



Integrated Single Electricity Market
(I-SEM)

Capacity Remuneration Mechanism
Detailed Design

Decision Paper 2
SEM-16-022

10 May 2016

1. EXECUTIVE SUMMARY

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 (RAs) for Ireland and Northern Ireland have agreed the High Level Design¹ of the market required for the third package - and called that market the I-SEM (Integrated Single Electricity Market).

The proposed I-SEM closely models the “Target Model” that sits at the heart of the European 3rd package. Specifically, it includes the following energy markets:

- **Day Ahead:** The Day Ahead Market will operate at 11:00 on the day ahead of the physical delivery of electricity. This will be a cleared market – where parties offer to buy and sell electrical energy for each hour of the following day, and all trades are priced at the price of the most expensive trade that is consistent with the received offers and bids.
- **Intra Day:** The Intra Day Market is bilaterally traded, and will operate from the closure of the Day Ahead Market to a “Gate Closure”, being some point close to the physical delivery of electrical energy.
- **Balancing:** The Balancing Market operates up to the physical delivery. This is the market where the TSOs adjust the output of generators (and demand of customers) as required to maintain the balance of generation and demand, and ensure the system operates in a stable and secure manner. These adjustments are made based on price data submitted by those Generators (or DSUs). Any electrical energy that is produced or consumed, and which has not been explicitly sold or bought through one of these markets is deemed to have been bought or sold through the Balancing Market.

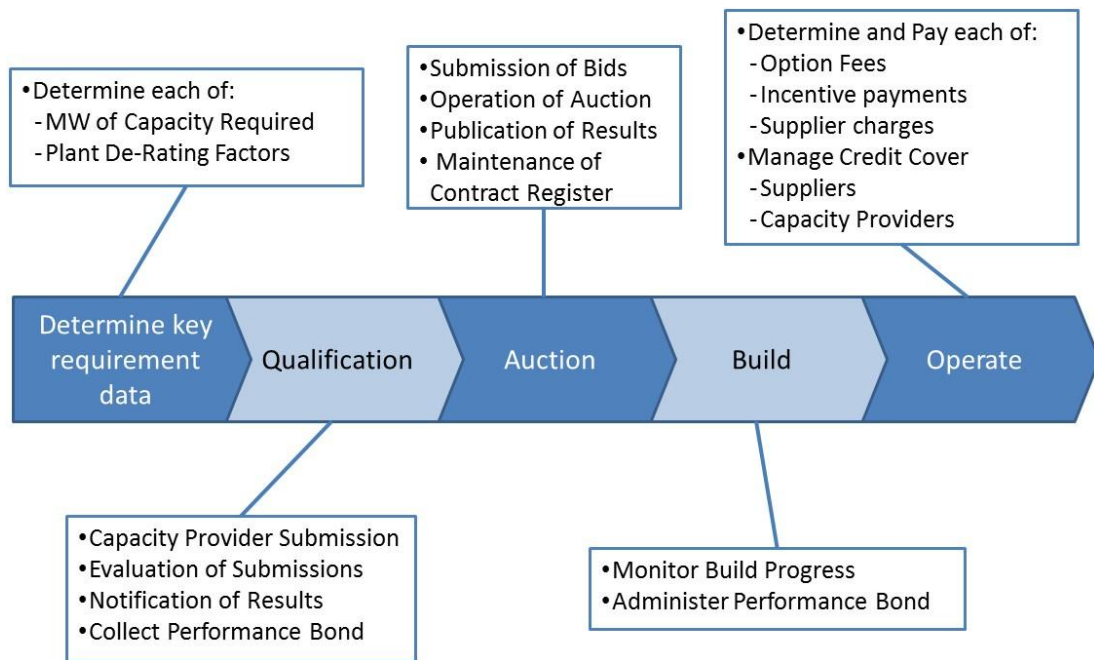
In addition to the above energy markets, the High Level Design includes a Capacity Remuneration Mechanism (CRM) based around Reliability Options. The CRM pays for the capacity to produce electrical energy through the I-SEM on a “per MW” basis. This means that, typically, Capacity Providers can receive two payments

- A (per MW) capacity payment for being *available* to produce electrical energy; and
- An (per MWh) energy payment through one of the Day Ahead, Intraday or Balancing markets for any electrical energy they produce

The I-SEM CRM has 5 key stages as illustrated in Figure 1: End to End Process for I-SEM CRM below.

¹ http://www.semcommittee.eu/en/wholesale_overview.aspx?article=d3cf03a9-b4ab-44af-8cc0-ee1b4e251d0f

Figure 1: End to End Process for I-SEM CRM



In summary, these steps are as follows:

- **Determine key requirements:** This step involves fundamental analysis of the I-SEM requirements for capacity to determine:
 - The level of capacity that will be needed to maintain security of supply in future years; and
 - The extent to which each plant contributes to that need for capacity. This leads to factors that scale down the “name plate” capacity of each plant to give its “de-rated” capacity.
- **Pre-qualification:** Pre-qualification is the start of the procurement of capacity from providers. This process aims to identify those potential providers of capacity that are genuinely credible – and are likely to be able to deliver the capacity they offer. Those “credible” providers “qualify” to participate in the subsequent auction.
- **Auction:** The auction is a competition between *qualified* capacity providers to be awarded Reliability Options for the provision of capacity. This auction will allocate sufficient Reliability Options to at least meet the Capacity requirement identified in the “Key Requirements” step. This allocation will aim to minimise the per-MW cost of those Reliability Options, based on prices submitted by each provider. The design of this auction is being considered in the third CRM Consultation paper, SEM-16-010.
- **Build:** Where the auction awards a Reliability Option to a new (as opposed to existing) capacity provider, that new capacity will need to be built. The arrangements for this “build” step will include incentives on the relevant party to build their capacity within the required timescales.
- **Operate:** The “Operate” step is when capacity is available to, and being paid by, the I-SEM. This leads to the following payments:

- “per MW” option-fee payments to capacity providers for their capacity
- “per MWh” difference payments from capacity providers at time when energy prices are high (above the Reliability Option strike price);
- Payments from Suppliers to cover the “per MW” option fee payments to capacity providers; and
- Payments to Suppliers at times when energy prices are high (above the Reliability Option strike price).

On 17th December 2015, the first Decision paper (SEM-15-103) was published and related to the detailed design of that CRM. This Decision paper follows from that and sets out a number of decisions relating to the second Consultation paper (SEM-15-104)². A third CRM Consultation paper (SEM-16-010) was published on 14th March 2016 and focuses on auction design arrangements and mitigation of market power.

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

- Cross-border participation
- Secondary trading of Reliability Options
- Further details on Reliability Option design
- Further details on Administered Scarcity Pricing
- Transitional Arrangements

The end to end process for the I-SEM CRM is illustrated in Figure 2 below, along with how that end to end process maps onto the key chapters of this Decision paper.

Figure 2: Key Decision 2 Chapters and the End to End Process



The following paragraphs summarise the decisions in each of these areas that make up the chapters of this Decision paper.

Cross-Border Participation

The SEM Committee is committed to developing arrangements for cross-border participation in CRMs in line with the emerging European common approach³. At this time the hybrid approach looks like a strong option, where both interconnectors and external capacity providers are paid for their contribution to the I-SEM generation security standard. This is the preferred long-term approach of the SEM Committee, and that which best aligns with the majority of our Assessment Criteria, however:

- It is impractical to implement this approach for I-SEM Go-Live given the need to develop the detail of the approach in conjunction with neighbouring Member States; and
- It is prudent to develop fully and implement the more complex longer term approach as the emerging EU wide model becomes clearer.

In the interim, the I-SEM CRM will follow an “interconnector led” model. Features of this include:

- Direct participation of the interconnectors into the CRM;
- An availability based approach, where the technical availability of the asset at times when the Reliability Option is called forms the basis of the model implementation; and
- Interconnector Reliability Options have the same option fee as other I-SEM providers.

Reasonable endeavours will be taken to move away from this interim model to an enduring approach that is expected to be based on the hybrid approach.

The SEM Committee believes that it is not possible to use purely historic scarcity event data in order to create a methodology to define interconnector de-ratings. The relative infrequency of such events over the past number of years means that there is significant risk attached to using this data. The RAs will instead develop a methodology based on suitable historic and forecast data (e.g. weather data, export data from GB).

Secondary Trading

Secondary trading differs from the primary allocation of Reliability Options to physical plant (through auctions). Under secondary trading, a plant that has been allocated a Reliability Option can transfer all or part of that option to another plant (through a secondary trade).

In designing the arrangements for secondary trading, the SEM Committee has sought to design a marketplace that:

³ http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

- Reflects the nature of plant outages⁴;
- Provides a single venue for plant to access traders; and
- Provides information that can highlight any abuse of market power

The need to improve the potentially adverse impact of market power with the I-SEM has led the SEM Committee to select a mandatory centralised marketplace for secondary trading of Reliability Options. This is expected to take the form of an auction platform. If this is not possible to implement a centralised market place for I-SEM go-live, the SEM Committee envisages a fall-back solution, where parties are effectively able to suspend their Reliability Options for periods covering planned outages.

As energy products, secondary trading of Reliability Options will be captured by existing EU legislation (REMIT) relating to manipulation of energy markets. The RAs will monitor secondary trading of Reliability Options and use their powers under REMIT as appropriate.

This Decision paper sets out a number of more detailed aspects relating to secondary trading of Reliability Options. Specifically:

- Trading above de-rated capacity will be permitted to provide cover to other players seeking to transfer their Reliability Option obligations for legitimate technical reasons. In all other cases, plant will be limited to its de-rated capacity in backing secondary trades. What constitutes a legitimate technical reason will include normal planned and forced outages.
- Trading of capacity between the adjusted load-following capacity obligation and de-rated capacity will be permitted.
- No ex-post trading or trades where a counterparty represents a pre-commissioned asset will be included in the design for secondary trading.
- Stop-loss limits will be retained by the Reliability Option holder, rather than transferred with the Reliability Option when traded. The buyer of the Reliability Option will have its existing stop-loss limit adjusted to reflect the additional volumes of Reliability Options acquired (see Section 5.4 for further details on stop losses). This necessitates that a history of loss accrual needs to be held at a unit level, even if it sells all of its Reliability Options in a delivery period. For this to be achieved, stop-loss limits will be retained at a unit level rather than a portfolio level.

Reliability Option Design

The high level design of Reliability Options was considered as a part of the first CRM Consultation paper (SEM-15-044) with decisions set out in SEM-15-103. A number of elements of this design were developed in more detail as a part of the second I-SEM CRM Consultation paper (SEM-15-104). These related to the following areas:

- Reliability Option length

⁴ An outage refers to a period when a plant is being maintained and therefore is out of service

- Option fee indexation
- Stop-loss limits
- Commissioning window
- Implementation Agreement

Reliability Option Length

The SEM Committee acknowledges that providing capacity that is facing an investment decision (new and refurbished capacity) with an opportunity to fix the price of their option fees for a number of years may be necessary to attract new investment at prices that are acceptable, and to support the efficient exit of existing plant.

The SEM Committee sees benefits in fixing the price of capacity for a number of years for new investment whilst allowing existing capacity providers to fix their price for a year. The key benefit of this approach is in allowing plant that requires investment to compete more effectively alongside existing plant.

Given the interrelationship between the length of the price fix and the parameters in the auction set out in CRM Consultation Paper 3, the SEM Committee has decided that the length of price fix available to plant requiring investment should be no more than ten years, with the actual value being confirmed in Decision 3 which is due to be published in July 2016. This period is expected to fall as the I-SEM matures and establishes a price history – reducing the risk to investors.

Reliability Option Fee Indexation

It is anticipated that the bulk of capacity will be procured a number of years ahead of when it will be contracted to be available. This lead time is required to allow new capacity (which will take time to build) to compete on an effective basis with existing capacity.

Given there is a lag between the time of a capacity auction, and the time when capacity is delivered, there are potential benefits in indexing the price (option fee) that arises from the auction. However, the SEM Committee believes on balance that reliability Option holders are best placed to manage this risk themselves. As set out in Section 5.3, the Committee has decided that indexation will not be applied to option fees.

Stop Loss Limits

SEM-15-103 set out that Reliability Options will include “stop loss” limits that restrict the obligation on plant to pay difference payments to some multiple of the option fees received by those plants. This paper sets out a minded-to position for the level for that stop loss limit, specifically that:

- In any contract year (October to September), the maximum difference payments made by any plant should be restricted to 1.5 times the annual Reliability Option fees received by that plant.

- In any billing period⁵, the maximum difference payments made by any plant should be restricted to a multiple of the relevant option fee for the period, e.g. for a billing period of one month this will be 9 times the relevant option fee.

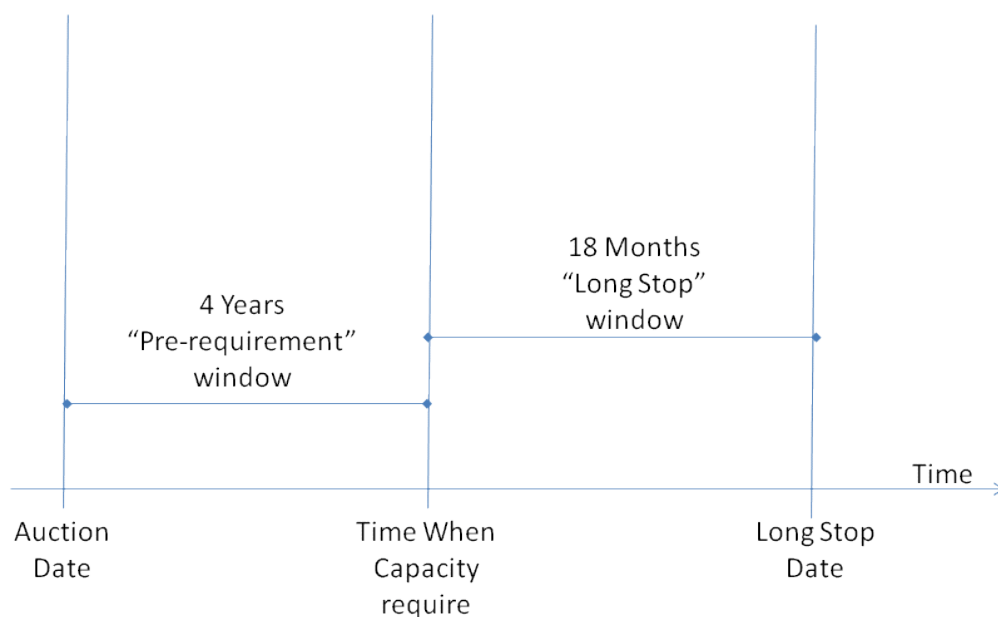
Commissioning Window

The Commissioning Window is the time from the date of the Capacity Auction until the point at which a Reliability Option will be terminated for failure to achieve Substantial Completion.

The Commissioning Window is divided into two parts (see Figure 3):

- **“Pre-requirement”**: The period from the Auction Date until the start of the first Delivery Year under the Reliability Option; and
- **Long stop**: An additional period after the start of the first Delivery Year to give a project time to commission. This allows projects with longer construction times to participate in the capacity market. It also reduces the risk for project sponsors as a delayed project will still be able to access option fees for the vast majority of the length of its Reliability Option.

Figure 3: Two-part lead-time



The SEM Committee has decided that:

- A 4-year commissioning window is an appropriate time to allow most plant to be operational before capacity is required in I-SEM; and

⁵ A billing period is defined as the period between the physical delivery of electricity and the time at which I-SEM payments will occur.

- There will be the addition of an extra 18 month long stop window which leaves a total period of 5½ years between the auction results and the termination (with penalties) of the reliability options for any plant that has not become operational. This 5½ year period is sufficiently long to accommodate the more complex plant that the project team is aware of being considered for the I-SEM.

Implementation Agreement

As previously decided, the Implementation Agreement will manage the build phase for any new capacity. This has a number of components, specifically:

- Defined milestones against which progress is measured;
- Routine reporting of project progress;
- Termination penalties for failing to meet specific and significant milestones; and
- A performance bond paid up front to cover the cost of termination payments.

This Decision paper includes decisions on each of these areas, notably:

- The milestones should be as proposed in SEM-15-104, namely:
 - Substantial Financial Completion;
 - Commencement of construction works;
 - Mechanical completion;
 - Completion of network connection;
 - First energy to network;
 - Start of performance/acceptance testing;
 - Provisional acceptance/Completion of performance testing; and
 - Substantial Completion
- Project progress should be reported to the capacity delivery body on a six-monthly basis. The report immediately prior to the final auction in which a failing project could be replaced must be independently verified; and
- A developer will be liable for termination penalties (and have its Implementation Agreement terminated) in the event of:
 - Failure to achieve Minimum Completion by the Long Stop Date;
 - Failure to achieve Substantial Financial Completion within 18 months of contract award; or
 - Material information submitted for pre-qualification being found to be false or misleading.

The SEM Committee has decided that the level of termination fee (and hence performance bond) should rise progressively over the lifetime of a project to build new capacity. Specifically:

- It should start at a low level – potentially linked to the levels used for the GB CRM; and
- It should reach its full level just before the last routine event through which alternative capacity could be procured to replace a failing project. This will be the point at which the

capacity requirement is set for the T-1 auction covering the first year in which the relevant plant could (if commissioned) receive option fees.

The “full level” of the termination fee (and performance bond) should be set based on estimates of:

- The cost to consumers of undelivered capacity;
- The level of delayed liquidated damages available from a typical EPC Contract⁶; and
- The level of penalties for undelivered capacity to which an existing unit would be exposed.

