



**Integrated Single Electricity Market  
(I-SEM)**

**Capacity Remuneration Mechanism  
Detailed Design**

**Third Decision Paper**

**SEM-16-039**

**8<sup>th</sup> July 2016**

Ireland and Northern Ireland has until the end of 2017 to change its wholesale electricity markets to meet the requirements of the European 3rd package of energy legislation. This legislation places a number of requirements on the wholesale electricity markets of Member States with the aim of improving energy trade within the EU. The Regulatory Authorities (Regulatory Authorities) for Ireland and Northern Ireland have agreed the High Level Design<sup>1</sup> of the market required for the third package - and called that market the I-SEM (Integrated Single Electricity Market).

In addition to reform of energy market, the High Level Design includes a Capacity Remuneration Mechanism (CRM) based around Reliability Options. The detailed design for the I-SEM CRM is being developed over the course of a number of consultations, this document being the decision paper relating to the third consultation:

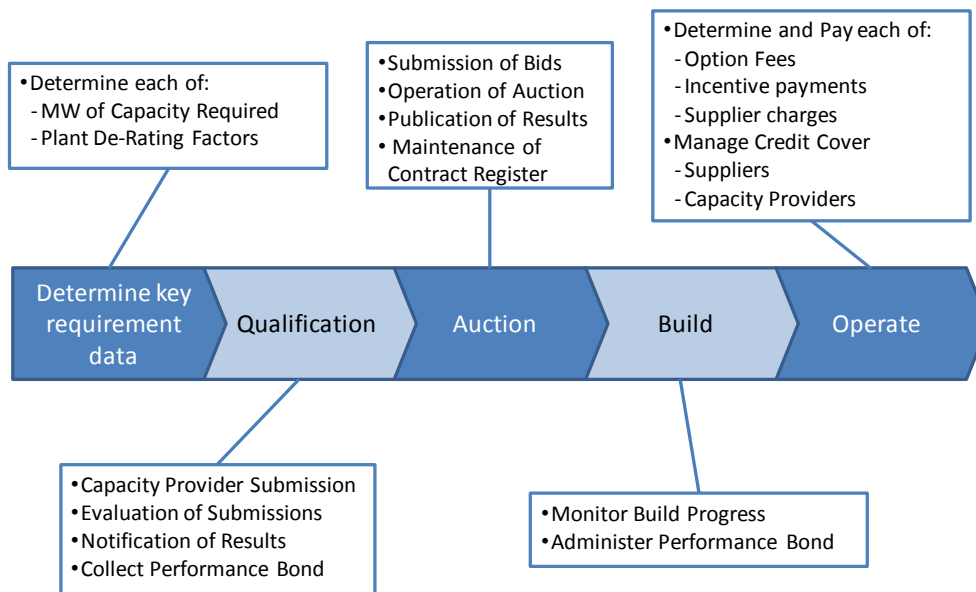
- Decision 1 set out a number of key elements of the I-SEM CRM process and the Reliability Option design, including: the methodology for setting the Capacity Requirement; key elements of the Reliability Option product design such as the Reference Price and the high level Strike Price design; eligibility to participate in the CRM; Supplier Arrangements; and the institutional framework. In addition, Decision 1 sets out the Administrative Scarcity pricing in the I-SEM Balancing Mechanisms in conjunction with the protection afforded to Suppliers by the Reliability Option hedge and socialisation of any shortfall in the hedge. These issues were consulted on in SEM 15-044, with the decisions set out in SEM 15-103;
- Decision 2 set out a number of key elements of the I-SEM CRM design including: interconnector and cross-border arrangements; secondary trading of Reliability Options; more detailed elements of the Reliability Option design; the level of the Administrative Scarcity Price; and transitional arrangements. These issues were consulted on in SEM-15-104 issued on 21 December 2015, with the decisions set out in SEM-16-022;
- This Decision paper to the third Consultation focuses primarily on the design of the CRM auction which will award Reliability Options to capacity providers, including the arrangements to mitigate market power in the auction. As a follow on to SEM 15-103, this document also considers the socialisation arrangements to cover times when Reliability Option difference payments received from capacity providers are insufficient to provide a complete hedge to Suppliers, and detailed design aspects of the Strike Price.

As illustrated in **Error! Reference source not found.** below, the auctions play a key role in the allocation of Reliability Options, and appropriate auction design is central to the efficient operation of the I-SEM CRM and in delivering reliable capacity at an appropriate price.

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<sup>1</sup> [http://www.semcommittee.eu/en/wholesale\\_overview.aspx?article=d3cf03a9-b4ab-44af-8cc0-ee1b4e251d0f](http://www.semcommittee.eu/en/wholesale_overview.aspx?article=d3cf03a9-b4ab-44af-8cc0-ee1b4e251d0f)

Figure 1: CRM Process Overview



The I-SEM CRM auctions will be auctions to procure capacity. The auction will secure multiple MW of capacity in each auction from multiple bidders. The “bidders”<sup>2</sup> are offering to make capacity available by competing to obtain a physically backed Reliability Option.

This Decision paper focuses on elements of the CRM design relating to:

- Auction Design Framework
- Market Power Mitigation Measures
- Auction Design
- Auction Governance, Roles and Responsibilities
- Locational issues during transition
- Socialisation of Reliability Option difference payments
- Further details of the Strike Price formula

## Auction Frequency and Volumes

There will be a range of different auctions, including:

- **Transitional auction(s)**, to cover the period up to the Capacity Delivery Year of the first T-4 auction. The key feature of these auctions is that there is expected to be little scope for new entry due to time constraints (although new entrants will be welcomed);
- **T-4 auctions**. These auctions will take place annually and will procure capacity with an approximate 4 year lead time to the Capacity Delivery Year; and

<sup>2</sup> Note that whilst the auction participants may be considered to be making “offers” we shall continue to call them “bidders” throughout this document, and to refer to their price offers as “bids”

- **T-1 auctions.** These auctions will take place annually and will procure capacity in the year preceding the Capacity Delivery Year.
- The SEM Committee confirms its intention to conduct separate transitional auctions to cover the period up to the Capacity Delivery Year of the first T-4 auction. The transitional auction in respect of the 2017/18 Capacity Delivery Year will occur as soon as reasonably practical, given timelines required to develop and implement the Capacity Market Code and the auction system, and achieve EC State Aid clearance.
- The SEM Committee will then consider whether it is appropriate to conduct auctions for each of the remaining transitional auctions in sequence, once lessons learnt from the 2017/18 transitional auction have been appropriately reflected in the Capacity Market Code, and other governance arrangements, processes and systems.

The SEM Committee has decided that the Capacity Market Code will require the CRM Delivery Body to conduct a T-4 auction between 3 years 6 months and 4 years 6 months in advance of each Capacity Delivery Year. However, the Capacity Market Code shall give the SEM Committee the power to bring forward, delay or postpone the T-4 auction where appropriate. The SEM Committee will use reasonable endeavours to ensure that an auction is not cancelled after the start of the Qualification Window. The volumes procured in the T-4 auction will be determined by the SEM Committee and specified in the form of a demand curve. However, in setting the demand curve parameters the SEM Committee will take account of the following:

- The Capacity Requirement to be estimated by the CRM Delivery Body in accordance with the methodology set out in CRM Decision 1 (SEM-15-103);
- Volumes already procured in respect of the relevant Capacity Delivery Year under multi-year Reliability Options; and
- Volumes to be withheld from the T-4 auction to the T-1 Auction. The volume to be withheld from the first T-4 auction will be in the range 2% to 5% of the Capacity Requirement determined at that time<sup>3</sup>.

The SEM Committee will consult periodically on the volume of the Capacity Requirement to withhold from T-4 auctions to T-1 auctions, and this amount may grow over time if the contribution of DSUs increases.

The Capacity Market Code will provide a level of flexibility in the timing of T-1 auctions, plus the right to cancel these auctions if they are not required, or to hold alternate auctions (e.g. T-2) at other times. However, the SEM Committee will:

1. Normally seek to conduct the auctions within a narrow window and with reasonable notice in advance of the Capacity Delivery Year; and

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<sup>3</sup> Note that there will be an initial determination of the Capacity Requirement in year T-4, which will be used for input to the T-4 auction parameters, however this initial determination of the Capacity Requirement is expected to be updated in years T-3 and T-2 as time passes and as new information becomes available. There is expected to be a final determination of the Capacity Requirement in year T-1, which will be used for input to the T-1 auction parameters. Given that forecast error uncertainty should decrease from year T-4 to year T-1, it is possible that no further capacity will be required in year T-1, even if 2% to 5% of the Capacity Requirement initially determined in year T-4 was withheld at that time.

2. Ensure that the full amount of the residual capacity required – as determined in year T-1, and as represented by one or more relevant demand curve(s) – must be purchased by the CRM Delivery Body by year T-1.

## Market Power Mitigation Measures

The SEM Committee believes there is a material concern of market power in the I-SEM CRM. The I-SEM capacity market is likely to exhibit structural market power, creating challenges for the design of the auction. The SEM Committee remains concerned about the potential for tacit collusion, particularly in the transitional auctions, where there is little scope for new entrants to place significant competitive pressure on incumbents. The SEM Committee recognises that even in T-4 auctions, incumbent firms may have certain structural advantages (access to sites, existing connections) which confer advantages on incumbent firms, and provide barriers to entry for other firms. These factors increase the ability of incumbent firms to tacitly collude.

The SEM Committee will take a conservative approach to managing the exercise of market power in the CRM auctions, starting with a wide ranging set of controls to be applied in the transitional auctions and the first T-4 auction. Only when there is demonstrable practice of competitive outcomes emerging from the auctions, will the SEM Committee consider relaxing the controls.

The SEM Committee has decided that in addition to the market power mitigation measures set out in CRM Decision 1 (mandatory bidding, adjusting the capacity requirement- see SEM-15-103) the following market power mitigation measures will apply with respect to the auctions:

- **Auction Price Cap:** Most auctions will employ an Auction Price Cap, which will set a maximum price which all Qualified Bidders may bid. The Auction Price Cap is the maximum price that the auction can clear at, and the maximum Reliability Option fee that any capacity provider can be paid.
- **Price-taker Offer Cap:**
  - **Non-technology specific Price-taker Offer Cap:** All Existing Generators will be required to bid their full Qualified Volume into the transitional auctions and the T-4 auctions at a price no higher than the Price-taker Offer Cap (specified in €/MW or £/MW), unless they apply for an exemption as set out below. Generators which meet the criteria for new build generation will not be subject to the Price-taker Offer Cap and may bid at a price up to the Auction Price Cap. New build capacity and DSUs will not be subject to the Price-taker Offer Cap.
  - **Right to apply for higher bid limit:** Where an existing generation Capacity Market Unit (CMU) is able to provide evidence that it has higher Net Going Forward costs than the Price-taker Offer Cap, it will be able to apply to the CRM Delivery Body to be allowed to submit a higher Bid Limit– up to the level of those Net Going Forward costs. Net Going Forward cost are the avoidable costs<sup>4</sup> that the specific unit needs to recover from the capacity mechanism in order to justify its continuing operation, and are net of infra-marginal rent from the energy market and the ancillary services market. The Regulatory Authorities will review the

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<sup>4</sup> Net Going Forward cost does not include sunk costs, for example the cost of investments made in the past.

application and make a recommendation to the SEM Committee whether to accept or reject the application, and at what level of Net Going Forward Costs are reasonable for that unit. The SEM Committee may then set a Bid Limit specific to that unit for that auction, at a higher level than the Price-taker Offer Cap, at a level commensurate with its view of the unit's Net Going Forward costs.

- **Sloping demand curve:** All auctions will employ a sloping demand curve, in part as a market power mitigant. The slope and positioning of the demand curve will be consulted on as part of the CRM parameters consultation, but the principles set out in this document will guide the setting of the parameter values.

The SEM Committee has decided that it does not favour introducing bid floors in any of the CRM auctions. The rationale for this decision is set out in the market power section discussing bid limits in paragraph 3.3.30, citing reasons such as distortion on competition, the effect of the introduction of a sloping demand curve and the fact that the Regulatory Authorities, Independent Auction Monitor and Auditor will be monitoring for signs of market manipulation.

The SEM Committee has decided not to put ex ante controls on the ability of any market participants from acting as Capacity Aggregators. This measure would introduce practical challenges and complexities that, given the materiality of the issue are not seen as justified at this point in time. However, the SEM Committee will continue to monitor the need for any such measures and may intervene if appropriate.

The SEM Committee recognises the concerns expressed by some respondents with respect to the exercise of market power in the secondary market. The decisions made in CRM Decision 2 (SEM-16-022) with respect to the creation of a mandatory, centralised marketplace have been taken (in part) to address market power issues in the secondary market.

## **Auction Design Framework**

SEM-16-010 set out the following multi-unit auction format options, and evaluated their appropriateness for the transitional, T-4 and T-1 auctions:

- **Option 1: Simple sealed-bid, multi-unit auction.** Bidders simultaneously submit sealed bids comprising their supply curves. The bids are then aggregated, and the clearing price at which supply equals the demand is determined. Each bidder wins the quantity that it supplied at the clearing price. The winners' payments may be based solely upon the uniform clearing price ("pay-as-clear"), or the amount of each winning offer ("pay as bid/offer"), with some variants around these options.
- **Option 2: Multiple round descending clock auction.** The auctioneer announces prices to bidders, and bidders simultaneously submit offers indicating the quantities supplied at those prices. If aggregate supply exceeds demand, then the auction proceeds to a new round of bidding, in which the price "clock" has been decreased. When a round occurs in which aggregate supply no longer exceeds demand, the auction concludes. Each bidder wins the quantity that it offered at the final price ("pay-as-clear").
- **Option 3: Sealed bid combinatorial auction.** Bidders simultaneously submit one or more bids, per Capacity Market Unit, with each bid consisting of a single price quantity pair for that Capacity Year. If the bidder chooses to submit multiple bids then these bids are mutually exclusive, i.e. the

auctioneer cannot accept both bids for the same unit. The auctioneer then chooses the optimum combination of bids to meet the capacity requirement. The winners' payments may be based solely upon the uniform clearing price ("pay-as-clear"), or the amount of each winning offer ("pay as bid/offer"), with some variants around these options.

The auction design needs to promote competition and should not create scope for players with high market shares to exercise market power. For this reason, the SEM Committee has decided against the multiple round descending clock format (Option 2). The market power concerns that Option 2 gives rise to outweigh the incremental benefit in terms of price discovery. The SEM Committee believes that the key market power concerns can be managed under either Option 1 (Simple sealed bid), or Option 3 (Combinatorial).

The key benefits of Option 1 are: practicality, simplicity and cost; it has the least potential for market power abuse; and equity- there would be no unhappy losers.

There are however a number of benefits to the combinatorial approach, in that it potentially gives a more efficient solution to the lumpiness problem, in the longer term such a solution is expected to be capable of facilitating potential synergies between CRM and DS3 procurement and this approach provides the most flexible auction platform for dealing with a range of potential solutions that could be adopted for managing locational issues. This issue is discussed further below.

There are also practical considerations to be considered in relation to the timeframes required to develop auction system for the first transitional auction to support the operation of a CRM from I-SEM go-live. In this context, the Regulatory Authorities are currently working with the TSOs to establish the feasibility of implementing Option 3 within the timescales required for the first transitional auction and final decision on the enduring choice of auction format will be made as part of any decision on locational issues in the context of transitional transmission constraints, as described below.

In the meantime, the SEM Committee has made the following key decisions concerning the auction design, which can be taken largely independently of the choice between auction format options 1 and 3:

- Bid structure:
  - A bidder may submit a bid comprising up to 5 price quantity pairs in respect of a single generating unit. The price-quantity pairs must be monotonically increasing.
  - The price of each segment is measured in EUR/GBP per MW-year and must be compliant with the market power mitigation measures outlined above.
  - The quantity of each segment must meet defined requirements, including that – in aggregate across segments corresponding to existing capacity – the mandatory bidding requirement quantity is submitted.
- Other bid parameters – each price quantity "pair" will have two other bid parameters:
  - A duration bid parameter, which is an integer measured in years representing the duration of the capacity commitment offered and which may be up to 10 years in the case of new capacity and must be exactly 1 year in the case of existing generators; and

- A flexible /inflexible “flag” parameter for that bid segment.<sup>5</sup> If this flag is set to 1 then the CRM Delivery Body may partially accept the bid segment; if it is set to 0 then the CRM Delivery Body may only either accept the bid segment in its entirety, or reject the bid segment in its entirety.
- Winner determination:
  - Winners will be determined based on the price and quantity offered, and as if the duration of all bids is 1 year, i.e. there will be no adjustment for Reliability Option price fix length.
  - The winner determination process will require and ensure that all lower-priced segments of a bid from a CMU must be accepted in whole before any higher-priced segment from that CMU is accepted in whole or in part.<sup>6</sup>
  - Regarding lumpiness, and its impact of the winner determination process, the approach will be dependent on the auction format and method of managing locational issues to be chosen. In either case the approach will be based on a principle of evaluating total social welfare (Net Consumer + Producer Welfare):
    - Under Auction Format 1 (Simple sealed-bid, multi-unit auction): If the marginal bid is inflexible, and not required in its entirety, then auctioneer will use an evaluation of social welfare (Lumpiness Option 3c) to choose whether to accept the marginal bid in entirety, accept out-of-merit bids instead, or reject all marginal and out-of-merit bids.
    - Under Auction Format 3 (Sealed bid combinatorial auction): the auction will have an objective of maximising total social welfare, subject to lumpiness and other constraints.
- Price determination:
  - The auction will pay-as-clear, for all winning bids that are in-merit. The merit order for this price-determination purpose will be determined by a simple ordering of bid segments by price, ignoring the bid duration and flexibility bid parameters.
  - The SEM Committee has deferred a final decision on how the clearing price will be pending the outcome of the separate consultation on managing locational constraints, since the treatment of locational constraints may materially impact the assessment of these two options. The clearing price will either be set equal to (a) the highest-priced accepted bid segment which is either partially or fully in-merit, ignoring bids rejected for constraint reasons; or (b) on an unconstrained basis. .
  - Any bid segments accepted out-of-merit for constraint reasons (inflexibility or transmission constraints) will be paid as bid.

## Auction Parameters

SEM-16-010 discussed the key auction parameters that will need to be set for each auction. The value of parameters for the first auctions will be consulted on later this year, but Section 4 of this document sets out the key principles which will be used to determine the setting of the demand curve.

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<sup>5</sup> Capacity, particularly generation capacity is typically offered in discrete units, which reflect the typical size of unit offered by turbine manufacturers. Capacity providers, may opt to declare bids inflexible, i.e. the auctioneer must accept all or nothing of that bid segment.

<sup>6</sup> The higher-priced segment might be accepted in part if it is flagged as a flexible bid segment.



## Auction Governance, Roles and Responsibilities

In previous Decision Papers, the SEM Committee set out its decision on the institutional arrangements that will underpin the new CRM. Specifically, the papers set out that we will implement a Rules Based Model for the detailed terms that cover the settlement of Reliability Options. These detailed terms will be captured in a Capacity Market Register required to be maintained by the TSOs under the Capacity Market Code. Other terms governing the operation of the CRM will be set out in the Capacity Market Code. The Capacity Market Code will specify the process by which generators and demand side units can qualify to take part in the capacity auction and gain a Reliability Option.

CRM Consultation 3 (SEM-16-010) set out the proposed governance arrangements for the Capacity Market Code, including:

- The legal and governance framework for the auctions (the Capacity Market Code);
- A mechanism to deal with disputes arising;
- The Capacity Market Code modification process;
- The key roles and responsibilities associated with qualification<sup>7</sup> for the auctions, and conducting the auction, including:
  - The role of the TSOs as CRM Delivery Body;
  - The role of an Independent Auction Monitor and Auditor;
  - The role of the SEM Committee / Regulatory Authorities; and
- Managing Conflicts of Interest.

The SEM Committee received a range of feedback on the proposals received on SEM-16-010, and has decided to proceed with the proposals set out in SEM-16-010.

### Locational issues

The CRM auction is being developed on the basis of a single zone consistent with the I-SEM energy markets.

In the near term there will likely be more existing de-rated capacity on the system than will be procured through the initial CRM auctions and, at least initially, there will be significant constraints on the transmission network. In this context, it is recognised that in practice the system is not indifferent to the location of capacity required to meet security of supply requirements across the island.

Having considered the development of the detailed auction design in recent months, the SEM Committee recognise that particular emphasis is needed to support the transition to the new CRM, including the management of locational issues. For example, until the required transmission investment is commissioned, there is a possibility that a plant required for locational reasons may not clear in the CRM auction.

To manage the issue, the SEM Committee are considering a framework within the CRM design aimed at ensuring there is sufficient generation adequacy in areas that are considered transmission capacity constrained. This framework is outlined further in Section **Error! Reference source not found.** and a

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<sup>7</sup> called pre-qualification in some previous documents

supplementary consultation to SEM-16-010 will be issued in Quarter 3 this year, which will provide further detail on options under consideration and an opportunity for stakeholder feedback.

Of course if a particular constraint remains persistent then there will be a need to consider a bidding zone review process under the Capacity Allocation and Congestion Management (CACM) Regulation.

### **Socialisation of Reliability Option difference payments**

The SEM Committee's first CRM decision (SEM-15-103) decided that a Suppliers Contribution Rate (SCR) would be set as ex ante as a fixed €/MWh charge in order to build up a socialisation fund. This Supplier Contribution Rate will be proposed by SEMO and subject to review and approval by the Regulatory Authorities. This decision paper has determined that this Socialisation Fund will apply to both capacity payment differences and Reliability Option difference payments.

The SEMO will be expected to fund shortfalls in difference payments, over and above the cash available in the socialisation fund, up to a limit which takes into account the overall funding requirements placed upon the SEMO. This will be short term until the cash is recovered through the operation of k-factors in subsequent tariff years. Where the socialisation fund has been exhausted, including drawing down on SEMO funding up to the limit agreed between the SEM Committee and the SEMO, a Suspend and Accrue approach will be employed. In other words, when the fund is exhausted, payments would be suspended until there are sufficient funds from ongoing contributions to cover liabilities. Once there are sufficient socialisation funds, following credit facility repayments and the fund reaching a sufficient surplus, these are first used to cover the historic shortfalls accrued, and then new liabilities.

### **Strike Price**

The SEM Committee has decided to adopt all the proposals for refining the Strike Price formula set out in the CRM 3 consultation document, with a correction to carbon intensity factor to achieve the original intent.

### **Reliability Option Price Fix Length**

The second CRM Decision Paper (SEM-16-022) deferred the decision on Reliability Option price fix length to this third CRM Decision Paper due to the relationship between the contract price fix length and certain aspects of the auction design and market power mitigation measures. The SEM Committee has already decided in SEM-16-022 the length of price fix available to plant requiring significant investment will be set on a "Balanced Economic Life" basis.

Within this decision paper the SEM Committee had decided that the Balanced Economic Life shall mean 10 years. This means that any new capacity provider meeting the significant financial commitment criteria ("new build") will be able to bid for a Reliability Option of any number of years up to a maximum of ten years.

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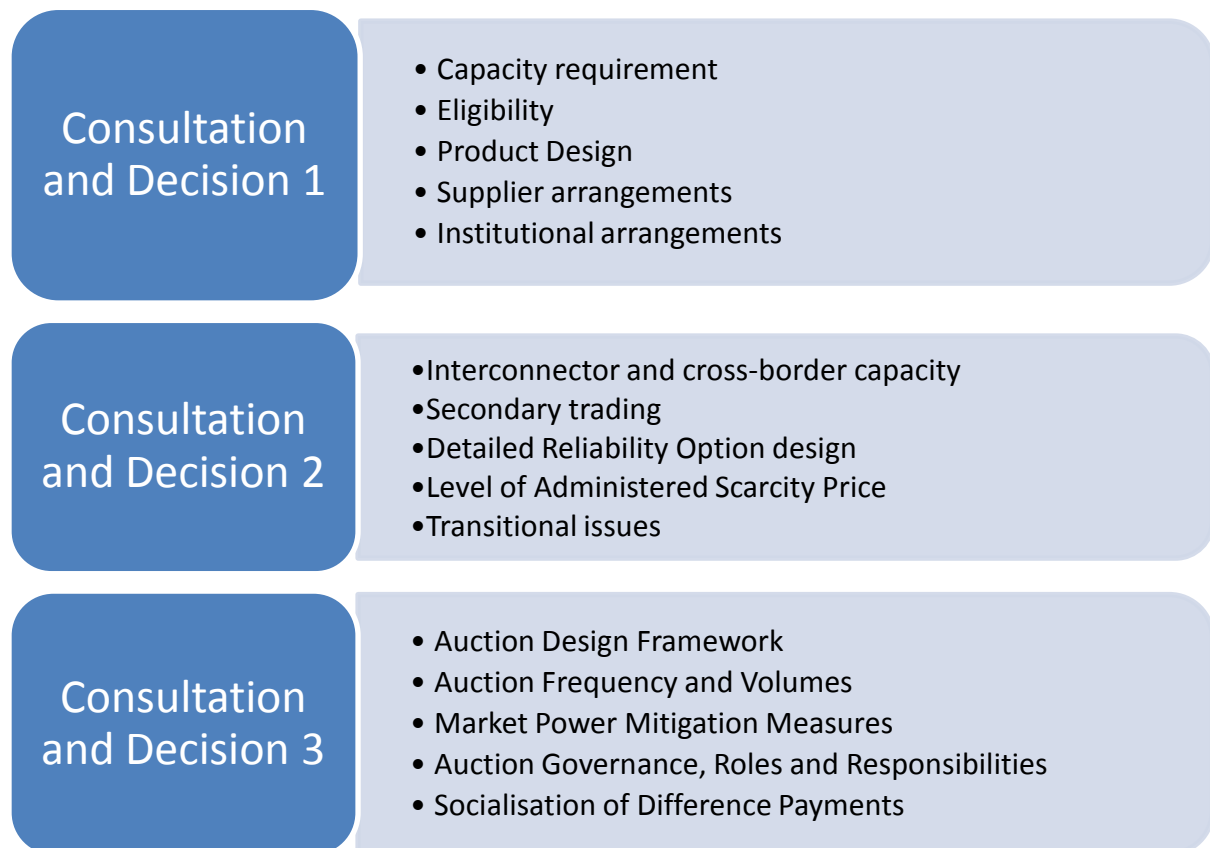
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# 1. INTRODUCTION

## 1.1 BACKGROUND

1.1.1 The purpose of the CRM Detailed Design is to develop through consultation the specific design features of the new capacity mechanism. As illustrated in Figure 2, this Decision paper is the third consultation in the development of the CRM Detailed Design.

Figure 2 : Overview of CRM Policy Development



1.1.2 This document focuses on the design framework of the CRM auction including the market power mitigation measures that will be incorporated into the auction design.

1.1.3 Whilst this Decision paper represents the third stage of the CRM policy development, there will be subsequent consultation on parameter values and the detailed de-rating and capacity requirement methodologies. As outlined further in this paper there will also be a supplemental consultation on locational issues during transition. These consultation processes are planned for Quarter 3 2016.

## 1.2 PURPOSE OF THIS PAPER

1.2.1 This paper details the SEM Committee's decisions on the third phase of the detailed design of the I-SEM Capacity Remuneration Mechanism (CRM). The paper also includes a summary of the responses made to the consultation paper issued on 11 March 2016, SEM-

16-010, and sets out the SEM Committee's response to the key points raised. Where relevant, next steps are also set out.

- 1.2.2 The introduction of the CRM will involve notifying the proposed mechanism to the European Commission (EC) in relation to State Aid, a process which will be led by Department of Communications, Energy and Natural Resources (DCENR) and Department for the Economy (DfE). The proposals in this paper have been developed to be consistent with guidelines published by the EC in this respect; however, the proposals are subject to the outcome of this notification process.
- 1.2.3 The structure of this paper is consistent with that of the Consultation paper (SEM-16-010), with the key Sections summarised below:
- **Auction Frequency and Volume:** Section 2 discusses the frequency, timing and volumes of the transitional, T-1 and T-4 auctions;
  - **Market power:** Section 3 sets out the measures that will be placed on participants in order to mitigate potential market power abuse;
  - **Auction design:** Section 3.4.2 sets out a number of design areas, including the format of the auction and bid structure, winner and price determination, managing lumpiness issue, tie break rules, the level of information that will be published at different stages in the end to end process and restrictions on what communication from bidders is permitted;
  - **Auction governance, roles and responsibilities:** Section 5 sets out several governance areas that include the development of the Capacity Market Code (CMC) dispute resolution, CMC modification, the role of an independent auction monitor, the roles of the TSOs, SEM Committee and Regulatory Authorities and management of conflicts of interest;
  - **Other residual issues:** Section 6 provides decisions on the specification of carbon, fuel indices and thermal efficiencies in the Strike Price formula and the approach to the Socialisation Fund;
  - **Locational issues:** Section **Error! Reference source not found.** outlines proposals for managing locational issues in the context of a single zone approach and potential locational constraints on the system. A supplemental consultation will be issued in Quarter 3 2016 on the proposals within this section.
- 1.2.4 Each policy Section sets out a summary of the issues consulted upon, provides an overview of respondent's views, sets out the SEM Committee's response to the key points raised and then specifies the SEM Committee's decision on each matter (along with next steps, as relevant).

## 1.3 CONSULTATION MILESTONES AND RESPONSES

- 1.3.1 The consultation process was carried out through the use of stakeholder workshops and a request for feedback. An overview of each is given below.

### Consultation Three: Key Milestones

- 1.3.2 A comprehensive programme of stakeholder engagement on the third consultation has been carried out over the past months by the project team. The following bullet points outline key milestones of engagement that have been carried out.
- Consultation Document Published: 11 March 2016
  - Consultation 3 workshop: 16 March 2016
  - Consultation 3 emerging thinking workshop: 21<sup>st</sup> June 2016
- 1.3.3 Slides presented at each of the workshops outlined above have been published on the SEM Committee website and in addition to these milestones, further bilateral meetings have been facilitated at various stages of the decision development process.

## Responses to Consultation

- 1.3.4 A total of 27 responses to the consultation were received. These were submitted from a wide range of interested parties including Generators, Suppliers, the Transmission System Operators, Network Owners and Industry Representative Groups. Of the 27 responses, three have been marked confidential. The remaining 24 are outlined below and copies can be obtained from the SEM Committee website.

