signals for non-GB capacity to contribute to GB security of supply by flowing energy to GB at times of system stress.

The Expert Group is specifically invited to comment on the following questions:

- Does the Expert Group believe that the proposed model offers a suitable approach?
- Are there aspects of either element of the model that are of particular benefit?
- Are there aspects of either element of the model that are of particular concern?
- Are either or both elements needed?

1. Background

1.1. The Capacity Market is a remedy for the "missing money". However addressing the missing money for GB Capacity while not for non-GB capacity creates a potential distortion to incentives to flow energy to GB. This is true at all times and notably at times of stress. This will incorrectly signal a reduced value of any security of supply contribution from interconnected markets (which may drive up costs to GB consumers), reduce revenues to existing interconnectors and damage the business case for new interconnectors. These issues should be addressed as non-GB Capacity delivered via an interconnector could provide a lower cost solution if allowed to compete.

1.2. The exact arrangements for Interconnectors under the Target Model are yet to be determined. For the purpose of this paper it is assumed that the following arrangements will be adopted that will operate in two timescales.

- The first is where parties take long-term positions and trade in "Physical Transmission Rights" (PTRs). These give them the right to nominate flow across the interconnector up to 9am day-ahead of delivery. If they do not then the right is lost and sold on their behalf to other users.

- Subsequent to this there are "Implicit Auctions" across the interconnector to determine cross border flows using a 'market coupling' algorithm that compares spot energy prices at the day-ahead stage across the interconnector and determines the flow according to these price differentials. These implicit auctions are anonymous and dictate the quantity and direction of flow across interconnectors. This bears no relationship with the previously sold PTRs and in particular can result in the direction of flow being completely the reverse of that established by the PTR nominations that has taken place previously.

1.3. This means that a direct assessment of the deliverability of any non-GB Capacity on an equivalent basis to GB Capacity is not possible. The flow will be solely determined by the market coupling algorithm. The possession of a PTR by non-GB resource can be taken as a signal of intent to flow energy to GB but it is different from the actual metering a GB generating unit's delivery of energy direct onto the GB Transmission System at times of stress.

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2. Detailed Description of the Proposed Model to incorporate non-GB Capacity

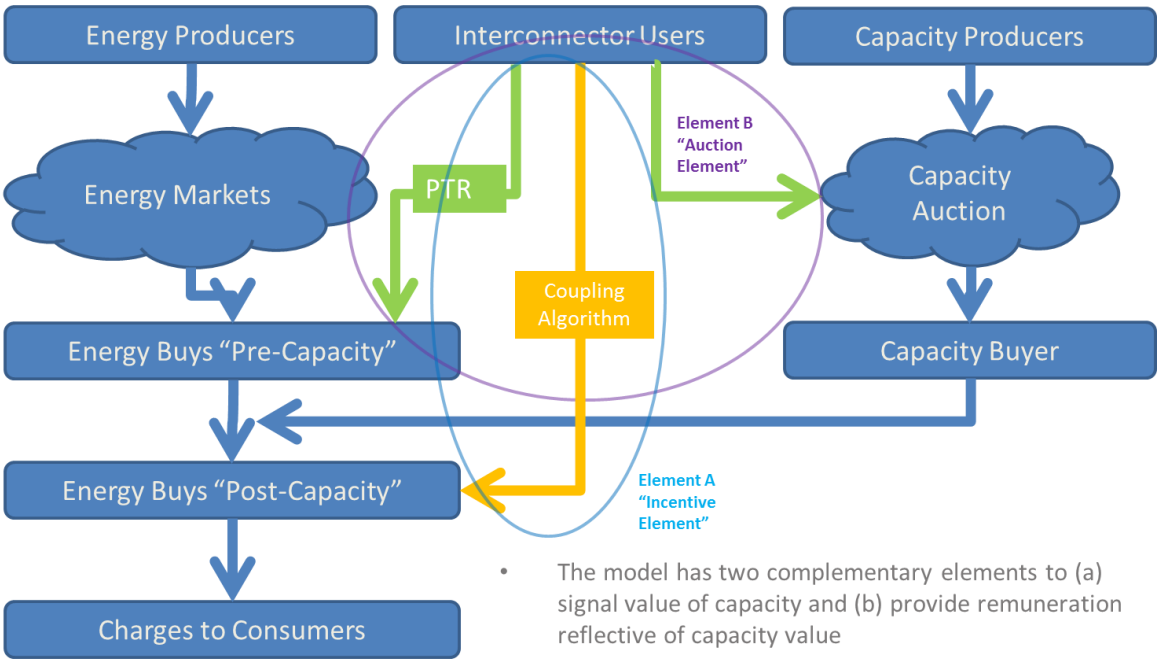
2.1. The model is comprised of two discrete but complementary elements.