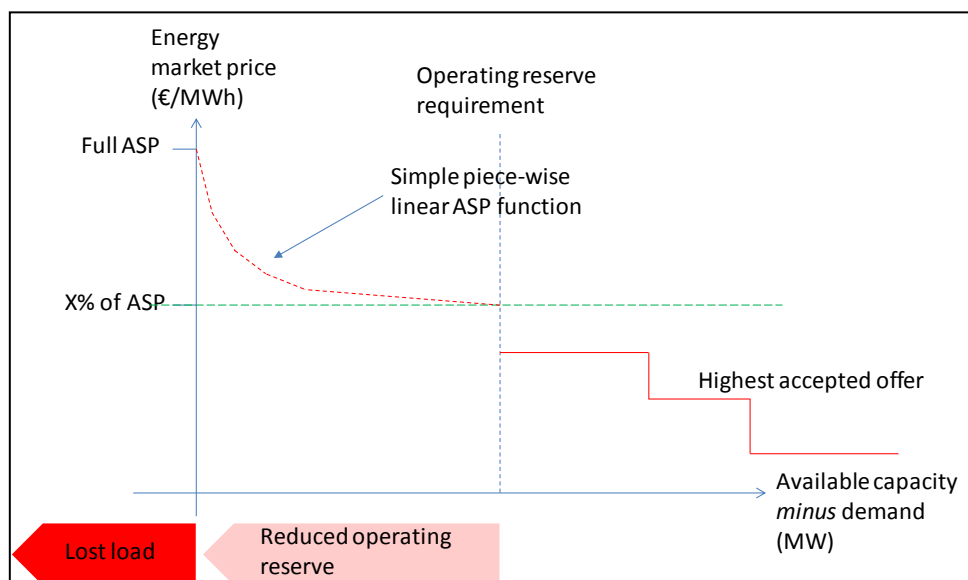
The initial analysis of these values indicates a value in the range of €47/kW to €55/kW, however, the values for the levels of termination fees and performance bonds will be considered as part of a consultation on parameters. The level of termination fee and performance bond will then be kept under review by the SEM Committee.

Administrative Scarcity Price

The SEM Committee has decided that the Balancing Market will include an Administrative Scarcity Price (ASP), which will set a floor on the Balancing Market Price at times when available capacity is less than that required to cover electricity demand plus the associated reserve requirement.

As illustrated in Figure. 4, the ASP will increase in line with parameters, which were included within the CRM Consultation paper SEM-15-104 and are covered in Section 6 of this document.

Figure. 4: Parameterised ASP Function



In order to define this function, the value of Full ASP (FASP) needs to be determined. This will begin at the implementation of the CRM at a lower level to continue to the end of the transition

⁶ Engineering, Procurement and Construction Management Contract

period. This starting value will be the Euphemia day ahead price cap of €3000/MWh. It will rise to a suitable percentage of the SEM Value of Lost Load (VoLL) at the end of this transition period.

A piece-wise linear function will be used to define ASP between the operating reserve requirement and lost load. This function will be a static function that approximates Loss of Load Probability (LoLP). This choice represents a trade-off decision between accuracy and practicality, with a preference for practicality followed. The static function will be defined by the TSO and approved by the RAs.

The energy market price when the linear function begins (at the point where scarcity is declared) will be set at the Reliability Option Strike Price, in order to ensure that the maximum number of Reliability Option holders is available and that normal energy market actions have been exhausted.

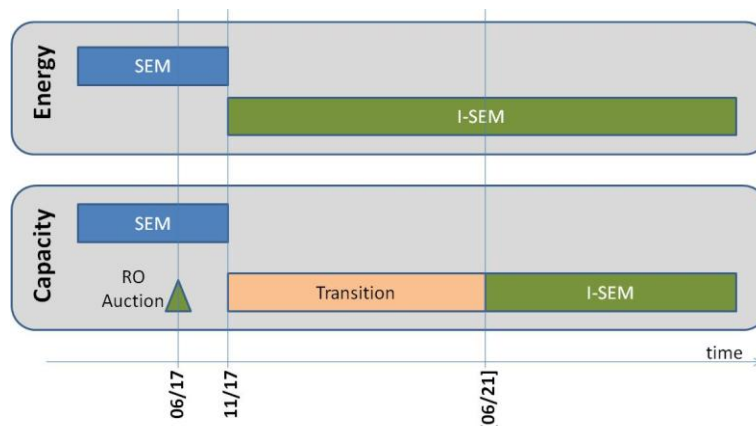
Administered Scarcity will be triggered when an event corresponding to any of Customer Voltage Reduction, Planned or Emergency Manual Disconnection or Automatic Load Shedding either as defined in the SONI Grid Code or a direct equivalent event defined in the Eirgrid Grid Code is declared. The two Grid Codes will be reviewed to ensure consistency of approach.

Target operating reserve will be deemed to have been depleted if operating reserve (i.e. POR, SOR, TOR1 and TOR2) cannot be replaced from replacement reserve or ramping margin within one hour.

Transitional Arrangements

As illustrated in Figure 5, the anticipated lead time between the first main auction for the allocation of Reliability Options and the start of those options leads to transitional period. Neither the existing SEM CRM, nor the Reliability Options from that first auction, will be paying for capacity that operates during this transitional period.

Figure 5: Moving from the SEM CRM to the I-SEM CRM



In the transition period, the required capacity will be procured through annual auctions that procure each year separately. The demand curve for each of these auctions may be modified to ensure plant needed at the end of the transitional period does not close having not been

awarded a contract for the start of the period. This will be considered further in a subsequent consultation on CRM parameters.

Next Steps

A number of “next steps” have been identified associated with the decisions set out in this paper that the RAs will develop through subsequent consultation either as part of the CRM Code or through separate parameters consultation. These next steps fall into the following areas:

- **Methodologies:** There are a number of areas where specific methodologies need to be developed to support decisions in this paper. These relate to interconnector de-rating, and the prudent forecasting of any capacity freed up through load following.
- **Hybrid model for cross border participation:** The Regulatory Authorities, in conjunction with DECC and Ofgem will develop an implementation plan for the “hybrid” model for cross border participation in the I-SEM CRM. At this stage, the target is to implement the hybrid model for the I-SEM CRM for 2019.
- **Parameters:** A number of decisions in this paper are subject to specific parameters that will be set (and kept under review) by the SEM Committee. These will be considered as part of Consultation 3 and as part of a separate consultation on CRM parameters.
- **Secondary Trading Venue:** The Regulatory Authorities will continue to work with the TSOs towards developing an auction solution for the secondary trading of Reliability Options.

CONTENTS

1. Executive Summary	2
Contents	13
2. Introduction.....	15
2.1 Purpose of this Paper.....	15
2.2 The Detailed Design Phase of the I-SEM Capacity Mechanism	16
2.3 Consultation Process	16
2.4 Assesment Criteria.....	18
3. Cross Border Participation	20
3.1 Introduction	20
3.2 Model for Cross Border Participation in the I-SEM CRM.....	21
3.3 Interconnector De-rating.....	38
3.4 SUMMARY of SEM Committee Decisions	40
4. Secondary Trading.....	42
4.1 Introduction	42
4.2 Case for Secondary Trading	42
4.3 Requirement for a Centralised Secondary Marketplace	46
4.4 Limits on Secondary Purchasing	51
4.5 Limits on Secondary Trading Timeframes	58
4.6 Secondary Trading and Application of “Stop-Loss” Limits	61
4.7 Summary of SEM Committee decisions.....	64
5. Detailed Reliability Option Design.....	66
5.1 Introduction	66
5.2 Reliability Option Length	67
5.3 Option Fee Indexation	75
5.4 Stop-Loss Limits	76
5.5 Commissioning Window	79
5.6 Implementation Agreement	82
5.7 Summary of SEM Committee Decisions	88
6. Level of Administered Scarcity Price	92

6.1	Introduction	92
6.2	Definition of Load Shedding	93
6.3	Level of Full Administered Scarcity Price	97
6.4	Summary of SEM Committee Decisions	101
7.	Transitional Issues	103
7.1	Consultation Summary	103
8.	Next Steps.....	106
Appendix A.	Virtual Bidding	108
Appendix B.	Transfer of stop-loss limits	109

2. INTRODUCTION

2.1 PURPOSE OF THIS PAPER

- 2.1.1 This paper details the SEM Committee's decisions on the second 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 second Consultation paper issued on 21 December 2015, SEM-15-104, and sets out the SEM Committee's response to the key points raised. Where relevant, next steps are also set out.
- 2.1.2 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 of Enterprise, Trade and Investment (DETI). 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.
- 2.1.3 The structure of this paper is consistent with that of the Consultation paper (SEM-15-104), with the key Sections summarised below:
- **Interconnector and Cross-Border Trading:** Section 3 considers the issues around trade with other systems including approaches to de-rating interconnector capacity, obligations on cross border capacity providers and sets out a number of options for the treatment of cross-border participation in the CRM.
 - **Secondary Trading:** Section 4 sets out the framework for secondary trading of Reliability Options, laying out the rationale for permitting such trading, consideration of the need for a centralised marketplace and explores limits on the volume and timing of such trade.
 - **Detailed Reliability Option Design:** Section 5 explores more detailed issues around the design of Reliability Options. It includes consideration of the length of 'price fix' (contract length), the indexation of option fees, the application of stop-loss limits, definition of the commissioning window and the design of Implementation Agreements
 - **Level of Administered Scarcity Price:** Section **Error! Reference source not found.** covers details of Administrative Scarcity Price (ASP) further to the decisions made in the previous Decision paper SEM-15-103. It includes the definition of load shedding (the point at which scarcity is declared) and the parameters that govern the value of ASP.
 - **Transitional Arrangements:** Section 7 covers the potential options for the auction of capacity over the transitional period from the SEM to delivery under the first full I-SEM CRM auction.

- 2.1.4 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).

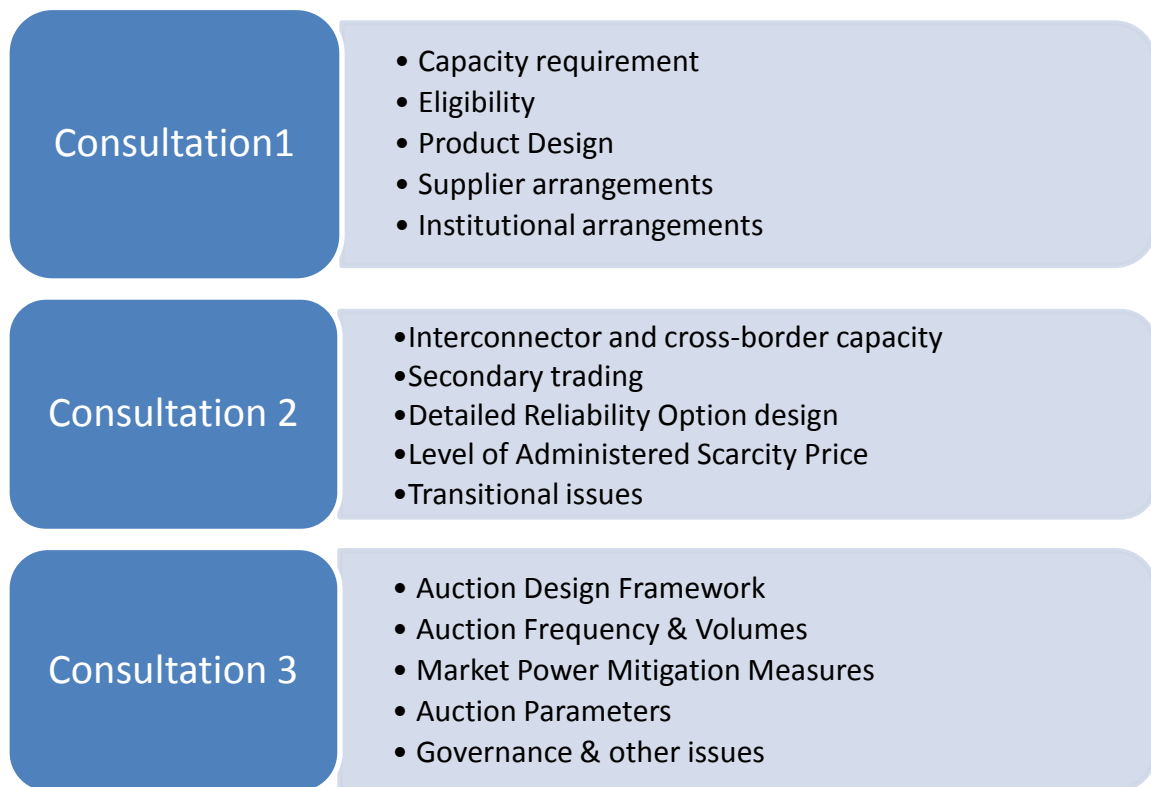
2.2 THE DETAILED DESIGN PHASE OF THE I-SEM CAPACITY MECHANISM

- 2.2.1 Over the course of 2014 the SEM Committee consulted extensively before publishing the decision paper on the High Level Design (HLD) for the I-SEM in keeping with our statutory objectives. The HLD decision sought to maximise benefits for consumers in the short-term and long-term, while ensuring security of supply and meeting environmental requirements. Following the HLD, the Detailed Design Phase of the I-SEM commenced and a number of workstreams were established including the CRM workstream.
- 2.2.2 The purpose of the CRM Detailed Design is to develop through consultation the specific design features of the new capacity mechanism that are consistent with the High Level Design of the I-SEM. Following on from this, detailed legal drafting of the CRM market rules will be completed. These detailed legal rules in the current SEM take the form of the Trading and Settlement Code.
- 2.2.3 The SEM Committee and the Regulatory Authorities (RAs), in close cooperation with the Departments will continue to engage with the EC on the design of the I-SEM Capacity Mechanism, to ensure that the detailed design complies with existing and emerging European rules and guidelines.
- 2.2.4 In addition to the detailed policy design the RAs will be working with the TSOs in relation to systemisation and codification of the mechanism. It is important to ensure that there is alignment between CRM development, other I-SEM workstreams and DS3 System Services to ensure customers are protected and investors are appropriately incentivised.

2.3 CONSULTATION PROCESS

- 2.3.1 Development of the CRM policy will be primarily carried out via a three stage consultation and decision process. This is the second decision paper of the three stage approach. An overview of the main topics (to be) discussed in each paper is given in Figure 6.

Figure 6: Overview of CRM Policy Development



Consultation Two: Key Milestones

2.3.2 A comprehensive programme of stakeholder engagement on the second 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.

- First Stakeholder Workshop: 29 September 2015
- Consultation Document Published: 21 December 2015
- Second Stakeholder Workshop: 20 January 2016
- Update provided as part of Consultation 3 workshop: 16 March 2016
- Third Stakeholder Workshop: 5th April 2016

2.3.3 Detail of and the slides presented at each of the workshops outlined above have been published on the SEM Committee website⁷ and in addition to these milestones, further bilateral meeting have been facilitated at various stages of the decision development process.

⁷ www.semcommittee.com/capacity-remuneration-mechanism

Responses to Consultation

2.3.4 A total of 28 responses to the consultation was received. These were submitted from a wide range of interested parties including Generators, Suppliers, the System Operators, Network Owners and Industry Representative Groups. Of the 28 responses, three have been marked confidential. The remaining 25 are outlined below and copies can be obtained from the SEM Committee webpage.

- 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 East West Interconnector
- Gaelectric
- Tynagh
- Aughinish
- IWEA
- Kore Energy

2.4 ASSESSMENT CRITERIA

2.4.1 Assessment Criteria for the detailed design of the CRM, as set out in the consultation document, 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 March 2013. The 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.

2.4.2 In assessing the various options under the different sections we acknowledge that there are trade-offs to be struck between the different Assessment Criteria.

3. CROSS BORDER PARTICIPATION

3.1 INTRODUCTION

3.1.1 Under the model arising from the EU's third package of energy legislation (the EU Electricity Target Model) flows of electricity between price zones are determined by relative market prices. This is referred to as market coupling at the day ahead and intraday stages and will ultimately include TSO-TSO arrangements for cross border exchanges of balancing services as set out under the draft Electricity Balancing Network Code. . These arrangements should ensure that power flows to where it is most valued at a given moment in time.

3.1.2 Within this context, several EU Member States have implemented or are in the process of implementing CRMs and consideration is being given to how to ensure that these do not distort the EU Internal market⁸. The State Aid guidelines⁹ state that any Capacity Mechanisms should be designed to allow:

"the participation of operators from other Member States where such participation is physically possible in particular in the regional context, that is to say, where capacity can be physically provided to the Member State implementing the measure and the obligations set out in the measure can be enforced".

3.1.3 The second I-SEM CRM Consultation paper (SEM-15-104) considered how these requirements could be incorporated in a way that:

- Maximises competition in the I-SEM capacity market;
- Recognises the contribution of interconnectors and external providers in meeting the I-SEM generation security standard;
- Provides appropriate incentives for investment in interconnectors and generators (as well as demand side response and storage) between the I-SEM and other electricity markets; and

⁸ See:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/358141/Frontier_economics_Report_Participation_of_Interconnected_Capacity_in_the_GB_Capacity_Market_Fro_.pdf and

http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_6_draft.pdf

⁹ 232(B), Guidelines on State Aid for environmental protection and energy 2014-20

20. 2014/C 200/1

- Enables market coupling to continue to deliver the most efficient use of existing resource.

3.2 MODEL FOR CROSS BORDER PARTICIPATION IN THE I-SEM CRM

Consultation Summary

3.2.1 SEM-15-104 set out five models to recognise the contribution of non-I-SEM providers, specifically:

- **Net off demand:** This approach would quantify the expected contribution (positive or negative) of cross-border transmission capacity to the need for generation capacity in the I-SEM, and uses this to adjust the generation capacity to be procured from within the I-SEM. This approach does recognise that generation capacity will be provided across the interconnector; however, it does not provide any explicit capacity payments to particular resources to reflect the support (if any) provided by cross-border capacity. This is the approach that has been used to date in the French CRM.
- **Interconnector led:** Under this approach, the interconnector participates in the I-SEM Capacity Remuneration Mechanism (CRM). This is the approach used in the GB CRM as an interim solution until an EU-wide approach has been agreed. There are two variants of this approach:
 - **Performance based:** Performance is assessed based on actual flows at the relevant interconnector(s). this is the variant used in the GB CRM; and
 - **Availability based:** Performance is assessed based on the relevant interconnector’s technical availability.
- **FTR led:** Under this approach, the participants in the I-SEM are the parties that hold the beneficial rights to import power into the I-SEM at the Day Ahead stage – through FTRs.
- **Provider led:** Under this approach, providers located outside the I-SEM are able to participate directly in the I-SEM CRM. Mechanisms are put in place to adjust for losses between the provider and the I-SEM, as well as to ensure I-SEM consumers do not pay for capacity if it does not deliver to the I-SEM when required. There are two variants of this option, depending on how the performance of the external provider is assessed:
 - **Performance based:** Performance is assessed based on actual flows at the relevant interconnector(s) as well as at the relevant provider’s meter; and
 - **Availability Based:** Performance is assessed based on the relevant provider’s availability to perform at the relevant time (e.g. by having offers to generate in all relevant energy markets within its Member State).