- IBEC
- SSE
- PPB
- ESB GWM
- Electric Ireland
- PrePayPower
- Moyle Interconnector
- Bord Na Mona
- Eirgrid/SONI
- Vayu Energy
- EAI
- Gas Networks Ireland
- Brookfield Renewable
- BGE
- Power NI
- AES
- Energia
- EnerNOC
- DRAI
- Eirgrid Interconnector Limited
- Gaelectric
- Tynagh
- Aughinish
- IWEA

## 1.4 ROLE OF AUCTIONS WITHIN THE CRM PROCESS

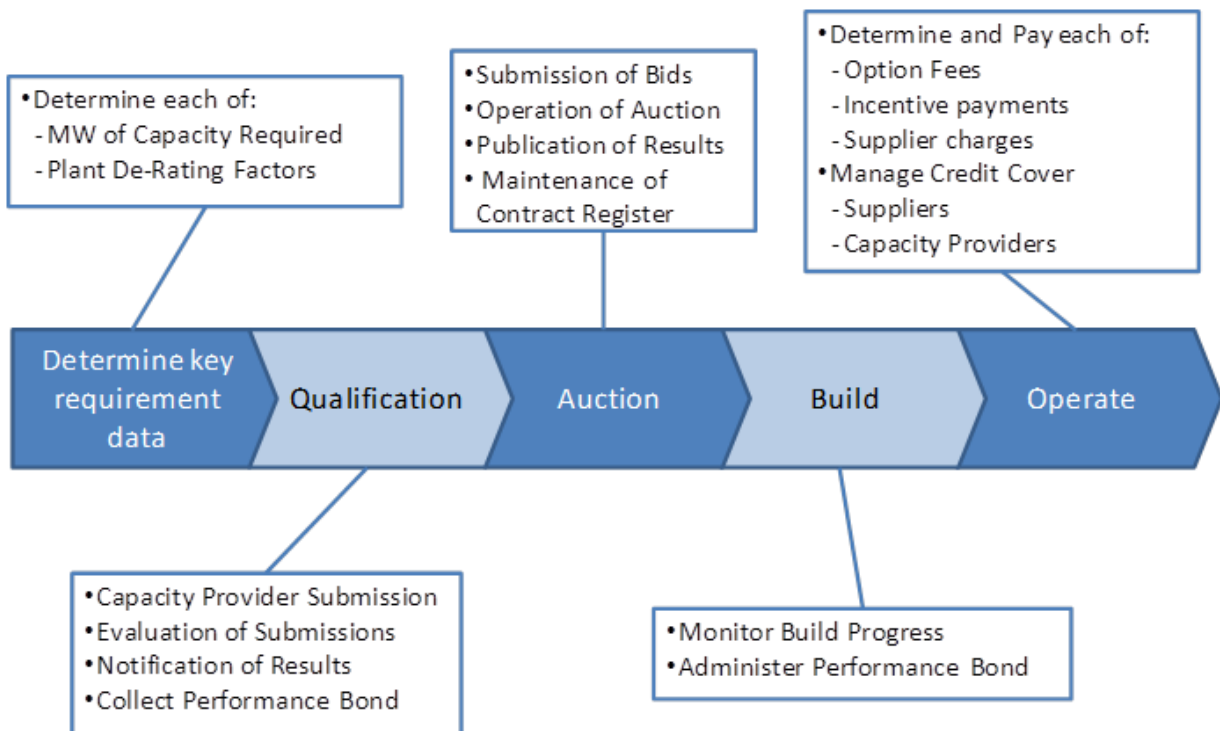
- 1.4.1 At a high level, an auction is a selection process designed to procure or allocate goods and services competitively. Auctions have played a key role in matching supply and demand in the electricity sector since the early 1990s and they are an important part of coordinating long term investment signals in capacity markets worldwide. An auction to procure capacity for the I-SEM CRM is therefore in line with international best practice as well as EU State Aid Guidelines which require a competitive bidding process for the CRM.

1.4.2 At its core, the auction process involves three key processes: bidding, clearing and pricing. Figure 3: End to End Process for the I-SEM CRM illustrates how these process will be implemented for auctions in the CRM:

- Qualified capacity providers will submit bids to the auction
- The CRM Delivery Body (EirGrid/SONI) will then operate the auction in accordance with the Capacity Market Code, using software developed in accordance with specifications set out in this decision and supplementary decisions, and the more detailed rules and algorithms to be specified in the Capacity Market Code. The auction will select the winners (who will be awarded Reliability Options) and determine the clearing price(s).
- The clearing price(s) will be the Option Fee payable per MW of de-rated capacity.

1.4.3 The auction design (including market power mitigation controls) will be the key to ensuring an efficient and equitable selection of capacity providers with fair competition between different capacity providers, and appropriate prices for capacity providers, and ultimately consumers.

Figure 3: End to End Process for the I-SEM CRM



## 1.5 INTERACTION WITH DS3 PROGRAMME

1.5.1 The SEM Committee has recognised that for providers seeking to deliver new plant or significantly refurbish existing plant there will be a preference to gain investment certainty based on projected revenue streams, and that for many new entrants this will mean securing both DS3 System Services and CRM revenues. Such coordination of long run



investment could be achieved by having a single joint auction for the procurement of capacity and DS3 System Services. However, on 23 May 2016 the SEM Committee announced that it will be necessary to revise the date for the first DS3 auction to the first half of 2018, for delivery of the service(s) in October of 2018. The SEM Committee also recognises that there is significant project risk associated with introducing a single combined auction for both DS3 and CRM at this stage.

- 1.5.2 As a result, the CRM and DS3 programmes are currently progressing the development of separate auctions to procure Capacity and System Services respectively. Notwithstanding this, the SEM Committee's view is that the design and deployment of CRM and DS3 System Services auctions should not preclude the development of such a combined approach in the future. The SEM Committee recognise there is a requirement to achieve a level of consistency between the procurement of capacity and the procurement of DS3 System Services where possible.
- 1.5.3 As these projects develop, and given their market inter-dependencies, it is recognised that a coordinated and consistent approach must continue.

## 1.6 LOCATIONAL ISSUES DURING TRANSITION

- 1.6.1 The CRM auction is being developed on the basis of a single zone consistent with the I-SEM energy markets.
- 1.6.2 In the near term there will likely be more existing de-rated capacity connected to the all-island transmission system than will be awarded ROs through the initial CRM auctions. At least initially, there will be significant thermal transmission constraints on the transmission network which will constrain the TSOs with regard to which generation plants will need to operate to maintain security of supply across the entire island. In this context, it is recognised that in practice the system is not indifferent to the location of capacity required to meet security of supply requirements across the island.
- 1.6.3 Having considered the development of the detailed auction design, the SEM Committee recognise that particular emphasis is needed to support the transition to the new CRM, including the management of locational issues. For example, until the required transmission investment is commissioned, there is a possibility that a plant required for locational reasons may not clear in the CRM auction and may choose to exit the market, leading to a security of supply problem.
- 1.6.4 To manage the issue, the SEM Committee are considering a framework within the CRM design aimed at ensuring there is sufficient generation adequacy in areas that are considered capacity constrained. This framework is outlined further in section 7 and a supplementary consultation to SEM-16-010 will be issued in Quarter 3 of this year, which will provide further detail on options under consideration and an opportunity for stakeholder feedback.

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<sup>8</sup> See <https://www.semcommittee.com/news-centre/ds3-system-services-notification-delay-auction-design>

- 1.6.5 Of course if a particular constraint remains persistent then there will be a need to consider a bidding zone review process under the Capacity Allocation and Congestion Management (CACM) Regulation.

## 1.7 ASSESSMENT CRITERIA

- 1.7.1 The assessment criteria for the detailed design of the CRM (including the auction design) are based on the same principles as those applied to the I-SEM High Level Design and as agreed with the Departments in the Next Steps Decision Paper published March 2013. We have developed detailed descriptions of these criteria to focus on issues that are relevant to procuring capacity and tailored to the detailed design elements of the capacity remuneration mechanism.
- 1.7.2 These assessment criteria are set out below:
- **The Internal Electricity Market:** the market design should efficiently implement the EU Target Model and ensure efficient cross border trade.
  - **Security of supply:** the chosen wholesale market design should facilitate the operation of the system that meets relevant security standards.
  - **Competition:** the trading arrangements should promote competition between participants; incentivise appropriate investment and operation within the market; and should not inhibit efficient entry or exit, all in a transparent and objective manner.
  - **Equity:** the market design should allocate the costs and benefits associated with the production, transportation and consumption of electricity in a fair and reasonable manner.
  - **Environmental:** while a market cannot be designed specifically around renewable generation, the selected wholesale market design should promote renewable energy sources and facilitate government targets for renewables.
  - **Adaptive:** The governance arrangements should provide an appropriate basis for the development and modification of the arrangements in a straightforward and cost effective manner.
  - **Stability:** the trading arrangements should be stable and predictable throughout the lifetime of the market, for reasons of investor confidence and cost of capital considerations.
  - **Efficiency:** market design should, in so far as it is practical to do so, result in the most economic overall operation of the power system.
  - **Practicality/Cost:** the cost of implementing and participating in the CRM should be minimised; and the market design should lend itself to an implementation that is well defined, timely and reasonably priced.
- 1.7.3 As set out in paragraph 1.2.2, the proposals are being developed to be consistent with the requirements of State aid.

## 2. AUCTION FREQUENCY AND VOLUMES

### 2.1 INTRODUCTION

2.1.1 This section sets out the decision with regard to the frequency, timing and volumes for transitional, T-4 and T-1 auctions. The SEM Committee set out its minded to position in this regard in the third Consultation paper, SEM-16-010. SEM-16-010 also consulted on some areas of detail with regard to:

- The cancelling of an auction;
- The definition of flexibility around the timing of an auction; and
- The amount of volume to be withheld for a T-1 auction.

### 2.2 CONSULTATION SUMMARY

2.2.1 In SEM-16-010 the SEM Committee envisaged that there will be a range of different auctions, including:

- **Transitional auction(s)**, to cover the period up to the delivery year of the first T-4 auction. The key feature of these auctions is that there is expected to be little scope for new entry due to time constraints (although new entrants will be permitted);
- **T-4 auctions**. These auctions will take place annually and will procure capacity with an approximate 4 year lead time to the Capacity Delivery Year; and
- **T-1 auctions**. These auctions will take place annually and will procure capacity in the year preceding the Capacity Delivery Year.

#### Transitional year auctions

2.2.2 In SEM-16-010 the SEM Committee set out its minded to position to conduct separate T-1 auctions for each of the Capacity Delivery Years up to the delivery year of the first T-4 auction in the transition period. Each of these auctions will procure the total Capacity Requirement for that year in that T-1 auction.

2.2.3 Lessons learnt from these auctions will then be factored into subsequent T-1 auctions for Capacity Delivery Years during the transitional years, where applicable. Only limited new entry is expected in these auctions. As a result, appropriate market power controls will be applied in these transitional auctions.

#### T-4 Auctions

2.2.4 The SEM Committee set out plans to hold T-4 auctions annually, approximately 4 years in advance of the Capacity Delivery Year. In considering the timeframe in which to hold the annual T-4 auction the SEM Committee proposed having the flexibility of up to 6 months either side of a 4-year period.

2.2.5 Beyond the transitional period, the majority of the Capacity Requirement would be procured at the T-4 auctions. This will ensure that the price which will have the biggest impact on customer bills will be determined in an auction where new capacity is competing alongside existing capacity, which will:

- Help to mitigate the market power of existing capacity providers; and
- Ensure that the price paid by consumers substantially reflects the costs of new entry, where relevant. All categories of capacity provider, i.e. existing and new capacity, including DSUs will be eligible to submit price bids in the T-4 auctions, although we recognise that the participation of DSUs may be limited in the T-4 auction.

2.2.6 In the T-4 auction, the auctioneer will determine the amount to be auctioned in each auction as:

*Amount auctioned = Capacity Requirement – Amount already procured for the Capacity Delivery Year via previous T-4 auctions – Amount withheld for T-1*

2.2.7 If projections of future capacity in four years' time are such that no new Reliability Options are required, the SEM Committee may cancel the T-4 auction for that year. This may happen if, for instance, there is already a lot of capacity procured under long-term Reliability Options, and there is a decline in expected peak demand, leaving no, or only a very small additional procurement requirement. A small amount of capacity can then be procured in a T-1 auction nearer the time when the exact supply/demand balance is better understood.

## **T-1 Auctions**

2.2.8 The rationale for holding T-1 auctions is that:

- It is envisaged that some Demand Side Units may have difficulty predicting their ability to commit to reducing load 4 years ahead of the Capacity Delivery Year; and
- The Capacity Requirement cannot be forecast with complete accuracy 4 years in advance of the Capacity Delivery year, so procuring 100% of the expected requirement 4 years in advance may result in procuring more capacity than is required.

2.2.9 The SEM Committee will consult periodically on the volume of the Capacity Requirement to withhold from T-4 auctions to T-1 auctions, and this amount may grow over time if the contribution of DSUs increases.

2.2.10 The auctioneer will hold a T-1 auction for the residual capacity requirement in the year preceding the Capacity Delivery Year, based on an updated estimate of the Capacity Requirement for the Capacity Delivery Year in question.

2.2.11 All categories of capacity provider will be eligible to compete in the T-1 auction, including new capacity, although new capacity will need to prove during the qualification process that it can feasibly deliver within the Capacity Delivery Year.

- 2.2.12 This allows for some forms of capacity that meet the investment threshold to be “new capacity” that can be installed within a year- e.g. DSUs, smaller reciprocating engines, some solar farms, onshore wind farms with the potential to enter in the T-1 auctions.
- 2.2.13 The flexibility of timing in holding the annual T-1 auction was a topic of consultation, and noted that within GB their T-1 auction can be held anytime within a period ranging from 13 months to 2 months before the start of the delivery year for which the auction is to be held.

## Other auctions

- 2.2.14 If any new capacity fails to meet its Implementation Agreement milestones to the extent that its Reliability Options is cancelled, the SEM Committee may choose to re-auction the capacity for that Capacity Delivery Year as a T-3 or T-2 auction (depending on when the Reliability Options is cancelled). Alternatively, the SEM Committee may choose to wait and re-auction the capacity shortfall in the T-1 auction. These other auctions will be infrequent, and on an ad hoc basis.
- 2.2.15 In deciding whether to re-auction any shortfall as a result of cancelled Reliability Options immediately, or whether to wait until the scheduled T-1 auctions, the SEM Committee will be mindful of:
- Any change in forecasts of the Capacity Requirement for the Capacity Delivery year in question and the time when the Reliability Options is cancelled; and
  - A risk assessment of the likelihood of being able to procure the additional capacity requirement in T-1 auctions at reasonable cost to customers<sup>9</sup>.

## 2.3 SUMMARY OF RESPONSES

- 2.3.1 The vast majority of responses agreed with the proposed approach for the T-1 and T-4 auctions.
- 2.3.2 While there was agreement for the proposed approach to transitional auctions some respondents were unsure if these auctions were proposed to be held annually each year (at T-1 stage) or all held sequentially during 2017 with the first auction for 2017/18 in June 2017.
- 2.3.3 In particular, some respondents expressed concern that the proposed approach would require capacity providers to commit to making capacity available for a Capacity Delivery year four years ahead in a T-4 auction, before they were guaranteed a Reliability option for prior delivery years via a transitional auction. They expressed a desire to know their position throughout the transitional period, before committing to

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<sup>9</sup> For instance the SEM Committee may decide not to conduct a T-2 auction if it judges that it is too close to the start of the Capacity Delivery Year to generate competition from new capacity, and that it is too far in advance of the Capacity Delivery Year to generate material competition from DSUs

the T-4 auction, and argued that lack of certainty would require them to price risk into their T-4 auction price.

- 2.3.4 In terms of the flexibility of timing of the T-4 auction, a mixed response was received with no clear position.
- 2.3.5 The majority of responses disagreed with the proposed flexibility around the T-1 auction particularly if an auction was held 2 months before the delivery date. Some alternatives were suggested ranging from 13 to 6 months prior to T-1 auction delivery. Most of those who disagreed with the general principle of auction timing flexibility supported reduced flexibility with a preference for fixed dates for both T-4 and particularly T-1 auctions.
- 2.3.6 One respondent sought a separate auction category for new entrants. They have argued that new entry is at a cost disadvantage relative to existing players, and that a certain proportion of the market should be reserved for the new entrants in a separate auction.
- 2.3.7 One potential new entrant expressed concern that no new entry is assumed during the transition period, and were concerned that the design leans towards the status quo for the existing fleet, insofar as possible for as long as possible. In particular, they expressed concern that the SEM Committee is minded to go with T-1 auctions in the transitional period even though they preclude new entry and increase market power.

## 2.4 SEM COMMITTEE RESPONSE

- 2.4.1 The SEM Committee does not agree that it is appropriate to create a separate auction for new plant, and to reserve a proportion of the market for new plant. Allowing the cheapest capacity to win (whether new or existing) delivers better outcomes for customers. Creating separate auctions will result in worse outcomes for customers. If the costs of existing plant (or upgraded plant) are lower than the cost of new plant (including net of infra-marginal rent in the energy market), they are a more efficient choice, and should be awarded an RO. It is appropriate that they should win the capacity auction, and that more expensive plant in excess of the capacity requirement should not be accepted in the auctions. Creating a separate auction for new plant and reserving a portion of the volume for these new entrants will potentially impose more cost on customer- i.e. completely the opposite intention of introducing competition, and does not meet the SEM Committee obligations to look after the needs of the all island customers. This is particularly the case where the customer is locked into paying this higher cost for a ten-year Reliability Option duration. The SEM Committee notes that it is standard practice in US capacity auctions and GB capacity auctions to have new entrants competing alongside existing plant in the same auction. The SEM Committee notes that the new entrant may bring competitive benefits in terms of lower energy prices for customer, but to the extent that an efficient new entrant has lower costs of energy production than an old incumbent plant, it should expect to earn extra infra-marginal and allowing it to bid more competitively in the capacity

market. Finally, the SEM Committee notes that the EC Guidelines on State aid for environmental protection and energy (EEAG), state that the generation adequacy measure should be constructed so as to ensure that the price paid for availability automatically tends to zero when the level of capacity supplied is expected to be adequate to meet the level of capacity demanded. Reserving a proportion of the market for new build, and holding separate auctions for new build capacity could result in prices in the new build auction which do not tend to zero, when there is adequate existing capacity to meet demand.

- 2.4.2 The SEM Committee recognises the concerns expressed by some potential capacity providers at being asked to bid in respect of a Capacity Delivery year in a T-4 auction before being sure whether they are going to get a Reliability Option for all the transitional years, or alternatively the price they can achieve in each of the transitional years. However, the SEM Committee notes that it consulted on this approach of having series of T-1 auctions for the transitional period in the CRM 2 Consultation (SEM-15-104), and this approach was supported by the majority of respondents.
- 2.4.3 The SEM Committee re-iterates the case for the approach to transitional auctions set out in CRM Decision 2, which took account of practicality and competition criteria:
- Lead times associated with developing and implementing the Capacity Market Code and the auction system mean that it is not practical to hold the first transitional auction for the Capacity Delivery Year 2017/18 before June 2017;
  - The SEM Committee is keen to allow the practical lessons learnt from the auction for the first transitional year to be incorporated into auctions for the subsequent transitional years. It may take time to incorporate lessons learned in changes to the Capacity Market Code and auction systems;
  - The approach reduces the risk that the SEM Committee specifies too high a capacity requirement in the later period of the transitional period due to demand growth forecast error;
  - In order to facilitate new entry (competition and efficiency criteria), the SEM Committee wants to conduct T-4 auctions as soon as possible, and hence there is expected to be a limited amount of time for a series of transitional auctions to take place for the intervening Capacity Delivery Years in advance of the first T-4 auction.
- 2.4.4 However, depending on the outcome of the first transitional auction (e.g. if little change to the auction system or Capacity Market Code is required), it may be possible to procure a significant proportion of the capacity requirement for the other transitional years through a sequence of T-3 and T-2 transitional auctions (coupled with later residual T-1 auctions for these years) prior to the first T-4 auction. However, at this stage, the SEM Committee makes no commitment in this regard.
- 2.4.5 The SEM Committee notes the concern expressed by one new entrant that no new entry is presumed during the transitional period, but considers that this reflects the reality of project lead times for traditional thermal plant. The SEM Committee believes that the best way to facilitate efficient new entry that benefits consumers is to hold T-

4 auctions as soon as feasible. The SEM Committee also notes that the entry of certain renewable plant which generally has shorter construction periods (such as onshore wind and solar) is largely not contingent on the outcome of capacity auctions, but on renewable support regimes for financing.

- 2.4.6 On an ongoing basis, beyond the transitional period, the SEM Committee believes there is value in maintaining flexibility in the timing of both T-4 and T-1 auctions. This allows the SEM Committee the scope to respond to changes in market conditions, and to ensure that any relevant changes to the Capacity Market Code and auction systems can be better accommodated within the auction timetable. However, this needs to be balanced against providing certainty to participants so that a sensible range of flexibility can be permitted.
- 2.4.7 The proposed +/-6 month flexibility for T-4 auctions provides a sensible level of flexibility which we deem to be appropriate for T-4 auctions. This gives a 12-month window for the auctions to take place, with the decision to do so taking place before the end of the qualification period in order to ensure all participants are able to meet the qualification requirements in time.
- 2.4.8 Flexibility around T-4 auctions is required to accommodate a range of factors, whereas the key driver for T-1 auction flexibility is more specific, namely the time required for DSU providers to secure a capacity base that can be bid. The SEM Committee believes that this should be a key basis for the decision on setting the flexibility range for DSU.
- 2.4.9 The range of dates should allow the SEM Committee to bring forward the auction (for example if the quantity to be procured is low and there are enough known bidders to ensure a competitive, efficient auction) but also to allow the most time for DSU providers to emerge. The range of 2-13 months prior to delivery is one that the SEM Committee believes accomplishes these aims, and to avoid unduly constraining the SEM Committee the Capacity Market Code will provide for this high level of flexibility. However, the SEM Committee will normally seek to conduct the auctions within a narrower window, and significantly further in advance of the start of the Capacity Delivery Year than 2 months.
- 2.4.10 It is possible that a set of market conditions emerge that mean there is limited or no value in holding a T-4 auction, if all demand is already covered by long term Reliability Options. There could be diverse reasons for this, and therefore the SEM Committee believes the facility to cancel a T-4 auction should exist. Such a cancellation decision should be left at the SEM Committee's discretion and communicated to the market before the start of qualification.
- 2.4.11 There is merit in withholding some volume from T-4 auctions in order to ensure volume exists to be procured in T-1 auctions. This should initially be set at a level that allows for DSU providers to choose to compete in the T-1 auction because the lead time for delivery is short, and they may not have made the investment decision when the T-4 auction was held. The exact value of this volume withheld for the first T-1



auction will be a feature of the parameters consultation, but an indicative range can already be stated.

- 2.4.12 International experience, as noted in the Consultation paper, provides evidence that volumes reserved for the T-1 are in a range of 0-5%. The minimum value that should be taken in the I-SEM CRM needs to reflect the expected level of future DSU, which would suggest a percentage of 2.5%<sup>10</sup> and a range of 2-5% represent an indicative starting position for the parameters consultation.
- 2.4.13 There may also occasionally be a need to hold ad hoc auctions between T-4 and T-1 in order to ensure that sufficient capacity is procured to maintain the security standard. The SEM Committee believes that sufficient flexibility should be facilitated in order to allow this to happen.

## 2.5 SEM COMMITTEE DECISIONS

### Transitional Auctions

- 2.5.1 The SEM Committee confirms its intention to conduct separate transitional auctions in respect of each of the transitional Capacity Delivery Years, with new and existing capacity eligible to compete alongside each other in these auctions. The transitional auction in respect of the 2017/18 Capacity Delivery Year will occur as soon as reasonably practical, given timelines required to develop and implement the Capacity Market Code and the auction system.
- 2.5.2 The SEM Committee will then conduct auctions for each of the remaining transitional years on an annual basis in advance of the relevant delivery year. However, once lessons learnt from the 2017/18 transitional auction have been appropriately reflected, the SEM Committee will consider further the possibility of holding subsequent transitional auctions in sequence before the first T-4 auction, but at this time, the SEM Committee makes no commitment in this regard.

### T-4 auctions

- 2.5.3 The SEM Committee has decided that the Capacity Market Code will require the CRM Delivery Body to conduct a T-4 auction between 3 years 6 months and 4 years 6 months in advance of the start of each relevant Capacity Delivery Year. The SEM Committee will determine where within this window the CRM Delivery Body will hold the T-4 auction each year. Both new and existing capacity will be eligible to compete alongside each other in T-4 auctions.
- 2.5.4 However, the Capacity Market Code shall give the SEM Committee the power to bring forward, delay or postpone the T-4 auction in exceptional circumstances, such as

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<sup>10</sup> Based on Eirgrid/SONI Generation Capacity Statement 2016-2025, an expectation of 264MW of DSU can be assumed for 2017, corresponding to ~2% of total market volume.

where the capacity requirement has already been met through long term Reliability Options procured in prior year auctions.

- 2.5.5 The volumes procured in the T-4 auction will be determined by the SEM Committee and specified in the form of a demand curve (see Section 3.4). However, in setting the demand curve parameters the SEM Committee will take account of the following:
- The Capacity Requirement to be estimated by the CRM Delivery Body in accordance with the methodology set out in CRM Decision 1 (SEM-15-103);
  - Volumes already procured in respect of the relevant Capacity Delivery Year under multi-year fixed price Reliability Options; and
  - Volumes to be withheld from the T-4 auction to the T-1 Auction. The SEM Committee will consult periodically on the volume of the Capacity Requirement to withhold from T-4 auctions to T-1 auctions, and this amount may grow over time if the contribution of DSUs increases.

### **T-1 auctions**

- 2.5.6 Both new and existing capacity will be eligible to compete alongside each other in T-1 auctions.
- 2.5.7 The Capacity Market Code will provide a level of flexibility in the timing of T-1 auctions of 2 to 13 months in advance of the relevant Capacity Delivery Year, plus the right to cancel these auctions if they are not required, or to hold alternate auctions (e.g. T-2) at other times. However, the SEM Committee will normally seek to conduct the auctions within a narrower window. It will be at the SEM Committee's discretion to determine where within the 2 to 13 month window the T-1 auctions shall be held each year.

### **Other auctions**

- 2.5.8 The SEM Committee may direct the CRM Delivery Body to conduct auctions at other times (e.g. T-3, T-2) if it perceives such auctions are required to preserve system security, or to protect consumers from high prices. Such circumstances may apply, if for instance, larger than expected volumes would otherwise have to be procured at T-1 stage, due to the failure of a new build generator to meet Implementation Agreement milestones.

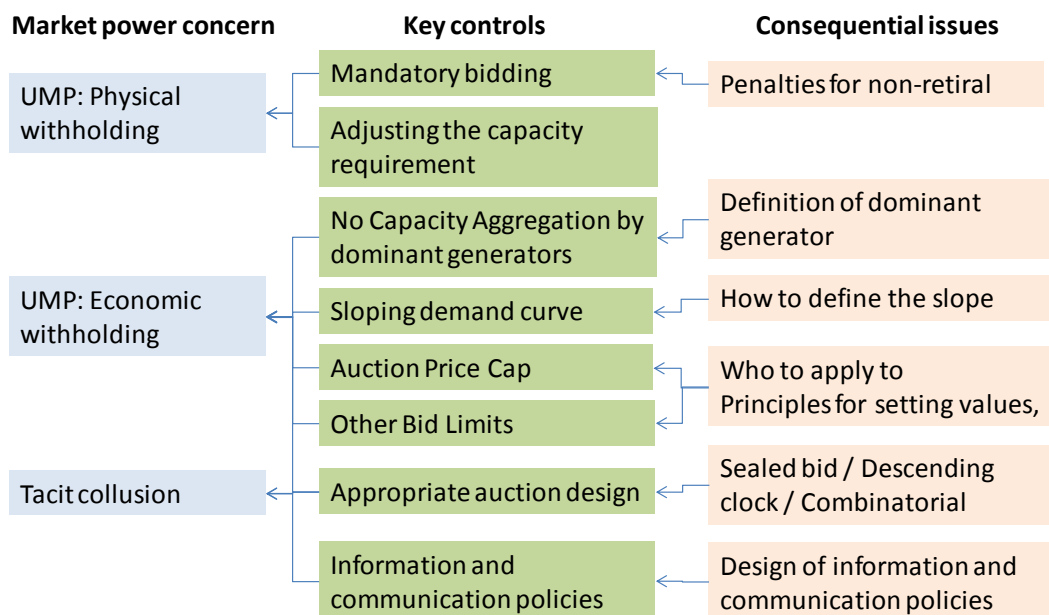
### 3. MARKET POWER

#### 3.1 CONSULTATION SUMMARY

3.1.1 SEM-16-010 explained how central market power and market power mitigation is important to the design of the auction. In SEM-16-010, the SEM Committee set out:

- Market definition: The relevant market was defined as the forward capacity product for a specified Capacity Delivery Year, and to apply on an all-island basis;
- Key market power concerns: A discussion of the key market power concerns, including unilateral market power and tacit collusion and how a market participant or group of participants may seek to exercise market power through physical withholding (not bidding) or economic withholding (bidding at a high price);
- Impact of new entry: How the impact of new entry may affect market power differently in the transitional, T-1 and T-4 auctions, with greater potential for market entry to reduce market power concerns in T-4 auctions;
- Metrics: A discussion of which metrics might be used to assess market power in the I-SEM CRM. These metrics may be used to decide whether to apply market power controls to particular dominant participants, or the market as a whole;
- Level of market power: A review of the likely level of market power at the inception of the I-SEM CRM, which indicated that the market is relatively concentrated and that ESB, and possibly SSE and AES would be pivotal suppliers; and
- Market power control framework: A summary of the SEM Committee’s market power control framework which links relevant market power concerns to key controls and consequential issues arising from the imposition of these measures. The high level framework is illustrated in Figure 4 below.

Figure 4: Market power control framework



- 3.1.2 SEM-16-010 noted that concerns about market power can be mitigated somewhat by auction design choices and by rules governing the participation in the CRM auctions. In particular, SEM-16-010 discussed how multiple round auction formats (such as multiple round descending clock), which provide information back to bidders between rounds may be more amenable to market power manipulation than simple sealed bid formats.
- 3.1.3 As well as determining features of auction design, SEM-16-010 set out a number of other market power mitigation controls, and asked for feedback on these controls including:
- Rules on physical withholding- making bidding mandatory, a decision taken in CRM Decision 1 (see SEM-15-103);
  - Adjust the capacity requirement down for physical withholding (non-bidders), another decision taken in CRM Decision 1 (see SEM-15-103);
  - Price controls on economic withholding, including:
    - An Auction Price Cap, which is a form of reserve pricing, which limits the amount that the auction can clear at, and by extension, the maximum amount that a bidder can bid. SEM-16-010 noted that most other capacity auctions have Auction Price Caps, typically set in the range 1.5 to 2 x Net Cost of New Entrant (Net CONE);
    - Other Bid Limits set at levels below the Auction Price Cap, to apply to existing generation. SEM-16-010 set out options as to whether the bid limits should: apply to all existing generators, or just generation units owned by generators with high market shares, and by reference to what metric high market share should be defined, if relevant; apply to intermittent plant and non-firm transmission access plant; be uniform or technology specific; and whether capacity providers with higher Net Going Forward costs should be allowed to apply for a higher bid limit;
  - Introducing a sloping demand curve. SEM-16-010 noted that there are a number of other reasons for employing a sloping demand curve, other than the impact in restraining market power, and these may also help determine the optimum slope of the curve;
  - Prohibitions on provision of aggregation services by dominant capacity providers; and
  - Information strategy. Information and communication rules and policies need to be appropriately designed to limit the potential for the abuse of unilateral market power / gaming by individual bidders and to limit the potential for collusion amongst groups of bidders.
- 3.1.4 A specific area of consultation in SEM-16-010 was the treatment in the T-1 auction of plant that previously exercised a right to withhold volume in the T-4 auction, where such behaviour could either constitute a legitimate strategy of commercial optimisation or market manipulation.

- 3.1.5 SEM-16-010 noted that the key controls set out in Figure 4 above are ex-ante interventions to prevent anti-competitive behaviour through the capacity auction design. In addition to these measures, gaming in the capacity auction falls under EU antitrust rules, relating both to abuse of dominant position and collusive practices. Furthermore, specific anti-gaming provisions may be included in the Capacity Market Code and applied alongside other specific market manipulation legislation or licence conditions which apply to the energy sector, for example REMIT<sup>11</sup> and wider competition law provisions. Finally, robust market monitoring by the Regulatory Authorities and an independent Market Monitor/Auditor will be additional protection against non-competitive behaviour in the I-SEM CRM auctions. The role and responsibilities regarding the Independent Auction Monitor/Independent Auction Auditor and the Regulatory Authorities are discussed in Section 5 while the specific market power concerns and suite of mitigation measures are set out in this section.
- 3.1.6 SEM-16-010 considered that, for the foreseeable future at least, there will be a need for robust Market Monitoring activity by the Regulatory Authorities, as a strong ex-post market power mitigation measure in the various I-SEM market timeframes, including the capacity market.