2.2. The design philosophy behind them is that in the current energy market, capacity and energy are remunerated through a single wholesale price. However in a world with a separate GB Capacity Market the prices for Energy and Capacity are separate. If parties seeking to supply GB via an interconnector can only access the energy price and not also the capacity price, this gives rise to two issues:

- That capacity outside of GB cannot compete with GB capacity possibly driving up costs to GB consumers
- That the price signals that set interconnector flows when the Target Model is implemented will not be accurate insofar as they will not include a capacity component and this may lead to inefficient flows.

2.3. Therefore it is proposed to establish a model with two elements, each operating in two distinct timeframes. They are designed to be complementary and are described below.

Figure 2: Summary of Model



2.4. Element A: Incentive Element utilising short term pricing signals

2.4.1. This element of the model recognises that interconnector flows are driven by the short-term arbitrage opportunities that exist between the interconnected energy markets. It seeks to "add back" a price for GB capacity into the spot prices that are used by the on-the-day implicit auctions for each interconnector. This serves a

purpose of ensuring that interconnector flows adhere to the wider supply and demand picture in each of the interconnected markets, and are not skewed by the existence of the GB Capacity Market. In short the "missing money" is restored.

2.4.2. There is no explicit role for generating units outside of Great Britain in this model; instead it is based upon the actions of interconnector users – i.e. those parties wishing to trade energy across an interconnector.

Setting the Annual Interconnector Capacity Revenue "Fund"

2.4.3. This element of the model would commence at a prior auction stage (either the T-1 or T-4 auction) by establishing the revenue fund that would be available to interconnector users. The principal behind the fund is to set its value at the equivalent revenue that a GB Capacity Provider (of equivalent capacity to the interconnector) would receive if it provided capacity throughout the year.

2.4.4. To calculate the "fund", the analysis that informs the overall assessment of the volume of capacity to procure in the GB capacity auction would establish a "de-rated capacity contribution" of each interconnector. The current thinking is that this would form the baseline capacity contribution of each interconnector and thus the basis of future capacity revenues available to the users of that interconnector.

2.4.5. The same capacity auction will clear a price for capacity for the delivery year in question. This is then multiplied by the de-rated capacity contribution of that interconnector to present the total annual capacity revenues that are potentially available to the users of that interconnector.

Setting Hourly Interconnector Capacity Prices

2.4.6. The next stage is to ascribe the annual capacity value to each settlement period across the year. The aim of this exercise is to provide a signal to parties trading over the interconnector of the time-varying value of delivering capacity to GB, and correspondingly the cost of drawing capacity from GB.

2.4.7. Inevitably perfectly reflecting the "actual" capacity cost/value would require the price to be set post event, however an *ex-ante* trading signal for interconnectors is needed.

2.4.8. It is proposed that the System Operator would generate a half-hourly "Stress Probability" value according to a published methodology. This Stress Probability would be used to derive an hourly "interconnector capacity price" with the hours of highest price being those with highest Stress Probability and those with the lowest Stress probability correspondingly having the lowest capacity price. The precise detail of this methodology would need to be determined.