- **Hybrid:** This approach is a hybrid of the “Provider Led” and “Interconnector Led” approaches. Providers located outside the I-SEM are able to participate directly in the I-SEM CRM; however:
 - The interconnectors will make any difference payments which arise as a result of a technical failure of their asset; and
 - The interconnectors are able to retain any difference in the clearing (€/MWyear) prices for capacity in I-SEM and the relevant neighbouring market.

Summary of Responses

3.2.2 We asked respondents to comment on which of the five models was preferred as well as on a number of details relating to the implementation of those models.

3.2.3 There is no clear preference as to which approach to treatment of cross border capacity should be implemented. For the first of these areas, there was support for each of the five models – although a number of respondents noted that none are ideal. In many cases, respondents stated two preferences:

- **Ideal model:** A number of respondents have identified a model they believe is ideal, but have highlighted a number of factors that mean they believe this model cannot be adopted from the outset of the I-SEM. In the main, this relates to the “Provider Led” and “Hybrid” models as the ideal, with respondents citing barriers to the (initial) implementation of these models relating to:
 - The complexity of these models, for example relating to the need to access meter data for the external participants; and
 - The stated need for reciprocal arrangements – so that I-SEM generators can equally participate in the relevant non-I-SEM capacity markets.
- **Fall back:** Many respondents who believe their preferred “ideal” model will be challenging to implement for I-SEM go live have also identified which model they would like to see in the interim. In most cases, the “Interconnector led” option has been selected as the fall back; however, it has also been suggested that the consideration of cross border participation should be delayed until reciprocal arrangements are established between the I-SEM CRM and other CRMs in the region.

3.2.4 In summary, the responses to each of the five models were as follows:

- **Provider Led:** The “provider led, performance based” model was favoured by the largest group of respondents. Many of these respondents stated the need for an equitable approach that allows non-I-SEM cross-border participants to be treated on a level playing field with I-SEM participants. One respondent proposed a variation of the “Provider Led” model where:
 - External providers earned the same option fee as those located in the I-SEM, rather than the (potentially lower) price of those competing for the limited

interconnector capacity that constrains their ability to contribute to the I-SEM generation security standard;

- Reliability Options are settled without reference to the actual (metered) performance of the external party's plant.
- **Net Off Demand:** This model was the second most popular with respondents. Those in favour of this model note its simplicity, and that non-I-SEM participants will still be incentivised to provide capacity through energy prices in the I-SEM as well as their resident electricity markets.
- **Interconnector led:** A similar number of respondents favour the "Interconnector led" model to those that favour the "Net off demand" model. Some of these respondents suggested this approach as an interim measure prior to provider-led solution. Many of those supporting this option noted:
 - its simplicity, that will allow its implementation in time for I-SEM go-live; and
 - its equivalence (in performance based form) to the approach used for the GB Capacity Remuneration Mechanism.
- **Hybrid:** The Hybrid model was favoured by a small number of respondents, noting its potential to appropriately reward and incentivise both interconnectors and external capacity. The key concerns with this model related to its complexity.
- **FTR Led:** This was the least favoured of the five models, with many acknowledging issues with the availability of FTRs at the time Reliability Options are auctioned. One respondent did favour this option, and believed it could deliver efficient participation for non-I-SEM participants. This respondent argued that:
 - the timescales for FTR availability reflected uncertainty over interconnector availability; and
 - FTR does provide some revenue to interconnectors

3.2.5 Respondents were also asked to comment on a number of details for how specific models were implemented. Responses to these questions were more sparse than those identifying the preferred overall model, and are summarised below:

- **Performance or Availability?** For three of the five models (Interconnector, Provider and Hybrid), the non-I-SEM participant is a physical player whose performance can be measured or assessed, with this assessment used in the Settlement of the relevant Reliability Options. In each case, the consultation considered whether these models should be implemented (and reliability options settled) based on:
 - the *metered* performance of the relevant assets at times when I-SEM market prices are above the Reliability Option strike price; or
 - the technical availability of the relevant assets at times when I-SEM market prices are above the Reliability Option strike price.

A significant majority of respondents favoured Reliability Options for non-I-SEM participants being settled on a performance (rather than availability) basis.

These respondents note that this would provide broadly similar treatment for I-SEM and non-I-SEM Reliability Options.

One of the respondents in favour of the performance basis linked the variant to the “Interconnector led” option, arguing that at times of system stress, this model will prevent ‘double dipping’ into two markets at simultaneous system stress.

The few respondents who supported the settlement of non-I-SEM participant Reliability Options on an availability basis linked this to a preference for the “Interconnector led” option. These respondents are interconnector owner/operators and noted that interconnectors do not “earn” the I-SEM energy prices, so cannot perform in a way that delivers a market revenue to offset the Reliability Option difference payments. This lack of offsetting revenue makes it difficult to treat interconnectors (in the interconnector led model) in a manner that is exactly equivalent to that for capacity providers located in the I-SEM.

- **Allocation of cross-border trades between interconnectors:** Respondents were asked to comment on three potential approaches to allocating cross border trades between physical interconnectors. In response to this:
 - One respondent noted that this problem has to be addressed for the correct settlement of day ahead market coupling. This is required in the CACM regulation¹⁰. European TSOs (through ENTSO-E) are meant to be developing a methodology for this allocation. This respondent noted that this approach may only be workable for the day-ahead market and that other approaches may be needed for the Intra-day and balancing markets.
 - All other respondents that commented on this area favoured allocating cross border trades between interconnectors pro-rata to the metered flow across those interconnectors. This is consistent with the actual support provided by those interconnectors – reflecting both their technical availability as well as the physical characteristics of electricity networks that may direct electricity flows more to a specific interconnector.
- **Allocation of cross border trades between external providers:** For the “provider led” and “hybrid” models, trades across each interconnector will need to be allocated between the relevant capacity providers that are located outside the I-SEM. Three of the four options presented for this allocation received a positive response, as follows:

¹⁰ Draft regulation establishing a guideline for Capacity Allocation and Congestion Management – 24 July 2015. See:

<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R1222>

- **Ignore:** Most of those that provided a response in this area favoured ignoring the allocation of trades at the day-ahead and intra-day stages. This would lead to the reliability options for external participants always being settled against the I-SEM Balancing Market
- **Pro-Rata (net):** Some respondents favoured that cross border trades be allocated to external participants pro-rata to the un-utilised proportion of their reliability options.
- **As Traded:** There was limited support for allocating cross border trades on an ‘as traded; basis for the intra-day and balancing market timescales.

SEM Committee Response

- 3.2.6 The SEM Committee objective is to adopt a solution to cross-border participation that preserves the integrity of the I-SEM Capacity Market itself, and is compatible with European energy market rules.
- 3.2.7 In order for the I-SEM CRM to meet the requirements of the EEAG, the design of the cross-border participation should enable the direct participation of interconnectors and/or foreign capacity.
- 3.2.8 The SEM Committee believes that the hybrid model availability based approach best fits a number of the I-SEM Assessment Criteria, provides a sound basis for efficient cross-border capacity markets and addresses the EEAG requirements. In addition, this is consistent with current thinking from the European Commission¹¹.
- 3.2.9 The SEM Committee acknowledges the concerns over the equal treatment for I-SEM capacity providers and foreign providers and the point raised by some of the respondents that if foreign providers and interconnectors are allowed to compete directly with the domestic capacity then all should be exposed to the same obligations and penalties. However, in its decision process the SEM Committee took into consideration the issue of equal obligations and penalties into the context of market coupling, neighbouring capacity markets and possible market distortion and believes the availability based approach better addresses the overall requirements and makes cross-border participation much more readily implementable.
- 3.2.10 The following paragraphs briefly set out the SEM committee views on the following:
- The Hybrid model – as a preferred enduring solution;
 - The selection of a preferred interim model, as well as a description of that model; and
 - Other issues raised in the consultation paper, specifically relating to:
 - The choice between making difference payments on a “performance” or “availability” basis; and
 - Detailed implementation issues relating to the allocation of trades between interconnectors, and between external capacity providers.

The Hybrid Model

3.2.11 The Hybrid model scores most favourably against all of the I-SEM assessment criteria, save those relating to practicality. In addition, the European Commission is currently consulting on this model as the standard approach for the treatment of cross border capacity at the EU level. The following paragraphs provide:

- An overview of the Hybrid Model; and
- A discussion of the benefits of the Hybrid Model.

Outline of the hybrid model – availability based

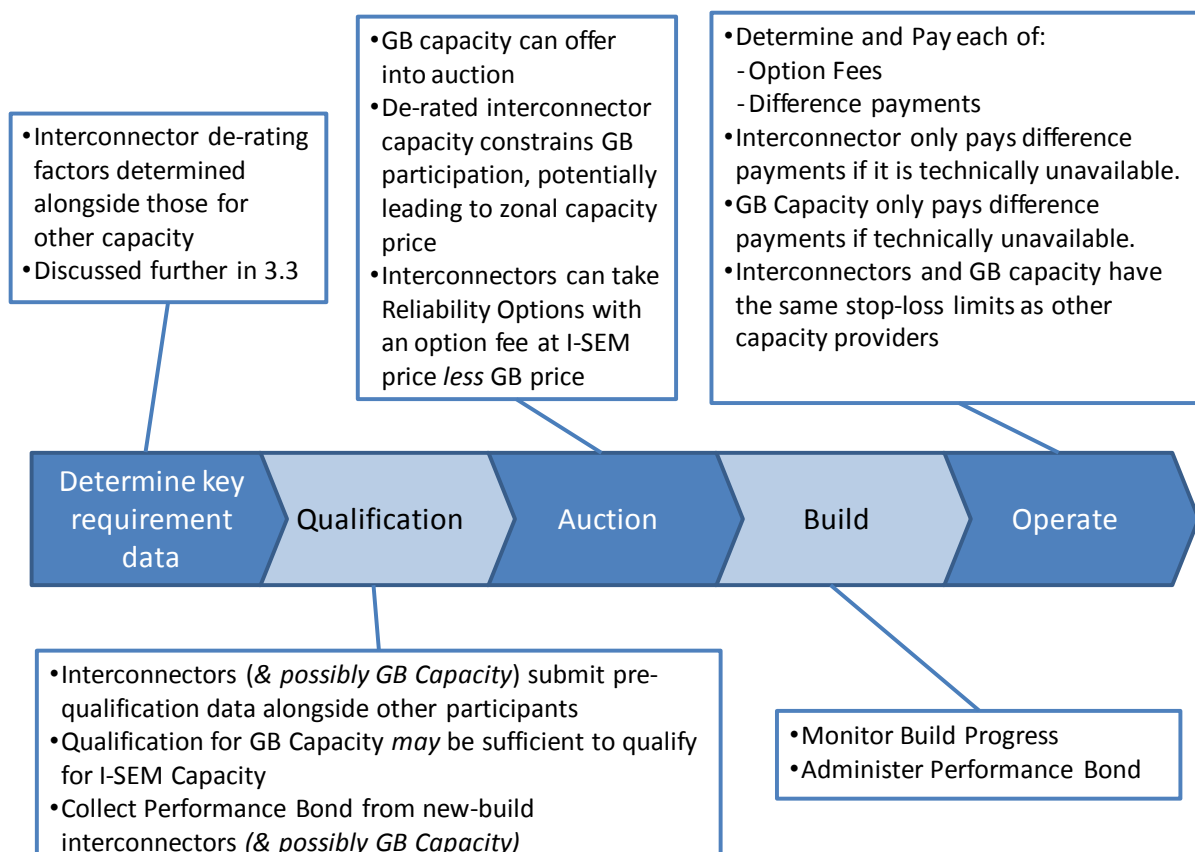
3.2.12 The following paragraphs provide an outline of how a hybrid option would work, based largely on the emerging thinking at European level as set out in the European Commission's recently published Interim Report on the Sector Enquiry into Capacity Mechanisms¹¹, and its consistency with the overall design of the capacity market in I-SEM. As indicated in this discussion, a number of details of this model would need to be refined and agreed with the European Commission as well as neighbouring Member States and National Regulatory Authorities, in particular DECC and Ofgem, before it could be implemented. Nevertheless, we expect that a number of elements of the Reliability Option design will apply to non I-SEM capacity providers in a similar manner to I-SEM Capacity Providers, notably:

- The strike price for the reliability option will be the same for I-SEM and non-I-SEM capacity providers, meaning that the trigger for the calling of the RO will be similar for both zones, i.e. when the I-SEM references prices exceed the single strike price.
- Stop loss limits will apply equally to I-SEM and non-I-SEM capacity providers
- Price Fix durations for new and existing capacity providers as set out in section 5 will apply to non I-SEM capacity providers
- The New Investment Threshold that will be used to determine new investment will apply to non I-SEM capacity providers as well as I-SEM capacity providers

3.2.13 Figure 7 below provides an overview of the end-to end hybrid model, and sets the framework for the subsequent discussion. For simplicity, this discussion refers to non-I-SEM participants as "GB" participants; however, this could apply equally to capacity providers from other member states.

¹¹ http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

Figure 7: End to End overview of hybrid model



3.2.14 For the “Determine Key Requirement Data” stage:

- There is a need to determine a de-rating factor to apply to each interconnector. As with other capacity providers, this de-rating factor will reflect the expected contribution of flows across the interconnectors to the I-SEM generation security standard. This is discussed in more detail 3.3 below.
- De-rating factors will also be required for external capacity. More work is required to define these factors. For example, they could be the same as for equivalent capacity technologies located in the I-SEM, or different – representing the characteristics of that technology in the external market.

3.2.15 For the “Qualification” stage:

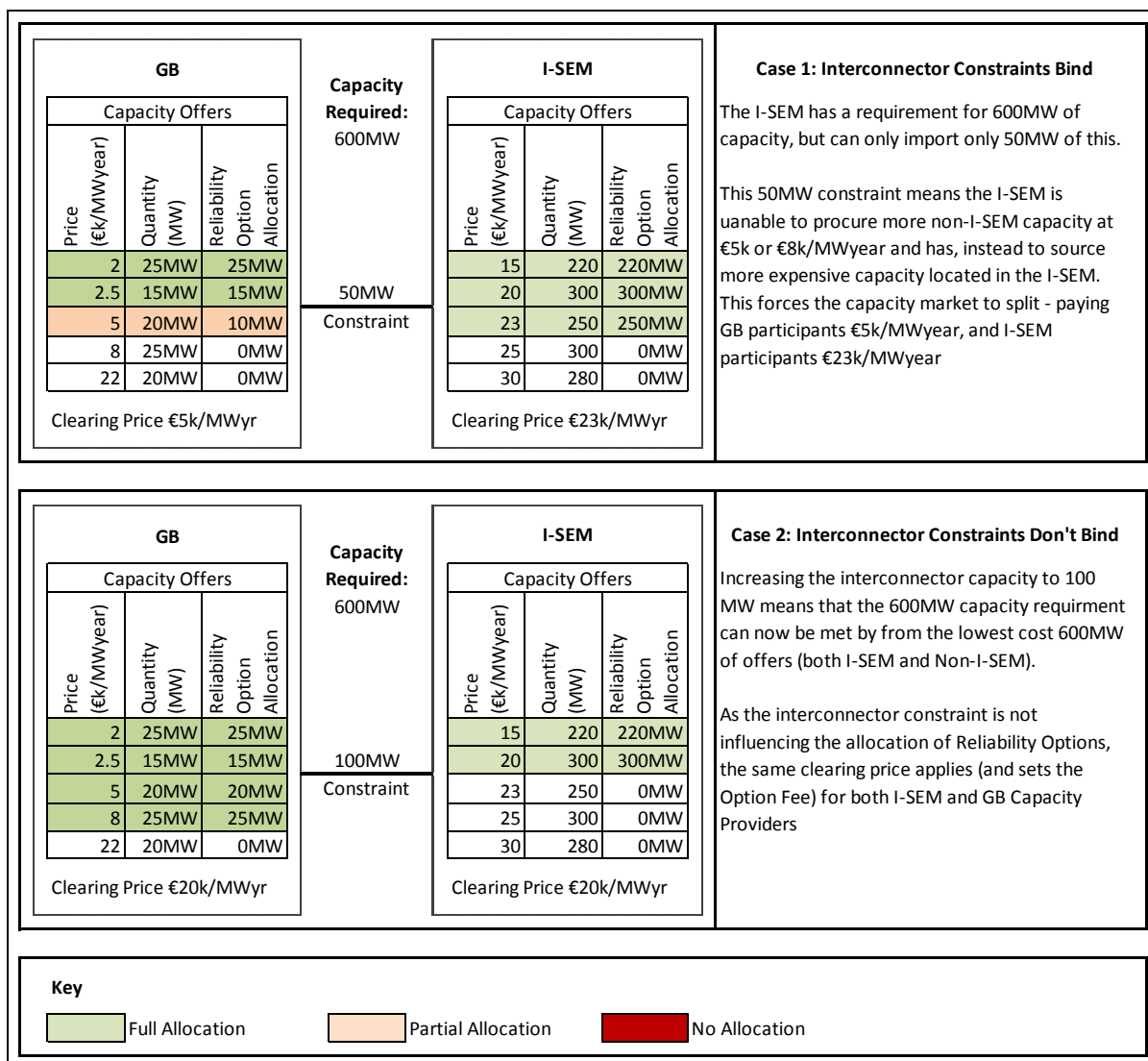
- Interconnectors will have to submit qualification data alongside other participants;
- Decisions need to be taken for how external generators will qualify – relating to whether it is sufficient for them to have qualified for their local CRM, or whether, as seems more likely, they need to explicitly qualify through the I-SEM mechanism;
- Any new build interconnectors or external capacity that qualify will be required to provide a performance bond. The level of this performance bond will be set on a €/MW of capacity basis – at the same €/MW rate as applies to other capacity;

3.2.16 For the “**Auction**” stage, suitably qualified external capacity will be free (not required) to offer their de-rated capacity into the capacity auctions. The auction under the hybrid model is more complicated than the interim ‘interconnector’ based model for cross border participation. There are two elements to this increased complexity (see Figure 8 below):

- **Zonal:** The capacity auction will become zonal – potentially leading to a different clearing price for capacity in GB to that in the I-SEM. As illustrated in Figure 8, this zonality arises because the extent to which GB capacity can contribute to the I-SEM generation security standard will be constrained by the de-rated capacity of (GB to I-SEM) interconnection. Where this constraint “binds”, GB capacity will typically be awarded a lower option fee than capacity located in the I-SEM.
- **Purchase part of a GB Capacity Offer:** The auction is expected to purchase capacity located in the I-SEM on an “all or nothing” basis. For example, an I-SEM capacity provider with a de-rated capacity of 100MW could (through the auction) be awarded a Reliability Option for the full 100MW, or for 0MW. Decisions will need to be taken on whether this approach would also apply to GB plant, or whether (as illustrated in Figure 8), it is appropriate to purchase the capacity for part of the plant (on the basis that its primary market is in GB).