## 3.2 SUMMARY OF RESPONSES

### Market power concerns, metrics and level of market power

- 3.2.1 We asked respondents to comment on whether they believed market power to be a material concern in the I-SEM CRM, and if so, whether the SEM Committee should be concerned by unilateral market power, coordinated market power (e.g. tacit collusion) or both. All of the received responses to these questions of market power agreed that in the I-SEM CRM it is a concern, and acknowledged that unilateral power exists. Some respondents noted that the potential for market power abuse in the CRM I-SEM is greater than in the GB Capacity Market.
- 3.2.2 The nature and extent of further concerns, however, varied between respondents. Several responses additionally and expressly stated that the potential for collusion and coordinated (whether explicit or tacit) market power abuse existed. Of those who expressly stated that collusion was not a concern, reasons given to justify this view included that:
- There is a lack of supporting evidence that collusion takes place, therefore it is a distraction from the greater issue of unilateral market power abuse to focus on collusion; and
  - Collusion is remedied through a simple imposition of bidder communication restrictions, therefore is not a material concern.

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<sup>11</sup> We will also consider including in the Capacity Market Code and/or licences specific provisions such as the 'no market manipulation clause' and the requirement to sign a Certificate of Ethical Conduct both of which were provided for in the GB auction rules.

- 3.2.3 In the context of the wider I-SEM, some respondents noted that the question of market power exists across all markets and therefore mitigation measures also need to bear in mind the potential to use wider I-SEM measures that can mitigate manipulation ex-ante.
- 3.2.4 We also asked respondents to comment on the most appropriate metric to use to assess market power potential. Responses received covered almost all of the options suggested in the consultation document, with some noting that all have merit and none are perfect in identifying market power potential in isolation. Support was expressed for a simple market share threshold by some respondents, with supporting arguments including the relative simplicity of the approach and the potential risk that other measures may be less effective in the smaller market context of the I-SEM CRM. The Herfindahl-Hirschman Index (HHI) market power metric found support from some respondents, who noted it would align with the existing processes that have proved effective in the SEM. Pivotal supplier tests were preferred by some who supported the view with arguments that included its robustness to market changes. However, the use of Two or Three Pivotal Supplier Test had little support, and some respondents stated that imposing the Two or Three Pivotal Supplier Test would be inappropriate, because it would result in all market participants being deemed as dominant<sup>12</sup>. Some respondents argued that it is unnecessary to choose a preferred metric to mitigate market power concerns.
- 3.2.5 Some respondents declined to comment, stating that only once the auction format is confirmed can an appropriate metric be defined.
- 3.2.6 A number of additional market power concerns were identified by respondents, particularly a risk of predatory pricing (bidding below cost) by dominant players to the detriment of competition within CRM. Other concerns included: the need to force incumbent players to divest opted out plant; the perceived need to focus on plant retireals; the need for the Regulatory Authorities to mitigate the exercise of market power in the secondary market for Reliability Options, not just the primary auctions; and the need to consider constraints on the all island system and the locational need for capacity on the island, particularly in the absence of the second North-South Interconnector.

### **Market power mitigation measures- overview**

- 3.2.7 In response to whether the market power control framework and package of mitigation measures are comprehensive and proportionate, a number of respondents stated that the package of measures were broadly acceptable, although few respondents universally supported the package without providing a set of caveats or further measures. Some viewed the package as disproportionate, while one

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<sup>12</sup> ESB is very likely to fail the Single Pivotal Supplier Test, which by definition means all other participants would fail the Two or Three Pivotal Supplier Tests

respondent also considered the package to be a hindrance to competition, arguing that the design would favour new entry, which is not subject to the same regulation.

- 3.2.8 Measures most widely recognised as being necessary in some form included mandatory bidding, auction price caps, restrictions on bidder communications and sloping demand curves.
- 3.2.9 The use of bid limits was most frequently identified as either a disproportionate measure that should not be pursued or one that needed refinement.

### **Auction Price Caps**

- 3.2.10 The vast majority of respondents supported the introduction of an Auction Price Cap. The main advantage cited was that it offers an important protection for consumers against abuses of market power. Some responses in support of the Auction Price Cap cautioned the need for careful consideration when setting the cap to ensure it doesn't become a barrier to entry.
- 3.2.11 The main concern for those respondents who disagreed with an Auction Price Cap was that its introduction could be problematic for new entrants if the cap was not set high enough to support the procurement of new entry. They also considered an Auction Price Cap to be unnecessary if all existing conventional plant is subject to bid limits.
- 3.2.12 The following principles were suggested by respondents in terms of determining the Auction Price Cap:
- Be a multiple of Net CONE;
  - 1 x Net CONE is not considered appropriate as this assumes absolute confidence in the value and would stunt new investment;
  - 1.5 to 2 x Net CONE is proposed by most respondents. This encourages new investment and allows for a margin of uncertainty;
  - The cap must reflect the cost to the consumer of under-procuring capacity;
  - Cautioned against the use of the existing Best New Entrant (BNE). If it is used, it should form the basis for adjusting specifically for I-SEM CRM e.g. reforms within energy and DS3 markets, time of product delivery, Reliability Option difference payment exposure and Reliability Option length;
  - Smaller market should attract a higher multiple than those applied to larger markets;
  - Revise multiple depending on whether it is the T-1 auction or T-4 auction.

### **Other Bid Limits (Caps and Floors)**

- 3.2.13 In general, there was reasonable support for the introduction of other bid limits. However, there was very strong disagreement from a number of respondents. The concern with bid limits ranged from a risk that they would be set too low and costs would not be recovered, through to the need for bid limits to be targeted towards those who are dominant or applied to existing conventional generators only. One

respondent, who does not support bid limits, proposed an alternative which focused on an ex-post review of bid details after the auction is run but before auction results are announced.

3.2.14 Generally, the majority of respondents were of the view that:

- We should use a generic (non-technology specific) Price-taker Offer Cap approach. There was very little appetite for the introduction of technology specific bid limits. To do so was seen as requiring significant workload, risk of being discriminatory and could potentially lead to perverse outcomes. Those who did support technology specific bid limits also proposed the use of plant specific bid limits and variable renewable generation attracting a higher bid limit to reflect risk. It was also commented that if bid limits are imposed there must be a process to allow participants to submit evidence and demonstrate higher unit specific costs; and
- There is no need to impose bid limits below Net CONE on participants who do not have significant market power.

3.2.15 There were many different views expressed about the level at which any bid limits are set, including:

- Set at going forward costs with a forecast error i.e. greater than 50% net CONE;
- Allow recovery of fixed costs, Reliability Option difference payments and a margin;
- Allow recovery of fixed costs and a reasonable return on assets for incumbents;
- Allow recovery of missing money based on similar BNE method and a Reliability Option fee risk premium;
- BNE ongoing costs are inappropriate for setting bid limits as they are likely to be significantly lower than costs of existing capacity providers;
- Reflect missing money and allow for forecasting error; and
- Set at level to ensure continued operation of economically useful generation capacity.

3.2.16 A number of respondents also suggested that in addition to auction price caps, price floors should also be introduced. Given concerns regarding market power abuse, bid floors were considered necessary for any parties who might use a dominant position to depress prices to the detriment of their competitors, thereby increasing their market share (predatory pricing). There was also support for symmetric application of market power mitigation measures (caps and floors) and it was cited that many US markets use bid floors due to a fear of under-pricing. Bid floors may alternatively be applied to individual bids to prevent predatory behaviour and anti-competitive outcomes. Furthermore, bid floors will not cause the auction outturn price to be any higher than the competitive level.

## **Demand Curve**

3.2.17 Significant support was received for the introduction of a sloped demand curve. Advantages included managing price volatility, an effective market power mitigation measure and it helps address the lumpiness issue by reducing the need to select out of merit units.



- 3.2.18 A few respondents agreed in theory, but specifically within I-SEM CRM were concerned that it dampens exit signals or had concerns regarding the appropriateness of the proposed methodology; while another was concerned it may increase regulatory risk. One respondent considered the introduction of a sloped demand curve would remove the need to offer long term Reliability Options to new entrants. Another respondent considered a sloped demand curve is only required for the T-4 auction to avoid less capacity being secured than is required for an 8-hour Loss of Load Expectation (LOLE), while the T-1 auction will have a vertical demand curve to reflect a firm quantity requirement.
- 3.2.19 One respondent expressed concerned that while an auction implies an exit signal, there are design elements including highly sloping demand curves, particularly during the transition period, which could act as a life support for the existing fleet until the early-to-mid 2020s. They argued that more volumes than necessary will be procured, and this is not consistent with prudent fleet management as is seen in virtually every other industry.
- 3.2.20 A mixed response was received as to whether a sloped demand curve, if introduced, should be different for the transitional period. Of those who agreed most suggested a 'shallower' curve should be used during the transitional years to minimise shocks and as a means to managing potential plant exit. Some other respondents thought the slope should be steeper during the transitional period as they considered there to be greater exposure to market power abuse during these years. Those respondents who supported adopting an enduring curve from the start did so on the basis it allows for experience to be gained and a consistent methodology applied without exposure to continual change and regulatory risk. Furthermore, it reduces the risk of procuring more volume than necessary.
- 3.2.21 Respondents were asked for principles associated with determining the slope and range of the demand curve. Two respondents gave detailed views of the principles and proposed sloping demand curves. A summary of the principles suggested by respondents include:
- Ensuring 8 hour LOLE is met at the minimum procurement limit;
  - Curve should reflect the shape of changes to LOLE at different levels of de-rated capacity;
  - Due to smaller market the demand curve should be shallower to have desired effect;
  - If the Value of Loss Load (VoLL) is fixed, then the relationship between the capacity requirement and price can be established;
  - Exit signals must be maintained;
  - Steeper demand curve at points below the target capacity requirement to provide correct investment signals. Beyond the target capacity requirement apply a flatter curve to mitigate price volatility;
  - Prices should decline steeply until inflection point at net CONE, thereafter a flatter curve;
  - Must agree to objective, publically available inputs and determined by a formula;

- Must be robust and consistently applied to minimise regulatory risk and promote stability of CRM and investment incentives; and
  - Be flexible to amend principles in light of experience of completed auctions.
- 3.2.22 It was generally viewed that the introduction of a sloped demand curve will stabilise prices, reduce the scope for market power abuse and thereby increase competition and result in greater value for money.

### **Participation in T-4 and T-1 auction**

- 3.2.23 The majority of respondents stated that existing firm transmission access non-intermittent plant which opts out of the T-4 auction should not be barred from entering the T-1 auction for the same delivery period. Reasons given included allowing flexibility for unforeseeable changes in market conditions over a four-year period e.g. profitability driven by prices or plant which is needed for system security due to forced outages. Those in support of barring participants proposed additional measures ranging from allowing participation in T-1 auction only after rigorous checks and balances, through to forcing plant retirement/asset divestment.
- 3.2.24 We asked respondents to comment on whether firm transmission access plant that has not bid full capacity within its tolerance band in the T-4 auction may bid more capacity in the T-1 auction. There was full support for allowing participants to bid more capacity (up to the top of the tolerance band) in the T-1 auction. However, some respondents gave their support subject to ensuring participants with high levels of market concentration cannot exercise market power, and placed importance on adequate bid limits, carefully considered tolerance bands and close market monitoring being in place.

### **Restrictions on Capacity Aggregators**

- 3.2.25 The majority of respondents supported prohibiting generators with high market shares from acting as Capacity Aggregators, including their associated businesses (e.g. supply business). Furthermore, most respondents agreed with prohibiting generators with high market shares providing aggregation services.
- 3.2.26 Those who disagreed with prohibiting generators with high market shares did so on the basis that small scale participants should have access to the market through capacity aggregators and that there was no evidence presented of a market power issue nor a theory of harm. There was also concern around how existing contractual arrangements would be accounted for.
- 3.2.27 Some of the respondents who supported prohibiting generators with high market shares from acting as Capacity Aggregators made the distinction between new and existing aggregation contracts, noting that a prohibition should only apply in respect to new aggregation contracts and a cut-off date should be put in place. Some respondents supported only ESB (including Electric Ireland) being prohibited thereby

allowing capacity aggregation with other providers. A small number declined to comment as, in their view, the Regulatory Authorities had not defined which firms are dominant/pivotal and that further analysis is required.

### 3.3 SEM COMMITTEE RESPONSE

#### Market power concerns, metrics and level of market power

- 3.3.1 The SEM Committee believes there is a material concern with market power in the I-SEM CRM, both in terms of unilateral and coordinated market power to varying degrees across the auction timeframes. The I-SEM capacity market is likely to exhibit structural market power, creating challenges for the design and operation of the auctions.
- 3.3.2 Concerns about the ability of one or more firms to exercise unilateral market power are clear. This point was reinforced by the Economic Social and Research Institute (ESRI), which considered this issue in a recent research paper on the I-SEM<sup>13</sup>, and cautioned that there could be a danger that if the total amount of Reliability Options cannot be sold without the participation of one particular firm (i.e. they are pivotal), this firm will have both the ability and incentive to bid a high price for holding these options, which will lead to the auction clearing at a high price.
- 3.3.3 The SEM Committee remains concerned about the potential for tacit collusion, particularly in the transitional auctions, where there is little scope for new entrants to place significant competitive pressure on incumbents. The SEM Committee recognises that even in T-4 auctions, existing market participants may have certain structural advantages (access to sites, existing connections) which may create barriers to entry if market power mitigation measures are not implemented in the auction design. Further, although the potential for new entry in T-4 auctions should, in theory, help mitigate market power, there is no guarantee that this mitigation will be effective, and no guarantee that it would ensure competitive capacity market outcomes. For example, in some years the market might have no need for new capacity to be built. In other years, when capacity is needed, there might only be limited competition – maybe only one, two, or three potential new generators – given the limited number of sites with connection offers, fixed costs of participating in the auction and the relatively small size of the market and its growth rate.
- 3.3.4 The SEM Committee does not agree with the argument put forward by one respondent that the level of risk does not justify ex ante controls. In line with international best practice in capacity auctions, the SEM Committee does not consider it appropriate to rely solely on ex-post competition controls to mitigate market power in the CRM auctions.

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<sup>13</sup> 'The Irish Electricity Market: New Regulation to Preserve Competition'  
<https://www.esri.ie/pubs/RN20150101.pdf>

- 3.3.5 The SEM Committee will take a conservative approach to managing the exercise of market power in the CRM auctions, starting with a wide ranging set of controls to be applied in the transitional auctions and the first T-4 auction. Only when there is demonstrable practice of competitive outcomes emerging from the auctions, will the SEM Committee consider relaxing the controls.

### **Auction Price Cap**

- 3.3.6 The SEM Committee agrees with the majority of respondents who agreed that an Auction Price Cap was applicable. The I-SEM criteria which drive the decision are efficiency and competition (i.e. limiting the exercise of market power).
- 3.3.7 The efficiency reason is that customers would not be prepared to pay an unlimited amount for system security, so the auction should have a maximum price.
- 3.3.8 The SEM Committee believes that there is a case for restraining the exercise of market power in all auctions (transitional, T-1, T-4). As set out in the Consultation Paper (SEM-16-010) demonstrated that there is quite a high level of concentration among existing capacity providers, with some participants almost certain to be pivotal in the transitional auctions and likely to be pivotal in the first T-4 auctions. Whilst there is an argument that new build capacity has a greater chance of imposing competitive pressure in the T-4 auctions, the SEM Committee remains unconvinced that there will be sufficient competitive pressure from new entrants to justify the absence of an Auction Price Cap.
- 3.3.9 The SEM Committee proposes to apply an Auction Price Cap until such point in time that it can be clearly demonstrated that market power is not a material concern. In this regard, the SEM Committee notes that most if not all existing global capacity auctions, even those that have been operating for many years (e.g. ISO New England, PJM) retain an Auction Price Cap.
- 3.3.10 The SEM Committee notes the responses that favoured an Auction Price Cap based on a multiple of the Net CONE, and their preference for the multiple to be set in the range of 1.5 to 2 times Net CONE. The SEM Committee will make a final decision on the level of the Auction Price Cap for the transitional auctions as part of the forthcoming CRM parameters consultation. However, the SEM Committee notes that the current level of average capacity price has been effective in delivering sufficient capacity. The level of the Auction Price Cap for the enduring T-4 and T-1 auctions will be determined in advance of these auctions.

### **Bid limits (caps and floors)**

- 3.3.11 While an Auction Price Cap is necessary, the SEM Committee has also determined that an Auction Price Cap is not sufficient to adequately mitigate market power. Other market power mitigation measures are also required.

- 3.3.12 The SEM Committee is of the view that a Price-taker Offer Cap should be applied to all existing (non-new build) generators, including intermittent and non-firm transmission access generators. However, an existing generator will be able to apply for a higher bid limit where it can prove that its avoidable Net Going Forward costs (i.e. net recurring costs) are higher than the Price-taker Offer Cap. New build capacity and DSUs will not be subject to any bid limits. The level of the Price-taker Offer Cap will be consulted on as part of the CRM parameters consultation.
- 3.3.13 Given concerns about market power and competition, the SEM Committee rejects the view that ex ante controls on the bids of generators with high market shares, in addition to the Auction Price Cap are not necessary. This view applies to transitional auctions and T-1 auctions (where new entry is welcome, but not expected), and also to T-4 auctions for the foreseeable future.
- 3.3.14 As illustrated in Figure 5 below, the all-island capacity market will be relatively concentrated. At the current time the HHI of de-rated capacity is estimated to be around 1,800<sup>14</sup>. This is a level which would normally give rise to market power concerns. Moreover, as established in SEM-16-010, ESB is almost certain to be pivotal, and some other generators or groups of generators may also be pivotal.
- 3.3.15 At this level of market concentration, if a transitional auction was conducted immediately, these metrics would reinforce the fact that there would be a *prima facie* concern that a large player could unilaterally exercise market power, or small groups of generators could collude to exert market power.

Figure 5: Market shares of current installed capacity

	Name-plate MW	Estimated de-rated MW	De-rated market share	HHI Contribution (de-rated capacity)
ESB PG (Non Wind)	4,073	3,590	38%	1,451
SSE (Non Wind)	1,264	1,065	11%	128
AES	1,022	896	10%	90
Viridian Huntstown 1&2	736	648	7%	47
NIE PPB	587	517	5%	30
BG Energy	444	391	4%	17
Tynagh Energy	386	340	4%	13
BnM	234	212	2%	5
Aughinish	162	146	2%	2
Other dispatchable generators	185	163	2%	
Demand Side	235	235	2%	
Moyle Interconnector	450	338	4%	13
EWIC Interconnector	500	375	4%	16
Total wind	3,573	511	5%	
<b>Total</b>	<b>13,851</b>	<b>9,425</b>	<b>100%</b>	<b>1,813</b>

<sup>14</sup> The estimates in Figure 6 are indicative only to give context to the market power analysis. The numbers are based on plant capacity figures presented in the 2016-2025 Generation Capacity Statement<sup>14</sup> and are calculated using GB de-rating factors (which are likely to be different from those that appropriate for the I-SEM). They assign a 75% capacity credit to the interconnectors, following the approach used in the Generation Capacity Statement. The I-SEM CRM de-rating factors will be consulted up on in Quarter 3 2016.

3.3.16 These concerns were amplified by the recent Economic Social and Research Institute (ESRI) research paper on the I-SEM<sup>15</sup>, which cautioned that there could be a danger that if the total amount of Reliability Options cannot be sold without the participation of one particular firm, this firm will have both the ability and incentive to bid a high price for holding these options, which will lead to the auction clearing at a high price.

3.3.17 The transitional auctions, where there is expected to be capacity in excess of the Capacity Requirement, should clear well below the Auction Price Cap, in the absence of the exercise of market power. It is important that market power is not used by a generator or groups of generators in transitional auctions to cause the auction to clear at prices different to the level that would pertain in a market with the same supply-demand balance, but more fragmented ownership structure.

3.3.18 Whilst we cannot be sure of the level of new entry in any T-4 auction, based on the current installed capacity, unless there was significant new entry from non-incumbents, there are likely to be a number of generators who may also be able to exercise market power in T-4 capacity auctions. It is not yet clear that there will be sufficient competitive pressure from new build capacity to restrain the bids of existing generators in T-4 auctions, so the SEM Committee will maintain Price-taker Offer Caps for existing generators in T-4 auctions too, until experience has been clearly demonstrated that such offer caps are not necessary or appropriate.

3.3.19 The SEM Committee considered whether a Price-taker Offer Cap should apply to all generators, or just generators with high market share.

3.3.20 Given the level of concentration in the market, now and for the foreseeable future, the SEM Committee:

- Remains concerned by the potential for the exercise of both unilateral and coordinated market power;
- Considers that it should take a conservative approach to managing market power and ensure that consumers are protected by applying ex ante controls, only relaxing such controls at a future point in time once it had been demonstrated that auctions have delivered competitive outcomes. This means that ex ante controls should be applied to the transitional auctions, and to T-4 auctions until the SEM Committee has clear evidence that pressure from new entry is sufficient to constrain any market power of incumbents.

3.3.21 The SEM Committee considered how to protect consumers against concerns around collusive market power. As discussed in SEM-16-010, some markets (e.g. PJM in the US) apply tests to measure the combined market power of two or three providers- typically they used the Two Pivotal Supplier test or Three Pivotal Supplier test. Any supplier that fails the test is then subject to additional market power controls.

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<sup>15</sup> 'The Irish Electricity Market: New Regulation to Preserve Competition'  
<https://www.esri.ie/pubs/RN20150101.pdf>

3.3.22 The SEM Committee considered the application of the Two/Three Pivotal Supplier test and decided that the basic principle was sound. However, if it were to apply this test to the I-SEM CRM, then it is clear that, at the moment, all suppliers (i.e. capacity providers) would fail this test. In practice, given the fact that ESB is almost certain to be pivotal on its own, all generating companies<sup>16</sup> would fail the Two/Three Pivotal Supplier test. On practicality grounds, the SEM Committee decided not to introduce an unnecessary process step<sup>17</sup>, which could prolong the auction process, when the result of that process is entirely predictable. The SEM Committee therefore decided to avoid this unnecessary complication and ensure that all generating companies would be subject to the Price-taker Offer Cap, until such time as it has been demonstrated that such controls are not necessary.

3.3.23 The SEM Committee further recognises the possibility that the exertion of market power in instances of capacity excess could be used to set the clearing price at the Price-taker Offer Cap (or at a level above the Price-taker Offer Cap but below the Auction Price Cap) when a more fragmented ownership structure would have resulted in a clearing price below the Price-taker Offer Cap. The SEM Committee does not rule out the possibility that additional ex-ante mitigation measures might be required to address any market power of this nature in the future.

3.3.24 The SEM Committee considered whether the Price-taker Offer Cap should be uniform, or whether it should be technology specific, and whether a generator should be allowed to apply for a higher bid limit as a special case. The SEM Committee noted the lack of support amongst respondents for technology specific caps, and decided in favour of a uniform Price-taker Offer Cap because:

- On competition grounds, where possible it favours the use of a non-discriminatory test/principle and it is possible to set the Price-taker Offer Cap which can accommodate the Net Going forward costs of most technologies without jeopardising competitive outcomes;
- Technologies (or individual plants) which have different cost characteristics can be dealt with through applications for a higher bid limit on grounds of higher Net Going Forward costs; and
- This approach is simpler and more practical to apply.

3.3.25 In implementing the Price-taker Offer Cap a provision will be made to allow participants to have a higher bid limit where they can prove that their existing plant's going avoidable (forward) costs are above the Price-taker Offer Cap. To be allowed a higher bid limit, the generator unit must apply for a higher bid limit, and demonstrate to the satisfaction of the SEM Committee that its avoidable Net Going Forward costs exceed the Price-taker Offer Cap. The CMC will set out the detailed requirements applicable to this process. Regarding timeframes, the CMC will set out: the lead-time before an auction by which the corresponding Price-taker Offer Cap will be published;

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<sup>16</sup> pivotal supplier test are applied at company level

<sup>17</sup> requiring the CRM Delivery Body to calculate pass/fail pivotal supplier test, which would then need to be reviewed and approved by the SEM Committee given perceived issue around conflict of interests

the time limit for submitting an application for a higher bid limit; the time period within which the SEM Committee will make a decision; and any time periods relevant to appeal or dispute provisions.

- 3.3.26 Whilst provision for special cases adds administrative cost and some complexity for the Regulatory Authorities, the SEM Committee sees efficiency benefits, since it is preferable to allow the Unit to bid a higher value than the Price-taker Offer Cap and be accepted if it would otherwise and inefficiently seek to close – and particularly if the result was that the market otherwise cleared at the cost of new entry.
- 3.3.27 The SEM Committee considered whether the Price-taker Offer Cap should also apply to intermittent generation units and the portion of non-intermittent generation units which do not have firm transmission access. Note that this capacity can opt out of bidding into the auction. The SEM Committee has decided that the Price-taker Offer Cap should also apply to this capacity, if it chooses to participate in the auction. Note that these non-mandatory bidders will know what the Price-taker Offer Cap is when they have to make a decision on whether to enter their capacity into the auction at the qualification stage. The SEM Committee has taken this view because:
- A sizeable proportion of intermittent plant are owned by larger companies such as ESB, SSE (Airtricity), Viridian and BGE. Some of the rest is also likely to be contracted to these companies (or their associated Supply businesses) under PPA agreements;
  - Where this capacity is owned or controlled by generators with high market shares, they could otherwise potentially game the auction by bidding in just below the Auction Price Cap, with the consequence that there wouldn't be a corresponding adjustment to the Capacity Requirement. This risk may be particularly high where the plant in question is a supported renewable plant, which under some schemes will be compensated for any loss of capacity payments by the support mechanism.
- 3.3.28 The SEM Committee decided to exempt any generator which meets the new build criteria from the Price-taker Offer Cap, regardless of whether the owner is a dominant generator or not, since new build capacity may not be offered otherwise. DSUs have been exempted primarily because they are expected to have little or no market power.
- 3.3.29 Some respondents argued in favour of bid floors in the auction, arguing that they are appropriate to prevent predatory pricing. Bid floors would involve a minimum price at which a prescribed unit can bid in at, as opposed to a minimum price that the auction can clear at.
- 3.3.30 The SEM Committee does not favour bid floors for a number of reasons:
- Any bid floor which was applied to a single company or select group of companies could provide an unacceptable distortion on competition and could lead to lower cost plant from a dominant company being forced out of in favour of higher cost plant from a smaller company. This is inefficient and could impose unnecessary cost on customers;



- The introduction of a sloping demand curve should reduce the chance that the capacity price would drop to very low levels and for small generators to be predatory priced out of the market. It allows more capacity to be bought as the price drops, so reducing the pay-off to any party trying to engage in predatory pricing;
- The Regulatory Authorities, the Independent Auction Monitor and independent Auction Auditor will be monitoring for signs of market manipulation (including predatory pricing) and will, where appropriate, apply anti-manipulation rules within the REMIT framework, the Capacity Market Code and wider competition law provisions;
- A floor which is applicable to a large number of generators would have a strong probability of being the clearing price and cause a large number of units to bid at this price, with the result that the winners are likely to be selected through some tie break rules, which could be perceived to be arbitrary and/or iniquitous;
- Bid floor would have a similar effect to price floors and therefore would likely raise issues with the CRMs consistency with the EC State Aid Guidelines.

## Demand Curve

3.3.31 The SEM Committee notes the strong support for a sloping demand curve, and thinks that it is appropriate to implement a sloping demand curve for transitional, T-1 and T-4 auctions. As discussed in CRM Consultation 3 (SEM-16-010), there are a number of reasons to implement a sloping demand curve, namely:

- **Competition and market power mitigation.** A sloping demand curve may serve to mitigate market power of bidders as bidders face “competition” from reduced demand as well as from other bidders. If a bidder knows that the auctioneer has a fixed capacity requirement, i.e. a vertical demand curve, the bidder might have market power which it can profitably exert. However, with a sloping demand curve the auctioneer has the opportunity to buy less capacity when bids are high and that might potentially mean that a bidder would not exercise market power, either because it is no longer profitable to do so. With a sloping demand curve the auctioneer is not merely a price taker who has to pay for new investment at any price (up to the Auction Price Cap), so a sloped demand curve can bring additional constraints on the bidding behaviour of both existing and new generators.
- **Economic efficiency.** It may be economically efficient to procure more capacity if it is cheap (so reducing lost load costs less than anticipated), and less capacity if it is expensive (so reducing lost load is more expensive than anticipated); and
- **Stability- smoothing out volatility in auction clearing prices between time periods.** The price of capacity during times of excess is a key driver of the price required to attract new entry and the degree to which investment is cyclical<sup>18</sup>. An additional benefit of a sloping demand curve is that it can be expected to smooth out the volatility in auction prices from year to year as supply and demand conditions change, particularly where the scale of entry is large relative to market size (i.e. the ‘lumpiness

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<sup>18</sup> If potential new entrants anticipate depressed prices over a large portion of the investment cycle then the price needed to attract entry will need to be high enough to compensate for such prices.

problem) as will be the case for the I-SEM. Capacity Markets in the United States (PJM, New England ISO and New York ISO) have all introduced sloping demand curves due to concerns about volatile capacity prices and this has been recognised by the Federal Regulatory Energy Commission (FERC) in its deliberations on capacity market design<sup>19</sup>.

- 3.3.32 There is a further and potentially significant benefit in the event that Auction Format Option 3 is chosen (and to a lesser extent if Auction Format Option 1 is chosen and uses an optimisation approach to manage lumpiness and/or exit and entry issues). In auctions solved either fully or partly by optimisation, a sloped demand curve can help mitigate the potential for both gaming opportunities and other unintended consequences that can arise when some or all of the offers are inflexible. The risk of specifying inflexible demand is that the auction is overly-constrained to procuring the combination of bids to accept with exactly the “right” total quantity, and is hamstrung from making sensible trade-offs based on relative costs. This inflexibility could mean, for example, that small and expensive bids are more likely to win, relative to an efficient outcome, and larger and less expensive are less likely to win. Specifying flexibility in demand, i.e. a sloping demand curve, addresses this issue.
- 3.3.33 The above factors apply to transitional auctions, T-1 and T-4 auctions in varying degrees, so the gradient of the slope of the demand curve may vary from auction to auction, but the case for a sloping demand curve is strong in all auctions.
- 3.3.34 The SEM Committee agrees that a sloping demand curve could lead to the procurement of more capacity than needed to meet the security standard and may serve to dampen exit signals. However, if more capacity is retained at low prices in one year, the fact that there is more capacity retained cheaply for that delivery year could lead to greater competition for Reliability Options in subsequent years from existing capacity, resulting in lower costs for customers. Therefore, the dampening of exit signals at low prices can be of benefit to customers in subsequent years.
- 3.3.35 The SEM Committee will establish the parameters for the transitional auction demand curve during the CRM Parameters Consultation, but is minded to set the demand curve based on the following principles which reflect the security standard, and the rationale for introducing a sloping demand curve. These principles are similar to those employed in ISO New England and PJM demand curve setting:
- System security (Reliability) and economic efficiency:
    - Should be consistent with the security standard of maintaining the 8 hours per Capacity Delivery Year LOLE standard set out in CRM Decision 1; and
    - Should, at minimum, reflect an economically efficient trade-off between the cost of an incremental MW of Reliability Option and the value of extra

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<sup>19</sup> See for example FERC Assessment of Market Power Mitigation in US Capacity Markets (2013): <https://www.ferc.gov/CalendarFiles/20130826142258-Staff%20Paper.pdf>

reliability that RO provides, but could be less vertical as a result of other factors set out below;

- Competition: Should reduce susceptibility of the auction to market power (in conjunction with other market power controls);
- Stability (price volatility):
  - Should reduce long term price volatility impact from small variations in market conditions and administrative parameters, including lumpy investment decisions, and demand forecast changes; and
  - Should limit the frequency of outcomes at Auction Price Cap.
- Practicality: Should perform well under a range of market conditions, including changes in administrative parameters and administrative estimation forecast errors.