2.4.9. Ultimately the above process would yield a set of 8,760 hourly prices. They would be highest at times of greatest stress and lowest at times of least stress. The prices

would be paid to any interconnector user nominating energy in the direction of GB and would be charged to any user nominating energy out of GB in the manner contemplated in the Target Model. For this Model to operate effectively then this "capacity price" would need to be added to the market coupling algorithm currently under design as part of the development of the Target Model. This would clearly be a key dependency for the successful implementation or otherwise of this approach.

2.5. Element B: Auction Element for non-GB Capacity

2.5.1. This element of the model retains a link to the physical capability to deliver energy during a stress event and is based upon allowing non-GB generation plant to participate within the GB Capacity Market in the T-4 auction process. It does however modify discrete elements of the assessment of energy delivery during a stress event, to reflect the fact that it cannot dictate interconnector flows, but must have made efforts to supply the GB energy market during times of stress.

2.5.2. This element of the model is therefore formed around the principal that the non-GB capacity must (a) demonstrate to be willing to take on an equivalent firm commitment to deliver its energy into the GB market and then (b) take steps to deliver energy onto the GB market at times of stress. If it is able to meet both criteria then it should be allowed to participate in the GB Capacity Auctions. This is notwithstanding the fact that ultimately that the non-GB Capacity cannot guarantee the direction of flows across any particular interconnector. Instead a firm commitment will be signalled through their procurement and nomination against a Physical Transmission Right (PTR) over a relevant interconnector.

2.5.3. The primary participants representing non-GB capacity would be generating plant or DSR capability outside of GB (collectively referred to as "non-GB plant"). The key aspects of how they might participate in the auction would be as follows:

2.5.4. ***Capacity to participate:*** CM Capacity can be sold to non-GB plant on an interconnector specific basis up to the maximum capability of that interconnector to import to GB. Appropriate pre-qualification criteria would need to be identified but would be identical or comparable to GB plant e.g. that the non-GB plant has a PTR to support their bid. Non-GB plant shall undertake not to participate in any other market or mechanism that prejudices its ability to meet its GB CM obligation. This would include other capacity markets.

2.5.5. ***Constrained procurement:*** If demand to sell CM capacity over an interconnector exceeds the maximum capability of that interconnector to export to GB then the capacity rights available across that interconnector will initially be auctioned to set the interconnector specific capacity price and volume. The parties that have been successful in that "mini-auction" will then participate in the GB Capacity Market auction proper. If they are successful in the main auction then they will receive the lesser of the main auction price and the "mini-auction" price.

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2.5.6. ***Evidence of Capability:*** Evidence of an operational non-GB plant is required. Such plant will be subject to the same testing and verification criteria as GB generating plant that participates in the CM.

2.5.7. ***Evidence of Delivery:*** During a stress event the non-GB plant must be generating at a level commensurate with its capacity obligation. Furthermore the non-GB Plant must be able to demonstrate that it has nominated energy to GB using Physical Transmission Rights at a level commensurate with its CM capacity obligation (as limited by any technical failure of the interconnector).

2.5.8. There are other issues such as reaching agreement with the non-GB plants' host TSO to supply data to the GB TSO related to that plants' performance at system stress and the non-GB plant owners would have to agree that the contract would be governed by the laws of England and Wales.

3. Cost of Non-GB Capacity under the Proposed Model

3.1. The unit cost of capacity paid by the GB Consumer for the capacity offered by Non-GB Capacity under the proposed model should be no more than the unit cost of equivalent GB Capacity procured through the Capacity Auctions.

3.2. The costs of non-GB capacity will be built up across the two elements, starting with any costs accrued through the Auction Element. In this element a volume of capacity up to the capacity of the interconnector will be sold, at a price generated through that auction and at a cost equivalent to GB Capacity.

3.3. If any residual capability to offer capacity across the interconnector remains (once PTRs have been nominated against), this may be released through the Incentive Element. The prices set here will be such that if the residual capacity is provided to GB consumers in every hour across the year, it shall be paid an amount equivalent to what it would have had it been sold through the auction element. If the capacity provided through the Incentive element is not provided to GB consumers in every hour, then it will cost GB Consumers less.