3.2.17 Under the Hybrid model, Interconnectors are represented in the auction as a constraint between zones, but do not otherwise participate. Following the auction, Interconnectors can choose whether to assume the rights and obligations of a Reliability Obligation up to their de-rated capacity. If they do so, the option fee for that Reliability Option will be the difference between the “GB” and “I-SEM” prices. In Case 1 of Figure 8 this would be £18k/MWyr, whilst in Case 2 it would be £0/MWyr.

Figure 8: Zonal Capacity Auction Example



- 3.2.18 The requirements of the **“Build”** stage would apply to any new-build interconnectors (or external capacity) in the same way as it applies to any other new-build capacity within the I-SEM. These arrangements are discussed in more detail in sections 5.5 and 5.6 below.
- 3.2.19 For the **“Operate”** stage, GB capacity providers and interconnectors will receive Option Fees in line with the result of the auction (for GB capacity providers) and their choice on whether to enter into a Reliability Option (for interconnectors).
- 3.2.20 The determination of Reliability Option difference payments in respect of interconnector flows is more complicated under the hybrid model, as these now have to be split between specific GB capacity providers and each of the interconnectors. The exact nature of this split will need to be developed in conjunction with other member states; however, the emerging EU model is that:

- Interconnectors should be responsible for shortfalls in flows that result from their technical unavailability; and
 - GB Capacity providers should be responsible for any remaining shortfall to the extent it is consistent with their technical unavailability.
- 3.2.21 There are further detailed decisions that will need to be agreed with other member states to give effect to this thinking, for example relating to:
- The exact definition of “availability” for GB capacity – including how this will be measured and associated data provision requirements relate to this;
 - Penalty arrangements if the capacity provider has sold capacity in two capacity mechanisms and a period of coincident scarcity occurs.
- 3.2.22 Arrangements for secondary trading of Reliability Options may also differ for GB Capacity providers, interconnectors and I-SEM located capacity.

Benefits of the hybrid model

- 3.2.23 The Implementation of the hybrid model is considered to be an efficient long-term cross-border approach because it:
- Enables direct participation of interconnectors and external capacity providers into the I-SEM capacity market;
 - Effectively splits the revenue for cross-border capacity between external providers and the interconnector operators and thus reflect the relevant contribution each makes to security of supply;
 - Provides locational long term investment signals for either additional interconnection or foreign capacity providers (generation, storage or demand side);
 - Imposes difference payments on non I-SEM capacity providers that fail to meet their cross-border obligations. Physical interconnectors subsequently will be liable for difference payments only if technically unavailable.
- 3.2.24 The SEM Committee and the RAs acknowledge the risk of potential conflicts of interests regarding the role of EirGrid as owners and operator of the East West Interconnector and new functions as Delivery Body for the I-SEM CRM and are in the process of developing the necessary proportionate mitigation measures to protect consumers in this regard.
- 3.2.25 It is important to recognise that the introduction of scarcity pricing as part of the I-SEM balancing market design (along with similar provisions introduced by Ofgem in GB) will help facilitate efficient cross border flows and electricity market coupling with GB.
- 3.2.26 The SEM Committee are also committed to developing cross border balancing arrangements with GB to ensure that clear rules and market mechanisms are in place during periods of coincident scarcity such that energy prices through market coupling are the main driver of cross border electricity flows. The enduring hybrid model of cross border participation in the CRM will be developed in this context.

Interim Model

3.2.27 Whilst the Hybrid model is the SEM Committee’s choice for the long term, its level of complexity is the main impediment for its implementation for the I-SEM ‘go-live’. The hybrid model requires a number of detailed design decisions for it to be applied including:

- The potential need for I-SEM capacity auctions to become zonal. This would be required, for example, to account for the (de-rated interconnector) constraint between GB and the I-SEM that could lead to GB capacity being paid a lower Reliability Option Fee than capacity located in the I-SEM;
- Qualification requirements for non-I-SEM parties, for example including whether qualification for the GB Capacity Market is sufficient to qualify for the I-SEM CRM;
- How to monitor the availability of the non-I-SEM providers;
- The need to agree a number of factors with other regulatory authorities and governments, for example relating to access to data.

3.2.28 The above complexities impact the “Practicality” Assessment Criteria, making it challenging to finalise the details of the design in time for the start of the qualification for the first I-SEM capacity auctions. Therefore:

- The RAs will continue to work with the EU, GB and others towards the integration of neighbouring electricity capacity markets. This will enable capacity providers from those (non-I-SEM) markets to participate in the I-SEM CRM, and hence the implementation of the hybrid model.
- Until it is practical to implement the hybrid model, a simpler interim measure will be applied.

3.2.29 The following paragraphs:

- Consider which of the alternative models for cross border trading should form the basis for the interim; and
- Provide a description of the preferred interim model.

Selection of an interim model

3.2.30 The RAs considered the strengths and weaknesses of each of the remaining models for cross border participation in the I-SEM CRM, notably:

- **Net off demand:** The net off demand model is the simplest to implement. As mentioned in the consultation paper, this model provides implicit participation for cross border participants. This occurs through the potential for:
 - External capacity providers to access high energy prices when capacity is scarce in the I-SEM, as high prices in the I-SEM lead to wholesale price increases in their resident market; and
 - Interconnectors to benefit from access to any difference in the wholesale prices in adjacent markets when there is scarcity on one of those markets and not the

other. This “congestion rent” may be directly retained by the Interconnector, or sold to others through an FTR – with the price paid for that FTR reflecting the expected value of such congestion rent.

However:

- This option does not explicitly remunerate the foreign providers for the security of supply benefits that they deliver to the I-SEM zone and raises the concerns over potential difficulties obtaining State Aid clearance as it does not meet the requirements in the European Commission Guidelines on State aid for environmental protection and energy (EEAG)¹² which require *explicit* participation.
 - This may distort long run investment signals by skewing them in favour of capacity located in the I-SEM zone. If only domestic capacity benefits from the capacity payments and the price certainty they provide, there will be a greater incentive for domestic investment than investment in external capacity or interconnection.
- **FTR led:** The SEM committee remains concerned that the “FTR led” option diverges from the principle that Reliability Options should be physically backed – as FTRs are released progressively from 1 year ahead of delivery. One respondent stated a belief that interconnectors were inherently unreliable, and that the phased release of FTRs from 1 year out was consistent with increasing certainty over their reliability. We do not support this belief and note that interconnector reliability is comparable to that of other capacity providers.
 - **Provider led:** Similar to the Hybrid model, the provider led approach requires the same design decisions and due to its complexity its implementation on time for I-SEM is questionable. In addition, the provider-led approach does not effectively provide price signals to both foreign capacity providers and interconnector operators. This lack of balanced price signals means there is no recognition of the contribution the interconnectors make to the security of supply in the zone operating the capacity mechanism, and therefore no signals for investment in more interconnection if needed. The hybrid approach attempts to remedy this deficiency by giving the interconnectors an incentive to build more capacity.
 - **Interconnector led:** The interconnector led model is relatively simple to implement and will not need consideration of the allocation of trades between external providers. Implementing this approach has a number of potential attractions:

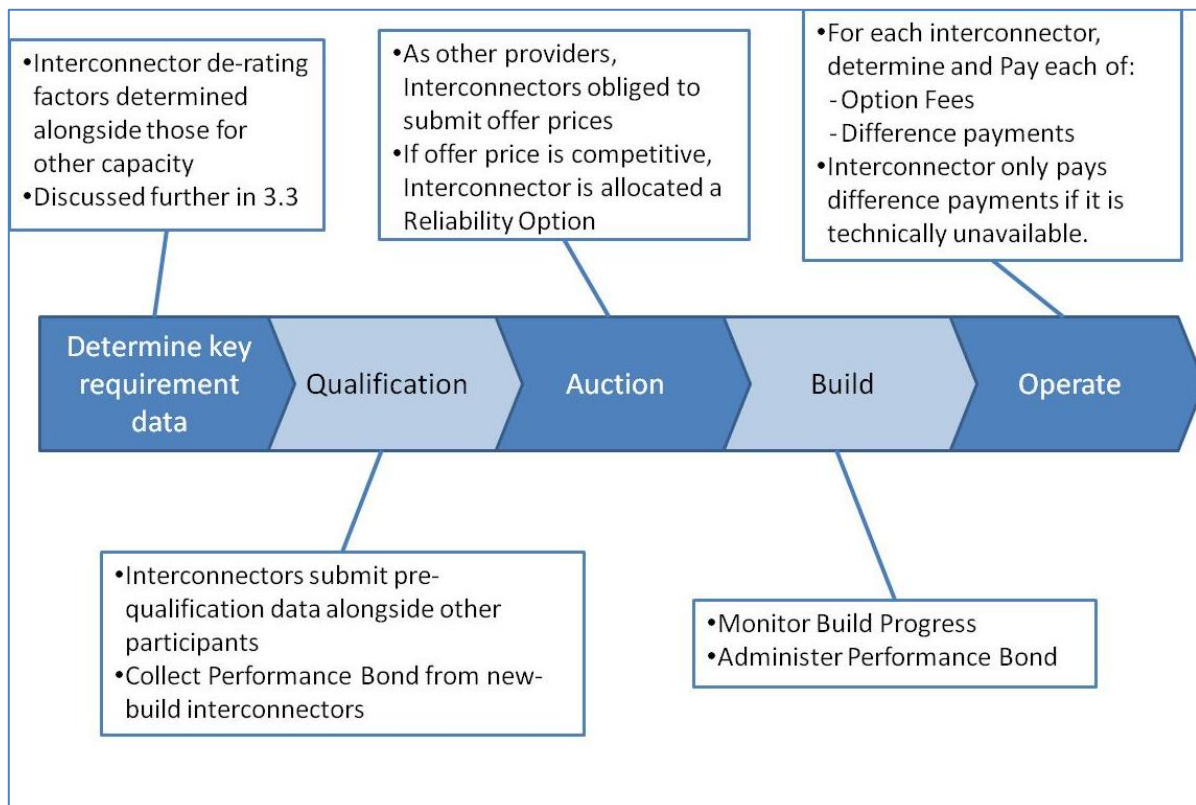
¹²The GB applied net-off demand model for the first year of operating the mechanism, but the approval of the scheme included a commitment that from the second (2015) auction interconnected capacity would be able to directly participate in the Capacity Market. In the second auction (Dec. 2015) interconnectors were admitted to participate

- **Improved incentives:** Allows interconnectors to obtain capacity obligations and therefore provide incentive to be available when they are most needed, as well as for investment in new interconnectors.
- **Possible for Day 1 of I-SEM:** Makes cross border participation much more readily implementable for the first day of I-SEM
- **Part way to the hybrid:** The “Hybrid” model does include interconnector participation. It will be possible to implement the interconnector option in a way that is a stepping stone to the hybrid solution;
- **Similar to GB:** The GB (the I-SEM’s electrical neighbour) has adopted an interconnector led approach for accommodating cross-border participation in its capacity market. Adopting a similar approach for the I-SEM would minimise any distortion in trade between the two markets.

Description of the interim model

3.2.31 Following on from the discussion above, the “Interconnector led” model is preferred as an interim solution. This is described in the following paragraphs using the framework illustrated in Figure 9.

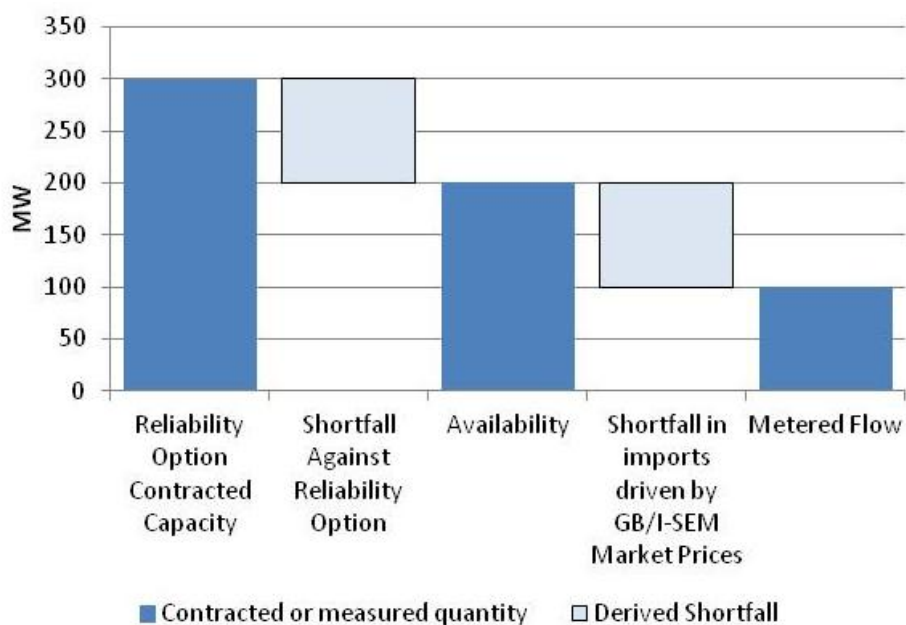
Figure 9: End to End overview of Interconnector model as an interim solution



3.2.32 For the “**Determine Key Requirement Data**” stage, there is a need to determine a de-rating factor to apply to each interconnector. As with other capacity providers, this de-rating factor will reflect the expected contribution of flows across the interconnectors to the I-SEM generation security standard. This is discussed in more detail 3.3 below.

- 3.2.33 For the **“Qualification”** stage, Interconnectors will have to submit qualification data alongside other participants. Any new build interconnectors that qualify will be required to provide a performance bond. The level of this performance bond will be set on a €/MW of capacity basis – at the same €/MW rate as applies to other capacity
- 3.2.34 For the **“Auction”** stage, as with other (I-SEM) capacity providers, Interconnectors will be required to offer their de-rated capacity into the capacity auctions. We would expect the offer made by interconnectors to:
- At least cover their expected exposure to difference payments under the resulting Reliability Option;
 - Be subject to similar limitations on the level of their offer as would apply to other existing capacity providers. This is being considered as part of CRM Consultation 3 (SEM-16-010)
- 3.2.35 The requirements of the **“Build”** stage would apply to any new-build interconnectors in the same way as it applies to any other new-build capacity within the I-SEM. These arrangements are discussed in more detail in sections 5.5 and 5.6 below.
- 3.2.36 For the **“Operate”** stage, interconnectors that hold Reliability Options will be treated substantially the same as any other I-SEM capacity provider. The key difference is that interconnectors will only pay difference payments if they are unavailable and the Balancing Market price is above the Reliability Option strike price. This is consistent with the treatment of other I-SEM capacity providers that are unavailable – as their unavailability would leave them exposed to Reliability Option difference payments based on the Balancing Market. For this to work:
- Difference payments are only made if the total flow across a specific interconnector is less than the Reliability Option Quantity for that interconnector; and
 - The reduced flow across the interconnector is consistent with any reduction in the availability of that interconnector
- 3.2.37 This is illustrated in Figure 10 below, which shows two derived shortfalls for an interconnector. The relevant interconnector would be liable for difference payments for the first of these (shortfall against reliability option). The other shortfall takes the flow across the interconnector below its technical availability, so is driven by prices of energy in GB and the I-SEM, rather than the technical availability of the interconnector.

Figure 10: Interconnector responsibility for import shortfalls



3.2.38 In all respects other than the determination of difference payments, interconnectors would be treated in a manner exactly equivalent to that for other capacity providers. This equivalent treatment includes:

- Any difference payments made by interconnectors would be subject to the same stop loss limits as other providers; and
- Interconnectors would be able to enter into secondary trades of reliability options in an equivalent manner to other providers.

Other issues in consultation paper

The consultation paper raises a number of other issues that have not explicitly been covered as part of the above discussion of the interim and enduring solutions. These are covered below for completeness, and relate to the choice between making difference payments on a “performance” or “availability” basis.

Performance-based vs. Availability Based approach

3.2.39 As discussed in SEM-15-104 there are two ways for measuring the contribution of the foreign participants in the capacity mechanism. Foreign providers may be required to either be available or to be required to actually deliver electricity regardless of whether the local energy market price is sufficient to cover their running costs. With market coupling put in place the foreign capacity providers will have a very minor influence on the direction of the flows across an interconnector and the interconnector itself would have no influence over the flow direction.