3.3.36 The SEM Committee notes that the introduction of a sloping demand curve is not intended to solve the lumpiness issue per se, but can help mitigate this issue. The “lumpiness problem” can occur regardless of whether the demand curve is vertical or sloped<sup>20</sup>, and other solutions to the lumpiness problem are considered later in this paper.

### **Restrictions on generators opting out of T-4 auctions**

3.3.37 CRM Decision 1 set out exceptions to the mandatory bidding requirement. The SEM Committee is of the view that, on balance, it should not restrict excepted generators who decide not to bid in the T-4 auctions from bidding in the subsequent T-1 auctions for the same Capacity Delivery Year. The SEM Committee notes the concerns that some respondents have with regard to competition and gaming potential but believes that these are limited. Given that it is not expected that more than 5% (i.e. approximately 500MW) of the Capacity Requirement will be withheld from the T-4 auctions to T-1 auctions initially, any generator seeking to withhold capacity from the T-4 auction (with a view to manipulating the price) but hoping to get a Reliability Option in T-1 auction is taking a significant risk that it will not get a Reliability Option at all.

3.3.38 The SEM Committee also recognises that a plant owner which opts out of a T-4 auction may genuinely change its mind (e.g. due to revised economic forecasts, changes in fuel prices) and allowing them to bid in later auctions may promote economic efficiency and security of supply, and avoid the customer having to pay for costlier new entry, if this plant is prohibited from re-entering the capacity market.

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<sup>20</sup> GB capacity market rules allowed the auctioneer to accept or reject the marginal bid based on within a volume tolerance defined by the sloping portion of the curve, but the two issues are in principle independent

## Restrictions on Capacity Aggregators

- 3.3.39 The SEM Committee is of the view that the practical difficulties with implementing a control on generators with high market shares acting as Capacity Aggregators, and environmental benefit outweigh any incremental risks to competition objectives.
- 3.3.40 To impose a full restriction on dominant players acting as Capacity Aggregators, we would need to consider practical difficulties, for example, with legacy PPAs and interaction with energy aggregation and energy market settlement. Whilst in principle it may be possible to impose restrictions on generators with high market shares (and their associated companies) entering into new PPAs and/or otherwise new Capacity Aggregation arrangements we have decided not to impose any ex ante restriction on new arrangements at this time because:
- The other bid controls (Auction Price Cap, Price-taker Offer Cap) will provide a strong set of market power controls;
  - The volume of existing aggregatable de-rated capacity is relatively limited, and can do little to enhance dominance. The majority of aggregatable capacity is expected to be wind generation, which will be subject to significant de-rating;
  - We are keen to ensure that renewable generators and DSUs are able to access aggregators who can pool their risk, and enhance participation by renewables. Prohibiting generators with high market share and their associated companies from acting as Capacity Aggregators could materially reduce the range of PPA providers and other aggregators available for renewables and DSUs and hence could harm the growth of small players.
- 3.3.41 General limits on the size and type of unit which can be aggregated in capacity auctions (which are consistent with the limits that apply in the energy market) which were set out in CRM Decision 1 (SEM-15-103) still apply.

## General market monitoring

- 3.3.42 The legal framework governing the I-SEM prohibits the gaming of auctions. Compliance with this framework will be monitored by the Regulatory Authorities and, where appropriate, through the Independent Auction Monitor and the Independent Auction Auditor (see Section 5.6).

## Other issues

- 3.3.43 The SEM Committee recognises the concerns expressed by some respondents with respect to the exercise of market power in the secondary market. The decisions made in CRM Decision 2 (SEM-16-022) with respect to the creation of a mandatory, centralised marketplace for back to back secondary trading were taken (in part) to address market power issues in the secondary market. We are committed to the development of the mandatory centralised secondary trading platform for the first

CRM auction and have set out contingency options should this not be in place in sufficient time.

## 3.4 SUMMARY OF DECISIONS

3.4.1 The SEM Committee has decided that in addition to the market power mitigation measures set out in CRM Decision 1 (mandatory bidding, adjusting the capacity requirement- see SEM-15-103) the SEM Committee will apply the following market power mitigation measures with respect to the auctions:

- **Auction Price Cap:** All auctions will employ an Auction Price Cap, which will set a maximum price at which all Qualified Bidders may bid their Qualified Volume. The Auction Price Cap is the maximum price that the auction can clear at.
- **Other bid limits:**
  - **Non-technology specific Price-taker Offer Cap:** All Existing Generators will be required to bid their full Qualified Volume into the transitional auctions and the T-4 auctions at a price no higher than the Price-taker Offer Cap (specified in €/MW or £/MW)<sup>21</sup>, unless they apply for higher bid limit as set out below, or submit an Opt-Out Notification on the grounds that they are going to close before the end of the relevant Capacity Delivery Year. Generators which meet the criteria for new build generation will not be subject to the Price-taker Offer Cap and may bid at a price up to the Auction Price Cap.
  - **Right to apply for higher bid limit:** Where an existing generation Capacity Market Unit (CMU) is able to evidence the fact that it has higher avoidable Net Going Forward costs than the Price-taker Offer Cap, it will be able to apply to the CRM Delivery Body to be allowed to submit a higher Bid Limit– up to the level of those Net Going Forward costs. Net Going Forward cost are the avoidable costs<sup>22</sup> that the CMU needs to recover from the capacity mechanism in order to justify its continuing operation, and are net of infra-marginal rent from the energy market and the ancillary services market. The CRM Delivery Body will review the application and make a recommendation to the SEM Committee whether to accept or reject the application, and at what level of Net Going Forward Costs are reasonable for that unit. The SEM Committee may then set a Bid Limit specific to that unit for that auction, at a higher level than the Price-taker Offer Cap, at a level commensurate with its view of the unit's Net Going Forward costs. DSUs are not subject to a price-taker offer cap less than the auction price cap;
- **Sloping demand curve:** All auctions will employ a sloping demand curve, in part as a market power mitigant. The slope and positioning of the demand curve will be

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<sup>21</sup> Existing Generators will not normally be expected to compete in T-1 auctions, as they will be expected to have sold their capacity for a given Capacity Delivery year already in the T-4 auctions for that year. Where they opt out of the T-4 auction, and then opt back in at T-1 stage, they will be subject to a Price-taker offer Cap, in order to disincentivise withdrawal from T-4 auctions in favour of T-1 auctions. However, the ability to apply for a higher bid limit on grounds of Higher Net Going forward Costs will also apply to the T-1 auctions

<sup>22</sup> Net Going Forward cost does not include sunk costs, for example the cost of investments made in the past.

consulted on as part of the CRM parameters consultation, but the principles set out below will guide the setting of the parameter values.

- 3.4.2 Where a generator submits a bid to increase the capacity of an existing Capacity Market Unit (CMU) and the increment meets the criteria for New Build, the increment will not be subject to the Price-taker Offer Cap, and may be bid into the auction at any price up to the Auction Price Cap, but the existing de-rated capacity of the CMU will be subject to the Price-taker Offer Cap.
- 3.4.3 The SEM Committee is minded to use the following principles to set the slope and position of the demand curve:
- System security (Reliability) and economic efficiency:
    - Should be consistent with the security standard of maintaining the 8 hours per Capacity Delivery Year LOLE standard set out in CRM Decision 1;
    - Should, at minimum, reflect an economically efficient trade-off between price of Reliability Option and value of extra reliability<sup>23</sup>, but could be less vertical as a result of other factors set out below;
  - Competition: Should reduce susceptibility of the auction to market power (in conjunction with other market power controls);
  - Stability (price volatility):
    - Should reduce price volatility impact from small variations in market conditions and administrative parameters, including lumpy investment decisions, and demand forecast changes; and
    - Should limit the frequency of outcomes at the Auction Price Cap.
  - Practicality: Should perform well under a range of market conditions, including changes in administrative parameters and administrative estimation errors.
- 3.4.4 The SEM Committee has decided not to restrict generators who decide not to bid in the T-4 auctions from bidding in the subsequent T-1 auctions for the same Capacity Delivery Year.
- 3.4.5 The SEM Committee has decided not to put ex ante controls on the ability of any market participants from acting as Capacity Aggregators at this time. However, the Regulatory Authorities will monitor this position and may intervene if appropriate.

## 3.5 NEXT STEPS

- 3.5.1 The SEM Committee will consult on the value of a number of key market power controls parameters to be applied in the first transitional auction in the forthcoming CRM Parameters consultation. These include:
- The Auction Price Cap;
  - The Price-taker Offer Cap; and

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<sup>23</sup> Value of Lost Load x reduction in unserved energy

- Parameters that define the slope and shape of the demand curve.

## 4. AUCTION DESIGN

### 4.1 INTRODUCTION

4.1.1 There are many areas of auction design that need to be defined for the CRM. These were set out in SEM-16-010 as:

- Auction format (Simple single round sealed bid, Multiple round descending clock, Combinatorial);
- Structure of bids;
- Winner determination;
- Pricing rules (pay as bid, pay as clear, other algorithm basis);
- Dealing with discrete bids (“lumpiness”);
- Tie break rules; and
- Information and communication rules

### 4.2 AUCTION FORMAT

#### Consultation Summary

4.2.1 SEM-16-010 set out the following multi-unit auction format options, and evaluated their appropriateness for the transitional, T-4 and T-1 auctions:

- **Option 1: Sealed-bid, multi-unit auction.** Bidders simultaneously submit sealed bids for each Capacity Market Unit. The bids are then aggregated, and the clearing price at which supply equals the demand is determined. Each bidder wins the quantity that it supplied at the clearing price. The winners’ payments may be based solely upon the uniform clearing price (“pay-as-clear”), or the amount of each winning offer (“pay as bid/offer”), with some variants around these options.
- **Option 2: Multiple round descending clock auction.** The auctioneer announces prices to bidders, and bidders simultaneously submit offers indicating the quantities supplied at those prices for each Capacity Market Unit. If aggregate supply exceeds demand, then the auction proceeds to a new round of bidding, in which the price “clock” has been decreased. When a round occurs in which aggregate supply no longer exceeds demand, the auction concludes. Each bidder wins the quantity that it offered at the final price (“pay-as-clear”).
- **Option 3: Sealed bid combinatorial auction** may also be considered. Bidders simultaneously submit one or more bids, per Capacity Market Unit, with each bid consisting of a single price quantity pair for that Capacity Year. If the bidder chooses to submit multiple bids then these bids are mutually exclusive, i.e. the auctioneer cannot accept both bids for the same unit. The auctioneer then chose the optimum combination of bids to meet the capacity requirement. The winners’ payments may be based solely upon the uniform clearing price (“pay-as-clear”), or the amount of each winning offer (“pay as bid/offer”), with some variants around these options.



- 4.2.2 SEM-16-010 conducted a review of international experience of capacity auction formats and also conducted a first principles review of the formats against the key I-SEM criteria. SEM-16-010 noted the market concerns with the multiple round format (Option 2) and stated that at that juncture, the SEM Committee favoured a simple sealed bid auction format for all auctions, until such time as the SEM Committee was ready to move to co-procurement of CRM and DS3 products in a single auction.

### **Summary of response**

- 4.2.3 A mixed response was received, with the simple sealed bid format (Option 1) favoured by slightly more respondents. It was considered this was simpler, provided the fairest level of information and resulting in the lowest potential for market power abuse.
- 4.2.4 However, the multiple round descending clock format (Option 2) did receive strong support from a wide range of respondents. It was viewed this format better supported new entry and would ensure efficient market outcomes for all parties by helping to reduce the risk of ‘winners curse’ where a participant has incorrectly valued their costs. The information feedback allows parties to sense check their trading strategy and valuations before being bound. Although a small number of respondents recognised that market power concerns may outweigh the transparency of such an auction.
- 4.2.5 The auction format based on either of the above was seen as sufficient and therefore no support was given for a more complex sealed bid combinatorial auction format (Option 3).

### **SEM Committee Response**

- 4.2.6 The SEM Committee recognises that auction design needs to balance a number of objectives, including competition, efficiency, simplicity, practicality and cost. An updated summary evaluation of the three different options presented in SEM-16-010 is set out in Table 1: Pros and cons of T-4 auction formats below. The relative importance of certain criteria may vary between the first transitional auctions, the T-4 auctions and the ongoing T-1 auctions. In particular, there may be certain practical timing auction system development constraints for the first transitional auction to support a particular auction format from I-SEM go-live.

Table 1: Pros and cons of T-4 auction formats

	<b>Option 1: Simple Sealed Bid</b>	<b>Option 2: Multiple round descending clock</b>	<b>Option 3: Combinatorial auction format</b>
<b>Pros</b>	Lower potential for market power abuse, including unilateral market power and tacit collusion ( <b>competition criteria</b> )	Provides greater price discovery and transparency for bidders, which may encourage participation and: result in lower capacity prices; reduce the risk of winner’s curse ( <b>efficiency and competition criteria</b> )	Can deliver optimal solutions to lumpiness problem and a range of solutions for the transitional transmission constraints issue ( <b>efficiency criteria</b> )
	Quickest and simplest for unsophisticated bidders to participate ( <b>simplicity criteria</b> )		Consistent with format proposed for DS3 auctions ( <b>adaptive criteria</b> )
	Easy to solve and easy for an Independent Auction Monitor to validate the results ( <b>simplicity, practicality and cost</b> )		Could use same auction platform as DS3 in longer term? ( <b>practicality and cost criteria</b> )
	Relatively less complex and low cost ( <b>practicality and cost criteria</b> )		Quicker and simpler for unsophisticated bidders to participate than Option 2 ( <b>simplicity criteria</b> )
<b>Cons</b>	Does not provides price discovery and price transparency for bidders during auction, which may discourage participation and increase the risk of winner’s curse ( <b>efficiency and competition criteria</b> )	Greater potential for market power abuse, including unilateral market power and tacit collusion ( <b>competition criteria</b> ), but potential for abuse may be mitigated by market power control measures set out in Section 3	Greater potential for unilateral market power abuse than Option 1 ( <b>competition criteria</b> )
	May not deliver optimal solutions to manage exits within transitional auctions, given short term transmission constraints ( <b>efficiency</b> )	May tie up bidders for 2-3 days of auction duration, and slightly more complicated ( <b>simplicity criteria</b> )	Not clear that can be delivered for first auction ( <b>practicality / cost criteria</b> )
			Potential for “unhappy losers” ( <b>equity criteria</b> )
			Results are less transparent ( <b>simplicity, practicality</b> )
			Harder for an independent Auction Monitor to validate the results ( <b>simplicity, practicality and cost</b> )

4.2.7 The auction design needs to promote competition and should not create scope for dominant players to exercise market power, when operating in conjunction with key market power controls<sup>24</sup>. For this reason, the SEM Committee has decided against the multiple round descending clock format (Option 2). The market power concerns that Option 2 gives rise to outweigh the incremental benefit in terms of price discovery. The SEM Committee believes that the key market power concerns can be managed under either Option 1 (Simple sealed bid), or Option 3 (Combinatorial) so neither of these options should be ruled out on competition grounds.

4.2.8 The SEM Committee agrees with the majority of respondents who felt that the benefits of Option 1 (Simple sealed bid) outweigh those of (Option 3) combinatorial auction, for the CRM T-4 auctions in isolation. As set in Table 1: Pros and cons of T-4 auction formats, the key benefits of Option 1 are:

- Practicality, simplicity and cost: It is the simplest auction format to implement, and generates the most transparent results, and hence is easiest for the Independent Auction Monitor and Independent Auction Auditor to validate;
- Competition: Least potential for market power abuse. Whilst Option 1 and Option 3, which are both sealed bid formats have less potential for market power abuse than Option 2, Option 3 with its greater complexity and lower transparency, gives some potential for gaming;
- Equity: Option 1 would select bidders in rank price order to procure the required capacity<sup>25</sup>, whereas a full combinatorial auction could reject cheaper bids in favour of more expensive bids- for instance to help solve the lumpiness issue.

4.2.9 There are however some benefits to the combinatorial approach, in that it potentially gives a more efficient solution to the lumpiness problem and provides the most flexible auction platform for dealing with a range of potential solutions that could be adopted for managing entry and exit during transition. In this context, the SEM Committee recognises that:

- In the shorter term at least, there may be efficiency advantages to adopting a combinatorial approach to managing locational issues during the transition. This issue is discussed further in section **Error! Reference source not found.**
- In the longer term, if the CRM and DS3 requirements are to be jointly procured, then we will need to move to a combinatorial format (i.e. Auction Format Option 3) to be able to accommodate package bidding with a number of competitively procured products;
- Our proposed solution to the “lumpiness” problem if Auction Format Option 1 is chosen proposes, in any event, to use some elements of a combinatorial auction to solve the lumpiness problem at the margin (without rejecting fully in-merit bids)<sup>26</sup>.

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<sup>24</sup>such as the Auction Price Cap and the Price-taker Offer Cap, which can be applied to any of the designs under consideration in slightly different form

<sup>25</sup> There may be some variation to this principle at the marginal to deal with the lumpiness issue

<sup>26</sup> Only an inflexible marginal bidder can be rejected in favour of a smaller but more expensive bid

4.2.10 There are also practical considerations in relation to the timeframes required to develop the auction system for the first transitional auction in order to support the operation of a CRM from I-SEM go-live. In this context, the Regulatory Authorities are currently working with the TSOs to establish the feasibility of implementing Option 3 within the timescales required for the first transitional auction.

### SEM Committee Decision

4.2.11 The SEM Committee has decided to defer a final decision on the enduring choice of auction format for the CRM auctions until the consultation on managing locational issues in the context of transitional transmission constraints is complete (described in Section 7), and until the assessment of the feasibility of delivering a combinatorial auction format in time for the first transitional auction is complete.

### Next steps

4.2.12 The SEM Committee:

- Intends to consult separately on the issue of managing locational issues in the context of transitional transmission constraints );
- Will work with the TSOs to understand the practicality of delivering Option 3 in time for the first transitional auction.

## 4.3 STRUCTURE OF BIDS

### Consultation Summary

4.3.1 Bidding in the CRM auctions will be unit based for non-aggregated plant. SEM-16-010 set out a number of options for the format of the bids, with the key issue being whether bidders would be able to submit a single price-quantity pair, a finite set of pairs or a supply curve.

4.3.2 The bid format depends to some extent on the auction format. In the simplest form of multiple unit sealed bid procurement auctions, bidder typically submits a price at or above which they are prepared to supply a given quantity of product. By contrast, a descending clock auction has a starting volume and bidders submit an Exit Bid- as the price descends, they indicate at which price they are no longer prepared to supply that volume.

4.3.3 We have rejected the option of a multiple round descending clock auction, but in sealed bid auctions (whether simple sealed bid or combinatorial sealed bid), bidders could be allowed to:

- **Option 1:** Only submit a price quantity pair  $(P_i, Q_i)$  per Capacity Market unit  $i$ , for that Capacity Delivery year  $t$ ; or
- **Option 2:** be allowed to submit a supply curve which is a function  $Q_i(P_i)$ .

- 4.3.4 Hybrid variants of this are possible, where by bidders are allowed to submit multiple price-quantity pairs, which create a piece-wise linear supply curve function, rather than a continuous supply curve.
- 4.3.5 In SEM-16-010 we also discussed the “lumpiness problem”. Implicit in the discussion of the lumpiness problem is a presumption that bidders are allowed to declare their bids inflexible- i.e. require the auctioneer to take all or nothing of their bid, but not part of their bid volume. If bids can be declared flexible, the lumpiness problem does not exist, as the auctioneer can ensure that supply and demand balance by accepting only part of a bid.
- 4.3.6 We asked stakeholders if they had any preference for the structure of bids for the auctions.

### **Summary of Responses**

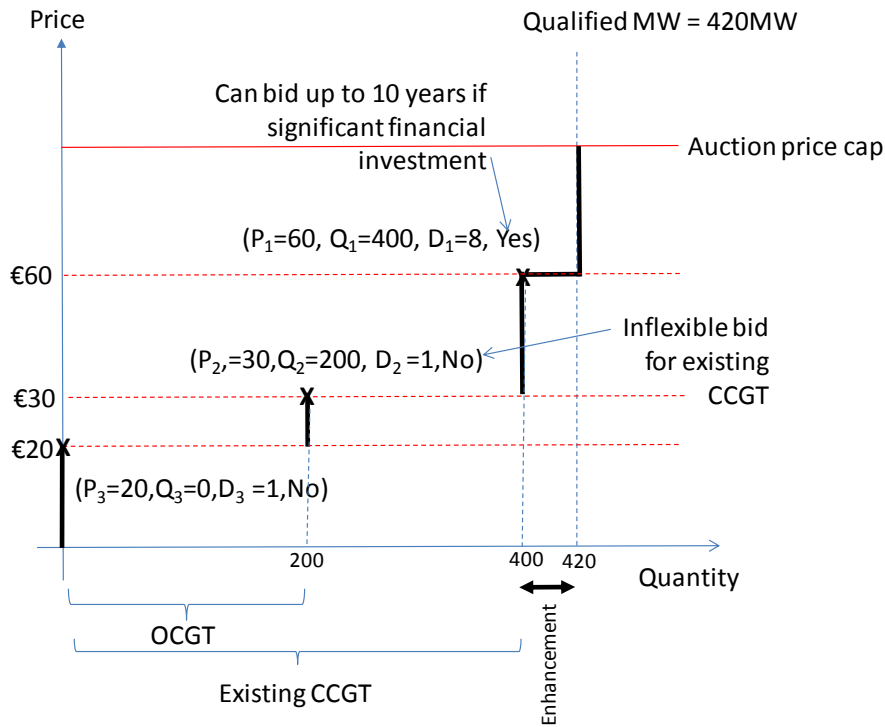
- 4.3.7 Of those respondents who commented on bid structure there was slightly more support for the supply curve structure (Option 2) than the price quantity pair (Option 1). A number of respondents supported whichever bid structure was compatible with the multiple round descending clock auction format. The supply curve structure was favoured as multiple price quantity pairs provided flexibility or allow for ‘divisible bids’ to help address the lumpiness issue. While others did not see the value in the supply curve structure and viewed it as giving scope for dominant players to exploit power.

### **SEM Committee Response**

- 4.3.8 Based on the responses received the SEM Committee is of the view that the functionality of Option 2 can be combined with the simplicity of Option 1. The SEM Committee believes a good balance between practicality and efficiency can be achieved if a hybrid option is adopted where by a bidder is allowed to submit up to 5 price quantity pairs in respect of a single CMU. These price-quantity pairs would be required to form a piece-wise linear supply curve, and be subject to the requirement that  $Q_i$  is a monotonically increasing function of  $P_i$  and the understanding that  $Q_{i+1}$  may only be accepted in the auction once  $Q_i$  is accepted. A bidder could submit a bid in the Option 1 format if it wished to (i.e. for the full capacity of its Capacity Market unit) but would have the flexibility to submit a bid in the form of a simple supply curve if it wished to.
- 4.3.9 Figure 6 below illustrates how an existing CMU which is a 400MW CCGT could use this bid structure to bid 3 different physical plant options into the auction: an enhancement in capacity of up to a total of 420MW if the price exceeds €60/kW/year; maintaining the existing capacity of 400MW if the price is between €30/kW/year and €60/kW/year; reducing the capacity to 200MW if the price is between €20/kW/year

and €30/kW/year, and bidding no volume below €20/kW/year<sup>27</sup>. An auction requirement is that all the capacity of a lower price segment must be accepted in order that any capacity in a higher-priced segment may be accepted.

Figure 6: How an existing CMU which is a 400MW CCGT could use this bid structure to bid 3 different physical plant options into the auction



4.3.10 This bid format has been chosen because it allows bidders to efficiently express their cost structures, and is flexible in that it can be used both:

- In the context of a simple non-combinatorial sealed bid format which allows the auctioneer to create and aggregate supply curve by aggregating the supply curves of individual CMUs to establish the clearing price and quantity; and
- In the context of a combinatorial auction, where the above three bids are regarded as three mutually exclusive bids (because they apply in different, non-overlapping price ranges) for the same CMU.

<sup>27</sup> Note that in this example, we have assumed that the bidder is prepared to increase its capacity by any amount between 400MW and 420MW, so the first bid pair has been declared flexible. It can only reduce its capacity in discrete units below 400MW, so the second and third bid pairs have been declared inflexible. Given the decision to give bidders the option to make a bid inflexible, and the decision to allow new build capacity to have price fix for up to 10 years, each price-quantity pair will actually have four parameters: price, quantity, a yes or no flexibility indicator; and duration). The duration bid must be 1 year for existing plant, but may be any integer between 1 and 10 for new build- see decision on contract length. In the above example, the bidder has discretion on whether to bid up to 10 years on the 400MW to 420MW segment, but not on the existing 400MW

- 4.3.11 SEM Committee has chosen to limit the number of price-quantity pairs to five, since we understand most existing multi-unit auction systems are handling that number of price-quantity pairs (i.e. on practicality grounds). However, given procurement and systems development lead times, it may be necessary to accept a smaller number of price-quantity pairs for the first transitional auction.
- 4.3.12 A requirement for the price-quantity pairs to be monotonically increasing is standard, and included to prevent gaming, and reduce complexity in solving multiple combinations.

### **SEM Committee Decision**

- 4.3.13 The SEM Committee has decided that a bidder may submit a bid comprising up to 5 price quantity pairs in respect of a single CMU. The price-quantity pairs must be monotonically increasing.
- 4.3.14 Each price quantity “pair” will have two other bid parameters:
- A duration bid, which must be 1 year in the case of existing generators, but may be up to 10 years where a substantial financial commitment is made (see Section 6.4);
  - A flexible /inflexible flag for that bid segment. The bidder may declare a price quantity pair inflexible. Where a price quantity pair is declared inflexible, the auctioneer must accept all or nothing of the bid segment relating to that pair.

## **4.4 WINNER DETERMINATION**

### **Consultation Summary**

- 4.4.1 Setting aside issues associated with bid inflexibility and system constraints, SEM-16-010 noted that in a standard simple sealed bid auction, the winner determination process is simple. Bidders submit bids (whether via a single sealed bid (Option 1) or over a number of rounds in a multiple round descending clock auction (Option 2)). The auctioneer selects the cheapest bids as the winners, with the number of winners depending on the number of units needed.
- 4.4.2 The key complexities in a simple sealed bid auction occur if bids have more than just the annual price dimension. In the case of the CRM auction, the other dimension which the auctioneer might want to take into account is Reliability Option length, given that we envisage that existing capacity will receive only one year Reliability Options, but new capacity could receive multi-year Reliability Options (e.g. up to 10 years in length, at the bidder’s option<sup>28</sup>). The issue arises in any auction where a bidder meets the criteria for new investment and opts for a price fix duration in excess

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<sup>28</sup> The bidder will need to specify the contract length when bidding- it cannot wait to see the auction clearing price and then decide what length of contract it wants

of one year (and up to ten years primarily in the T-4 auctions, but could also arise in the other auctions where, existing capacity might be competing alongside new investment. At a minimum, we will potentially be awarding different length Reliability Options to new and existing capacity, with existing capacity being awarded a one-year Reliability Option and new capacity being awarded Reliability Options of up to 10 years, in line with the minded to position discussed in Section 1.4.

- 4.4.3 The key question is whether winners should be selected on the basis of a simple comparison of annual price or, alternatively, whether Reliability Option length should be taken into account<sup>29</sup>. The simplest approach from an auction management perspective and the one that is used in ISO New England and in the GB capacity auction, which face the same “winner determination” issue, is to ignore any differences in the length of Reliability Option.
- 4.4.4 The DS3 auctions also face this issue. The SEM Committee consulted on the same “winner determination” issue in the context of the DS3 auctions (see SEM-15-105 and the accompanying paper SEM-15-105a, produced by DotEcon), where bidders may also be bidding for Reliability Options of different durations in the same auction. In SEM-15-105a, the following winner determination options were set out and explained in more detail:
- Option 1: winner determination with no adjustment, i.e. purely on a price basis, ignoring Reliability Option duration, as per the US capacity auction and the GB capacity auction approach;
  - Option 2: winner determination with a discount rate calculation. In this option, we would need to determine an appropriate discount factor, and the choice of winners could be quite sensitive to the choice of discount factor, and further work would need to be done to develop the simple example set out in SEM-15-105a;
  - Option 3: winner determination with an adjustment for Reliability Option length, such as to multiply each bid amount by a parameter equal to the bid’s Reliability Option length divided by the maximum possible Reliability Option length; and
  - Option 4: winner determination with an expectation of prices in future auctions. Such an approach might favour longer term Reliability Options, if, for instance prices were expected to rise in future auctions. This approach would be dependent upon the outcome of market forecasting and be sensitive to forecasting assumptions, and therefore subject to forecasting error.
- 4.4.5 Regardless of the approach to winner determination, the DotEcon paper proposes a uniform clearing price based on the marginal bidder with no adjustments for Reliability Option length.

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<sup>29</sup> For instance, how should a bid of €20/kW/year for a 5 year contract be compared with a contract of €19/kW/year for 10 years? Should the €19/kW/year bid always be chosen because it is the lower price bid, or should any weighting (whether positive or negative) be given to the fact that one contract entails a 5 year commitment for customers and the other a much longer 10 commitment?



4.4.6 In SEM-16-010, the SEM Committee stated that it considers Option 1 to be the most appropriate for the following reasons:

- Auction efficiency and competition: Judged purely on price offered for Capacity Delivery year, this approach will ensure efficient procurement, at least for the first delivery year (Nevertheless this approach might score less favourably on a score measuring efficiency over the whole Reliability Option horizon, since Option 2 and Option 4 would be designed to take conditions over the entire Reliability Option horizon into account).
- Simplicity, practicality and cost:
  - This approach is clearly the simplest and most transparent; and
  - It is not clear how the relevant adjustments for the other options would be implemented in practice, and how the parameters would be appropriately estimated.

### Summary of responses

4.4.7 The responses were mixed with slightly more respondents disagreeing with winners being determined purely on price offered for each capacity delivery year.

4.4.8 Those disagreeing with a price only approach wanted Reliability Option length included. A price only approach was seen as too simplistic, inefficient and discriminatory. Winner determination should fairly reflect the additional risk to consumers for taking on long term Reliability Options. Furthermore, respondents considered that a price only approach could create inefficient outcomes due to the risk to consumers of locking in Reliability Options that may not be required or preventing lower-cost new entrants from entering the market. A small number of respondents gave support for either winner determination with a discount rate calculation (Option 2) or winner determination with a multiple adjustment for Reliability Option length (Option 3). However, further consultation was requested in order to develop the methodology.

4.4.9 One respondent has consistently sought to have separate auction categories for existing plant and new entrants, and argued that if there must be a single auction then a new competition scalar applied should be applied to new entrant bid prices, and that the scalar would go some way to capturing the wider benefits of competition for consumers.

4.4.10 Those favouring a price only approach (Option 1) cited reasons such as auction efficiency, competition, simplicity, practicality and cost. Furthermore, the complexity of discounting longer term Reliability Options on an equal basis supported a price only approach as a transparent way of allowing existing and new capacity to compete on an equal footing. Some respondents evidenced the GB and the US markets whereby the length of Reliability Option is ignored and bids are accepted / rejected on the basis of price alone.