4. Analysis of Benefits and Disadvantages

4.1. ***Non-discriminatory:*** The core benefit of each element of the model is that they each permit non-GB capacity willing and able to make a commitment to supply the GB market with capacity access to the similar arrangements as capacity within GB.

4.2. ***Supports revenues of Interconnector Owners:*** This aspect is met in differing ways by each of the elements. Under the Incentive Element the aspired to impact of the model is that the trading activity across the interconnector is left largely unchanged from a world without a Capacity Market. The impact therefore on the interconnector owners' revenues is therefore very limited. Under the Auction Element, by linking the long-term commitment to provide capacity to PTRs the model has the knock on effect of sharing revenues with Interconnector Owners.

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4.3. ***Supports new interconnector build:*** This is a consequence of the fact that revenues are much less impacted by the Capacity Market, thus if a project was deemed economic under the current market arrangements then the introduction of a GB Capacity Market would not have a negative impact upon the project.

4.4. ***Influencing Interconnector flows:*** This is a core disadvantage of the Auction Element in that it is impossible to directly guarantee interconnector flows under any model. However under the "Incentive Element" an appropriate real time signal of the value of interconnector flows to GB from **both** a capacity and an energy perspective would be signalled to interconnector users. Therefore it should mean that exports from GB should occur only when the need in the interconnected country is genuinely greater than that in GB and thus it should increase the reliability of the interconnector flows especially at times of interconnector stress.

5. Additional Benefits of the Combined Model

5.1. Though it adds complexity there are benefits in the combined model of both elements described above. This is for a number of reasons

5.2. Firstly the two elements are complementary. One of the principal drawbacks of the "Auction Element" is that it can only place an incentive around day-ahead delivery through the nomination against the PTR. However this can be subsequently super-imposed by the actions of others should prices in the implicit auction dictate that flows out of GB are more profitable. However by simultaneously incorporating the "Incentive Element", any such implicit trades would have to pay the "capacity price" which even if this still meant flows out of GB were the economically correct choice the value of the capacity lost would be properly reflected.

5.3. Another benefit of adopting both elements would be that interconnectors and indeed interconnector users will face different commercial pressures and wish to take on different risks. In implementing just one or the other element, this would leave some parties being forced to participate in a mechanism that is not aligned to their commercial risk appetite, or not participate at all. Given the elements at first assessment appear to be able to co-exist this may be arbitrarily forcing a choice on potential market participants.

5.4. In adopting both elements they can each be more properly focussed on the area in which they operate, rather than compromising them. For instance the "Incentives Element" could be focussed more acutely at the short term drivers of stress, given that the longer term drivers could be accounted for through the "Auction Element".

5.5. The "Auction Element" could also inform the assessment of the "de-rated interconnector capacity contribution" under the "Incentives Element" as it will provide information on the level of day-ahead commitment to flow energy to GB. Clearly however the forecasting of reverse nominations through PTRs and the likely outcome of the implicit interconnector auctions will still need to be modelled.

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6. Conclusions and Next Steps

6.1. The Expert Group is invited to give its views on the content of this paper, and in the following specific areas

- Does the Expert Group believe that the proposed model offers a suitable approach?
- Are there aspects of either element of the model that are of particular benefit?
- Are there aspects of either element of the model that are of particular concern?
- Are either or both elements needed?

6.2. It is recognised that there is significant further work that would enable this model to be implemented. This would be undertaken alongside the detailed design of the arrangements throughout 2013 and would likely include:

6.3. ***EU Target Model – Market Coupling Algorithm:*** Work would need to be undertaken to examine whether the Market Coupling Algorithm could accommodate the "Incentive Element" as described in this paper.

6.4. ***Further development of "Stress Probability" forecasting methodologies:*** to examine what the most appropriate and feasible approach to this would be.