3.2.40 Different capacity mechanisms also have different obligations and penalties. Domestic capacity providers argue that the same obligations and penalties should be imposed on

the foreign providers if they are allowed to compete directly with the domestic capacity. While this may appear to be equitable, there are possible complications coming up from the performance-based obligations:

- 3.2.41 If the same assessment of performance is imposed on all capacity providers then, in the context of market coupling, even if foreign capacity providers have incentives to deliver, this will not influence significantly the chances of delivery of energy in a particular direction across a constrained interconnector;
- 3.2.42 Having obligations based on performance measurement may have a negative effect on market coupling. For example, if a generator in zone B is penalised if not delivering energy into zone B whenever there is scarcity in zone A, this means that generator's decision to run is no longer based only on its marginal costs and the price of electricity in zone B. It is also based on the cost of the penalty that will be levied by the zone A capacity mechanism if it does not produce. This could potentially lead to activations of generation plants out of the merit order, therefore causing an efficiency loss if such activated plants participate in the energy market¹³
- 3.2.43 The SEM Committee is concerned about the potential distortions that could arise with a performance based model, and therefore prefers the obligations on foreign capacity providers to be availability based for a number of reasons including:
- The internal wholesale electricity market will function without distortions Member States will have an additional incentive to correct regulatory failures and ensure their electricity prices reflect scarcity – which has further benefits for market functioning as such prices:
 - provide a signal for investment in flexible (generation) capacity;
 - enable demand response.
 - Enables cross-border participation from day one of I-SEM 'go live'.
 - Some of the respondents to the consultation raised the issue that availability based model may provide less security of supply than the performance based approach. However, we believe that the initial determination of the amount of foreign capacity to contract, together with the obligations imposed on the external capacity providers and interconnector operators who participate in the I-SEM capacity market, are enough to ensure that security is provided
 - As stated in Annex 2 to the Commission's recent staff working document¹³:
 - *"...delivery obligations may not be appropriate for interconnectors or foreign capacity. Establishing a relatively simple availability product instead makes cross border participation much more readily implementable and avoids creating distortions in merit order dispatch..."*

¹³ http://ec.europa.eu/competition/sectors/energy/state_aid_to_secure_electricity_supply_en.html

SEM Committee Decision

3.2.44 The SEM Committee has decided that, initially as an interim measure, cross-border participation in the I-SEM CRM should be based on the “interconnector led” model. This will be implemented such that:

- The Interconnector **bids directly** into the I-SEM capacity mechanism;
- **Availability based:** The model will be implemented (and reliability options settled) based on the technical availability of the relevant assets at times when I-SEM market prices are above the Reliability Option strike price. Interconnectors that back Reliability options will be liable to make difference payments at times when there is a technical failure on the relevant interconnector that is restricting the flow of electricity into the capacity market;
- **Mandatory qualification:** Interconnectors will be obliged to submit qualification information for the Capacity Auctions. Other specific requirements will be dealt with in subsequent CRM papers.

3.2.45 The SEM Committee has decided the hybrid model availability based approach to be implemented as an enduring measure. We will develop the hybrid model as part of a regional solution to the inclusion of cross border capacity in CRMs in conjunction with our colleagues in DECC and Ofgem in the context of relevant EU rules and guidelines on the detailed provisions of such a model.

Next steps

3.2.46 This implementation of the interconnector led model is seen as an interim measure, and will be kept under review in the context of developing the proposed hybrid model for cross border participation.

3.2.47 The SEM Committee is committed to working closely with relevant stakeholders including relevant Member States regulatory authorities and the European Commission and explore ways to implement, when practically possible, the hybrid availability based model as a long term approach for cross-border participation in the I-SEM CRM. As such, the RAs intend to develop an implementation plan, in conjunction with DECC and Ofgem, with the aim of facilitating the implementation of the hybrid model for the I-SEM CRM by 2019. It is expected that this process will involve further public consultation on the detailed arrangements for the enduring hybrid model.

Consultation Summary

- 3.3.1 Interconnectors, in line with other capacity providers, need to be de-rated to reflect their expected contribution to the I-SEM capacity requirement. However, determination of the de-rating factor is more complex as it needs to reflect both physical availability and the direction of flow at times of system stress. In the first instance, interconnector flows are based on price differentials in the connected markets.
- 3.3.2 The de-rating factors can be determined on either an ex-post or ex-ante basis, i.e. based on the historic or forecast behaviour of an interconnector. There may be issues with the historic approach given the significant changes between the SEM and I-SEM which will affect price formation.
- 3.3.3 The forecast approach would require analysis of the European power system under a range of scenarios to identify likely flows to the I-SEM at times of stress. Based on GB experience, such analysis may yield a wide range of potential values for the de-rating factor¹⁴.

Summary of Responses

- 3.3.4 The majority of respondents recognised the issues arising from reliance on purely historic data as the basis for de-rating the interconnector.
- 3.3.5 Use of an ex-ante forecast was favoured by the largest number of respondents, with a slightly smaller number preferring an ex-post approach. The majority of respondents favouring the ex-post approach noted that it would need to be adapted to account for known changes between the period covered by historic data and the period to which the interconnector de-rating would apply. A small number of respondents directly proposed use of a combined approach.
- 3.3.6 A small number of respondents suggested the long-term solution would be to use historic data, but all agreed that this would not be possible initially.
- 3.3.7 A few respondents recognised the difficulties of establishing a robust forecast to use as the basis for interconnector de-rating.
- 3.3.8 A substantial minority of respondents were concerned about TSO involvement in the de-rating process, most citing concerns over conflicts of interest relating to EWIC.

¹⁴ Department of Energy and Climate Change, Electricity Market Reform, “Announcement of de-rating methodology for Interconnectors in the Capacity Market”, February 2015.

SEM Committee Response

- 3.3.9 The SEM Committee notes the concerns over the TSOs, as owners of interconnectors, preparing interconnector de-rating factors – and notes that these concerns would be addressed if the RAs were responsible for the determination of these factors. This position is without-prejudice to the SEM Committee’s view on whether any conflict of interest actually exists with the TSOs deriving these factors.
- 3.3.10 The SEM Committee agrees that there are issues with implementing a purely historic approach to the determination of interconnector de-rating factors. In particular, the use of either flows between GB and the SEM or historic price differentials between GB and the SEM will be problematic as:
- the I-SEM market design is substantially different to the SEM design to which historic data relates; and
 - The GB market has also undergone significant change, e.g. the introduction of the carbon floor price in 2013, the EBSCR change to balancing market price formation and the introduction of a capacity market.
- 3.3.11 We would also note that the period for which historic data under the SEM can be obtained covers a period in which markets Europe-wide were carrying surplus capacity and so include limited events of scarcity.
- 3.3.12 More generally, given the rarity of scarcity events, a long time series of historic data is needed to provide confidence in the results of any analysis of the potential contribution of an interconnector to the capacity requirement. For many electricity markets, such a long period of historic data on a consistent basis may not be available.
- 3.3.13 However, the Committee also agrees with those respondents who identified the very serious issues which arise from using a forecast approach. They would note that the attempts by NGC in GB¹⁵ to use fundamental modelling of the European Power System as the basis produced a broad range of possible de-rating factors due to the uncertainty surrounding input assumptions several years into the future.
- 3.3.14 The Committee believes that any similar attempt at modelling the European Power System encounter similar forecasting problems. In particular, any such modelling will suffer from:
- limitations in the availability of consistent historic data covering demand and renewable infeed;
 - the lack of good historic data against which to calibrate the model, especially for periods of scarcity; and
 - The difficulties of capturing extreme events in optimisation models as they suffer from perfect foresight (which removes scarcity events).

¹⁵ National Grid EMR Electricity Capacity Report, 1 June 2015

- 3.3.15 The Committee believe that there is reliable data from operation of the SEM and GB which could be used as an input to the de-rating methodology, e.g. demand, interconnector availability and renewable infeed. This historic data would cover only a rather limited period, 2008 to present: a period with almost no scarcity in either market.
- 3.3.16 In setting de-rating factors for GB, NGC¹⁶ analysed 57 years of historic weather data and looked at the likely coincidence of demand peaks associated with low wind. We believe that this approach has some merits for the I-SEM, but would note that scarcity in the I-SEM requires the combination of high residual demand (i.e. demand net of wind production) and plant outage. The ability of the interconnector to contribute capacity would also depend on the presence of surplus capacity in GB at times of scarcity in the I-SEM.
- 3.3.17 The Committee would plan to augment the historic dataset by reference to a much longer time series of weather data. This larger dataset will then be adapted based on demand forecasts for the SEM and GB.
- 3.3.18 The Committee intends to develop a methodology which for periods of possible scarcity in the I-SEM, will consider the availability of exports from GB in the matching hours. Finally, this estimate would be adjusted down to account for the technical availability of the relevant interconnector.

SEM Committee Decision

- 3.3.19 The SEM Committee has decided that the RAs should develop a methodology to determine the de-rating factors to be applied to interconnectors. This methodology will be based on suitable historic and forecast data for GB and the SEM.

Next Steps

- 3.3.20 The RAs will develop a methodology for the determination of interconnector de-rating factors. This will be progressed alongside the TSO's development of a methodology for the de-rating of other types of capacity providers. It is currently planned that this will form part of a consultation paper to be issued in Q3 2016.

3.4 SUMMARY OF SEM COMMITTEE DECISIONS

- 3.4.1 The SEM Committee has decided that, initially as an interim measure, cross-border participation in the I-SEM CRM should be based on the "interconnector led" model. This will be implemented such that:

¹⁶ *ibid*

- The Interconnector **bids directly** into the I-SEM capacity mechanism;
 - **Availability based:** The model will be implemented (and reliability options settled) based on the technical availability of the relevant assets at times when I-SEM market prices are above the Reliability Option strike price. Interconnectors that back Reliability options will be liable to make difference payments at times its reduced availability is restricting the flow of electricity into the capacity market;
 - **Mandatory qualification:** Interconnectors will be obliged to submit qualification information for the Capacity Auctions. Other specific requirements will be dealt with in subsequent CRM papers.
- 3.4.2 The SEM Committee decided the hybrid model availability based approach will be implemented as an enduring measure. We will develop the Hybrid Model as part of a regional solution to the inclusion of cross border capacity in CRMs in conjunction with our colleagues in DECC and Ofgem in the context of relevant EU rules and guidelines on the detailed provisions of such a model.
- 3.4.3 The SEM Committee has decided that the RAs should develop a methodology to determine the de-rating factors to be applied to interconnectors. This methodology will be based on suitable historic and forecast data for GB and the SEM.

4. SECONDARY TRADING

4.1 INTRODUCTION

4.1.1 The primary trading of Reliability Options will be via centralised auctions. Section 3.1 of SEM-15-104 considered the question of supplementing the centralised auctions with secondary trading facilities. Detailed consideration was given to a number of issues, including:

- **The case for secondary trading:** Whether the *capacity* provider that sold capacity at auction should be allowed to trade its rights and obligations to a third party capacity provider (i.e. will secondary trading be allowed)
- **Secondary trading marketplace:** Whether the RAs should require that the Capacity Market Delivery Body put in place a secondary trading platform, and whether the RAs should require that any secondary trading must take place on the secondary platform
- **Limits on secondary purchasing:** Whether a capacity provider should be limited in the amount of capacity it is allowed to trade in the secondary market, like in the auction, where it is limited to its de-rated capacity.
- **Limits on secondary trading timeframes:** How soon after the auction and how close to (or even after) delivery a capacity obligation can be traded
- **Stop-loss limits and secondary trading:** Whether a secondary holder of a capacity obligation should start from a zero position against the stop-loss limit, or whether the loss should transfer.

4.1.2 For clarity, this section has been drafted such that Reliability Options are always described in terms of **capacity** or a **capacity obligation**. In consequence, a participant that is successful in the primary auction will be described as *selling* capacity. If this participant later, via secondary trading, chooses to reduce its capacity obligation then it will be described as *buying* capacity from *another* participant. This second participant will be described as having *sold* its capacity.

4.2 CASE FOR SECONDARY TRADING

Consultation Summary

4.2.1 When a capacity provider is successful in a primary auction, it is considered to have sold capacity leading to a number of rights and obligations:

- The right to the capacity option fee; and

- The obligation to make difference payments when the Market Reference Price exceeds the Strike Price.
- 4.2.2 The holder of a capacity obligation may want to trade its rights and obligations to a third party capacity provider for a number of reasons, these include:
- when its plant is on temporary planned outage or is on prolonged forced outage;
 - if plant reliability has degraded to a point whereby it no longer wants the exposure to difference payments; and
 - if its capacity is no longer economic and it wishes to close the plant before the end of its existing capacity obligation.
- 4.2.3 If a Reliability Option holder passes on these rights and obligations to a third party via secondary trading, this could take different forms:
- **Direct secondary trading.** In this model, the obligation holder, who sold capacity in the auction, buys capacity from a third party on the secondary market. This third party assumes all the rights and obligations of the original obligation holder. For this process to work, the third party will need to have undergone the same pre-qualification process as the original auction participant. This secondary trading could occur on an organised central secondary trading platform, if one exists, or it could be negotiated bi-laterally between market participants;
 - **“Back-to-back” trading.** In this model, the original obligation holder lays-off its purely financial rights and obligations to a third party by buying a financial call-option (in the form of a one-way CfD). The obligation holder negotiates with third parties to buy a one-way CfD, which has the same Market Reference Price, Strike Price, start and end date as the original obligation. It has therefore passed on its exposure to difference payments to the third party through the CfD market, and this is typically known as “back-to-back” trading. The original auction winner retains the original contractual relationship, and has the obligation to pay the difference payments to Suppliers, although it expects to be able to recoup these payments from the third party. Note this is purely a financial trade; the third party has not undergone any pre-qualification process and may not be backed by physical plant.

Summary of Responses Received

- 4.2.4 Respondents were universally in favour of secondary trading being permitted. A small number of responses mentioned concerns about concentration in the capacity market and the need for measures to reduce the potential for abuse arising from this concentration in secondary trading.
- 4.2.5 A number of participants made an explicit connection between secondary trading and outage management, with the point made that without secondary trading, ensuring efficient outage planning and amendments would not be compatible with the CRM.

- 4.2.6 The majority of responses were in favour of allowing “back-to-back” trading. Of these responses, some included additional comments around conditions for when such an approach should be used. These included:
- Ensuring all “back-to-back” trades are physically backed
 - Limiting “back-to-back” trades to short duration; and
 - Maintaining direct trading simultaneously as a preferred route to market.
- 4.2.7 One respondent made mention of the fundamental trade-off between improving liquidity and ensuring system security which the two approaches represent.

SEM Committee Response

- 4.2.8 International experience in capacity market design suggests that there are good reasons for permitting secondary trading. The design of capacity markets in North America^{17,18} feature secondary trading arrangements and DECC has recently consulted industry on the same topic in GB with a view to increasing the functionality and inclusiveness of the capacity market¹⁹. Evidence from the GB and several US capacity markets suggests secondary trading is used primarily to cover technical variations in the capacity available from the underlying plant. These technical variations are driven by forced and planned outages.
- 4.2.9 This has led to secondary markets that are typically:
- **Illiquid:** with relatively few trades; and
 - **Based on custom products:** outages differ in size and length, with each tending to need a custom product
- 4.2.10 We are aware that some standard products are emerging in the GB secondary markets, but that these:
- Typically relate to call options to cover forced outages; and
 - Tend to be converted into physical secondary trades if the option is called
- 4.2.11 We would expect the drivers of secondary trading to be similar in the I-SEM.
- 4.2.12 Based on the experience of other markets, it is clear that secondary trading of capacity should be accommodated in the I-SEM. This is consistent with a number of the I-SEM Assessment Criteria, notably:

¹⁷ ISO NE: <http://www.iso-ne.com/markets-operations/markets/forward-capacity-market/fcm-participation-guide/overview-and-timeline>

¹⁸ PJM: <http://pjm.com/markets-and-operations/rpm.aspx>

¹⁹ Consultation on reforms to the Capacity Market, October 2015: <https://www.gov.uk/government/consultations/2015-consultation-on-capacity-market-supplementary-design-proposals-and-changes-to-the-rules-and-regulations>

- **Efficiency:** capacity obligation holders need to make outage plans at various points in time over the course of the delivery period. Secondary trading allows for communication of a price signal in response to this need, which in turn enables more efficient costing of capacity.
 - **Competition:** secondary trading can support efficient entry and exit to the I-SEM, by providing a clear and transparent price for the cost of covering plant outages.
- 4.2.13 The participants in this market should represent the underlying assets in question; therefore, it is sensible for counterparties to be at unit level, consistent with the holders of capacity obligations, and for all trades to be physically backed.
- 4.2.14 The SEM Committee believes that direct secondary trading has several advantages over “back-to-back” trading, consistent with the I-SEM Assessment Criteria:
- **Stability:** All counterparties in a direct trade have undergone pre-qualification, therefore there is a certified level of predictability and confidence around the delivery of capacity
 - **Competition:** Direct trading is naturally more transparent, with clarity ahead of delivery as to which party is responsible for the rights and obligations associated with the traded capacity.
- 4.2.15 We also recognise that “back-to-back” trading may afford advantages to some participants in terms of adaptability and efficiency (both I-SEM Assessment Criteria). Given that it would be difficult to restrict “back-to-back” trading, such a restriction would not be consistent with the practicality criterion. We therefore do not believe it is sensible or desirable to limit the use of “back-to-back” trading.
- 4.2.16 The use of “back-to-back” trading allows participants to trade with whoever they choose, be it other generators or financial institutions. The timing of these trades will be privately determined by the participants involved in the trade. The size of these trades will also be privately negotiated, allowing more custom products to be traded.
- 4.2.17 It is important to note that direct secondary trading and “back-to-back” trading are not mutually exclusive options. While the SEM Committee has decided to put in place mechanisms to facilitate direct secondary trading (see the rest of this section) these would not preclude “back-to-back” trading developing organically.
- 4.2.18 In addition to the above options of direct secondary trading and “back-to-back” secondary trading, participants may be able to cover exposure to RO difference payments by using virtual bidding. In this scenario a unit would use a virtual bid to buy energy in the DAM to match the RO quantity it is exposed to. The unit would then either sell this energy back into the IDM or let it spill into the BM (based on projections closer to the time). Virtual bidding is described further in Appendix A.