## SEM Committee Response

- 4.4.11 The SEM Committee remains convinced that Option 1 is the best option primarily on simplicity, practicality and cost grounds. This is particularly true for the transitional auctions, for which new investment (which can get a multi-year Reliability Option) whilst welcome, is not expected to be material. New entry by DSUs may be more likely, but if this does not require investment which meets the specified significant financial commitment threshold, then multi-year Reliability Options will not be available for them.
- 4.4.12 The SEM Committee notes that no capacity auction to date, that we are aware of, has fully solved this issue of how to compare single and multi-year Reliability Option other than based on a straight price comparison.
- 4.4.13 The SEM Committee notes the proposal of one respondent to introduce a competition scalar which would favour new plant in winner determination. However, the SEM Committee believes that customers' best interests are not necessarily best served if higher priced new build bids are selected in preference to lower price existing plant – with the result that customers are expected to pay the incremental cost. This is particularly the case where the customer is locked into paying this higher cost for a ten-year Reliability Option duration.

## SEM Committee Decision

- 4.4.14 The SEM Committee has decided to adopt Option 1: winner determination with no adjustment for contract length. A one-year price fix and multi-year price fix will be treated equally. If a multi-year price fix is a winner it is paid the same price in all years of the price fix.

## Next steps

- 4.4.15 The SEM Committee will consult on any additional winner determination issues in the context of locational issues as set out in Section 7 **Error! Reference source not found..**

## 4.5 PRICE DETERMINATION

### Consultation Summary

- 4.5.1 SEM-16-010 noted that different alternative payment rules may be used in a multi-unit auction, including:
- Variants of uniform clearing pricing (pay-as-clear):
    - All bidders could be paid the price of the highest accepted offer, which is the normal practice; or

- All bidders could be paid the price of cheapest rejected offer<sup>30</sup>;
  - Pay-as-bid, where each winning bidder is paid its individual offer price; and
  - Various algorithms used to determine prices for individual service in a combinatorial auction, where bidders have bid a package price for multiple services rather than a price for each service.
- 4.5.2 In the context of a standard sealed bid auction or a multiple round descending clock auction, the clearing price is typically set as pay-as-clear with the clearing price set equal to highest accepted bid<sup>31</sup>. This pricing is used in the single zone GB capacity auction, and in multiple zone US capacity auctions, where there is potentially a different clearing price in each zone.

## Summary of responses

- 4.5.3 The majority of respondents who commented on this agreed with the proposed approach of paying winners on a “pay-as-clear” basis with the price based on the highest in-merit bid.
- 4.5.4 A number of respondents proposed the last in merit bid i.e. marginal bid (whether accepted or rejected) should set the price as it represents an “unconstrained” price and that there should be a single clearing price.
- 4.5.5 One respondent argued that the clearing price should always be based on the price of the lowest rejected bid (regardless of whether the marginal bid was rejected or not). They argued that to pay the highest accepted bid was a form of “first price” auction, and that “second price” auctions, i.e. paying the lowest rejected bid have superior incentives for truthful bidding.
- 4.5.6 The consultation paper also considered whether out of merit winners should be paid a different price to in-merit winners. Most respondents disagreed with the acceptance of out of merit bids in the first instance and therefore most responses disagreed with paying different prices to out of merit winners. They considered that paying out-of-merit bids on a “pay-as-bid” basis adds complexity and reduces transparency of winner determination.
- 4.5.7 One respondent questioned whether acceptance of out-of-merit bids results in in-merit bids being constrained off and whether they would be paid the difference between the bid and the clearing price.

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<sup>30</sup> Consider the following example to illustrate the difference between the two variants of uniform clearing prices. The auctioneer wishes to buy two units, and there are four bidders who each bid 1MW. A bids €10, B bids €11, C bids €12 and D bids €13. Clearly the auctioneer is going to accept the bids A and B, but under the first variant of uniform clearing prices, it pays both A and B at €11, whereas in the second variant, it pays both A and B the price of C’s bid, €12, since C is the cheapest rejected bid

<sup>31</sup> In a descending clock format, it is typically not possible to deploy a “pay-as-bid” pricing rule, even if the auctioneer wanted to, since the auction closes before the remaining bidders have completed their bidding, and knowing that they are winners, they would no longer have any incentive to bid their true costs. Whilst a “pay-as-bid” rule could feasibly be employed in a sealed bid auction (where the full set of bids are declared at the outset)

4.5.8 One respondent proposed two alternative approaches:

- Rank all bids by price alone, accept all in merit bids (excluding the marginal bidder) and select the least cost remaining bid that matches demand. This bid will set the single clearing price of bids concerned; or
- Set the clearing price based on the marginal bid (whether accepted or not) as it represents an “unconstrained” merit order of bids based only on price. Out of merit would earn a pay as bid price.

## **SEM Committee Response**

4.5.9 As discussed above under winner determination, the SEM Committee thinks that the long term benefits of being able to accept out-of-merit bids for lumpiness reasons outweigh the potential increase in complexity, including pricing complexity.

4.5.10 The SEM Committee is of the view that it is appropriate that:

- Pay-as-clear, for all bids accepted within merit;
- Pay-as-bid for any bids accepted out-of-merit, either for lumpiness reasons or for locational issues in the context of transitional transmission constraints.

4.5.11 Pay-as-clear pricing, is generally accepted in the academic literature as economically efficient. It incentivises a reasonably high degree of truthful cost based bidding and is standard practice in most auctions.

4.5.12 Pay-as-bid models are rarely favoured in auctions for a homogenous product (such as capacity), as they are more likely to introduce inefficiency and enhance anti-competitive behaviour. However, where bids are accepted out of merit, they need to be paid their bid price, and clearly these out-of-merit bids should not influence the market clearing price.

4.5.13 There are a number of ways in which the clearing price can be calculated, including the two options set out in SEM-16-010:

- Highest accepted bid;
- Lowest rejected bid; and
- A third option- based on the unconstrained price, which was suggested by some respondents.

4.5.14 The SEM Committee does not favour setting the clearing price based on lowest rejected bid. The SEM Committee recognises that some capacity providers favour paying based on the lowest rejected bid, and notes that this is also in their self-interest as- it would maximise their revenue. It is correct that under certain circumstances paying based on highest accepted bid can incentivise a bidder to “bid-up” to what it believes will be the next highest bidder in the merit order (i.e. not bid fully truthfully). However, such an outcome relies on the bidder having a reasonably accurate estimate of the cost of the next most expensive bidder and being prepared to gamble that by inflating its bid, it will not misjudge where the next bid up in the

merit-order is, and lose out. Paying based on the lowest rejected bid is potentially economically inefficient because it can pay accepted bidders a higher clearing price than necessary<sup>32</sup> (a cost that will fall on consumers), so the SEM Committee does not favour this option. The SEM Committee notes that US and GB capacity auctions pay based on highest accepted bid prices, not the lowest rejected bid price.

- 4.5.15 As some respondents pointed out, where constraints such as inflexibility apply, it would also be possible to set the clearing price based on an unconstrained price, i.e. one which ignored the constraints. In the case of the inflexibility (lumpiness) constraint, this would mean setting the price at the bid of the marginal unit, regardless of whether the marginal unit was accepted or not.
- 4.5.16 As we discuss below, fully in-merit bids will not be de-selected for inflexibility reasons, so in the case of the inflexibility constraint, the difference between paying the highest accepted bid price and the unconstrained price is only the difference between paying the price of the marginal bid, and the price of the bid immediately below it in the merit order. In the lumpiness example demonstrated in Figure 7 below, it is the difference between paying the price of €35/kW/year, the unconstrained price, or €30/kW/year that of the highest accepted bid.
- 4.5.17 However, as we shall discuss in the forthcoming consultation on locational issues, where transmission constraints apply, the impact of the constraints on price may be more material. Some of the options under consideration mean that units which would be in-merit in an unconstrained all-island auction may not be selected, if they are on the over-supplied side of a transmission constraint. This could have a more material impact on the difference between the highest accepted bid price and the unconstrained price. For this reason, we have decided to defer the decision on the choice between highest accepted bid price and unconstrained price until the locational issues consultation.

## **SEM Committee Decision**

- 4.5.18 The SEM Committee has decided that the auction will:
- Pay-as-clear, for all bids accepted within merit, but has decided to defer a decision on how the clearing price will be calculated until it comes to a decision on the treatment of locational issues;
  - Pay-as-bid for any bids accepted out-of-merit, either for lumpiness reasons or for locational issues in the context of transitional transmission constraints.

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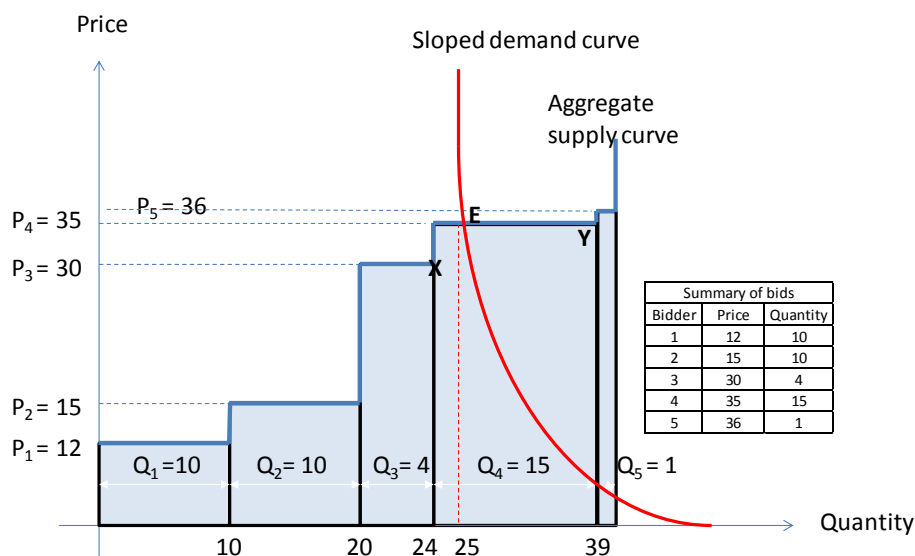
<sup>32</sup> Suppose that there happens to be a €10/kW gap between the highest accepted offer and the lowest rejected offer (which is not infeasible)- then the difference in pricing methodology could cost customers €70m in that year, for no efficiency gain

## 4.6 MANAGING LUMPINESS ISSUE

### Consultation summary

4.6.1 Capacity, particularly generation capacity is typically offered in discrete units, which reflect the typical size of unit offered by turbine manufacturers. The size of existing units is already fixed, and there are limits on the ability of new investors to vary their MWs offered. Rules are required to determine how the auctioneer copes with this problem of lumpiness / discrete units issue, where ranking bids in order from lowest to highest does not precisely equate supply and demand. The problem is illustrated in Figure 7, below which reproduces the worked example discussed more fully in SEM-16-010. In Figure 7, there are five bids all of which are inflexible, and ranked in merit order (i.e. lowest price to highest). Bids 1 to 3 are fully in-merit. Bidder 4 is the next cheapest, and is the marginal bidder, i.e. is partially in-merit and partially out-of-merit. Ideally, the auctioneer would like to accept 1 unit of Bidder 4's offer, and not accept the remaining 14 units, but cannot. Bid 5 is a smaller, but more expensive unit, and is out-of-merit, which is a better fit to the residual capacity requirement than Bid 5, if Bids 1 to 3 are accepted.

Figure 7: Example of discrete bidding and "lumpiness" problem



4.6.2 SEM-16-010 laid out a range of options as to how the auctioneer might be required to accept/reject different bids, and associated price methodologies:

- **Option 1:** requires the auctioneer to accept the marginal bid in all circumstances, i.e. to clear the auction at point Y, and does not allow the auctioneer to accept an out-of-merit offer instead;
- **Option 2:** requires the auctioneer to either accept or reject the marginal bid (under this option, the auctioneer is not allowed to accept an out-of-merit bid). The decision to accept the marginal bid could be based on either:

- Option 2a: a net welfare function calculation, which calculates whether net welfare is greater if the marginal bid is accepted or rejected; or
- Option 2b: some simpler rules based on MW tolerances, e.g. don't accept the marginal bid if the aggregate of cheaper bidders is within a specified number of MW of demand<sup>33</sup>.
- **Option 3:** allows the auctioneer to accept out-of-merit bids, based on an optimisation of either:
  - Option 3a: Least total purchase cost in €m or is €/kW-year (criteria would need to be developed to determine the minimum quantity purchased);
  - Option 3b: Net consumer welfare; or
  - Option 3c: Social welfare (consumer surplus plus producer surplus).

## Summary of Responses

- 4.6.3 The majority of respondents disagreed with the proposed principle of accepting “out of merit” bids to manage lumpiness. Their preference was that only “in merit” bids should be accepted. A few respondents suggested that “in merit” bids should be accepted in full (marginal bid) and the definition of “in merit” must be extended to accommodate lumpiness.
- 4.6.4 Most respondents disagreed with the proposed approach to manage the lumpiness issue by allowing the acceptance of out of merit bids using a net consumer welfare calculation (Option 3b). In general, most respondents preferred lumpiness to be managed by accepting the marginal bid (Option 1) and thereby not creating a situation of “unhappy winners” and “happy losers” meanwhile consumers benefit from a higher standard of security of supply.
- 4.6.5 The main concern with option 3b was the risk and uncertainty around the acceptance of out of merit bids and potential rejection of those in merit and the introduction of undue discrimination. Other concerns were that the price would be depressed by the rejection of marginal bids, new entry would be discouraged, the market would be distorted and there doesn't appear to be international precedents in capacity auctions. Furthermore, there were concerns around the greater complexity causing a lack of transparency with potential gaming opportunities. It was also suggested that social welfare would be more appropriate than net consumer welfare.
- 4.6.6 One respondent considered option 1 was the only option consistent with SEM CRM 1 decision regarding 8 hour LOLE. A few respondents supported either accepting or rejecting the marginal bid (Option 2 and 2a). Alternatives suggested include partial acceptance of offers, allowing divisible bids, flexing the capacity requirement to ensure all or nothing acceptance or accepting the marginal bid within a tolerance band and manage discrepancies in T-1 auction.

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<sup>33</sup> In the above example, if a volume tolerance of 1MW is allowed, the auctioneer is allowed to accept only Bids 1 to 3, for a total of 24MW at a price of €30/MW- a cost to the consumer of only  $24,000 \times 30 = €0.72m$ , a saving of nearly 50%, for being 1MW short of equating supply with demand

## SEM Committee Response

- 4.6.7 The issue is closely tied to the choice of Auction Format, and a different solution might be appropriate in the case of Auction Format Option 1 (Simple sealed-bid, multi-unit auction) vs. Auction Format Option 3 (Sealed bid combinatorial auction). The final choice between these Auction Format options will be made as part of any decision on managing locational issues in the context of transitional transmission constraints. The SEM Committee therefore defers a final and detailed decision regarding lumpiness to be part of that decision.
- 4.6.8 However, in either case, the SEM Committee favours a principle of evaluating total social welfare (Net Consumer + Producer Welfare) as this is the appropriate measure of market efficiency, and market efficiency is a key evaluation criterion. Accordingly, in the event that Auction Format Option 1 is chosen, the SEM Committee favours Lumpiness Option 3c, with the proviso that fully within merit bids should not be rejected. An evaluation of social welfare would then be made to determine whether or not to accept the marginal bid, or to accept one or more out-of-merit bids. Specifically, if the marginal bid is inflexible, and not required in its entirety, then auctioneer will use an evaluation of social welfare to choose whether to accept the marginal bid in entirety, accept out-of-merit bids instead, or reject all marginal and out-of-merit bids.
- 4.6.9 In the event that Auction Format Option 3 is chosen, the auction will have an objective of maximising total social welfare, subject to lumpiness and other constraints.
- 4.6.10 The SEM Committee thinks there is sufficient efficiency/ welfare at stake to reject the option of always accepting the marginal bid (Lumpiness Option 1) or only accepting or rejecting the marginal bid (Lumpiness Options 2a and 2b). The SEM Committee sees this issue as important in the context of a small system like the all-island system, where a single CMU can be relatively large in relation to the overall system size.
- 4.6.11 The SEM Committee favours a total social welfare approach (producer plus consumer surplus) rather than just consumer surplus because:
- Welfare economics tells us that we should be seeking to maximise social welfare;
  - Using only consumer surplus can create distortions and perverse results. An example of this is included in Appendix B.
- 4.6.12 Consumer surplus will be defined in formulae in the Capacity Market Code, and is the amount of welfare that customers derive from a good or service in excess of what they have to pay for it. The amount of welfare they derive will be defined with reference to the demand curve- the demand curve is assumed to be an accurate representation of the amount of capacity consumers wish to procure, as a function of the price of capacity. Producer welfare is defined as the price that producers (in this case capacity providers) receive for the good/service in excess of the price at which they are prepared to provide it. The price at which they are prepared to provide it is defined by the supply curve.



- 4.6.13 The SEM Committee notes some US capacity auctions allow the auctioneer to accept an out-of-merit offer.
- 4.6.14 However, if the combinatorial elements of either Auction Format Option 1 with Lumpiness Option 3c or Auction Format Option 3 cannot be implemented in auction systems in time for the first auction, Option 2 could be employed on a temporary basis. Nevertheless, this would be a variant based on evaluation of social welfare.
- 4.6.15 The SEM Committee rejected the option which would allow fully in merit bids to be rejected for lumpiness reasons (using a fully combinatorial approach) because:
- It could lead to smaller in-merit CMUs being rejected in favour of bigger CMUs, where for instance, the marginal bid is a larger unit and the smaller unit is not required if the larger unit is accepted. The SEM Committee considers this inequitable and not justified by the level of potential efficiency/customer welfare benefits (see Appendix A).
  - It increases the number of potential combinations that need to be evaluated with the risk that the optimal solution cannot be discovered in an acceptable timeframe.
- 4.6.16 The SEM Committee notes that the lumpiness issue only arises if the marginal bid is inflexible. Where the marginal bid chooses to make itself flexible, it cannot be rejected in favour of a more expensive bid. If it is prepared to be flexible on volume, a more expensive bid cannot deliver higher social welfare. The SEM Committee therefore does not consider it inequitable to reject the inflexible marginal bidder in favour of a smaller but more expensive unit, which is a better fit to the residual capacity requirement, as the “unhappy loser” is only unhappy because it has declared itself inflexible.

## **SEM Committee Decision**

- 4.6.17 The SEM Committee has decided that:
- The approach taken will be dependent on the auction format and method of managing locational issues to be chosen. In either case the approach will be based on a principle of evaluating total social welfare (Net Consumer + Producer Welfare):
  - Under Auction Format 1 (Simple sealed-bid, multi-unit auction): If the marginal bid is inflexible, and not required in its entirety, then auctioneer will use an evaluation of social welfare (Lumpiness Option 3c) to choose whether to accept the marginal bid in entirety, accept out-of-merit bids instead, or reject all marginal and out-of-merit bids.
  - Under Auction Format 3 (Sealed bid combinatorial auction): the auction will have an objective of maximising total social welfare, subject to lumpiness and other constraints.
- 4.6.18 This decision is subject to proviso that if it will not be possible to implement the approach chosen in time for the first transitional auction, then it may be necessary on practicality grounds to have a temporary solution, in particular if the combinatorial aspects of the solution cannot be implemented in time.

- 4.6.19 If the above solution cannot be implemented in time for the first transitional auction, the SEM Committee may accept a solution which only considers whether to accept or reject the marginal bid based on social welfare.

## 4.7 TIED BIDS

### Consultation Summary

- 4.7.1 Auctions typically need tie break rules to choose between tied bids<sup>34</sup>, where two bidders have submitted the same bid price. This problem most commonly occurs where Price-taker Offer Caps apply at the same level to many bidders, and a number of bidders bid at or just below the cap.
- 4.7.2 For instance, in ranking bids with the same price, the GB capacity auctions used the following rules to do the following:
- Rank exit bids from highest to lowest capacity (so that higher capacity bids exit first), and if still some of equal price and capacity;
  - Rank from shortest to longest duration (so that shorter duration bids exit first), and if still some of equal price, capacity and duration;
  - Apply random selection (each bid when entered is automatically assigned a random number).
- 4.7.3 Logically, it would make sense to use the net welfare function to rank bids, and it is not clear that the highest capacity bid will always have a higher net welfare than a lower capacity bid or vice-versa. However, using the net welfare algorithm may be more computationally intensive.

### Summary of Responses

- 4.7.4 Most respondents proposed the use of tie break rules which are based on net welfare calculations for marginal units. It was also proposed that tied bids should be decided upon by ranking Reliability Option length, however some favoured the shortest Reliability Option length being chosen while others had a preference for longer term Reliability Options or new entrants winning any tie-break.
- 4.7.5 Other proposals include the use of the GB approach, rank in unit size with smallest unit winning or accept the tied bid whose combination most closely matches the demand curve.
- 4.7.6 It was also commented that whichever approach is adopted there should be a detailed transparent systematic approach.

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<sup>34</sup> Choosing between tied bids only matters where one of them may be the marginal bid

4.7.7 It was also pointed out that EEAG guidelines require that renewable energy sources should be given either equal or preferential treatment to non-renewable energy, and it was further argued that preference should be given to renewable sources in the event of a tie.

### **SEM Committee Response**

4.7.8 The SEM Committee recognises that the EEAG guidelines require that renewable energy sources should be given either equal or preferential treatment to non-renewable energy. Given the clear policy goals of the governments of Ireland and Northern Ireland, the SEM Committee considers that in the event of a tie on price, renewable energy capacity providers and demand reduction<sup>35</sup> should be given preference over conventional non-renewable generators.

4.7.9 The SEM Committee agrees that there should be a systematic approach, and that the use of random numbers should be avoided if at all possible.

4.7.10 The SEM Committee proposes to use the following criteria in order to rank bids, in the event of a tie on price:

- Renewable generators and demand side units which are not backed by conventional thermal generation should be given preference over conventional non-renewable generation;
- Social welfare (based on the same algorithms as used to solve the lumpiness problem). Using social welfare as the first criteria promotes efficiency and there is also value in maintaining consistency of solution across lumpiness and tied bids. Note that if prices are tied, social welfare will be a function of MW offered, whether a larger unit of smaller unit is the best fit to the remaining capacity gap, so we do not propose to make size on its own a criterion;
- Shortest Reliability Option required- which entails a shorter commitment of behalf of customers. As discussed in section 4.4, whilst winner determination processes will not take account of contract length, we are keen to avoid the last resort of using random selection if at all possible; and finally
- Random number. This is the last resort, and would be rarely applied in examples where bids were alike in all material respects.

4.7.11 The SEM Committee recognises that if, following the locational issues consultation, the auction format changes, including to a full combinatorial auction, then:

- Other factors such as location will be taken into account; and
- A full combinatorial approach does not rely on ranking bids in the same way, and combinations are picked which optimise social welfare, but otherwise the same principles should be used to determine between units of the same price and size.

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<sup>35</sup> Not including demand reduction which is backed by conventional thermal generation

## SEM Committee Decision

4.7.12 The SEM Committee has decided that in the event of a tie on price, assuming auction format Option 1 is adopted, bids will be ranked in order of:

- Renewable generators and demand side units which are not backed by conventional non-renewable generation;
- Social welfare;
- Shortest Reliability Option required; and finally
- Random number.

4.7.13 This approach may need to be tailored, if a full combinatorial auction approach (auction format option 3) is adopted following the locational issues consultation.

## 4.8 INFORMATION AND COMMUNICATION POLICIES

### Consultation Summary

4.8.1 Information and communication rules and policies need to be appropriately designed to limit the potential for the abuse of unilateral market power / gaming by individual bidders and to limit the potential for collusion amongst groups of bidders. The rules and policies relate to:

- Information policies: What information the auctioneer should provide to bidders and winners:
  - Before qualification;
  - Between qualification and the start of the auction;
  - Between rounds in the case of a multiple round auction; and
  - After the end of the auction that might be of use to bidders in subsequent auctions or in the secondary market.
- What an individual bidder should be allowed to disclose publicly or to any other bidder before, during or after the auction.

#### Information provided before qualification

4.8.2 Before the close of the qualification process for a given auction, the CRM Delivery Body will announce an estimate of the key auction parameters including:

- How much capacity has already been procured for the relevant Capacity Delivery year(s), if relevant;
- The demand curve function, or the amount of capacity to be procured in the auction (if there is to be a vertical demand curve);
- The Auction Price Cap and other Bid Limits;
- Capital expenditure thresholds which define the boundary conditions for new, upgraded (if relevant) and existing capacity; and
- Key auction dates.

- 4.8.3 This information will assist new capacity providers to decide whether to enter qualification for the auction, and will assist capacity providers who have discretion over what volume to bid, to decide how much volume to seek to qualify.

#### Between qualification and start of the auction

- 4.8.4 Having received qualification bids, the CRM Delivery Body will run the qualification process, and determine how many MW of each Capacity Market Unit has qualified.
- 4.8.5 Before the start of the auction, the CRM Delivery Body will then provide an updated demand curve function. This demand curve function may be updated, for, inter alia:
- Changes to demand forecasts;
  - Volumes opted out of the auction, but not retiring i.e. any existing generators who have exercised their discretion not to qualify the number of MW consistent with their centrally determined derating factors; and
  - Competition considerations-e.g. if there are significant changes in estimated market power resulting from retirements or new entry notified during the qualification process.
- 4.8.6 There is then a question as to whether the CRM Delivery Body should tell bidders the total MW of capacity that qualified for the auction. If they are told the total MW qualified they can work out the excess of supply over demand, and work out whether they are pivotal or not.
- 4.8.7 In the GB 2014 T-4 auction, the auctioneer provided the aggregate level results of the qualification process, and showed the number of Capacity Market Units qualified and the breakdown by technology. In GB, these results demonstrated that there was strong competition, therefore publishing the results may have demonstrated that there was strong competition and served to incentivise bidders to bid their true costs.
- 4.8.8 In the I-SEM there is expected to be an excess of existing capacity over the procurement requirement for the transitional auctions and the first T-4 auction, so publishing results may incentivise cost reflective bidding. However, in the I-SEM there are not many generating units, and publishing the same level of detailed breakdown (for instance by technology and fuel type) may allow bidders to infer information about individual bidders.

#### At end of auction

- 4.8.9 At the end of the auction (regardless of format), all bidders have to be told the clearing price, and the MW of Reliability Option they have won on each of their qualified Capacity Market Units. The volumes won on each Capacity Market Unit do not necessarily have to be publicly disclosed, but we would propose to do so, on grounds of:
- General transparency; and

- Aiding secondary trading<sup>36</sup>.

#### Restrictions on bidder communications

4.8.10 The SEM Committee may consider putting in place rules which prevent a bidder:

- Giving an explicit or tacit signal of what price it is going to bid in the auction (and therefore signalling what price others should bid to co-ordinate withdrawal), whether before during or after the auction. Even disclosing bidding activity after the auction may signal intent in subsequent auctions; and
- From making public statements of their expectation of the auction clearing price, which can be regarded as signalling what they are going to bid themselves.

4.8.11 Communication rules should not prevent Capacity Aggregators agreeing with their clients at what price their capacity should be bid into the auction.

### Summary of Responses

4.8.12 In general, it was viewed that the overall information and communication policies needs to maintain a level playing field and support market power mitigation, auction design and efficiency without undermining them. It was also considered that the balance of information should be monitored by the Auction Monitor including consideration of competition law.

4.8.13 In terms of specific information provided there was broad agreement of the proposed information for the various stages throughout the auction process, as set out in the consultation paper. Comments or specific details provided by respondents which are additional to the information proposed in the consultation are reflected below.

#### Information provided before qualification

4.8.14 The TSOs consider the qualification criteria and rules, including dispute resolution, and all information related to the product should be known and made public to enable a capacity provider to reasonably value the risk associated with the product over the product lifetime. In their view, this would exclude any forecast information on the reference markets or strike price indices as it would be the responsibility of the capacity provider to assess the likely evolution of these.

4.8.15 In addition to the consultation paper specific mention was made to the publication of net CONE and auction dates with sufficient lead time.

4.8.16 A range of respondents requested the maximum information be provided to prepare bids and to support the auction producing efficient outcomes, while on the contrary, one respondent requested the minimum amount of information be released due to market power concerns.

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<sup>36</sup> If secondary trading is supported by intermediaries such as an exchange, bulletin board or broker then market participants who wish to trade can discover who the other players are via the intermediary, but if trading is not supported by intermediaries, then it helps to know who the other potential trading counterparties are

#### Between qualification and start of the auction

- 4.8.17 Following the qualification process but prior to the submission of offers, an assessment of various market power related metrics may need to take place and each capacity provider should be informed of any bid limits that would apply to their unit(s) and any other associated information that may influence their offer.
- 4.8.18 There were very mixed views as to whether the CRM Delivery Body should tell bidders the total MW of capacity that qualified for the auction. A small number of respondents specifically mentioned their preference for publishing total qualified capacity, while one respondent went further by wanting publication of total excess capacity, a breakdown of qualified existing capacity, new capacity and DSUs along with total installed and de-rated capacity.
- 4.8.19 Contrary to this a range of respondents requested the minimum amount of information be released due to market power concerns. Suggestions for publication of qualification results included the publication at an aggregate minimal detail, total de-rated capacity of qualified participants without a breakdown of technology, fuel or new entrant.

#### At end of auction

- 4.8.20 Again a mixed response ranging from a minimum amount of information being released to a summary of the auction being published including all key summary information of the auction process e.g. qualified volumes, capacity requirement, clearing price through to as much information as possible being published including the identity of the winning capacity.

#### Restrictions on bidder communications

- 4.8.21 A number of respondents gave explicit support for the restrictions proposed in the consultation paper. In comparison a small number of respondents did not see the need for the SEM Committee to place additional rules on bidder communications because existing competition law already restricts bidder communication sufficiently together with REMIT which provides a clear framework on behaviour.
- 4.8.22 Some respondents had strong views that additional rules are necessary to prevent communication across bidders and should be enforced in order to address any market power abuse. Rules preventing public announcements of clearing price expectations appeared sensible.
- 4.8.23 One respondent suggested that individual plant of dominant participants should be forced to bid individually, with communication restrictions.
- 4.8.24 It was considered that the Regulatory Authorities bid limits could have the same effect as setting a price expectation. However, bidder communication rules should not limit announcements on plans for capacity retirement or life extension.

- 4.8.25 There was agreement that communication rules should not prevent Capacity Aggregators agreeing with their clients at what price their capacity should be bid into the auction

### **SEM Committee Response**

- 4.8.26 The SEM Committee notes the broad agreement of the proposed information for the various stages throughout the auction process, as set out in the consultation paper, and notes the general agreement that information and communication policies should be clearly defined at the outset.
- 4.8.27 The SEM Committee agrees that all information related to the product should be known and made public to enable a capacity provider to reasonably value the risk associated with the product over the product lifetime, and believes that this was generally set out in the CRM 3 Consultation document (SEM-16-010). Since a bidder's view of the likelihood of scarcity and hence Reliability Option value will be informed by the volume of retirements, and of potential new build, the SEM Committee has decided to announce the volume of qualified de-rated capacity after the Qualification process is complete, and before the auction. This announcement can be expected to enhance competition level the playing field between large portfolio generators, who will have knowledge of their own retirements and new build, and small non-portfolio bidders.
- 4.8.28 The SEM Committee agrees with the TSOs that this would exclude any forecast information on the reference markets or strike price indices as it would be the responsibility of the capacity provider to assess the likely evolution of these.
- 4.8.29 As discussed in Section 3 the SEM Committee intends to take a conservative approach to controlling market power initially, particularly in the first transitional auctions. Accordingly, the SEM Committee intends to place additional rules on bidder communications and other forms of market manipulation in the Capacity Market Code.
- 4.8.30 The SEM Committee rejects the idea that individual plant of dominant participants should be required to bid individually with communications restricted. This is impractical and would impose unnecessary cost, since valuing certain elements of the Reliability Option may require some of the skills and data generally held in a centralised trading function. These bidder communication rules should not limit announcements on plans for capacity retirement or life extension or other types of communication that a quoted company might ordinarily communicate to the stock market (the same rules will apply to all bidders, regardless of whether quoted or not).
- 4.8.31 The SEM Committee notes that given that the option of a multiple round descending clock format has been rejected, policies related to communication between rounds of an auction is not relevant.



## **SEM Committee Decision**

- 4.8.32 The SEM Committee will require the CRM Delivery Body to announce the amount of aggregate de-rated capacity Qualified for the relevant auction after the Qualification process is complete, and before the auction.
- 4.8.33 In other regards, the information and communication policies will follow the approach set out in the CRM 3 Consultation (SEM-16-010) and summarised above in paragraphs 4.8.1 to 4.8.11 .

## 5. AUCTION GOVERNANCE, ROLES AND RESPONSIBILITIES

### 5.1 INTRODUCTION

5.1.1 Clear and transparent governance arrangements and allocation of roles and responsibilities are important to ensure that the I-SEM capacity market provides a stable and adaptable framework that protects consumers' interests, delivers competitive outcomes and ensures long run market confidence. The governance arrangements will be set out in the new Capacity Market Code (CMC). Strong regulatory oversight of the auction process will be assured, through a robust market monitoring function as well as through an independent Auction Monitor to oversee and monitor the operation of the capacity auction. Finally, an ex-post CRM Market Audit will ensure that the CRM Auction and the operation of the TSOs as CRM Delivery Body as set out in I-SEM Roles and Responsibilities Paper (SEM-15-077), have complied with the Capacity Market Code and its Agreed Procedures. The CMC will provide a robust modification process to facilitate necessary changes to the CMC, in furthering the objectives of the CMC as laid out therein. A dispute resolution process will also be detailed in the CMC. In this section we set out our proposals for:

- The legal and governance framework for the auctions which will be set out in the CMC
- A mechanism to deal with all CMC (including CRM auction related) disputes arising which will be contained within the text of the CMC;
- The CMC modification process;
- The key roles and responsibilities associated with qualification<sup>37</sup> for the auctions, and conducting the auction, including:
  - The role of the TSOs as CRM Delivery Body, which should not depart from SEM-15-077;
  - The role of the Auction Monitor and of the CMC Auditor;
  - The role of the SEM Committee / Regulatory Authorities; and
- Managing Conflicts of Interest.

### 5.2 AUCTION LEGAL AND GOVERNANCE FRAMEWORK

#### Consultation Summary

5.2.1 In previous Decision Papers, the SEM Committee set out its decision on the institutional arrangements that will underpin the new CRM. Specifically, this set out that we will implement a rules based model for the detailed terms that cover the settlement of Reliability Options within the Trading and Settlement Code. These detailed terms will be captured within a Capacity Market Register required to be maintained by the TSOs under the Capacity Market code. The TSOs' licences will

<sup>37</sup> called pre-qualification is some previous documents

include a condition requiring them to enter into and at all times to administer and maintain in force the Capacity Market Code.

5.2.2 The Capacity Market Code will specify the process by which capacity providers can qualify to take part in the capacity auction and gain a Reliability Option. The Capacity Market Code will set out the detailed rules for:

- Eligibility and de-rating rules;
- Roles and responsibilities, including that of the TSOs as CRM Delivery Body and Auction Monitor;
- Auction Qualification;
- The operation of the Capacity Market Auction;
- The key terms and conditions of the Reliability Option (with the exception of settlement terms contained with the TSC);
- The obligation on the TSOs as CRM Delivery Body to maintain a Capacity Market Register and make data available as required to support settlement, and to support secondary trading; and
- Implementation Agreements.

5.2.3 The Capacity Market Code will set out the following with respect to the operation of the CRM auctions:

- The content of any relevant Agreed Procedures, which will form part of the CMC and must be approved by the SEM Committee as part of the approval process of the CMC.
- The governance of the auction timetable, including:
  - How long before the start of each auction the qualification window opens, and closes and when results will be published
  - How long before each auction, key auction parameters will be published
- Detail on the operation of the capacity auction;
- Rules for qualification to bid in the capacity auction;
- Rules for disqualification from future bid submission;
- Capacity auction format;
- Format of bids in the capacity auction;
- Capacity auction clearing and pricing rules;
- Publication of capacity auction results;
- Rules governing the capacity auction suspension or cancellation;
- Prohibition on market manipulation;
- Prohibition on other unreasonable business methods; and
- Role of the Auction Monitor and Capacity Market Auditor. The Capacity Market Code will also have to contain *inter alia* the key auction parameters determined by the SEM Committee from time to time, such as the amount to be purchased, and if relevant, the Auction Price Cap, the Auction Bid Limits and the slope and points of the demand curve;

5.2.4 The Auction Agreed Procedures will contain operational detail relating to:

- Instructions on using the auction system, including qualification systems, if relevant. Alternatively, these instructions could be included in a separate IT user guide;
  - Where to access the relevant forms to be completed by applicants as part of the Qualification process and relevant file formats for the application and such additional information as may be required; and
  - Detail on any other processes and procedures which may be discovered to be required during the preparation of the CMC text.
- 5.2.5 All of these elements will be part of the CMC either as main text or as Appendices or Agreed Procedures as is done in the SEM Trading and Settlement Code. The final CMC will be approved and designated by the Regulatory Authorities prior to its implementation.

## Summary of Responses

- 5.2.6 Respondents were invited to provide comment on the proposed governance arrangements. Common themes that emerged included the need for any arrangements to be transparent, clear and streamlined.
- 5.2.7 A small number of participants expressed concern that the CMC and TSC are being proposed under separate frameworks.
- 5.2.8 There was comment from a small number of respondents that the rules development of the CMC needs to be made more visible and accelerated.

## SEM Committee Response

- 5.2.9 The SEM Committee is of the view that there are a number of key reasons for having capacity market rules incorporated within a Capacity Market Code, separate from the Trading and Settlement Code:
- Governance, including modifications process: The SEM Committee is seeking to implement different governance arrangements in the Capacity Market code from those in the Trading and Settlement Code. In particular, the Capacity Market code processes will enable the SEM Committee to make CMC modifications within tight timescales to incorporate the lessons learned from T-1 and T-4 auctions. Importantly, the SEM Committee must be able to ensure that lessons learnt from an auction, are incorporated whenever possible in time for the next auction. With T-1 auctions and T-4 auctions not necessarily happening at the same time each year, there may be limited time to ensure that changes are made in time for the next auction. This is particularly the case with the transitional period. For this reason, the SEM Committee has decided that different governance arrangements are appropriate with respect to a Capacity Market Code.
  - Different parties: The requirement to become a party to the agreement will be substantially different between the two codes. Everyone who wishes to trade energy in the I-SEM will need to be (and licensees will be obliged to be) a party to the Trading

and Settlement Code. However only capacity providers, or those planning to provide generation capacity will need to be parties to the CMC. It is expected that all generation licence holders will be obliged to become parties to the CMC and to apply for qualification for the capacity auction (even those who subsequently opt out of participating).

- **Code objectives:** The Capacity Market Code and the Trading and Settlement Code have different objectives.

5.2.10 The SEM Committee has therefore decided to proceed with governance arrangements set out in the consultation document and summarised above.

5.2.11 A detailed Heads of Terms of the Capacity Market Code has been developed by the RAs consistent with the decisions issued in CRM Decisions 1, 2 and 3. This detailed Heads of Terms will be issued to TSOs to inform the development of the Capacity Market code through the Rules Working Group. A “plain English” version of the Capacity Market Code Heads of Terms will be issued publicly in advance of the July Rules Working Group. The SEM Committee will be consulting on the full Capacity Market Code in Q4 2016.

5.2.12 The SEM Committee will seek to manage differences between the Capacity Market Code and the Trading and Settlement Code during development and through subsequent change control processes (in particular relating to structure, approach and definitions). The SEM Committee will also place appropriate obligations on other parties (e.g. CRM Delivery Body, CRM Auditor) to help identify and manage consistency issues.

## SEM Committee Decision

5.2.13 The governance arrangements for the Capacity Market Code will be as proposed in the CRM 3 Consultation Paper, and summarised above in paragraph 5.2.1 to 5.2.5 above.

## 5.3 DISPUTES

### Consultation Summary

5.3.1 We are considering whether an independent Dispute Resolution Process should be developed as part of the Capacity Market Code, in the same way that a dispute resolution procedure is captured within the text of the existing TSC for SEM. The purpose of this would be to resolve disputes between parties to the Capacity Market Code regarding any of the obligations, rules and procedures of the TSOs as CRM Delivery Body set out under therein<sup>38</sup>.

<sup>38</sup> These could relate, for example, to processing of qualification applications by the TSOs as CRM Delivery Body

- 5.3.2 Rules governing any proposed Dispute Resolution Process would be set out in the Capacity Market Code. The objectives of such a process will be comparable (to the extent possible) to that of the TSC, and may include but would not be limited to:
- Preserve or enhance the relationship between the Disputing Parties;
  - Resolve the Disputes on an equitable basis in accordance with the Capacity Market Code and its objectives;
  - Allow for the continuing and proper operation of the Capacity Market Code having regard to its objectives;
  - Take account of the relevant skills and knowledge required; and
  - Encourage resolution of Disputes without formal legal representation or reliance on legal procedures.
- 5.3.3 We considered whether a panel of experts would be nominated, a subset of which would form a Dispute Resolution Board to hear disputes with a chairperson of the panel appointed by the RAs<sup>39</sup>. We considered how the respective roles of the Disputes Panel and the Regulatory Authorities can best be exercised in the review of any determinations of the CRM Delivering Body in order to strike the appropriate balance between efficiency and equity within the legal framework that the I-SEM will operate in<sup>40</sup>.

## Summary of Responses

- 5.3.4 We asked respondents to comment on the Capacity Market Code dispute process, specifically whether the process should be similar to that for TSC disputes and if a separate panel should be set up to manage the process.
- 5.3.5 This question did not attract a large response rate but the majority of comments received stated that the dispute resolution process should be similar to that used for TSC. Reasons given to justify a counter position included the different aims of the CMC and TSC, therefore suggesting that distinct processes need to be maintained.
- 5.3.6 There was no clear consensus amongst respondents regarding whether a separate panel should be set up. Some suggested that a single panel would promote efficiency and consistency. The possibility of a combined dispute resolution process across CRM and DS3 was also suggested.
- 5.3.7 One respondent set out a list of possible criteria that the SEM Committee could use when deciding how to resolve disputes, which included:
- Assessing whether a specialist panel is required;

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<sup>39</sup> Members of the CRM Code disputes panel may or may not comprise those who were appointed to hear disputes with respect to the TSC.

<sup>40</sup> In the GB Capacity Market, an appeals mechanism to Ofgem was provided for in legislation. Given the contractual nature of the I-SEM Capacity Code a disputes panel and potentially some form of review process by the RAs of Delivery Body decisions is likely to be more appropriate.

- Assess whether the mix of skills needed sufficiently overlaps with existing TSC panel; and
- Assess whether an existing panel would benefit from the experience of making up the panel for CMC dispute resolution.

## **SEM Committee Response**

- 5.3.8 The SEM Committee considers that it is appropriate to include a separate Disputes Resolution Process within the Capacity Market Code. The process should comply with the objectives set out in the CRM 3 Consultation Paper and reproduced above.
- 5.3.9 The Capacity Market Code disputes resolution process should seek to minimise delays to auction timetables. Nonetheless, in developing the Capacity Market Code disputes resolution process, the SEM Committee is of the view that differences between the CMC and TSC dispute resolution process should be minimised to the extent possible. Nonetheless, the dispute resolution processes with respect to both the TSC and the CMC must operate with reference to their respective code objectives.

## **SEM Committee Decision**

- 5.3.10 The SEM Committee considers that it is appropriate to include a separate Disputes Resolution Process within the Capacity Market Code. The process should support the objectives set out in the CRM 3 Consultation Paper and the objectives of the CMC.
- 5.3.11 The CMC will set up a CMC Disputes Resolution Board, which will run independently of the TSC Disputes Panel but may or may not contain a similar membership.

## **5.4 CAPACITY MARKET CODE MODIFICATION PROCESS**

### **Consultation Summary**

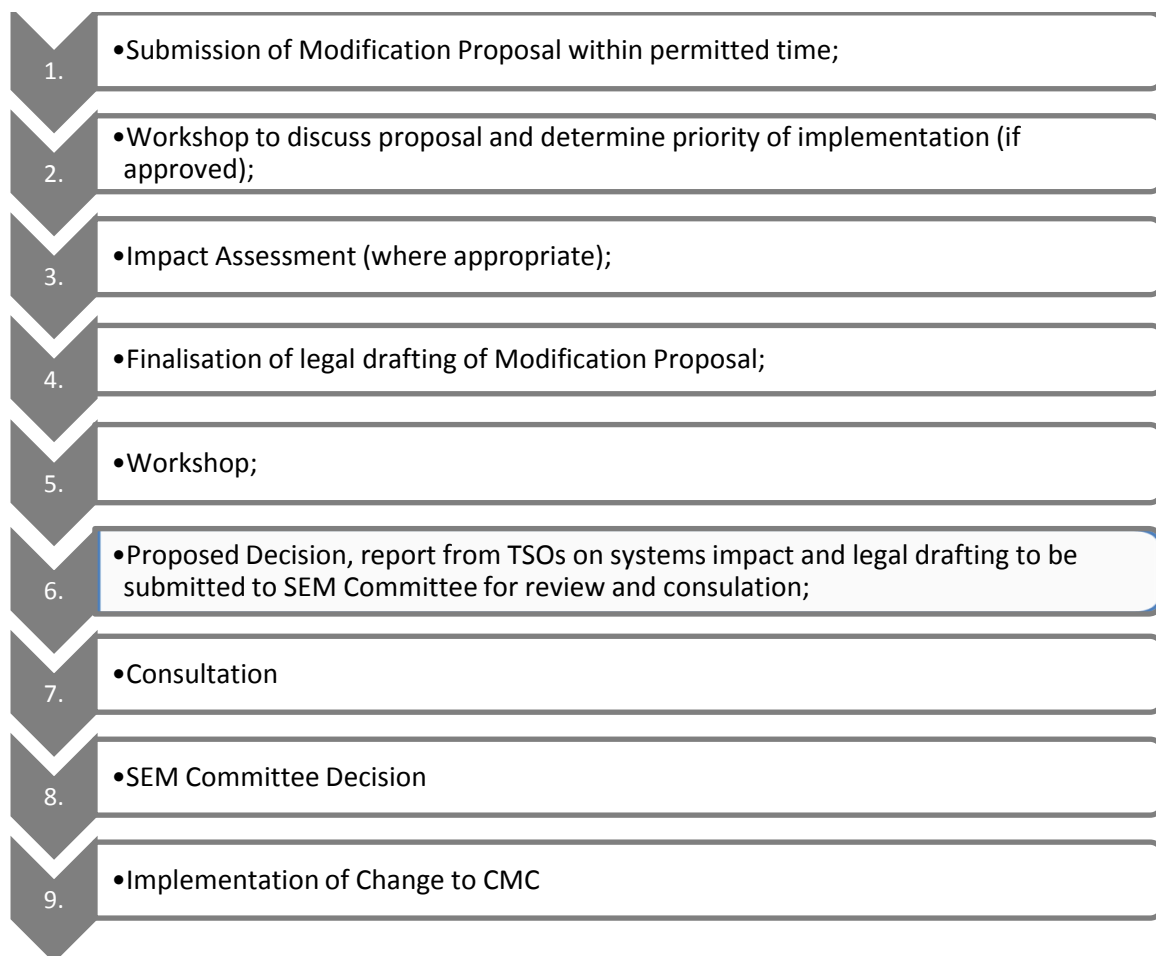
- 5.4.1 Modification Proposals to amend the Capacity Market Code may arise from consideration of the performance of the operation of the qualification and auction process and, if possible and appropriate, should be implemented before the start of the process for the next relevant auction.
- 5.4.2 Given that the CRM auction process will take place on an annual basis, the Regulatory Authorities are of the initial view that the timeline for changes to the CMC must run to a more precise timeline than that provided for the Modification Proposals to the existing Trading and Settlement Code.
- 5.4.3 Furthermore, given that a prudent level of regulatory oversight of the qualification and auction process is anticipated to be necessary, the Regulatory Authorities are

minded to use a different process to develop Proposed Modifications of the Capacity Market Code than the process currently used with respect to the TSC.

5.4.4 The initial process to define for the modification process is who should be able to raise proposals. We consider that it would be appropriate, in a similar manner to the existing TSC, that Modification Proposals to the Code be proposed by any person including the TSOs as CRM Delivery Body (and Market Operator) and the Regulatory Authorities.

5.4.5 As Modification Proposals may need to be implemented before the start of the process for the next relevant auction, it would seem imperative that the proposal would contain sufficient detail so that consideration of both the substantive question and the prioritisation is possible. In addition, this process must have a consultation element. We consider that the workshop approach (similar to that operated by Ofgem in GB for the Capacity Market) appears to have the necessary elements and is an appropriate model to be applied to the I-SEM CRM. Figure 15 shows the steps of such a process.

Figure 8: Pictorial Depiction of Proposed CMC Modification Process



5.4.6 It is proposed that the Capacity Market Code modification process should have the following elements:



1. A Modification Proposal is submitted to the TSOs as CRM Delivery Body within the time prescribed. There will be an annual deadline by which proposals must be raised. Any person including the Regulatory Authorities, TSOs and the CRM Delivery Body (and Market Operator) may raise a Modification Proposal. All modification proposals which are to be considered within a modification period must be submitted by the deadline together with:
  - Detailed description of the justification of the proposed change;
  - Detailed outline of the legal drafted changes necessary;
  - Outline of areas of impact on users and systems; and
  - Explanation of how it would further the objectives of the Capacity Market Code.
2. Priority should be determined via discussion at a Workshop organised by the TSOs as CRM Delivery Body. All accepted Modification Proposals will be considered in a two stage workshop process, whose purpose is to enable the SEM Committee to decide which proposals will progress to the next stage.
3. Once the priority has been determined, it is proposed that in the first instance, an impact assessment be carried out where the Modification Proposal would require changes to the associated systems software. Indeed, before making a decision in relation to any proposed change, the SEM Committee may need to know the impact of that change both in terms of impact on systems and resources and on the operation of the qualification and auction process.
4. In addition, the initial proposal must be developed into detailed legal drafting of the proposed change to the Capacity Market Code.
5. An additional Workshop will be held to discuss the substantive Modification Proposal.
6. It is proposed that both the impact assessment and legal drafting (where appropriate) be carried out by the TSOs and the results set out in a report to the SEM Committee which proposes (and justifies) which of the proposals should be implemented;
7. The SEM Committee publishes the report and a minded-to view for consultation (probably for a relatively short period - four to six weeks). This minded-to view may be on the basis of the TSOs proposal or otherwise;
8. The SEM Committee makes a decision on the Modification Proposal and directs the changes that should be implemented if possible before the start of the next qualification and auction cycle.
9. The relevant changes are implemented to the Capacity Market Code and software systems where required.

## Summary of Responses

- 5.4.7 We asked respondents for their views on the model and process for making modifications to the CMC. This question did not attract a large response rate, but there was general agreement with the principles stated in the Consultation Paper.
- 5.4.8 Some respondents suggested that the existing industry code modifications process sets a precedent that can be applied in the CMC process.
- 5.4.9 One respondent recommended an additional step to those proposed in the Consultation Paper, namely that the Auction Monitor review the analysis conducted ahead of the consultation and recommend outcomes of the changes.

## SEM Committee Response

- 5.4.10 The SEM Committee notes the general agreement with the principles set out in the CRM 3 Consultation Paper and proposes to proceed on that basis. The SEM Committee will expect that relevant proposals submitted for approval and contain input from the Auction Monitor and where relevant references to the CMC Auditor's reports.

## SEM Committee Decision

- 5.4.11 The SEM Committee has decided that the modification process set out in the CRM 3 Consultation paper and summarised in paragraphs 5.4.1 **Error! Reference source not found.** to 5.4.6 above should be implemented in the Capacity Market Code.

## 5.5 ROLE OF TSOS AND CONFLICTS OF INTEREST

### Consultation Summary

- 5.5.1 The TSOs (i.e. EirGrid and SONI) will have the overall responsibility for managing the qualification process and will operate the auction. These roles will be defined in the Capacity Market Code. The TSOs as CRM Delivery Body will be responsible for the following auction related tasks:
- Procuring software to run the auction, and software to run the qualification process if necessary /appropriate;
  - Developing auction guidelines, including developing appropriate user guides and agreed procedures;
  - Publishing key auction parameters in accordance with the Capacity Market Code, Auction Guidelines or as otherwise directed by the SEM Committee;
  - Running the qualification process, including obtaining and validating bid bonds; and
  - Running the auction, calculating and publishing the auction results in accordance with the auction guidelines.

- 5.5.2 The TSOs' obligations as CRM Delivery Body will be subject to monitoring by the Auction Monitor and the Regulatory Authorities/ SEM Committee.
- 5.5.3 A number of stakeholders have previously expressed a concern that there is a conflict of interest regarding the TSOs (EirGrid and SONI) between their role as the CRM Delivery Body and other roles that they will be undertaking, notably regarding the role of current and future ownership of interconnection assets and operator of balancing and ancillary service markets.
- 5.5.4 In the second CRM Decision paper, SEM-16-022, the SEM Committee set out its approach to cross-border participation, where an "interconnector led model will be used at the inception of the CRM, moving to a hybrid option later where both interconnectors and external capacity providers are paid for their contribution to the I-SEM generation security standard.
- 5.5.5 The interconnector led approach means that interconnectors (including the East West Interconnector (EIL Ltd) and any future interconnectors that may be owned by EirGrid) would be a direct bidder in the auction. Perceived or actual conflicts of interest will be mitigated through the design and rules set out in the Capacity Market Code. This includes clear and transparent rules and the use an Auction Monitor and Auditor (see section5.6).
- 5.5.6 The SEM Committee set out in the Decision Paper on I-SEM Roles and Responsibilities (SEM-15-077) its approach to assessing and managing conflicts of interest and realising synergies of the EirGrid Group roles in the I-SEM to ensure the long term interests of consumers are protected. To that end, the Regulatory Authorities are carrying out an assessment of conflicts of interest and synergies regarding the EirGrid Group's role in I-SEM and a suite of proportionate mitigation measures (behavioural, ring-fencing etc.) will be implemented to manage these.
- 5.5.7 As set out in the I-SEM Roles and Responsibilities Decision Paper there are four main categories of measures under consideration to mitigate conflicts of interest. The mitigation measures set out in this paper relate to the Control/Responsibility and Transparency measures to be applied through the Capacity Market Code while wider mitigation measures, if required, will be developed as part of the overall governance and licence framework for I-SEM.
- 5.5.8 With respect to possible conflicts between I-SEM/DS3 roles and the ownership and development of interconnection, the mitigation measures can be described as follows (at a high level):
- Rules on specific tasks that EirGrid plc and SONI Ltd must or must not carry out as part of their I-SEM/DS3 delivery roles (i.e. what they do and methodologies for doing it);
  - General rules on the ways in which EirGrid plc and SONI Ltd should behave in carrying out their I-SEM/DS3 delivery roles;

- Additional provisions relating to how EirGrid plc and SONI Ltd should behave in carrying out specific tasks that give rise to the biggest concerns about possible conflicts of interest.
- 5.5.9 These mitigation measures will be implemented through licence conditions; market rules documents (e.g. Capacity Market Code), public statements on procedures issued by EirGrid plc and SONI Ltd, and internal governance processes (within EirGrid plc and SONI Ltd). The mitigation combines ex-ante RA approvals of methodologies and ex-post external scrutiny of outcomes.
- 5.5.10 The RAs will include updates on progress on the implementation of these mitigation measures in the I-SEM quarterly project update reports.

## Summary of Responses

- 5.5.11 We asked respondents to comment on the proposed role of the TSOs with respect to the auctions. There was also a request for comments regarding conflicts of interest in the CMC and how to manage them, as well as any further steps that should be taken. The majority of responses received were largely in favour of the proposals made.
- 5.5.12 There were a number of responses that were against the proposals as drafted regarding the role of the TSOs. These included the view that the TSOs' role needs to be more clearly separated or ring-fenced from activities from which it could benefit commercially, including interconnector operations and auction participation.
- 5.5.13 A small number of responses were against the proposal and in favour of an independent third party taking the proposed responsibilities for the auction.
- 5.5.14 A small number of respondents agreed with the proposal, but qualified this with comments that indicated a desire for further measures, including:
- The proposal operating as the bare minimum approach to managing conflicts of interest; and
  - Ensuring that appropriate arrangements were in place to co-ordinate the various committees and governance arrangements applying to arrangements such as the NEMO, Balancing Code and the Capacity Market Code.
- 5.5.15 Some respondents suggested that the full suite of TSO responsibilities needs to be set out, with a small number stating that without this information it would not be possible to comment on the proposals. Others wanted further justification for the proposals from the SEM Committee.

## SEM Committee Response

- 5.5.16 SEM Committee recognises that there is widespread concern amongst potential capacity providers over the perceived conflict of interest between the TSOs' role as the CRM Delivery Body and Eirgrid's ownership of the EWIC interconnector,

particularly given its decision in SEM-16-022 to proceed with the interconnector led approach initially.

- 5.5.17 The decision to appoint the TSOs was made in the “I-SEM Roles and Responsibilities Decision Paper and Next Steps on Synergies and Conflicts of Interests” (SEM-15-077), which clarified the reasons for appointing the TSOs as the CRM Delivery Body.

*"As is standard in other jurisdictions where capacity mechanisms are implemented (Great Britain, Italy, New England ISO, and PJM) and in line with their statutory duties regarding security of supply, we proposed in the Roles and Responsibilities Consultation that the TSOs would be the Delivery Body for the new capacity mechanism in Ireland and Northern Ireland."*

- 5.5.18 The paper further noted that:

*"we intend to develop our thinking further on potential conflicts of interest and synergies with the development of mitigation on a case by case basis. In addition, we will further review the level of current separation and any ring-fencing within the EirGrid Group. We intend to bring forward solutions through the establishment of a Governance Review Process, which will also allow effective wider stakeholder engagement and draw on experience of managing these issues to date as suggested by some respondents to the consultation".*

- 5.5.19 One action the SEM Committee has taken is to instruct the RAs to undertake the modeling of the interconnector de-rating factors independent of the TSOs, and the RAs will take the lead on the setting of the de-rating factors for EWIC and Moyle.

- 5.5.20 The I-SEM programme will continue to develop the measures set out in paragraphs 5.5.1 to 5.5.10.

- 5.5.21 The SEM Committee re-iterates that it is the SEM Committee which has overarching responsibility to ensure consistency of design of the various market arrangements.

## **SEM Committee Decision**

- 5.5.22 The SEM Committee has decided that the RAs will take the lead on modeling de-rating factors for the interconnectors. Like all de-rating factors, the de-rating factors will be subject to approval by the SEM Committee.

- 5.5.23 The SEM Committee will manage conflict of interest using the framework set out in the CRM 3 consultation document (SEM-16-010), and summarised in paragraphs 5.5.1 to 5.5.10.

## **5.6 ROLE OF AN INDEPENDENT AUCTION MONITOR AND AUDIT**

### **Consultation Summary**

- 5.6.1 Many auctions employ an independent Auction Monitor to monitor the conduct of the auction and to ensure that the rules are complied with in addition to wider regulatory arrangements to monitor and take action against anti-competitive behaviour as well

as a CMC Auditor. We envisage that the role of I-SEM CRM monitoring will be split between the Regulatory Authorities and an Auction Monitor as follows:

- The Regulatory Authorities will monitor market participants' activity during the qualification and auctions (including attending auctions). This will include seeking to identify any abuse of market power and gaming, and where appropriate, monitoring compliance against REMIT regulations and wider competition law provisions.
- The Auction Monitor will assist the Regulatory Authorities in monitoring that the TSOs as CRM Delivery Body and market participants have complied with the Capacity Market Code in relation to the operation of the capacity auction.
- In addition, as with the TSC, a separate ex-post CMC Audit will take place by an appointed CMC Auditor. The terms of reference of any such audit will be consulted on and decided by SEM Committee annually.

5.6.2 The Auction Monitor will ensure valid operation of the auction process to the extent possible at the time of the auctions. This role will likely be competitively tendered by the SEM Committee, and would report to the SEM Committee, not the CRM Delivery Body, but its costs would be funded by the CRM Delivery Body<sup>41</sup>. At the end of the auction process, the Auction Monitor will provide the SEM Committee with an assurance report. The terms of reference for the assurance report will be set out in the CMC and amended through the CMC Modification Process and we envisage that, at least for the first auctions, the Auction Monitor's report will include a validation of the auction results. The settlement of the ROs will be governed by the TSC, and covered under the TSC audit.

5.6.3 In the context of the I-SEM CRM, the duties of the Auction Monitor will include all or some of the following tasks:

- Monitoring the Qualification process to ensure that the TSOs as CRM Delivery Body complied with the rules. Such a duty would entail appointing the Monitor early in the process;
- Be present at the auctions, with full read access to all key software, including access to all bids and all communications between the auctioneer and all bidders;
- Reporting on whether it considers that the CRM Delivery Body has conducted the Capacity Auction in accordance with the relevant rules and regulations;
- Where applicable, identifying any actual or potential breach of the rules and regulations or other actual or potential irregularities in the conduct of the Capacity Auction by the CRM Delivery Body and an assessment of the consequences; and
- Making recommendations on the changes to the Capacity Market Code / Auction Guidelines / User Guides.

5.6.4 The incorporation of the capacity settlement rules into the TSC will have implications for the audit of the TSC carried out by the TSC auditor. For instance, the TSC audit scope is likely to need to include calculation of the Reliability Option fees, Supplier

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<sup>41</sup> In much the same way as the oversight and financing of the TSC Market Audit for SEM currently operates.

charges, the Strike Price and difference payments and ensuring that they are made in accordance with the rules incorporated into the TSC.

- 5.6.5 SEM-16-010 also discussed introducing an Independent Auction Auditor, who would audit the calculations made during the auction and confirm that the auction results have been correctly calculated. The role of the Independent Auction Auditor could be tendered separately from that of the Independent Auction Monitor, or jointly.

## **Summary of Responses**

- 5.6.6 Respondents were invited to comment on the requirement for an Independent Auction Monitor, and whether such a role should be combined with the Independent Auction Auditor.
- 5.6.7 All responses received were in favour of having an Independent Auction Monitor. Most of these responses did not comment on the possibility of combining with the Auditor role, nevertheless there was support from a small number of respondents in combining the two roles.
- 5.6.8 A small number of respondents were expressly against the combining of the two roles as proposed. Reasons for this included:
- A difference in the distinct skills needed for each role; and
  - The fundamental difference between the two markets that are respectively served by each body.
- 5.6.9 One respondent suggested that the proposed role of the Independent Auction Auditor was too limited and made the following suggestions for the Independent Auction Auditor's responsibilities:
- A clear investigative remit, covering both price increases and decreases;
  - A remit to investigate TSO conduct in running the auction;
  - Publishing findings on RAs and participants; and
  - Not being limited only to reacting to concerns of RAs and participants.
- 5.6.10 A small number of respondents stated that the combining of the two roles should only take place if there is a cost saving that can be realised in so doing.