SEM Committee Decision

4.2.19 The SEM Committee has decided to include secondary trading within the I-SEM CRM. This will promote direct trading between counterparties. Counterparties in this market will be at unit level, consistent with the holding of capacity obligations. All trades through any centralised mechanism are to be physically backed. This does not preclude market participants also using “back-to-back” trading to manage their financial exposure from holding a Reliability Option.

4.3 REQUIREMENT FOR A CENTRALISED SECONDARY MARKETPLACE

Consultation Summary

4.3.1 In SEM-15-104, several options for where direct secondary trading of Reliability Options could take place were proposed. Key options to consider were:

- **No Centralised Market:** This option leaves secondary trading entirely to the market. An organised marketplace (e.g. exchange, broker platform) may develop if market participants want it to, or trading could be entirely bi-lateral;
- **Optional Centralised Market:** This option establishes a centrally funded marketplace for secondary trading of capacity, but does not preclude the emergence of competing marketplaces, or the bi-lateral trading of capacity;
- **Mandatory Centralised Market:** This option establishes a centrally funded marketplace for secondary trading of capacity. Only trades enacted through that centrally funded marketplace will be recognised in the settlement of capacity; or
- **No Centralised Market for go-live:** This option would allow secondary trading in the market initially for go live of I-SEM. However, a centrally funded marketplace for secondary trading of capacity would be subsequently developed.

4.3.2 An assessment of these options against the I-SEM Assessment Criteria is set out below:

- **Competition:** The “mandatory centralised market” option will be best for competition, with no centralised market being worst. The creation of a centralised market will increase transparency over the secondary value of capacity. This transparency will reduce new-entrant’s uncertainty over future capacity and ability to manage scheduled outages– ultimately leading to lower costs to consumers.

Making the centralised market mandatory has further benefits in terms of increasing the confidence that all capacity providers will be able to trade their capacity at an efficient price. It does this by:

- concentrating liquidity in one place; and
- forcing portfolio holders of capacity obligations to use the market to trade (e.g. to cover outages) rather than internally transferring capacity between their assets.

- **Stability:** The centralised marketplace options are inherently more stable than the alternative of leaving trading entirely to the market. Once a centralised marketplace is established, it is likely to endure; however, voluntary markets are not guaranteed
- **Efficiency:** Trading for capacity will enhance efficiency – regardless of which option is adopted. The efficiency of trading is arguably better in liquid markets; this would argue for the “mandatory centralised trading” option
- **Equity:** The choice of leaving secondary trading to the market or an optional centralised market may disadvantage smaller participants in the market
- **Practicality/Cost:** There are a number of points against this Assessment Criteria:
 - There is a cost associated with the creation of a centralised marketplace; however, these costs do not need to be prohibitive. In the early days of Nord Pool, the forward market consisted of little more than a few phones and a white board;
 - Any centralised market will need to accommodate the range of trades that may be required by participants. This could include trade for a few weeks (e.g. to cover a planned maintenance outage) or for significantly longer periods (e.g. if a catastrophic failure causes a plant to close)

4.3.3 The nature of products was also raised, noting that there is a choice of whether to base the secondary trading around:

- **Standard products** – for example covering 1MW of cover for a defined week; or
- **Custom products** – where the buyer and seller agree the period for which capacity is to be traded, and the volume of capacity that is transferred

Summary of Responses Received

- 4.3.4 The majority of respondents stated that a single, central platform would be the preferred venue for secondary trading. Of these responses, the majority favoured an exclusive, mandatory platform.
- 4.3.5 A small number of respondents preferred an optional platform, and a smaller number still preferred the market to freely define its own platform. One respondent stated that a mandatory rather than optional central platform would lead to reduced market liquidity.
- 4.3.6 A number of respondents stated that the need for a central platform is not pressing at the point of go-live. One respondent suggested that alternative arrangements during the transition period could be put in place and a central platform be implemented at a later date. However, a number of respondents were strongly in favour of a central platform being available at the point of go-live.
- 4.3.7 The majority of respondents stated that there is enough demand to justify a central platform. Some stated that it would be of particular importance in aiding transparency in the market. There was also consensus from a number of responses that the cost to

set up need not be high and that there need not be high complexity to ensure a well-functioning platform

- 4.3.8 Some respondents also noted that while appetite exists, there may not be sufficient volume in the market, particularly after the initial introduction. One response noted that in GB, further support has been required to develop secondary trading in the face of likely low volumes.
- 4.3.9 A number of respondents expressed a preference for standardised products. There was also a number expressing a desire for low granularity products.

SEM Committee Response

Need for a Centralised Platform

- 4.3.10 As discussed in above, there are clear benefits in allowing the secondary trading of capacity. Any secondary trading arrangements would create a need for all secondary trades to be logged as part of a central register (to ensure that the variation in capacity obligations over time can be tracked) but the venue(s) for secondary trading and participation could safely be left for the market to determine. In a perfectly competitive market, this would be sufficient but in the I-SEM additional measures will be required to alleviate the potential adverse consequences of concentration of ownership in the capacity market and to ensure price transparency and market access are available to all participants.
- 4.3.11 This leads to a need for a number of related decisions around:
- Whether a market for secondary trading will emerge naturally, or needs to be established centrally;
 - Whether any central trading platform should be exclusive. This would mean that only trades enacted through that platform are recognised by the SEMO for the settlement of Reliability Options; and
 - The type of trading that is expected (in terms of products and liquidity), which will impact the type of marketplace that is required
 - Any interim mechanisms required for go-live
- 4.3.12 These decisions will impact on the extent to which secondary trading delivers efficiency benefits to all participants. These benefits arise from providing plant that has sold capacity with a means to manage risks arising from genuine variations in the availability of the plant.
- 4.3.13 A number of factors could act to frustrate the delivery of this efficiency benefit, notably including the following (both of which relate to the “competition” assessment criterion):
- **Transparency:** parties are most likely to trade efficiently if they have a clear idea of the efficient price for their trade. This is best delivered by having public-domain price information based on the price of all (or a significant number of) trades. As

discussed in 4.2.9, we expect secondary trading of capacity (at least for outage cover) to be relatively illiquid, arguing that transparency will be significantly enhanced if all trades are forced to go through a single marketplace

- **Access:** exchanges and other forms of marketplace can lower barriers to entry, providing smaller players with access to the counterparts they need. This contrasts with less formal (e.g. bilateral phone based) markets, where a new entrant or small player may have a difficulty in establishing the network of trading contracts it requires to be efficient and successful

4.3.14 The above two factors argue strongly for a centrally established marketplace through which all direct secondary trades must be enacted. This represents a trade-off between two of the I-SEM Assessment Criteria:

- **Competition:** the improved transparency and reduced barriers to entry act to enhance competition, and;
- **Adaptability:** whilst a central marketplace will be adaptable, it may not respond to the needs of traders as well as if it were exposed to competition from other marketplaces. This loss of “adaptability” is (at least in part) offset by the potential for “back-to-back” trade which will occur outside the centralised marketplace.

The Form of the Marketplace

4.3.15 The type of marketplace depends on the nature of the capacity trades expected. Experience from other markets suggests there will be relatively illiquid trading of custom products, driven by plant outages. This could argue for either a bulletin board/broker platform or an auction-based platform. Products would be based on an aggregation of settlement days²⁰: either directly via a bulletin board or via trading in a “standard” weekly auctioned product which shifts to a “standard” daily product closer to real time, e.g. in the final quarter, through an auction platform. The use of an auction platform and standardised products may offer greater opportunities for price discovery and better anonymity for participants looking to manage an outage. There will also be practicality and cost advantages to the auction-based approach if it can make use of an existing platform.

4.3.16 The minimum trade quantity should also be standardised in order to assist market liquidity. Bearing in mind that outage planning is reported to TSOs at MW granularity, the SEM Committee believes 1MW to be a sensible minimum.

4.3.17 Given its advantages described above, the SEM Committee prefers the auction-based solution.

²⁰ Outage planning granularity at the point of submission to TSO is defined at daily rather than hourly granularity

The Interim Solution

- 4.3.18 There is a concern that setting up the arrangements for a trading venue and associated processes may be difficult to complete ahead of go-live. This necessitates having interim arrangements that can replicate the design to the necessary degree in the available time.
- 4.3.19 The SEM Committee believes that such interim measures are necessary to assist with outage management, and therefore a service needs to be offered whereby participants can manage their capacity obligations at times of planned outage. This ability would be limited to a maximum period of use within a Capacity Year, as laid out in section **Error! Reference source not found.**
- 4.3.20 A planned outage would be defined as an outage which forms part of the **Committed Outage Programme** (Ireland) or **Final Outage Programme** (Northern Ireland) defined under the Operating Code of the relevant Grid Code. This outage programme is set at the year-ahead stage, but can be changed closer to real time. However, any such change is subject to TSO approval which would be withheld if it were to have a detrimental effect on capacity adequacy or transmission system security.
- 4.3.21 While the Grid Codes have similar definitions of outage programmes, ideally these would be further conformed to ensure consistency of treatment of capacity in Ireland and Northern Ireland.
- 4.3.22 The effect of the interim arrangements to manage planned outage would be to suspend both payments of option fees to the capacity provider and the need to make difference payments by the provider for the duration of the outage. This could be implemented in a number of ways: the final choice will form part of the detailed implementation. Normal CRM settlement, including socialisation, will manage any variation in payments due to or from Suppliers arising from use of the interim solution.

Managing Concentration in the Capacity Market

- 4.3.23 The use of a centralised marketplace and the measures with respect to the limits on secondary trading of capacity laid out in 4.3 and 4.4 are intended to maximise liquidity and ameliorate the adverse impact of concentration in the capacity market.
- 4.3.24 The RAs will carefully monitor the functioning of the secondary trading marketplace and if it becomes apparent that further measures are needed to manage the issues arising from concentration then the RAs will consult on such measures at that time.

SEM Committee Decision

- 4.3.25 The SEM Committee believes a mandatory centralised market is the best option for secondary trading.
- 4.3.26 This centralised platform will be developed on the basis of an auction-based platform.

4.3.27 Reasonable endeavours will be taken to develop the arrangements described in time for I-SEM go-live. If this is not possible, an interim solution will be put in place to allow counterparties to manage planned outage volumes by suspension of both option fees and difference payments in relation to the affected unit for the duration of the outage. This option will only cover a limited period of planned outage as defined in section **Error! Reference source not found.** Planned outage will be as defined in the relevant Grid Code, i.e. an outage included in the Committed Outage Programme (Ireland) or Final Outage Programme (Northern Ireland).

Next Steps

4.3.28 The TSOs will review the Grid Codes to ensure consistency in the definitions of outage programme.

4.4 LIMITS ON SECONDARY PURCHASING

Consultation Summary

- 4.4.1 In the primary auction, a capacity provider cannot offer to sell capacity in excess of its de-rated capacity. The key question is whether the same rule should be applied to secondary trading.
- 4.4.2 There are a number of reasons to allow a capacity provider to sell more capacity, than its de-rated capacity in the weeks approaching delivery. For example:
- In a “tight” system, the aggregate capacity headroom (between nameplate and de-rated capacity) is implicitly required to provide cover for plant that is unavailable (due to maintenance or otherwise);
 - In the weeks approaching delivery, a capacity provider will know whether it has any planned maintenance outages over the relevant period;
 - The output from intermittent plant is weather dependant and so seasonal. There are times of year when the expected output of the plant will be higher than average, meaning that plant may be prepared to provide a greater contribution to the overall capacity requirement.
- 4.4.3 Although the certainty of plant availability will increase approaching delivery, the probability of forced outages will remain non-zero at all times of year. In addition, whilst intermittent plant may be more predictable 5 days ahead of delivery, allowing plant of any technology to take on capacity obligations up to its nameplate capacity or Maximum Export Capacity is likely to overstate its potential contribution to alleviating scarcity.

Summary of Responses Received

- 4.4.4 The majority of respondents stated that the de-rated limit should be relaxed to nameplate capacity or Maximum Export Capacity for secondary trading.
- 4.4.5 One respondent made an additional point around timing, that the limit should only be relaxed a year before delivery (only applicable to those plants with a long-term capacity obligation).
- 4.4.6 A number of respondents stated the need to ensure that while nameplate capacity should be the cap, there should be measures in place to ensure mitigation of the adverse impact of concentration in the capacity market, including imposing minimum volumes to be made available to the market by participants that hold a large volume of capacity obligations.
- 4.4.7 An alternative view was put forward that generators should only be able to offer above de-rated capacity close to real time - as forecasts become more accurate.
- 4.4.8 One participant raised concerns over whether there would be sufficient spare capacity from Reliability Option contracted plant to cover the expected level of planned and forced outages.

SEM Committee Response

- 4.4.9 The SEM Committee response has a number of elements that are considered separately below. These relate to the following areas:
- Trading above de-rated capacity;
 - Trading between load-following and de-rated capacity; and
 - Whether there is sufficient capacity available to cover planned and forced outages.

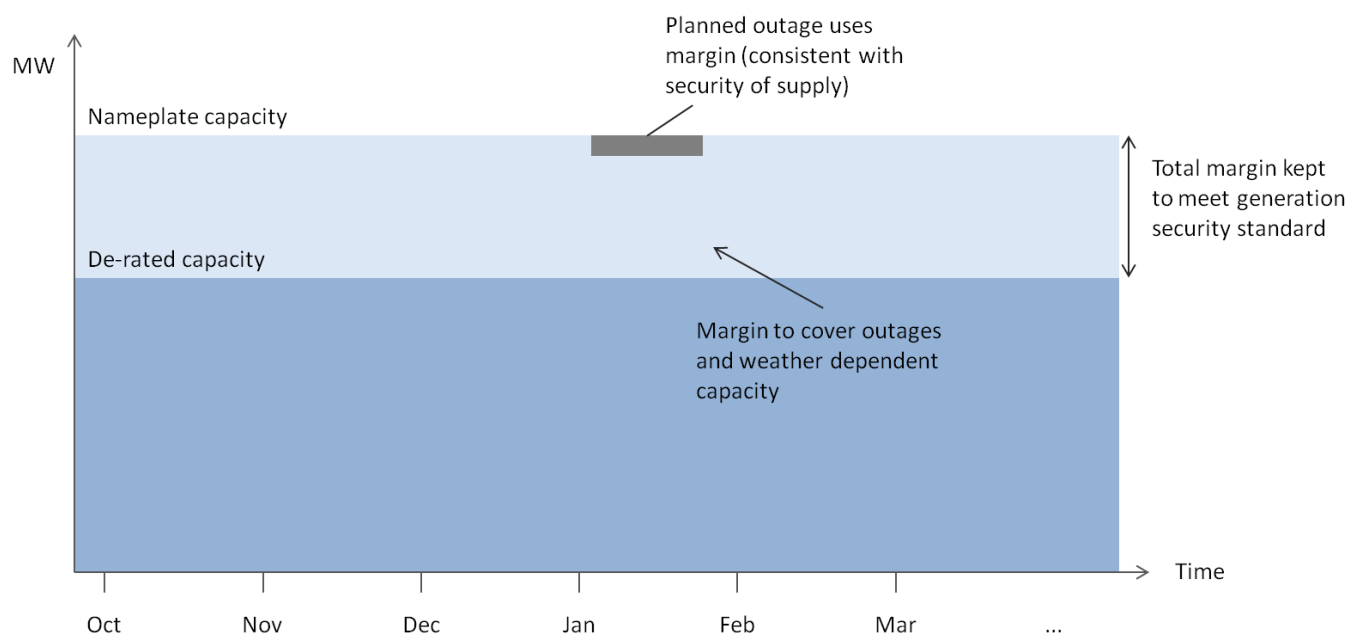
Trading above de-rated capacity

- 4.4.10 Allowing secondary trades of capacity above the level of de-rated capacity which can participate in a Reliability Option primary auction would be to increase the liquidity available for secondary trading and so enhance the ability of capacity providers to manage outages. However, this increase in liquidity should not be at the cost of a diminution in the security of supply purchased by the market through that primary Auction.
- 4.4.11 Any decision in this area will potentially represent a trade-off between two key I-SEM Assessment Criteria:
- **Security of supply:** the I-SEM CRM will purchase sufficient de-rated capacity to meet the capacity requirement and so provide the required security of supply. Some respondents have raised concerns that security of supply would be undermined if secondary trading were to allow plant to sell capacity above its de-rated capacity.

- **Efficiency:** capacity obligations are initially acquired from plant through auctions with most or all²¹ such plant selling capacity to the level of their de-rated capacity. This portfolio of plant is sufficient for security of supply, including a margin (between de-rated and nameplate capacity – see Figure 11) to cover outages and weather-dependent capacity variation

4.4.12 The figure below shows the contracted de-rated capacity (in dark blue) and the total nameplate capacity provided by this contracted capacity (the dark and light blue together). This additional capacity provides a margin to compensate for plant unavailable through normal outages (planned and forced) and which arise from weather-related variation in plant output.

Figure 11: Security of supply margins



4.4.13 Restricting secondary trading to de-rated capacity would mean that secondary trading for outage cover would rely on capacity from outside the contracted portfolio and this could lead to consumers over-paying for outage cover. Not only will consumers have paid to buy capacity in the primary auction, but the price at which this capacity was offered will have taken account of the additional costs of purchasing outage cover from uncontracted capacity. Indirectly, consumers will be purchasing capacity above the capacity requirement with a concomitant loss of efficiency.