## **SEM Committee Response**

- 5.6.11 The SEM Committee agrees with respondents that there is benefit in having an Auction Monitor and report on the conduct of the auction. The SEM Committee would like to re-iterate that the Auction Monitor will have a duty to monitor the activities of the TSOs as CRM Delivery Body during the course of the whole auction process, and the duty to investigate TSO conduct in the running of the auctions.

- 5.6.12 The SEM Committee notes the suggestion that the Independent Auction Auditor should have a wider investigative remit, and will consider the powers that the auditor might be granted to pursue this remit.
- 5.6.13 The SEM Committee would like to re-emphasise the role the RAs and the SEM Committee will continue to have in investigating the behaviour of market participants, including gaming and anti-competitive behaviour.
- 5.6.14 The CMC will maintain a distinction between the roles of the Auction Monitor and the Auction Auditor, and the SEM Committee will procure these roles separately with a view to allowing any synergies to be realised.

### **SEM Committee Decision**

- 5.6.15 The role of I-SEM CRM monitoring will be split between the Regulatory Authorities and an Auction Monitor as set out in paragraph 5.6.1.
- 5.6.16 An Auction Monitor will be appointed by the SEM Committee to monitor the TSOs as CRM Delivery Body in their operation of the end-to-end auction process including the Qualification process.
- 5.6.17 It is expected that the detailed terms of reference for the Auction Monitor will be set out in the CMC and the key duties of the Auction Monitor will be as set out in paragraph 5.6.3.
- 5.6.18 The CMC will set out the role of Auction Auditor, distinct from that of the Auction Monitor, and the SEM Committee will procure these roles separately but with a view to, allowing any procurement synergies to be realised.
- 5.6.19 The SEM Committee will consider the powers that the Auction Auditor and Auction Monitor might be granted to pursue their respective remits.
- 5.6.20 The Auction Monitor and Auction Auditor will report to the SEM Committee. They will be funded by the CRM Delivery Body, but their budget and terms of reference will be set by the SEM Committee.



## 5.7 ROLES OF SEM COMMITTEE AND THE REGULATORY AUTHORITIES

### Consultation Summary

- 5.7.1 The SEM Committee will have the following roles/powers with respect to the auction:
- Approving the de-rating methodology set out in the CMC and operated by the TSOs as CRM Delivery Body;
  - Determining the timings of the qualification processes and auctions for each time period;
  - Approval of key Auction Parameters;
  - Instructing the TSOs as CRM Delivery Body to cancel an auction, if it deems cancellation appropriate. It is also expected that criteria for cancellation will be set out in the CMC;
  - Setting the terms of reference for the Auction Monitor, in consultation with stakeholders. Again it is expected that these terms of reference will be set out in the CMC;
  - Directing changes to Capacity Market Code, which would include all the Auction rules according to the process, set out in Section 4 of this Paper.
- 5.7.2 In addition, the Regulatory Authorities will continuously monitor the capacity market (including qualification, auctions and the operation of the secondary market) for signs of market abuse, gaming and for compliance with REMIT and wider competition law provisions as part of their overall monitoring function regarding the all-island wholesale electricity market.

### Summary of Responses

- 5.7.3 We did not receive any material responses to this question.

### SEM Committee Decision

- 5.7.4 The SEM Committee and RAs will have the roles and responsibilities as set out in the CRM 3 Consultation paper (SEM-16-010), and summarised in paragraphs 5.7.1 to 5.7.2 above.

## 5.8 NEXT STEPS

- 5.8.1 The next steps will include the development of the draft Capacity Market Code through the Rules Working Group to include relevant sections relating to governance. Other elements of the governance framework relating, for instance, to managing Conflicts of Interest will be developed further within the Governance and Licensing framework.

## 6. OTHER RESIDUAL ISSUES

### 6.1 INTRODUCTION

6.1.1 In SEM-16-010, further consultation was taken on a number of details not finalised in the second Decision paper, SEM-16-022. This included:

- Reliability Option Strike Price; and
- Difference payment socialisation arrangements.

6.1.2 In addition, the second CRM decision paper (SEM-16-022) also deferred a decision on the Reliability Option price fix length for new build capacity, which was consulted on in SEM-15-104. We set out our decision on the price fix length in this section.

### 6.2 STRIKE PRICE

#### Introduction

6.2.1 In SEM-15-103, the SEM Committee decided that the Strike Price for the ROs would be based on a hypothetical low efficiency peaking unit, as per the example in New England. The Strike Price would also include an element of the formula which reflects costs of DSUs related to reducing demand<sup>42</sup>. SEM-15-103 stated that the Strike Price formula would be of the form<sup>43</sup>:

$$\text{Strike Price} = \text{Max} [1/T\% \times \text{Max} [\text{GRP}, \text{ORP}], \text{DSU}]$$

Where:

T% is the reference thermal efficiency for the hypothetical Peak Energy Rent unit

GRP is the gas reference price, which will be consulted on further, but which is likely to be a gas spot reference price (e.g. an NBP spot reference price plus a transport adder)<sup>44</sup>

<sup>42</sup> Such as lost production value

<sup>43</sup> The formula contains two key elements. The first is intended to reflect the marginal cost of a hypothetical reference peaking generator, which could be either gas fired or oil fired. The second is the cost faced by a DSU related to reducing energy consumption. That cost might for instance reflect lost output, and is not necessarily related to the cost of fuel for generation. These two elements are not additive. Whichever of the two is higher at any given time will set the Strike Price.

<sup>44</sup> Converted to the appropriate units

ORP is the oil reference price, which is likely to be a gas oil spot reference price (e.g. an ARA gas oil reference price plus a transport adder)<sup>45</sup>

DSU is the cost of a reference demand side unit, €/MWh which reflects the cost incurred by demand side in switching off, which may not be related to the cost of energy

6.2.2 In SEM-16-010, we consulted on:

- **The inclusion of carbon** in the above formula;
- **Spot or forward prices:** Whether to use a forward (month-ahead) gas and oil price rather than a daily spot gas and oil price. If we adopt a month-ahead gas and oil price, the Strike Price will be constant within any calendar month;
- **The reference thermal efficiency** (value of the parameter T): The key issue is to choose the reference low thermal efficiency unit (i.e. low value of T) which achieves an appropriate trade-off between minimising interference with the energy market whilst preserving the value of the Reliability Option hedge; and
- **The process and governance for selection of fuel and carbon input data.**

6.2.3 The following elements of the Strike Price calculation will be defined in the subsequent CRM parameter consultation:

- DSU floor price. As discussed in SEM-15-103, to facilitate DSU participation we plan to set the DSU element of the formula around €500/MWh, although the precise value of the DSU element of the formula will be consulted on closer to I-SEM go-live; and
- The value of transport adders<sup>46</sup>; and
- Carbon intensity factors, which are introduced in the following section.

## Treatment of Carbon in the Strike Price Formula

### Consultation Summary

6.2.4 Having decided that the Strike Price formula should be extended to recognise the existence of carbon pricing in European markets, we propose that the formula should be extended as follows:

Strike Price = Max [1/T% x Max [GRP + CIG x CP, ORP + CIO x CP], DSU]

Where:

CP is the carbon reference price in €/tonne of CO<sub>2</sub>;

CIG is a parameter to denote the Carbon Intensity of a reference gas fired plant in tonnes of CO<sub>2</sub> per MWh of electricity output;

CIO is a parameter to denote the Carbon Intensity of a reference oil fired plant in tonnes of CO<sub>2</sub> per MWh of electricity output;

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<sup>45</sup> Converted to the appropriate units

<sup>46</sup> E.g. to adjust from an NBP quote to delivery in Ireland / Northern Ireland

All other terms are as defined previously above.

- 6.2.5 The value of CIG and CIO will be published along with other parameters prior to the CRM auction. The current calculation of Directed Contract prices contains assumptions on the carbon intensity per unit of gas and oil burnt<sup>47</sup>, and the SEM Committee is of the opinion that the same approach would be applicable for the Strike Price calculations. The values of these parameters will reflect these assumptions on carbon content of the fuel, and the thermal efficiency of the reference plant.

### Summary of Responses

- 6.2.6 Most comments received agreed that carbon should be included in the strike price formula. While agreement for carbon inclusion was broad, a number of concerns was raised, some of which covered more areas than carbon alone:
- Some stated that the CIG and CIO definitions did not deliver the desired outcome, that the use of electrical output to measure carbon would be subject to thermal efficiency restrictions and therefore not simply reflect carbon as desired, double counting efficiency
  - Some expressed concern that adding additional parameters would introduce additional uncertainty and therefore risk premia into prices.

### SEM Committee Response

- 6.2.7 The SEM Committee recognises that the majority of respondents agree that carbon should be included in the strike price formula.
- 6.2.8 The SEM Committee recognises that the carbon element of the strike price formula is not correctly specified in SEM-16-010, as CIG and CIO were specified in terms of CO<sub>2</sub> output per MWh of energy generated and then divided by the reference thermal efficiency. Instead CIG and CIO should be defined as the carbon content of the fuel per MWh of energy in the fuel. The formula will then divide the CO<sub>2</sub> content per unit of fuel by the thermal efficiency and correctly represent the cost of carbon burned by the reference unit in the Strike Price.

### SEM Committee Decision

- 6.2.9 The SEM Committee has decided to incorporate carbon intensity parameters, CIG and CIO into the Strike Price formula. The definitions of CIG and CIO will be amended as follows to achieve the original intent:
- CIG is a parameter to denote the Carbon Intensity of a reference gas fired plant in tonnes of CO<sub>2</sub> per MWh of *fuel content*;
  - CIO is a parameter to denote the Carbon Intensity of a reference oil fired plant in tonnes of CO<sub>2</sub> per MWh of *fuel content*;

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<sup>47</sup> For Round 15 of the Directed Contracts is was 0.20 tCO<sub>2</sub>/GJ of gas burnt, 0.265 tCO<sub>2</sub>/GJ of Gasoil burnt and 0.277tCO<sub>2</sub>/GJ of Low Sulphur Fuel Oil burnt

## Spot versus Forward Gas and Oil Reference Prices

### Summary of consultation

- 6.2.10 The objective of setting the Strike Price is to provide the appropriate balance between ensuring that the ROs don't interfere with the energy market and providing a hedge of value to suppliers. So as not to interfere with the energy market, the strike price needs to be higher than the marginal cost of the plants operating on the day. To achieve this, the SEM Committee originally favoured the use of spot prices in the Strike Price formula, in order to ensure the Strike Price should exceed the Short Run Marginal Cost (SRMC) of a peaking plant<sup>48</sup>.
- 6.2.11 However, SEM-16-010 consulted on an alternative approach of using forward monthly gas and oil prices, for the following reasons:
- It is keen to preserve the value of the RO hedge to suppliers. The introduction of Administrative Scarcity Pricing in the GB gas market could drive the gas spot price high on certain key occasions, increasing the RO Strike Price greatly reducing the hedge value for Suppliers, if the Strike Price was based on the daily gas price;
  - It is also questionable whether in the event of expected involuntary load shedding of GB gas customers, any peaking generator on the island of Ireland could buy gas in the NBP spot market to alleviate an I-SEM security of supply issue. Therefore the GB gas VoLL could be reflected in the Strike Price with no realistic prospect of an I-SEM generator being able to procure gas at that price
  - The introduction of Administrative Scarcity Pricing (ASP) at an appropriate level will provide sufficiently strong incentives to be available, and override concerns about interference with the energy market; and
  - There are simplicity benefits in using monthly prices.
- 6.2.12 SEM-16-010 proposed to use the month-ahead value for NBP gas as the basis for setting the component of the Strike Price associated with gas fired generation, which will adjust to variations in the fuel price, but will not reflect ASP in the GB gas market. We proposed to set the NBP price for each day in month M, based on the forward value of gas in month M on the last trading day of month M-1. For example, the value of March 2016 gas as traded on 29 February 2016 would be the relevant NBP gas price for each day during March 2016.
- 6.2.13 In the case of the oil price, the choice between a forward price and a spot reference price is likely to make little difference. The greater storability of oil means there is much less difference in the volatility of a month ahead price and a spot price. However, we would propose to apply a similar approach for simplicity and consistency across gas and oil.
- 6.2.14 SEM-16-010 also consulted on a proposal to simplify the Strike Price formula by using only one oil reference price, Heavy Fuel Oil rather than the higher of Heavy Fuel Oil and gasoil. Whilst Gasoil prices are higher in terms of €/GJ, Heavy Fuel Oil plant have much lower thermal

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<sup>48</sup> According to these articles, "the strike price should be set at least at the level of the marginal variable cost the regulator estimates as the most expensive in the system..... Additionally, to avoid any negative impact that an under-estimation of this value could have, the Strike Price could be 10-15% above this value" Vazquez, Batlle, Riviere and Perez- Arriaga. Security of Supply in the Dutch electricity market: the role of reliability options, Instituto de Investigacion Tecnologica (IIT), Universidad Pontifica Comilla, Madrid for the Office of Energy Regulation of The Netherlands, December 2003

efficiencies, when instructed to start up and run for short periods. Therefore, the marginal cost of a heavy fuel oil plant is higher than that of a gasoil plant, so if the Strike Price is below the marginal cost of a Heavy Fuel Oil plant it will be below the marginal cost of a gasoil plant.

6.2.15 The frequency of updates to the DSU component to the Strike Price formula will be determined as part of the relevant parameter consultation.

### Summary of Responses

6.2.16 There was a fairly even split on the subject of using a month-ahead index, with slightly more in favour than against. Broadly speaking, there was more support for a monthly index amongst Suppliers, and weaker support for a monthly index amongst generators. One reason put forward for the month-ahead index was the greater inherent stability this would bring to Suppliers.

6.2.17 The arguments put forward against using a month-ahead index, included:

- A need for daily market volatilities to be reflected in the strike price and therefore capture the scheduling risk faced by marginal generators;
- The potential improvements to customer benefit and level of reduced cost and complexity are either minimal or do not exist.

6.2.18 A small number of respondents suggested that a gas capacity adder may be needed to replicate SRMC.

6.2.19 One respondent noted that using a month-ahead index should entail a reference thermal efficiency of 10%, rather than the 15% proposed, in order to reduce the risk of exposure for gas fired generators.

6.2.20 A majority of respondents did not agree with the use of HFO as the reference oil price, with one respondent questioning the consistency of using HFO with the EC desire to close older fossil fuel plant and the possible advantages to plant whose fuel source is a factor within the strike price formula. The proposed alternatives ranged between:

- Using an alternative on the basis that HFO is only used in very few instances, and by plant that is due to close in the coming years;
- Using the maximum value of a number of possible indices (in which HFO would be included); and
- An approach that combines HFO and gasoil

6.2.21 Some respondents stated that the currency indices need to be included in the formula as some of the fuel (and carbon) indices are likely to be in a variety of currencies such as US dollars, as well Euros and/or Sterling.

### SEM Committee Response

6.2.22 The SEM Committee recognises the points made by generators that some peaking generators will be exposed to daily gas price volatility. However, the SEM Committee remains convinced that the benefits of preserving the RO hedge for suppliers (and hence supporting the competition in Supply objective) outweigh other concerns regarding system security, given the introduction of ASP provides such strong incentives on capacity providers to be available.

- 6.2.23 The SEM Committee wishes to clarify the rationale behind the proposal to use an HFO index as opposed to the use of both HFO and gasoil there are two key points here. Firstly, historically HFO has been consistently more expensive per unit of energy contained in the fuel than gasoil. Since both are correlated to the price of crude oil, there is every reason to believe that this will continue to be the case. Secondly, gasoil units on the all-island system are significantly more thermally efficient than HFO units. The net result is that the marginal cost of a reference HFO unit is always likely to be higher than that of a gasoil unit, so setting a formula of 15% thermal efficiency x HFO price will ensure that the strike price exceeds the marginal cost of both units. Our analysis shows that whilst 15% is an appropriate reference thermal efficiency for natural gas and HFO plant, it is higher than necessary for a gasoil plant, either now or in future.
- 6.2.24 Clearly it would be possible to specify a formula of the form  $\text{Max} [\text{HFO price}, \text{gasoil price}]$ , but unless we used a different thermal efficiency for a gasoil unit, this would result in the Strike Price being unnecessarily high, diminishing the value of the Reliability Option hedge for Suppliers. Rather than introduce the additional complexity of having a different reference thermal efficiency for gasoil plant, the SEM Committee has decided that gasoil can be removed from the formula without material risk of the Strike Price interfering with the operation of any gasoil plant. The SEM Committee recognises that most or all Heavy Fuel Oil plant may retire on the island of Ireland in the foreseeable future, and will keep the choice of oil index under review.
- 6.2.25 The SEM Committee agrees that it is likely that the chosen indices are likely to need currency conversion, and the formula will need to be adapted once the relevant fuel and carbon indices have been chosen and the relevant currencies known. To the extent that the indices are in only Euros or Sterling, the existing SEM/I-SEM approach to currency conversion can be applied.

### SEM Committee Decision

- 6.2.26 The SEM Committee has decided to:
- Use monthly (month-ahead) natural gas and oil indices; and
  - Simplify the oil element of the formula by only using the Heavy Fuel Oil index until further notice.

## Choice of Reference Thermal Efficiency

### Summary of consultation

- 6.2.27 The choice of reference thermal efficiency needs to strike a balance between:
- Providing an effective hedge for Suppliers, which it will not do, if the Strike Price is too high because the reference thermal efficiency is too low; and
  - Not interfering with the operation of the energy market and threatening security of supply, which it could do if the Strike Prices are below the variable cost of running a peaking plant because the reference thermal efficiency is too high.

- 6.2.28 The key complexity in assessing the likelihood that the Strike Price will be below the variable cost of running, is the treatment of start-up costs, particularly when a peaking unit is asked to start-up and run for only a short period of time. SEM-16-010 presented some analysis of short run marginal costs, including start-up costs and suggested setting the reference thermal efficiency at 15%. This proposal was based on achieving a balance between the possible adverse impacts of setting the reference at too high a level and allowing the majority of existing plant to recover its short run marginal costs of operation, including start-up costs the majority of the time. However, there should be no commitment that all plant should be able to recover its start-up costs under all circumstances- very short running periods, as this would require a very high Strike Price which would materially reduce the value of the RO hedge to Suppliers.
- 6.2.29 SEM-16-010 also noted that this reference thermal efficiency is very similar to that employed in the New England market.
- 6.2.30 SEM-16-010 also noted that at this reference, the DSU floor price is likely to set the Strike Price the majority of the time.

### Summary of Responses

- 6.2.31 Respondents were fairly evenly split on the topic of reference thermal efficiency being set at 15%, with a small majority against this.
- 6.2.32 A number of reasons were presented against the use of 15%, which included:
- That 15% only applies of 1hour of full load operations, whereas there is historic precedent within SEM for half hourly periods of part load operations, with which this should be aligned- i.e. the analysis based on a minimum full hour start-up does not incorporate enough provision for start-up and O&M costs
  - That as a set value this would not give the flexibility to reflect increasing thermal efficiencies in future years; and

### SEM Committee Responses

- 6.2.33 The SEM Committee remains of the view that a 15% reference thermal efficiency strikes the appropriate balance between protecting the value of the RO hedge for suppliers (and hence promoting Supply competition objectives) and ensuring that generators are able to recover their costs, including start-up cost under most circumstances.
- 6.2.34 As discussed above in the context of the choice of reference fuel price, whilst it is desirable that the Strike Price will exceed the variable costs of operation of capacity providers, the introduction of ASP in the energy market, the RO will provide strong incentives to support system security, even if the Strike Price is above the variable cost of starting and running on some occasions.
- 6.2.35 The SEM Committee would like to clarify that this value will be kept under review, and could increase if thermal efficiencies increase in future years.

### SEM Committee Decision



6.2.36 The SEM Committee will set the reference thermal efficiency at 15% initially, but will keep the reference thermal efficiency under review and may change the efficiency in subsequent years.

## Process and Governance for Fuel and Carbon Input Data

### Consultation summary

6.2.37 The CRM Delivery Body will choose the fuel, carbon and exchange rate price index data sources subject to principles define by the SEM Committee, with the choice of data source being subject to approval by the SEM Committee.

6.2.38 The CRM Delivery Body will also calculate the fuel transport adders periodically, and submit them to the SEM Committee for approval.

6.2.39 In deciding which indices to approve, the SEM Committee proposes to take into account the following factors:

- The indice(s) from which the reference price is drawn must be sufficiently liquid to have confidence that it is a robust representation of market prices
- The price of the indice(s) should reflect the price that a generator could reasonably expect to achieve through trading in the physical market
- Data should meet a Data Quality Gold Standard. The Gold Standard could include:

Provision of data to be used for the index is: Accurate, Complete, and Capable of audit (parties keep records),

Methodology for deriving the index or benchmark is robust, documented and does not include judgement (i.e. is deterministic)

Methodology is subject to change control that protects against conflicts of interest (e.g. through an oversight committee)

Procedures exist in data providers and the index / benchmark to manage conflicts of interest and confidentiality

The index is subject to external audit against its methodology – including a sample of data from data providers.

6.2.40 The SEM Committee will review the CRM Delivery Body's choice of data sources prior to Qualification for the first auctions, and publish the indices and transport adders prior to the date on which capacity providers have to enter the Qualification process.

6.2.41 The SEM Committee will require the CRM Delivery Body to keep the choice of data source under review, and may at its discretion, direct a change the data source, if, at any time it considers that any other indice(s) better meet the criteria.

### Summary of Responses

6.2.42 A large majority of respondents agreed with the principles to choose data sources for fuel prices, carbon prices and exchange rates.

6.2.43 Some suggested that a periodic review may be required to ensure that the reference prices remain a robust representation of market prices. There was also a suggestion that some

parameters may not have liquid indices and therefore may need to resort to regulated tariff prices.

- 6.2.44 A small number of responses made reference to the need for the choice of indices to represent prices and commodities that any market participant could access.
- 6.2.45 In the minority of responses received that were against this proposal, a given reason was that gold standard indices may not be publishable as a result of being proprietary.
- 6.2.46 The majority of responses received were in favour of the proposed process for changes to fuel, carbon, exchange rates & transport adders.
- 6.2.47 Amongst the reasons given from those not in favour of the proposed process for changes, were:
- The need for more information on how oil transport adder information would be accessed;
  - The process needing a more general governance and public review process;
  - The need for a more regular, periodic review process;
  - The need for a principles basis by which a formula review could be triggered, with provision for bodies other than the CRM Delivery Body to be able to make such a trigger; and
  - The need for the RAs to hold responsibility for the process.

### **SEM Committee Response**

- 6.2.48 The SEM Committee notes the majority agreement to the process and governance arrangements and the principles for the choice of indices set out in SEM-16-010.
- 6.2.49 The SEM Committee notes concerns that 'gold standard' data may not be publishable as a result of being proprietary, but notes that the Directed Contracts operates using proprietary sources. The SEM Committee thinks that at minimum, the key principles that should govern the choice of indices are:
- The indices should be publicly available at reasonable cost (although not necessarily at zero cost- the SEM Committee recognises that the data may need to be paid for, if in some cases freely available data are not a reliable indicator of achievable commodity market prices);
  - The data should be judged by appropriately qualified experts to be a reasonable indicator of prices that can be accessed by traders in the market

### **SEM Committee Decision**

- 6.2.50 The SEM Committee has decided that the CRM Delivery Body will propose indices for approval by the RAs. The key principles that should govern the choice of indices are:
- The indices should be publicly available at reasonable cost (although not necessarily at zero cost- the SEM Committee recognises that the data may need to be paid for, if in some cases freely available data are not a reliable indicator of achievable commodity market prices);

- The data should be judged by appropriately qualified experts to be a reasonable indicator of prices that can be accessed by traders in the market.

## 6.3 DIFFERENCE PAYMENTS SOCIALISATION ARRANGEMENTS

### Consultation Summary

6.3.1 SEM-15-103 set out the SEM Committee’s decision that any shortfall in Reliability Option difference payments for any given Supplier will be socialised across all Suppliers. It further stated that socialisation will:

- Be funded by charges to all Suppliers as well as by any surplus difference payments that arise when difference payments from Reliability Option providers exceed those required to hedge Suppliers;
- Recover those charges from all Suppliers as an adjustment to the price Suppliers are charged to cover the annual cost of Reliability Option Fees;
- That any short-fall or surplus in the fund in one year will be used to adjust the total charge recovered from Suppliers in subsequent years, known as a k-factor.

6.3.2 The socialisation fund will build up a balance of money to be used to cover a potential deficit in payments (should receipts from Reliability Option difference payments be insufficient to cover the equivalent difference payments to Suppliers).

#### Setting the Supplier Contribution Rate

6.3.3 The costs of socialisation will be recovered from Suppliers by increasing the amount they are charged for capacity. As set out in SEM-15-103, Capacity Providers will receive an option fee set in €/MW on the basis of their de-rated capacity. These payments to Capacity Providers will be funded through a charge to Suppliers, – based on the consumption of each Supplier’s customers at specified times multiplied by the Supplier Contribution Rate.

6.3.4 The principles to guide the setting of the Supplier’s Contribution Rate needs to consider two objectives, notably:

- **Adequate (but not excessive) funding:** Ensuring that contributions to the fund from Supplier charges are sufficient to cover the likely payments by the fund; and
- **Avoiding price shocks:** Avoiding significant changes in the Contribution Rate from one year to the next.

6.3.5 SEM-16-010 set out a list of principles consistent with the above objectives, these were:

- **Sufficiency:** That the contribution rate for a given year should be set such that socialisation is sufficient to provide a 90% confidence level.
- **Avoiding Shocks:** That the contribution rate, when expressed in €/MWh should ideally not change by more than 2 x CPI between successive years;
- **Pragmatism:** That in normal circumstances, the above two objectives should be considered as constraints in setting the contribution rate. Where it is not possible to set a contribution that honours both constraints, they shall be relaxed:
  - In line with guidance from the SEM Committee at that time;

- With the aim of returning socialisation to a position where it can operate within those constraints as soon as is reasonably practicable.
- **I-SEM transition:** The contribution rate for the introduction of the fund (immediately following go-live) will be set such that, the fund can achieve the first of the above objectives (confidence level of sufficiency) within 4 years.

6.3.6 We proposed that the Suppliers "contribution rate" will be calculated and proposed by SEMO, based upon a set of principles, being consulted upon above. This proposed contribution rate would be subject to the Regulatory Authorities annual review and approval before coming into effect.

#### Treatment in the event of fund shortfall

6.3.7 While we aim to reduce the likelihood of any shortfall in difference payments and proposed a 90% confidence level in setting the contribution rate. We also considered the possibility that there may come a point where the Contribution Rate is insufficient to cover any shortfall in difference payments (for whatever reason they occur). In general, any shortfall can be covered through borrowing. However, there will come a point at which the costs of borrowing rise to a level such that this is not efficient. The following two options were presented in SEM-16-010:

- **Suspend and accrue:** Should a residual difference payment shortfall still remain we propose to suspend and accrue socialisation. Any existing funds are allocated to Suppliers pro-rata to the difference payments that they are owed. When the fund is exhausted, payments would be suspended until there are sufficient funds from ongoing contributions to cover liabilities. Once there are sufficient socialisation funds, following credit facility repayments and the fund reaching a minimum level, these are first used to cover the historic shortfalls accrued, and then new liabilities; and
- **Immediate additional charge:** Any shortfall remaining after surplus difference payments have been exhausted would be funded by an immediate additional charge to all Suppliers pro-rated to their (MWh) market share at the time of the shortfall. This money would be immediately used to cover the outstanding difference payments.

6.3.8 The two options will eventually deliver the same payments to Suppliers for outstanding difference payments, but the timing of the cashflows is different. In the Suspend and Accrue option, those Suppliers may have to wait a year or more to get their accrued liabilities funded. In the Immediate Additional Charge option they are funded immediately. For a worked example to illustrate the differences refer to 8.3.13 to 8.3.17 of SEM-16-010.

### Summary of Responses

6.3.9 Respondents were asked to comment on the proposed approach to setting the Supplier Contribution Rate. Responses were broadly supportive of the proposed approach. Dissenting

opinions related more broadly to the basic concept of the socialisation fund as laid out in CRM Decision 1 (SEM-15-103).

- 6.3.10 A few respondents noted that many of the key inputs to setting of the Supplier Contribution Rate were yet to be determined. One respondent noted that it will be very difficult to set any confidence limit reliably for a market which does not yet exist and which may have a very non-standard distribution of outcomes.
- 6.3.11 A small number of respondents noted that the socialisation fund would start with a zero balance and needed to be properly funded from day 1. Some of these proposed that a charge should be placed on Suppliers to build up the fund before the start of the I-SEM, i.e. during the final year of the SEM.
- 6.3.12 Some respondents preferred the Supplier Contribution Rate to be set as a separate per MWh charge, rather than as a multiplier applied to the Capacity Charge. Some respondents suggested alternative recovery regimes rather than recovery over the Charging Base, e.g. recovery across all demand or recovery across demand at times of scarcity only.
- 6.3.13 Many respondents noted the importance of the principles laid out in the Consultation Paper, i.e. that the Supplier Contribution Rate should be both sufficient and avoid shocks.
- 6.3.14 Whilst not formally part of this consultation, a number of respondents noted that the nature of Capacity Charges on Suppliers required by CRM Decision 1 meant that there would be cash flow issues affecting capacity payments and charges as well as difference payments.
- 6.3.15 Respondents were asked what approach they preferred in the event of a shortfall in money left in the fund to make Supplier difference payments. Two approaches were put forward in the Consultation Paper, namely the Suspend and Accrue approach and the Immediate Additional Charge approach. There was no support for the Immediate Additional Charge and only limited, conditional support for Suspend and Accrue. The majority of respondents rejected both approaches on the grounds of adverse impacts on Supplier cash flow, or the level of commercial risk being passed onto Suppliers, or both.
- 6.3.16 Some respondents noted that the adverse cash flow consequences would be particularly severe on smaller Suppliers who would be less capable of coping with exposure to an unexpected and unpredictable charge or a significant delay in delivery of the RO hedge against high market prices.
- 6.3.17 A significant number of respondents favoured an approach analogous to the current SEM treatment of Imperfection Charges. In this approach, the Single Electricity Market Operator (SEMO) would set a k-factor (i.e. the Supplier Contribution Rate) before the start of the Capacity Year and then manage shortfalls or surpluses in payments and charges that arose within the year. Any borrowing costs or interest income during the year, along with any shortfall or surplus carried forward would be included in the determination of the k-factor for the following year. Several respondents noted that with guaranteed income from the k-factor in future years to cover any shortfall, the SEMO would be in a much stronger position to manage the cash flow issues in terms of both feasibility and cost.

## SEM Committee Response

6.3.18 The SEM Committee acknowledges the point raised by respondents that the two key problems of setting a charge to cover an unpredictable funding requirement and of what to do in the event that the ex-ante charge is insufficient, are not unique to the socialisation fund and that there are parallels in both the current SEM (e.g. the Imperfections Charge) and in the future I-SEM ETA arrangements. The SEM Committee recognises that the SEMO is required to fund some of the cashflow shortfall in the short term, and is able to recover the cash through the operation of k-factors. The SEM Committee has envisaged that the SEMO would fund a portion of the socialisation fund cashflow shortfall up to a limit and on a temporary basis which is recoverable through k-factors. However the SCR and the choice of Suspend and Accrue vs Immediate Additional Charge merely govern the limit of exposure to that temporary funding requirement, and what to do in the event the limit is reached.

6.3.19 The SEM Committee accepts the arguments made by some respondents that the potential impact of cash flow on smaller Suppliers from the Suspend and Accrue and/or the Immediate Additional Charge options is a serious issue. However, the SEM Committee also recognises that:

- It is appropriate to place limits on the requirement of the TSOs' to fund shortfalls in the socialisation fund within year, and that it is appropriate to set that limit in the light of other similar funding requirements on the TSOs which are currently being developed. If the overall demands on the TSOs' funds from other similar TSOs funding requirements is high this will limit the access of the socialisation fund to the TSOs' finite funding, therefore the SCR will include a higher adjustment to fund the socialisation fund. However, if the likely demands on TSO funding from other funding requirements are more limited, the SCR can include a lower adjustment whilst providing a similar level of assurance to Suppliers;
- It is appropriate to specify what happens in the event that this limit is reached, even though this issue has a low probability of occurring.

6.3.20 The SEM Committee recognises the concerns raised by some participants about reliably setting a specific confidence level (i.e. assurance level) for the sufficiency of the socialisation fund. The SEM Committee also recognises the potential issues caused by the socialisation fund starting with a zero balance at the launch of the I-SEM CRM. Given that any scarcity which occurs in the first year of the I-SEM CRM is likely to occur during the early months, there is a greater risk of there being a cash flow issue in the fund<sup>49</sup>. We note the proposal to build up the fund by an additional capacity charge in the SEM CPM, but believe that the practical and regulatory hurdles render this option infeasible. Given the uncertainties around the overall funding requirements on the TSOs from similar arrangements (outside the CRM), the TSOs' access to funds, and the difficulties in forecasting the socialisation fund shortfalls, the SEM Committee does not propose to set a specific quantitative assurance level at this time.

6.3.21 Nevertheless, the principles of providing an appropriate balance for Suppliers between adequate (but not excessive funding) and predictability of charges is sound. If charges are too

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<sup>49</sup> though this is ameliorated by the decisions to operate with lower level of Full Administered Scarcity Price and a potentially higher capacity requirement (to avoid premature plant closure) during the transitional period

unpredictable it will prove difficult for Suppliers to set retail price offerings, and/or could lead to cashflow difficulties for some Suppliers who are unable to adjust tariffs, ultimately harming competition in Supply. By contrast, if charges are inadequate and not sufficiently flexible to adjust to changes in the socialisation fund's funding requirements, it may become impossible to manage cash flow and Supply competition could also be harmed, if some Suppliers' RO difference payments could not be met.

6.3.22 The choice of what to do in the event that the socialisation fund is exhausted (including utilising available TSO funding) is not an easy one. It has the potential for a high impact on the financial viability of small Suppliers. If there is an Immediate Additional Charge on all Suppliers, this could impact the cashflow of those suppliers who had accurately hedged their demand, prior to scarcity, and had no need for difference payments. Some of these could be small suppliers who have limited access to funding themselves. By contrast, if the Suspend and Accrue approach is applied, then some Supplier difference payments may go unmet for several months, which could adversely affect the cashflow of those suppliers exposed to the scarcity price. These suppliers could be disproportionately smaller suppliers, if smaller suppliers are less accurate at forecasting demand or have lesser ability to hedge demand spikes other than through the Reliability Option.

6.3.23 This clearly impacts on both the equity and competition criteria against which the I-SEM design is assessed. As discussed above, either way, small suppliers may be affected, which could adversely affect competition criteria. However, arguably it is more equitable that if, on rare occasions, some suppliers have to bear a cashflow impact, it should be the ones that failed to hedge their demand prior to scarcity. Those that had taken prudent measures to procure their demand in advance of scarcity should not face an Immediate Additional Charge, which they may not be able to pass on to customers.

6.3.24 Finally, the SEM Committee proposes to:

- Use the socialisation fund to manage the seasonal variation in the timing of receipts of capacity payments from Suppliers and payments to capacity providers. The extent of the seasonal variation will depend on the level of profiling of Supplier payments (see CRM Decision 1, SEM-15-103). However, we anticipate that over the course of a normal Capacity Delivery Year, Supplier contributions will exceed payments to capacity providers at the start of the year (Winter) building up a surplus in the Winter which can be used to fund the socialisation fund, with that surplus running down over the Summer months; and
- Include the within year surplus or shortfall due to forecast error within the socialisation fund.

6.3.25 In addition to normal seasonal variation, over the course of a complete year, the capacity payments received from suppliers may exceed Reliability Option fees paid to capacity providers due to the following forecast errors:

- Demand forecast error. The SCR will be set ex ante based on an ex ante demand forecast. In a high demand year, the charges recovered from Suppliers will, all other things being equal, exceed payments to capacity providers. However, in a high

demand year, scarcity events are more likely, and hence the probability of calls on the socialisation fund are greater. The reverse is true in a low demand year.

- New build capacity is late in delivering. If new build capacity is late, it will not be paid for the period of the delay, which would increase the probability of the fund being in surplus. However, it would also increase the probability of a scarcity event, and hence increase the likelihood of a call on the socialisation fund.

6.3.26 Given the above correlations between over recovery of capacity payments and greater demands on the socialisation fund (and the converse), it makes sense to include within year differences due to forecast errors within the socialisation fund, within the course of a year. At the end of the Capacity Delivery Year, the total accumulated surplus/deficit due to forecast error will be reflected in the k-factor for the following year.

### **SEM Committee Decision**

6.3.27 In SEM-15-103, the SEM Committee decided that the SCR would be set ex ante as a fixed €/MWh charge across demand in a pre-defined set of half hours that are judged to be those most likely to have high LoLP values. (the “Charging Base”). SEM-15-103 stated that the SCR would be set at a rate which would recover:

- Forecast Reliability Option fee payments;
- An adjustment to cover socialisation fund.

6.3.28 The SEM Committee has now decided that:

- Any within year differences in the timing of payments received from Suppliers and payments made to capacity payments will be credited/debited to the socialisation fund and may be used to cover any shortfall in Reliability Option difference payments, subject to the proviso that it does not jeopardise the ability to cover Reliability Option fee payments for the remainder of the Capacity Delivery Year, or the following year if the SCR has already been set for the following year;
- Any shortfalls and surpluses arising from forecast error (e.g. demand forecast error, due to the late delivery of capacity) should be credit/debited to the socialisation fund and may be used to cover any shortfall in Reliability Option difference payments, subject to the proviso that it does not jeopardise the ability to cover Reliability Option fee payments for the remainder of the Capacity Delivery Year, or the following year if the SCR has already been set for the following year. At the end of the Capacity Delivery Year, the total accumulated surplus/deficit due to forecast error will be reflected in the k-factor for the following year;
- The SEMO will be expected to fund shortfalls in difference payments, over and above the cash available in the socialisation fund, up to limits to be agreed between the SEM Committee and the SEMO. In setting this limit, the SEM Committee will take into account the overall funding requirements placed upon the SEMO;
- Where the socialisation fund has been exhausted, including drawing down on SEMO funding up to the limit agreed between the SEM Committee and the SEMO, a Suspend and Accrue approach will be employed;
- The SEMO should determine the annual SCR (including the adjustment to fund the socialisation fund) consistent with the principles to:



- recover sufficient funds from Suppliers to enable the Market Operator (SEMO) to manage any shortfalls affecting the socialisation fund, in most years; and
  - avoid price shocks where possible.
- The SEMC does not believe it is appropriate to set specific numeric targets, at this stage, for a target confidence level that the socialisation fund will be able to cover shortfalls in Reliability Option difference payments, as the target level may need to reflect the ability of the SEMO to also cover shortfalls;
  - The annual SCR, and its underlying rationale, will be subject to review and approval by the Regulatory Authorities.

## 6.4 RELIABILITY OPTION PRICE FIX LENGTH

- 6.4.1 The SEM Committee consulted on the length of time for which plant are able to fix their Reliability Option Fee (the price fix) in the second CRM Consultation Paper (SEM-15-104). In the second CRM Decision Paper (SEM-16-022) the SEM Committee review consultation responses and decided that:
- Existing plant that does not require significant investment will be able to fix its option fee for periods of 1 year.
  - The length of price fix available to plant requiring significant investment will be set on a “balanced economic life” basis. This will be:
    - The same for all plant technology types;
    - Based on ‘balanced economic life’ option, and be no more than ten years with the actual maximum value being to be confirmed in this CRM Decision 3.
- 6.4.2 In deferring this decision to CRM Decision 3, the SEM-16-022 paper noted the inter-relationship between the Reliability Option price fix length and certain aspects of the auction design and market power mitigation measures set out in CRM Consultation 3.
- 6.4.3 The key dependencies between the auction design / market power mitigation measures and the Reliability Option price fix length are the extent to which the imposition of a sloping demand curve, the Price-taker Offer Cap and the Auction Price Cap serve to increase or reduce the price risk faced by new plant, if they are not guaranteed long term fixed price Reliability Options.
- 6.4.4 Our decision to introduce a sloped demand curve can expect to reduce the volatility in auction prices. However, our proposal to introduce a Price-taker Offer Cap and make it applicable to all existing generators could serve to constrain prices in years in which no new entry is required, and hence increase price risk to new investors if Reliability Option prices are fixed for a short duration. The SEM Committee thinks that fixing prices for ten years strikes an appropriate balance between de-risking investment for generators (which should lead to lower bids) and to the risk of locking customers into long term commitments to assets which may become stranded by technological development. The SEM Committee notes that this 10-year price fix length is significantly longer than available to bidders in most, if not all US capacity markets, and these markets have been successful in attracting investment.

- 6.4.5 Whilst the parameters for the demand curve, the Auction Price Cap and the Price-taker Offer Cap will not be set until the parameters consultation, in Section 3, the SEM Committee set out its decision that the Price-taker Offer Cap will be applicable to all existing generators.
- 6.4.6 The SEM Committee notes a further issue regarding the Reliability Option price fix length has been raised by respondents. This relates to the point at which the price fix reduces when new investment is not operational during the commitment phase but does deliver by the long stop date. In particular concerns have been raised that the reduced price fix period could disadvantage capacity providers such as storage which may have construction periods beyond four years. The SEM Committee will consider this issue further through the implementation of the CRM rules.

### **SEM Committee Decision**

- 6.4.7 Given the general applicability of the Price-taker Offer Cap and the intention to implement a sloped demand curve in line with the principles set out in section 4, the SEM Committee has decided that to start with, Balanced Economic Life shall mean 10 years. This means that any new capacity provider meeting the significant financial commitment criteria (“new build”) will be able to bid for a contract of any integer number of years up to a maximum of ten years.
- 6.4.8 This decision will provide investors with greater price certainty and hence promote system security and efficiency objectives (since we would expect them to reflect reduced price risk into their offers).
- 6.4.9 This ten-year definition of Balanced Economic Life will apply to any “new build” that chooses to enter the transitional auctions, and to the first T-4. As stated in SEM-16-022, this definition of Balanced Economic Life will be kept under review with a view to amending the length of the price fix as I-SEM develops and the stabilising effect of the sloped demand curve and other auction parameters drive long term price stability and hence investment signals. However, for the avoidance of doubt, any change in contract fixed price duration would only apply to contracts awarded in subsequent auctions.
- 6.4.10 Regarding the issue of capacity providers such as storage plant accessing price fixes up to 10 years regardless of whether they are operational by the delivery year, the SEM Committee will consider this issue further through the implementation of the CRM rules.

## 7. LOCATIONAL ISSUES

- 7.1.1 The revised arrangements under the I-SEM and DS3 programme are being designed to improve the incentives for capacity providers to contribute to operational reliability and provide flexible response to market signals. The design aims to ensure that market arrangements send out the efficient signals to investors such that there is coordinated entry and exit of capacity and security of supply is delivered to consumers at least cost.
- 7.1.2 Within I-SEM, the CRM is being designed to coordinate investment required to provide capacity to the system consistent with maintaining the capacity adequacy standard. It aims to ensure that there is sufficient capacity available to the electricity system in order to meet demand in the medium to long term through the TSOs procuring (by means of auction) the capacity required to meet the security standard.
- 7.1.3 The SEM Committee decided (in CRM Decision 1 - SEM-15-103) that the I-SEM capacity requirement should be determined for the I-SEM as a whole. This creates a single zone for capacity consistent with the approach for the I-SEM energy markets and providing the associated benefits associated with a single zone in terms of liquidity and the ability to mitigate market power.
- 7.1.4 As part of the CRM Decision 1 process, it was recognised that, in practice, the system is not indifferent to the location of capacity that is procured. The value of capacity may vary by location, reflecting transmission constraints (or the costs to resolve those constraints), as well as transmission losses.
- 7.1.5 At the time of CRM Decision 1 these locational issues were considered to be more appropriate handled within the locational signals included within the use of Transmission Loss Adjustment Factors (TLAFs) and Generator Transmission Use of System charges (GTUoS) and was therefore considered outside the scope of CRM. The second North South Interconnector is expected to resolve constraints before they impact the need for new capacity. Should other significant and consistent constraints emerge, they would be considered under the bidding zone review process under the Capacity Allocation and Congestion Management (CACM) Regulation. In light of this review, the SEM Committee decided that the auction systems should be developed to handle multiple zones, should the need arise for separate capacity zones.
- 7.1.6 Most CRM 1 respondents supported a single zone auction with some giving their support conditional to the completion of the North-South interconnector. However, a number of respondents did raise concerns regarding capacity needs and that this locational need should be addressed within the CRM and was a matter for detailed design.
- 7.1.7 While the single zone decision has been made a number of responses to the CRM 3 consultation (SEM-16-010) continue to be very concerned that there remains a disconnect between the design of the capacity auction, the physical constraints of the all island system and the locational need for the appropriate capacity on the island. One respondent questioned the feasibility of the capacity outcome as currently proposed, together with the absence of the second North South Interconnector, and suggested it may not resolve locational issues within Northern Ireland and that Dublin and south west Ireland and other

areas are also impacted by system constraints. Similar concerns have also been raised in various I-SEM bi-lateral meetings.

- 7.1.8 Having considered the auction design in detail the Regulatory Authorities have recognised that there is a need to manage locational issues, and to take appropriate account of management of locational issues within the auction design. The enduring CRM design is that Reliability Options have the benefit of maintaining an influence over participant's behaviour can provide appropriate exit and entry signals and can ensure that payments more closely reflect the value provided by capacity to the system.
- 7.1.9 In addition to various CRM consultation responses and bi-lateral meetings, stakeholders have argued that there are significant limitations of the current locational signals within TLAFs and GTUoS and that there is a need for specific transmission network investment to address some of the existing network constraints.
- 7.1.10 It is important to recognise that transmission constraints will evolve as, inter alia, the network develops and demand patterns changes for example through the development of data centres in specific locations across the island. These operational constraints will continue to be a mix of capacity constraints and ancillary service constraints. In the CRM decision we are focusing on is capacity constraints from the CRM auction design perspective, however, the Regulatory Authorities will continue to take a holistic view of the issue with appropriate solutions to locational ancillary services developed through the DS3 programme.
- 7.1.11 The current EirGrid/SONI Generation Capacity Statement 2016-2025 indicates generation plant exit, mainly older generators due to emissions restrictions, during this 10-year period and it is important, as Regulators, that this exiting capacity is managed appropriately.
- 7.1.12 Equally it is important that the capacity available should continue to evolve with the introduction of new capacity and/or new entrants. It is also important that there are appropriate signals given for reliable low carbon flexible plant to develop in the most efficient locations. Given a lead time for such a build this is likely to be more important within the T-4 auctions than within either the transitional or on-going T-1 auctions.
- 7.1.13 Throughout the CRM process the Regulatory Authorities have been cognisant of the need to manage existing capacity and new capacity both within the transitional years and the enduring period. This has been reflected with the decisions within this paper and previous CRM decisions, notably the decision to have a series of transitional auctions, the introduction of a sloped demand curve and various bid limits.
- 7.1.14 Despite the above there may still be circumstances, particularly during the CRM transitional period and until significant transmission investment is commissioned, where plant required for locational reasons do not clear in the CRM auction. Should such a generating plant not receive sufficient revenue from the other revenue streams (energy market, ancillary services); there is a possibility that the plant may not stay operational beyond any required notice period. Hence it is important to put in place a framework to deal with such circumstances should they arise.

- 7.1.15 Currently within the TSOs Grid Codes there is a requirement for market participants with generating units, which have a registered capacity of 50 MW or greater, to provide the TSOs with 3 years notice of their intention to close or otherwise withdraw from the market. In addition to this a range of proposals to manage this situation have been considered by the Regulatory Authorities from various perspectives, such as, address outside or within the I-SEM market and before or after the CRM auctions. For example, consideration was given to various forms of strategic reserve contracts, specific purpose system service contracts and revising locational signals within GTUoS.
- 7.1.16 In the context of the CRM design, capacity providers would be permitted to submit offers above a bid limit e.g. Price Taker Offer Cap if it can be proven their net going forward costs are higher. This would be subject to the Regulatory Authorities scrutiny and possible adjustment. In conjunction with the CRM auction, the Regulatory Authorities and/or the TSOs may assess whether generating plant which did not clear in the auction, or which may not clear in a future auction, are required to meet system security. Plant which is deemed necessary to address locational capacity needs could potentially receive an annual Reliability Option fee at their bid price/net going forward costs, subject to Regulatory Authorities scrutiny.
- 7.1.17 There are a number of options within this high level mechanism that need to be considered further. For example, one possibility is those who clear in the auction receive their Reliability Option(s) together with the out of the market plant who is deemed necessary to address locational need also receiving a Reliability Option. Another possibility is to hold the unconstrained auction and then identify out of market plant that are deemed necessary and then economically assess the capacity auction winner(s) who should be displaced in order to meet the capacity requirement and system security. After which Reliability Options would be allocated accordingly.
- 7.1.18 Clearly there are inter-dependencies with DS3 and other I-SEM workstreams and the CRM team will continue to work closely with these teams to ensure the CRM auction design is developed consistently.
- 7.1.19 In order to effectively address the above issues and engage with industry the Regulatory Authorities are proposing to issue a supplemental consultation paper on this issues. This is expected to be published in August 2016.

## 8. NEXT STEPS

- 8.1.1 A detailed Heads of Terms of the Capacity Market Code has been developed by the RAs consistent with the decisions issued in CRM Decisions 1, 2 and 3. This detailed Heads of Terms will be issued to TSOs to inform the development of the Capacity Market code through the Rules Working Group. A “plain English” version of the Capacity Market Code Heads of Terms will be issued publicly in advance of the July Rules Working Group. The SEM Committee will be consulting on the full Capacity Market Code in Q4 2016.
- 8.1.2 As described in section 7, we will issue a supplemental consultation to CRM 3. This will consult on locational issue and how they can be managed through the CRM. This supplemental consultation is expected to be published in August 2016.
- 8.1.3 Also during August 2016, the Regulatory Authorities expect to publish the Capacity Requirement and De-rating methodologies consultation paper.
- 8.1.4 Furthermore, a CRM parameters consultation paper is planned for publication in September 2016.
- 8.1.5 All the above papers will be published on the new SEM Committee website:

[www.semcommittee.com](http://www.semcommittee.com)

## 9. ACRONYMS

ACER	Agency for the Co-operation of Energy Regulators
ACPS	Annual Capacity Payment Sum
AER	Alternative Energy Requirement
ALFCO	Adjusted Load Following Capacity Obligation
BCoP	Bidding Code of Practice
BM	Balancing Market
BNE	Best New Entrant
CACM	Capacity Allocation and Congestion Management
CCGT	Combined Cycle Gas Turbine
CfD	Contracts for Difference
CMU	Capacity Market Unit
CRM	Capacity Remuneration Mechanism
DAM	Day Ahead Market
DCENR	Department of Communications, Energy and Natural Resources
DECC	Department of Energy and Climate Change
DSR	Demand Side Response
DSU	Demand Side Unit
EC	European Commission
EEAG	The Environmental and Energy State Aid Guidelines
ENTSO-E	European Network of Transmission System Operators – Electricity
ETA	Energy Trading Arrangements
EU	European Union
FiT	Feed in Tariff
FOR	Forced Outage Rate
FTR	Financial Transmission Right
GB	Great Britain
GB CM	Great Britain Capacity Market
GDP	Gross Domestic Product
GTUoS	Generator Transmission Use of System
GUA	Generating Unit Agreement
HLD	High Level Design
ICE	Intercontinental Exchange
IDM	Intra-Day Market
IED	Industrial Emissions Directive
I-SEM	Integrated Single Electricity Market
ISO NE	Independent System Operator New England
LoLE	Loss of Load Expectation
LOLP	Loss of Load Probability
MB	Balancing Market (Italy)
MGP	Day Ahead Market (Italy)
MRP	Market Reference Price
MSD	Ancillary Services Market (Italy)

MW	Megawatt
MWh	Megawatt hour
NG	National Grid
OCGT	Open Cycle Gas Turbine
ODR	Over Delivery Rate
PER	Peak Energy Rents
PFP	Pay-for-Performance
PJM	Pennsylvania Jersey Maryland
PPA	Power Purchase Agreement
PPB	Power Procurement Business
PSO	Public Service Obligation
ROC	Renewables Obligation Certificate
RP	Reference Price
SEM	Single Electricity Market
SCR	Suppliers Contribution Rate
SO	System Operator
SoLR	Supplier of Last Resort
SP	Strike Price
SRMC	Short Run Marginal Cost
TLAF	Transmission Loss Adjustment Factor
TSC	Trading and Settlement Code
TSO	Transmission System Operator
US	United States



## APPENDIX A: ANALYSIS OF MAXIMUM WELFARE LOSS FROM LUMPINESS

The maximum loss would occur if the demand curve intersected the supply curve in the middle of a large inflexible unit. This note analyses the potential scale of the welfare loss, compared to our proposed solution, if:

- a) Scenario A: We had to accept the marginal unit;
- b) Scenario B: We could accept or reject the marginal unit, but could not accept any out-of-merit bids.

The welfare loss clearly depends on the slope of the demand curve (the steeper the curve, the greater the calculated potential welfare loss), and the size of the marginal inflexible unit. To bind the analysis we shall make the following assumptions:

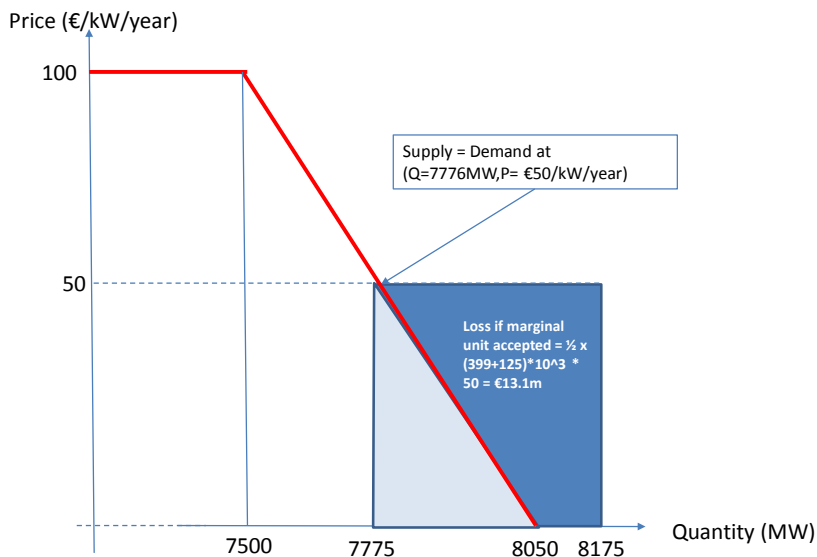
- Demand curve slope: We shall assume that the curve demand curve slopes from a point where  $Q = 7500\text{MW}$  (broadly  $7000\text{MW}$  peak demand +  $500\text{MW}$  reserve requirement) where the price is equal to the Auction Price Cap of  $1.5 \times \text{Net CONE}$ . In round numbers we assume  $1.5 \times \text{Net CONE} = \text{€}100/\text{kW}/\text{year}$ . The “curve” is a straight line and slopes down to a P axis crossing point at a 15% reserve margin, i.e.  $(7000\text{MW} \times 1.15 = 8050)$ . The curve is therefore downward sloping with a gradient of  $\text{€}100/550,000\text{kW}$ , i.e.  $-1.82 \times 10^{-4} \text{€}/\text{kW}$
- The largest unit in the current system is likely to have a de-rated capacity of around  $400\text{MW}$ , so we have assumed a  $400\text{MW}$  inflexible bid for the purposes of this analysis.

Let us assume, that initially we are looking at the transitional auctions, and let us assume that the Price-taker Offer Cap for existing capacity is  $\text{€}50/\text{kW}/\text{year}$ .

If we have to accept the marginal unit (Scenario A), the greatest welfare loss occurs if the demand and supply curve intersect where we only want  $1\text{MW}^{50}$  of the  $400\text{MW}$  inflexible bid. As illustrated in Figure 1, this results in a social welfare loss of  $\text{€}13.1\text{m}$  for that year, as a result of the inflexibility.

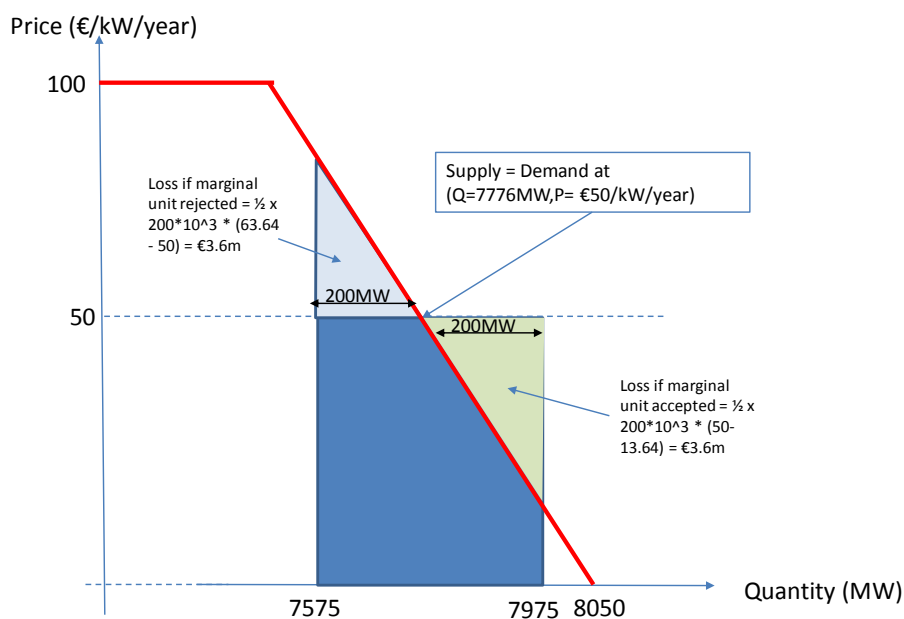
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<sup>50</sup> Assuming rounding to nearest MW



By contrast if it so happens that there is a 1MW unit available at only fractionally higher €50/kW/year, we could substitute the 400MW for the fractionally more expensive unit, adding €13.1m to social welfare in this year- in this case all that social welfare is consumer welfare. €13.1m is therefore our best estimate of the reasonable worst case social welfare loss, if the auctioneer has to accept the marginal bid in a transitional auction (Scenario A).

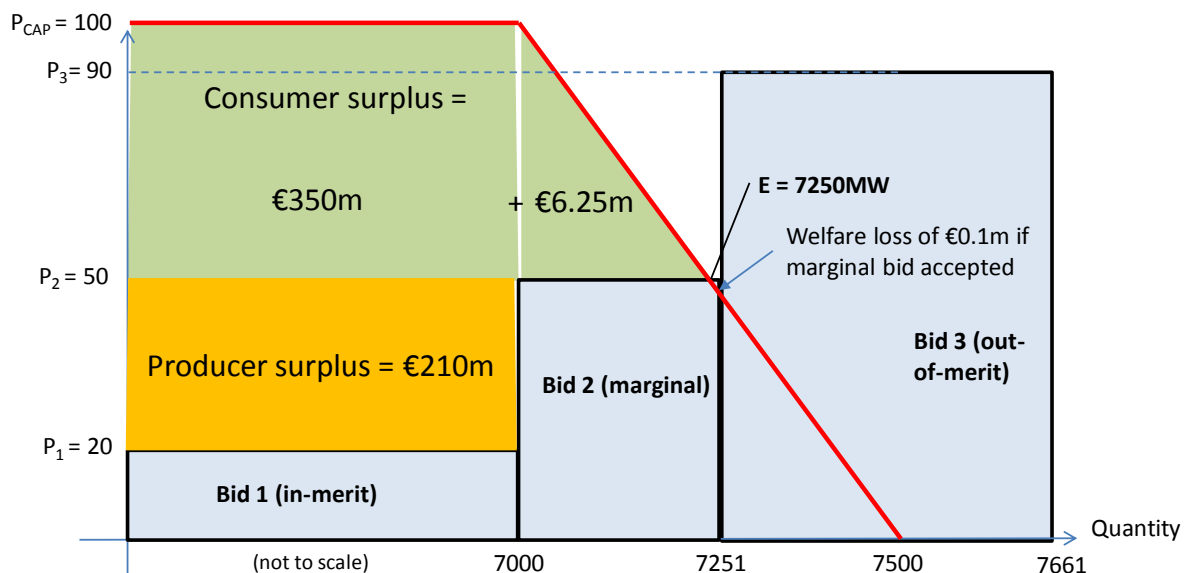
If, like in GB, the auctioneer has to choose between accepting or rejecting the marginal unit, but cannot accept out-of-merit bids, then the greatest welfare loss occurs when the area in triangle A equal the area in triangle B. Using the same assumptions as before with regard to demand curve slope and maximum unit size, the maximum welfare loss occurs when 200MW of the 400MW are required, and the light blue triangle (social welfare loss if the marginal unit is rejected) is equal to the light green triangle (social welfare loss if the marginal unit is accepted).



We have estimated this maximum loss at around €3.6m, relative to if a fractionally more expensive 200MW unit could be accepted in place of the inflexible 400MW unit. Hence our proposed solution delivers up to a potential €3.6m efficiency gain in the year.

## APPENDIX B: EXAMPLE OF HOW USING PRODUCER WELFARE COULD RESULT IN AN EFFICIENCY LOSS

Consider the simplified example illustrated below (not to scale) whereby the demand curve slopes down from an Auction Price Cap of €100/kW/year at 7000MW to a maximum quantity of 7,500MW. There are 7,000MW of bids at a price of €20/kW/year; the marginal bid is a 251MW inflexible unit at a price of €50/kW/year. The demand curve cuts the supply curve at 7,250MW, and ideally the auctioneer would like to accept 250MW of the 251MW marginal bid. Let us assume that the only out of merit bid is a large, expensive inflexible unit- clearly inferior to the marginal unit.



The social; welfare optimising solution is to accept all 250MW of the 251MW inflexible unit. Producer surplus is €210m ( $\text{€} (50-20)/\text{kW} \times 7,000,000\text{kW}$ ). The consumer surplus is the sum of the square area  $\text{€} (100-50)/\text{kW} \times 7,000,000\text{kW} = \text{€}350\text{m}$  and the green triangular area  $= \frac{1}{2} \times 250,000\text{kW} \times \text{€} (100-50)/\text{kW} = \text{€}6.25\text{m} = \text{€}356.25\text{m}$ , with a small consumer deficit (unwanted consumption) triangle of  $\frac{1}{2} \times 1,000\text{kW} \times \text{€}0.2/\text{kW} = \text{€}0.1\text{m}$ . The deficit from forcing the extra unwanted MW is significantly less than the additional consumer surplus on the first 250MW.

However, the consumer welfare optimising solution is to reject the marginal bid, and accept only the first 7,000MW. This is because the clearing price would drop to €20/kW/year, transferring €210m of producer surplus to consumer surplus, which outweighs the loss (in consumer surplus terms) of the green triangle which is worth only €6.25m of consumer surplus.

In this case, choosing to reject the marginal bid would seem a perverse result, one that generates a result far removed from the outcome absent the market failure cause by inflexibility/lumpiness.