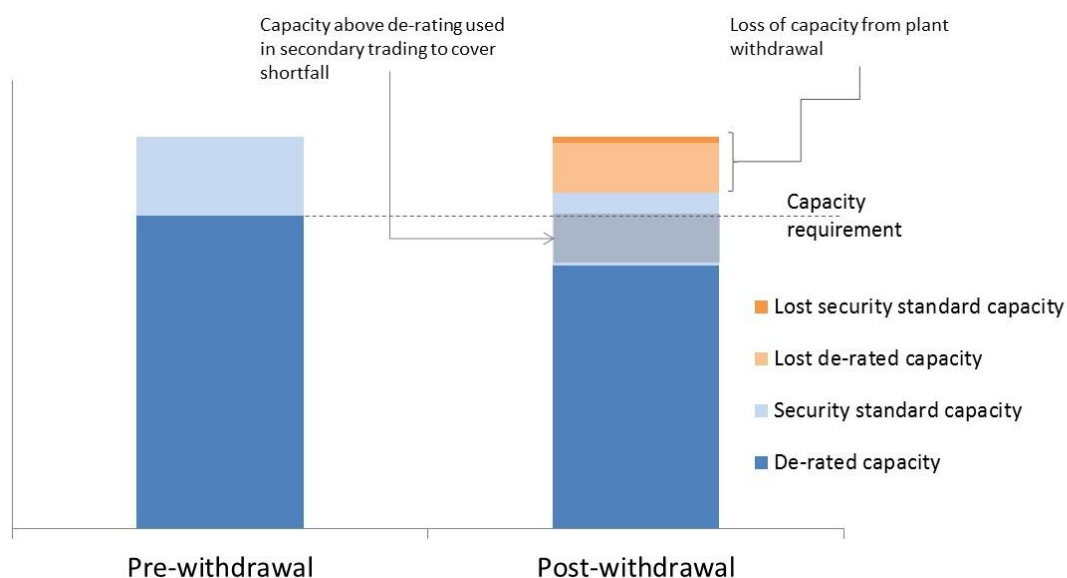
4.4.14 The SEM Committee acknowledges the trade-off between the potential risk to security of supply and efficiency, but would note, as illustrated in Figure 11, that the portfolio of capacity contracted through the primary auctions includes a margin to cover outages and weather-dependent capacity. As such:

²¹ It is possible that some plant will offer less than its de-rated capacity into the auctions.

- It is reasonable and efficient for plant to be able to access this margin where secondary trading is driven by these factors.
- In practice, the security standard may still be maintained through the presence of uncontracted capacity – though this may be expected to decline over time – but even in this situation, the consumer has effectively paid for a higher capacity requirement than is being delivered and uncontracted capacity has lost out on a potential auction sale.

4.4.15 Accessing this margin where secondary trading is driven by other factors could negatively impact security of supply. For example, a plant could close having bought capacity to offset its capacity obligations from capacity contracted through the primary auctions. In this situation, the capacity requirement is unchanged, but less contracted capacity is now available and so there has been an erosion of the security standard as illustrated in Figure 12.

Figure 12: Security standard reduction with plant withdrawal



4.4.16 The above two factors can be reconciled if secondary trading can **only** access the margin between de-rated and nameplate capacity for legitimate technical reasons, in particular those that are considered in the determination of the de-rating factors. Specifically, these reasons would cover the normal level of:

- Forced outages
- Planned outages
- Weather-dependent variability in the capacity of (renewable) intermittent plant

4.4.17 The above approach leads to consideration of the “practicality” I-SEM assessment criterion, specifically whether it is practical to police and enforce any restriction on secondary trading which uses the margin between the nameplate and de-rated capacity of contracted units. In this context, the SEM Committee notes:

- Data will exist on the extent to which each plant has accessed this margin;
- Where a specific plant's usage of the margin is at a rate which makes it an outlier compared to plant of a similar type, it would suggest that plant is potentially abusing the restriction;
- Reliability Options are "wholesale energy products" within the context of REMIT²²;
- Breaching the restriction could therefore be judged as manipulation of energy markets, and addressed through the RAs' existing powers under REMIT²³; and
- It would be very unusual for plant to have more than 70 days (10 weeks) on outage in any 12-month period²⁴.

Trading between Load Following Obligation and Derated Capacity

- 4.4.18 CRM Decision 1 says that the capacity obligation should be load-following, i.e. that the volume of capacity against which difference payments are made should be scaled down pro-rata to the requirement for capacity in a period.
- 4.4.19 This reduction in capacity obligation with respect to making difference payments is likely to be at its greatest during the summer months which is also the peak period for participants seeking to secondary trade their planned outage profile. At the Industry Workshop on 5 April 2016, it was suggested that this capacity should be allowed to participate in secondary trading would improve liquidity. However, it should be noted that at such times of reduced obligation, the expectation of scarcity would be low and so trading would be expected to occur at very low prices.
- 4.4.20 The GB market also has a load-following capacity obligation. In GB, the margin between the adjusted load-following obligation and de-rated capacity can be traded between capacity market units via the Volume Reallocation process. This is not directly analogous with secondary trading as defined for the I-SEM as the GB Volume Reallocation process is done on an ex-post basis but does offer external support for allowing its participation.
- 4.4.21 The SEM Committee agrees that releasing the capacity between the adjusted load following obligation and de-rated capacity would enhance the liquidity available for secondary trading.
- 4.4.22 Under the I-SEM, the adjusted load-following obligation is only defined in real-time but if secondary trading is to access the volumes "freed" by load-following, this volume will need to be defined in advance. This may be at the year-ahead stage for planned outages based on the determination of the outage programme under the Grid Codes. As a consequence, a profile will need to be established before the start of the capacity

²² Regulation (EU) No 1227/2011, Article 2.4.b

²³ Ibid, Article 13

²⁴ Based on the All-Island Outage Plans published by SEMO for the years 2014-2017.

year which will be used to determine the load-following obligation which will be used to determine the volume of capacity accessible to secondary trading

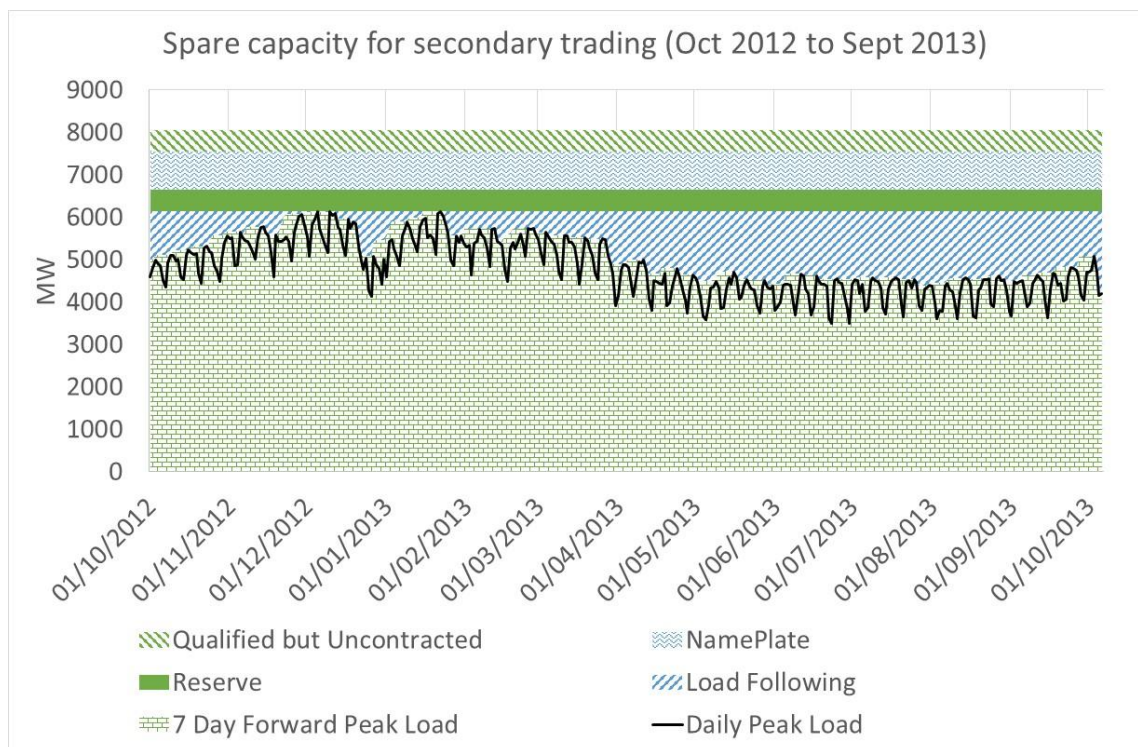
Sufficiency of contracted capacity to cover planned and forced outages

4.4.23 Secondary trading of reliability options will allow plant to buy capacity from suitably qualified plant to cover events such as forced and planned outages. The “suitably qualified plant” that is able to sell capacity to cover these outages will come from one of three areas:

- “load following” for plant that has been allocated reliability options;
- The margin between “de-rated” and “nameplate” capacity for plant that are allocated reliability options (albeit each plant can only buy this capacity up to 10 weeks per year); and
- Plant that has qualified, but not been allocated reliability options

4.4.24 These three effects are illustrated in Figure 13 below, based on illustrative levels for reserve and for the level of qualified plant that has not been allocated a reliability option (500MW in each case).

Figure 13: Spare Capacity



4.4.25 Ideally, the amount of spare capacity available should be sufficient to at least cover planned outages as well as allowing for some cover for forced outages. Our analysis indicates that there is sufficient cover for each of these. This is based on analysis of

planned outages²⁵ for the 2015, 2016 and 2017 outage years and an assumption of typical forced outage rates of 7%²⁶ as shown in the table below:

Year	Derived planned outage rate	Forced Outage Rate	Combined Outage Rate
2015	5.3%	7%	12.3%
2016	4.4%	7%	11.4%
2017	4.8%	7%	11.8%

4.4.26 This combined outage rate can be covered without any need to access capacity from qualified capacity that was not allocated a reliability option. Notably:

- **Margin between nameplate and de-rated capacity:** The size of the margin between name-plate and de-rated capacity is likely to be more than sufficient to cover the planned outages indicated above. The size of this margin will depend on the, yet to be determined, level of de-rating factors. We can assume that they will at least cover typical forced outages (giving a 7% margin as above). The de-rating factors used for the GB CRM would indicate a larger margin – 10% or greater.
- **Load following sufficient to cover all:** Analysis of historic demand from October 2010 to September 2015 indicates that load following on its own should be sufficient to cover the combined outage rates shown above. This analysis assumes that the capacity for load following would reflect the difference between the annual peak demand, and a smoothed version of the daily peak demand. In this case, the smoothing function is to take the maximum demand over a 7-day forward period. This gives load following margins as follows²⁷:
 - 10/10 to 9/11: 23%
 - 10/11 to 9/12: 18%
 - 10/12 to 9/13: 16%
 - 10/13 to 9/14: 16%
 - 10/14 to 9/15: 17%

²⁵ The outage data as shown on the SEMO website includes a number of unusually long outages, in some cases covering many years. In each case, these outages have been truncated to 10 weeks for this analysis – representing a more typical “long” outage

²⁶ http://www.eurelectric.org/media/26800/power_statistics_and_trends_synopsis-2011-180-0005-01-e.pdf

²⁷ These margins can potentially increase to recognise that any capacity that is freed up by load following will, itself, be scaled back for load following.

SEM Committee Decision

- 4.4.27 Plant should be able to back secondary trades up to its nameplate capacity:
- For a maximum of 70 days in any CRM Delivery year; and
 - Provided that each trade is for a legitimate technical reason²⁸.
- 4.4.28 In all other cases, plant will be limited to its de-rated capacity in backing secondary trades. In this situation, there will be no limitation on the number of days that can be traded in a CRM Delivery Year.
- 4.4.29 Those looking to purchase capacity through the secondary trading platform will be required, as part of their submission to the centralised marketplace, to identify whether their trade is for a legitimate technical reason. This will be a flag used by the auction platform which will then allow purchase of capacity from counterparties selling capacity above their de-rated level.
- 4.4.30 The RAs will monitor the usage of this margin between nameplate and de-rated capacity as part of routine monitoring for market abuse.
- 4.4.31 Plant will be able to back secondary trades using capacity that lies between its adjusted load-following capacity obligation and de-rated capacity. This capacity will be determined on the basis of a profile for the load-following capacity obligation.

Next Steps

- 4.4.32 A methodology will be developed to determine the level of load following that can be prudently assumed at the time of secondary trading. This will be considered as part of the parameters consultation.

4.5 LIMITS ON SECONDARY TRADING TIMEFRAMES

Consultation Summary

- 4.5.1 The detailed design of secondary trading will need to consider a number of issues relating to trading timeframes, notably:
- **Trading ahead of commissioning:** whether capacity providers should be allowed to sell their contracted capacity before they have commissioned their plant;
 - **Trading ex-post:** whether secondary trading should be allowed after the physical delivery of electricity

²⁸ i.e. planned or forced outage and weather dependent variations in (renewable) capacity

- 4.5.2 The SEM Committee asked for feedback from stakeholders on what limits should be placed on secondary trading timeframes, including:
- The timing of secondary trade execution- how soon after the auction should they be allowed, and how late in relation to real time delivery should they be allowed; and
 - The length of time for which capacity obligations can be traded.

Summary of Responses Received

- 4.5.3 A variety of responses were received, with little consensus on the questions posed. What consensus was evident related to the timing for the cessation of secondary trading, with a preference to see the trading window close as late as possible – albeit a number of respondents did not favour ex-post trading.
- 4.5.4 There was a variety of answers regarding when secondary trading should begin, ranging from immediately after auction to only a short time ahead of delivery.
- 4.5.5 As mentioned above, the majority of those who commented on ex-post trading were not in favour. However, one respondent did raise the importance of ex-post-trading for DSUs, which will tend to participate on a portfolio basis. This respondent did note that suitable aggregation arrangements in the CRM would provide an alternative to ex-post trading.

SEM Committee Response

- 4.5.6 As mentioned in 4.2.11, secondary trading needs to be suitable for managing outages. In terms of the industry timing related to outages, the SEM Committee notes that:
- The annual outage planning process requires generators to submit their year ahead outage plans to the TSOs by end of March²⁹
 - Provisional outage plans for two and three years ahead must be submitted at the same time
 - TSOs meet in May to discuss all-island outage plan for the next two years ahead on the basis of information received, with further consultation with industry in the following months before publishing the Generation Outage Plan in October for that two-year period
- 4.5.7 To facilitate the management of outage planning, facility to trade should be available at least consistent with these timescales. The SEM Committee believes there to be no disadvantage to allowing trading further in advance such that trading can be permitted as soon as practicable after auction results have been announced.

²⁹ <http://www.eirgridgroup.com/site-files/library/EirGrid/Harmonised%20AllIsland%20Generation%20Outage%20Planning.pdf>

- 4.5.8 In order to allow for short term amendments to outages and the improved forecasting certainty of intermittent generators, the secondary trading market needs to be open close to delivery, therefore should be available at day ahead stage. This is an area of consensus amongst respondents and scores highly against the environmental criterion.
- 4.5.9 The SEM Committee sees potential benefits of allowing pre-commissioned plant to sell part of its capacity before the plant is commissioned, but believes this trading would need to be constrained in order to avoid a number of potentially adverse outcomes. These adverse effects impact upon a number of the I-SEM Assessment Criteria as follows (in each case based on extreme cases):
- **Competition:** a pre-commissioned plant could:
 - Be awarded a multi-year fixed price through a T-4 auction
 - Trade that multi-year price fix with an existing plant
 - Never build the plant

This would have the effect of awarding a multi-10-year price fix to an existing plant, thereby limiting the plant that competes in subsequent auctions and enhancing barriers to entry for subsequent plant.
 - **Security of supply:** if the relevant plant covers its late commissioning by trading with existing contracted capacity up to their nameplate capacity, this will not lead to more plant to cover its shortfall. Whilst this will not make security of supply any worse, it has the effect of weakening incentives on participants to commission their plant (see also section 5.6 on the Implementation Agreement). Clearly, the same issue does not arise if the plant contracts with existing, uncontracted capacity as this would create a new capacity obligation.
- 4.5.10 Mitigating the adverse outcomes would impose a level of complexity on the overall design. The SEM Committee believes that including such arrangements would not be practical prior to I-SEM go-live, and that the best solution for the overall CRM design is not to permit secondary trading ahead of commissioning.
- 4.5.11 The SEM Committee acknowledges there is a range of different responses on the topic of ex-post trading. Measured against the SEM Assessment Criteria:
- **Efficiency:** ex-post trading allows a portfolio to manage its volume across a wider asset base, reducing the volatility of earnings. This is more efficient for the overall system
 - **Competition:** ex-post trading has the potential to remove transparency from the market as volumes are reallocated. The perceived complexity of ex-post trading may also create a barrier to entry.
 - **Equity:** Ex-post trading can serve to create an unfair competitive disadvantage to single asset capacity obligation holders, who may be unable to reallocate volume
 - **Stability:** Enabling volumes to be reallocated may increase investor confidence in aggregated portfolio projects

- **Practicality/cost:** The need to align ex-post trading with the timing of settlement and reconciliation means that additional burden is placed on the CRM arrangements, which reduces practicality and cost.
- 4.5.12 The principal need identified for ex-post secondary trading related to portfolios of DSUs. This should be covered by the implementation of capacity aggregator units (CAUs) within the CRM without recourse to ex-post secondary trading. A CAU would allow the component DSUs to bid at separate prices into the energy markets, but they would be considered as a single unit within the CRM for the purposes of difference payment obligations.
- 4.5.13 The SEM Committee believes that against these criteria, there is no compelling reason to believe that ex-post trading is necessary for a suitable, well-functioning secondary traded market. Furthermore, the potential benefits do not serve the interests of all market participants and therefore it should not be included in the initial secondary trading design.

SEM Committee Decision

- 4.5.14 Secondary trading will begin at the earliest point possible after auction results have been published and close before delivery.
- 4.5.15 All parties participating in the secondary trading market must have reached the commissioning milestone.
- 4.5.16 Initially no facility for ex-post trading will be included in the design of secondary trading. I.e. all trades in the secondary market must be completed prior to the delivery period.

4.6 SECONDARY TRADING AND APPLICATION OF “STOP-LOSS” LIMITS

Consultation Summary

- 4.6.1 In SEM-15-104, we consulted on the design of stop-loss limits. We stated that there will be annual “stop-loss” limits, and that we are consulting on whether to also have monthly and per event/per day stop-loss limits.
- 4.6.2 Another key issue is how to apply stop-loss limits, if and when a capacity provider transfers its capacity obligations for a period other than a complete stop-loss year.
- 4.6.3 Two plausible options exist for how best to manage this:
- Reset the stop-loss limit for the new acquirer and retain the accrued loss with the seller; or
 - Transfer the stop-loss limit with the capacity obligation from the seller to the acquirer

- 4.6.4 The first option would simplify the secondary trading and registry process. It would also improve price transparency, since all secondary capacity trades for a given capacity delivery period should have the same value / MW.
- 4.6.5 In the second option, a contracted unit which is already close to its stop-loss level for the year is more valuable to a counterparty than an equivalent contracted unit which has not yet hit its stop-loss limit.
- 4.6.6 We recognise that allowing a loss to transfer may have some marginal impact on the secondary value of capacity, and that this could have a feedback effect on the value of capacity in the primary auction, and hence the cost to customers of the capacity mechanism.

Summary of Responses Received

- 4.6.7 A variety of responses were received regarding the treatment of stop-loss limits without a clear consensus. The responses aligned with the options mentioned in the Consultation Summary with a fairly even distribution between the two.
- 4.6.8 A number of respondents made mention of the need to align with the overall approach to stop-loss limits, responses to which were requested in section 4.4 of SEM-15-104. As a result of this and other areas of CRM design elements not yet defined, some respondents noted that it is too early to provide a fully informed view on this topic.

SEM Committee Response

- 4.6.9 The SEM Committee believes that the loss accrual of contracted capacity against the stop-loss limits needs to persist in some form, and that the mode by which this persists represents a choice between:
- **Transferring the limit:** the new capacity obligation holder receives the stop-loss limit with its accrued losses at the point of transfer; or
 - **Retaining the limit:** the stop-loss limit with its accrued losses does not transfer with the trade, being retained against the initial participant in some form. The stop-loss limit is reset for the new obligation holder (i.e. is set to their retained stop-loss limit).
- 4.6.10 **Transferring the limit** would mean that two capacity obligations of the same volume and delivery period would cease to be homogeneous, creating a new criterion to include in the valuation. Such additional complexity may be desirable in a market that wishes to encourage providers to incorporate loss accruals into the overall valuation of capacity, as well as encouraging commercial optimisation and speculative trading.
- 4.6.11 **Retaining the limit** with the original seller would mean that capacity obligations remain easily comparable, allowing for simpler and more transparent secondary trading. An incentive persists with the participant to manage their asset(s) according to stop-loss limits over a longer period of time.

4.6.12 The mode by which stop-loss limits persist would define the nature of the traded product to some degree, therefore, the key drivers in making this decision should reflect a need to maximise liquidity and the need to ensure suitability to cover outages. Additional considerations also exist, requiring an investigation into several areas of the Assessment Criteria:

- **Competition:** Retaining the limit is best for competition:
 - It keeps traded capacity as homogenous as possible. This homogeneity ensures a level of product transparency that reduces barriers to entry and may drive liquidity. It also simplifies the information needed to complete a trade and simplifies the settlement process.
 - As set out in the first decision paper, SEM-15-103 (3.6.32), Reliability Options provide a hedge to suppliers against excessively high prices, which has benefits in terms of competition in supply. To reset the stop-loss limit at point of transfer enhances this benefit – it minimises the difference payment shortfall that would otherwise dilute the hedge
 - The intent of a stop-loss limit is to reduce the risk on capacity providers. In SEM-15-103 3.6.28, it was stated that *“it is appropriate to impose limits on the level of RO difference payments which a capacity provider could be exposed to.”* The intent is for the stop-loss limit to apply to individual capacity providers and therefore should retain an individual provider’s history
- **Environmental:** Part of the original intent, as referred to in the previous bullet point, was to reduce risk particularly for intermittent plant with reduced ability to manage output. Retaining a limit with the capacity provider ensures the history is retained for that plant
- **Security of supply:** There is a correlation between the size of a loss accrual and the reliability of plant that will back it. If a stop-loss limit is retained after transfer, a less reliable plant that has accrued a greater loss is still exposed to its historic performance. Were this not the case and it were able to pass its historic performance to another capacity provider through trading, it could return to the market to purchase a capacity obligation that had a lower level of accrued loss. This would enable the unreliable plant to receive benefits from providing capacity for longer than if the stop-loss limit were retained, and poses a risk to security of supply.
- **Practical/cost:** transferring the limit is more complex and therefore less practical. This is because it is not immediately apparent how the stop-loss limit will be applied to the new holder’s existing stop-loss limits in the event of customised products. Furthermore, we are aware that defining this has proved to be highly complex in the GB capacity market design

4.6.13 The assessment above leads the SEM Committee to believe that retaining the stop-loss limit with the plant is the most suitable option. This simplifies the pricing of capacity at the point of secondary trade, as well as avoiding any impact on marginal pricing at the

time of primary auction. Additional market complexity does not assist the overall management of outages and is best avoided through keeping the stop-loss limit with the original holder and resetting the limit for the new holder.

- 4.6.14 For participants with multiple capacity obligations pertaining to multiple assets, a retained stop-loss limit after a single transfer could be performed through reallocating the limit across the remaining portfolio. This would be a complex solution that would not necessarily provide the best route to sensible outage management, nor be equitable for non-portfolio participants. The SEM Committee therefore believes the stop-loss limit should remain at the unit level. If no capacity obligation is held by a unit after transfer, the stop-loss limit should be re-instated at the point that holding of the relevant obligation returns to the holder, to ensure continuity.
- 4.6.15 An example of the impact of both retained and transferred stop-loss limits is provided in Appendix B.

SEM Committee Decision

- All units will have a separate stop-loss limit set at a multiple of its option fees (see 5.4 below);
- When a Reliability Option is transferred:
 - The plant from which it is transferred (that which is “buying” capacity) retains the limit along with the history of any losses against that limit. That limit continues to apply, so that if the unit becomes subject to a Reliability Option again it is that limit, and any associated history of losses, which will apply.
 - The plant to which it is transferred (that which is “selling” capacity) is has its existing stop-loss limit increased to account for the increased sale of capacity – with no allowance for any history of losses against that limit.

4.7 SUMMARY OF SEM COMMITTEE DECISIONS

- 4.7.1 **Case for Secondary Trading:** Secondary trading will be included within the I-SEM CRM. Direct, physically backed trading between counterparties at unit level will be facilitated. This will not preclude “back-to-back” secondary trading developing organically.
- 4.7.2 **Requirement for a centralised secondary marketplace:** A mandatory, centralised marketplace will be developed on the basis of an auction based platform.

- 4.7.3 **Limits on secondary purchasing:** Trading allowed up to nameplate capacity for legitimate technical reason³⁰. In all other cases, plant will be limited to its de-rated capacity in backing secondary trades. Secondary trading of capacity between the load-following capacity obligation of a unit and its de-rated capacity will also be allowed.
- 4.7.4 **Limits on secondary trading timeframes:** Secondary trading will begin at the earliest point possible after auction results have been published and close before delivery. All parties participating in the secondary trading market must have reached the commissioning milestone.
- 4.7.5 **Secondary trading and application of stop-loss limits:** stop-loss limits will be retained by the transferring unit in the trade. The limit will be reset for the new holder of the obligation. This will be applied to the unit to which the obligation pertained, and shall continue for any remaining or later capacity obligations that relate to the unit for the delivery period in question.

³⁰ i.e. planned or forced outage and weather dependent variations in (renewable) capacity

5. DETAILED RELIABILITY OPTION DESIGN

5.1 INTRODUCTION

5.1.1 The high level design of Reliability Options was considered as a part of the first CRM Consultation paper (SEM-15-044) with decisions set out in SEM-15-103. A number of elements of this design were developed in more detail as a part of the second I-SEM CRM Consultation paper (SEM-15-104). These related to the following areas:

- **Contract length;** Contract length refers to the length of time for which plant are able to fix their Reliability Option fee. The duration of contract length is one of the key design elements in forward electricity auctions and a key driver in providing new investment with the stability required to finance their project and provide effective competition between existing and new capacity providers. Contract length also has a significant impact on capacity auction clearing prices with longer term contracts effectively creating a wedge between annual prices and those earned by new investment during the period of the contract.
- **Option fee indexation;** there is a lag between the time of a capacity auction award being made and the delivery of that auction's winning capacity. The option fees agreed at the time of the auction will therefore not represent the real price achieved at the time of delivery and indexation of the option fee would provide a solution to this.
- **Stop-loss limits;** the SEM Committee has decided in SEM-15-103 that stop-loss limits will apply to uncovered difference payments in the I-SEM. The second Consultation paper SEM-15-104 covered further detail on the design of these limits, both in terms of size and structure.
- **Commissioning window;** The time between capacity auction and Substantial Completion of a project is the Commissioning Window. This time period represents the time needed for a project that has secured its financing through the auction to be built and provide capacity; if this has not been achieved in the timeframe the Reliability Options awarded may be terminated. It therefore needs to be of a suitable length and structure to accommodate project development timescales, without compromising the overall capacity procured in an auction to meet the necessary security standard.
- **Implementation Agreement;** To ensure visibility of project progress and improved certainty that progress will be achieved, an Implementation Agreement with defined milestones will be used for new projects. This will define the reporting requirements of a project and the consequences of not meeting milestones in the necessary timeframe. Furthermore, a Performance Bond will need to be posted as part of the Implementation Agreement to provide incentive for investments to be followed through.

5.1.2 The following paragraphs sets out the SEM Committee thinking and decisions in respect of the above areas.

5.2 RELIABILITY OPTION LENGTH

Consultation Summary

5.2.1 Reliability Option length refers to the length of time for which plant are able to fix their Option Fee (the price fix). The Consultation paper SEM-15-104 considered:

- Whether all plant should have the same length of price fix, or whether capacity providers requiring investment should be able to fix its price for longer
- How long the price fix should be for existing plant, and for plant requiring investment

5.2.2 There are both benefits and downsides in awarding longer term Reliability Options to plants requiring significant investment, whilst awarding annual Reliability Options to existing plant. This is explicitly mentioned in the DG Competition's working papers³¹ considering how Capacity Remuneration Mechanisms can be designed to be compliant with State Aid Guidelines, and the trade-off of the benefits and downsides was considered in SEM-15-104.

5.2.3 SEM-15-104 set out five options for the principles to guide maximum length of time that plant requiring investment are able to fix their option fees as follows:

- **Generic Economic Life (e.g. 15 years):** This option is similar to that adopted in the GB Capacity Mechanism. All new build plant would be able to avail of Reliability Options which fix the option fee up to that generic economic life;
- **"Balanced" economic life (e.g. 10 years):** This option would recognise that developers are prepared to accept they will need to compete on an annual basis for Reliability Option fees for the latter years of their economic (and technical) lives.
- **Shortest Economic Life (e.g. 5 years):** This option would set the maximum period for which Reliability Options fees could be fixed based on the shortest economic or technical life of technology that is capable of providing capacity. This could deliver a maximum price-fix period similar to those observed in US Capacity Markets.
- **Technology Specific Life:** This option would set different maximum periods for which new-entrant plant could fix their Reliability Option fees based on the estimated economic life for its technology type. This would allow more detailed control over the risk of future stranded costs.

³¹ See for example, 'Designing a Competitive Bidding Process, and Ensuring Competition Between New and Existing Capacity' 14 April 2015 at section 4.2

- **Technology Specific Balanced:** This option would set different maximum periods for which plant requiring investment could fix their Reliability Options fees based on a period just shorter (e.g. 66%) of the estimated economic life for its technology type. This would allow more detailed control over the risk of future stranded costs, as well as limiting the impact on competition on future capacity auctions.

Summary of Responses

5.2.4 Respondents to the consultation paper are split into two broad camps:

- Those that believe all plant should receive the same (short term) length of price fix. These respondents are typically existing portfolio generators with ageing plant. Many of these reference challenges through the European institutions to the British differentiation on contract length. Justification for equal treatment referenced a number of existing markets, e.g. Western Australia and New York, where one year contracts are the maximum offered through a centralised auction.
- Those that believe plant requiring investment should be able to access longer contracts. This constitutes the majority of respondents. Of these:
 - Most support differentiation between new, upgraded and existing plant
 - Most are arguing for a contract length based on economic life for the plant requiring investment, and around 3 years for upgraded. This includes response from demand side participants who note this may be the form that “new investment” takes for their sites.

5.2.5 In terms of the maximum length for contracts, the majority of the respondents who favoured longer contracts for new capacity proposed 15 years, i.e. the ‘generic economic life’ option, noting this will be consistent with the proposed contract length in the DS3 auction. A small number of respondents argued that contract lengths of up to 20 years would be required for some plant investments, but otherwise there was no strong support for technology-specific contract lengths. A few respondents favoured 10 years, i.e. ‘balanced economic life’.

5.2.6 Some respondents, suggested a one to three-year contract length would be appropriate for:

- Refurbished plant; and
- Avoiding any technology based capacity differentiation by following the ‘shortest economic life’ option.

5.2.7 When considering how to determine whether capacity was new or existing, the vast majority of respondents preferred either the cost threshold or tangible facts methodologies. Many favoured some combination of the two, e.g. with the cost threshold representing one of the tangible facts. A small number of respondents proposed the use of judgment but only under specific circumstances, e.g. in case of dispute, though most preferred to avoid introducing this subjective element. A few

respondents provided detailed lists of ‘tangible facts’ criteria creating a very strict definition of new capacity. Those objecting to differentiation noted that this determination would not be needed if the same contract length were offered to all capacity providers.

SEM Committee Response

5.2.8 The SEM Committee recognises that the issue of differentiation over the length of contract available to plant is currently subject to challenge through the European Institutions, and that the outcome of this ultimately may impact on I-SEM policy in this respect. Notwithstanding this, the SEM Committee sees benefits in fixing the price for a number of years for plant requiring significant investment whilst only allowing existing plant to fix their price for a year. The key benefit of this approach is in allowing plant requiring investment to compete more effectively alongside existing plant. This, in turn supports efficient exit and entry to the I-SEM – as “old” plant will be displaced by newer, more efficient plant that will lead to an overall reduction in costs to the consumer. The outcome of such challenges and indeed the EC’s updated thinking in this area will be fully considered by SEMC in due course. The SEMC’s current position (based on the information and evidence available to date) is that it sees benefits in fixing the price for a number of years.

5.2.9 Before considering the actual length of price fix that should be available to plant requiring investment, we need to consider the impact of international experience in other capacity markets and whether the length of price fix available should vary between:

- New and refurbished plant; and
- By the technology used to provide the capacity.

5.2.10 These are discussed further in the following paragraphs.

International Experience

5.2.11 International experience on contract length varies across regions and depends to a large degree on the capital intensiveness of the prevailing technologies, stability of the market and regulatory environment and overall country risk. While the experience in South America has been to award long term contracts particularly to large hydropower investments, contract durations in the United States are generally much shorter, reflecting the dominance of thermal generation and more stable economic climate)³². Most of this investment has been made by existing utilities, and funded “on balance

³² See: Batlle, C., Mastropietro, P., Rodilla, P., Pérez-Arriaga, I. J., 2013. “The system adequacy problem: lessons learned from the American continent”. Working Paper IIT.

sheet” rather than through project finance. The PJM and New York markets for example manage to attract significant investment through a system of six monthly and annual contracts³³ to new and existing capacity providers respectively while the ISO New England Forward Capacity Auction has recently moved from 5 to 7 year contracts³⁴. Similarly, the new Western Australia capacity market is planning to offer annual contracts. Experience elsewhere in North America has pointed to problems with longer term contracts such as in California where longer term contracts led to a lack of competition between new and existing resources and over-procurement of capacity at above market costs³⁵.

- 5.2.12 In Europe, where capacity markets exist, a range of contract durations have been implemented from annual contracts under the French NOME capacity obligation scheme to a three-year contract period for new and existing players under the Italian Reliability Options Mechanism and 15 year contracts in the GB Capacity Market for new investment above a specified capital threshold and annual contracts for existing providers. The new Italian mechanism plans to award only annual or three year contracts.
- 5.2.13 The draft design of the Italian RO mechanism is contemplating a sloped demand curve as a stabilising mechanism during years of excess as an alternative means of providing price stability for those plant requiring investment. A similar approach is taken in PJM where new investment is permitted to add its capital costs to its capacity offer for a period of three years. The approach that the SEM Committee has taken under the DS3 is to consider contract lengths of up to 20 years, reflecting the potential volatility in ancillary service revenue and the changing technology mix on the island. Similar issues along with perceived market failure and tightening capacity margins prompted DECC to award 15 year contracts for capacity in GB.
- 5.2.14 The international context is for considering the length of contracts in the I-SEM capacity market and an appropriate balance will need to be struck between de-risking long term investment and protecting consumers from undue risk of shouldering higher costs (e.g. from stranded assets). The decision on the length of capacity contracts and which categories of participant are eligible for them will be key to ensuring effective competition between new and existing resources. The experience from the United States cautions against using capacity markets to move to a system of long term contracts while elsewhere longer term contracts have been deemed necessary to deliver new investment in a context of a move to a low carbon electricity system through largescale capital investment projects (e.g. large hydropower or nuclear).

³³ Albeit in PJM, Capacity providers have the option to keep the capacity price awarded in their first auction for three years.

³⁴ See: http://ec.europa.eu/competition/sectors/energy/capacity_mechanisms_working_group_april2015.pdf

³⁵ See: <https://www.ferc.gov/CalendarFiles/20130826142258-Staff%20Paper.pdf>

- 5.2.15 The SEM Committee acknowledges that providing capacity that is facing an investment decision (new and refurbished capacity) with an opportunity to fix the price of their option fees for a number of years may be necessary to attract new investment at prices that are acceptable, and to support the efficient exit of existing plant. Absent this opportunity there may be too much uncertainty over future capacity prices to induce investors to offer reasonable prices for the initial term. Some may be unwilling to invest at all. This same constraint does not apply to existing plant where the investment has already taken place and is sunk cost.
- 5.2.16 The key benefit of long term price fix periods is that they reduce the risk faced by plant requiring investment, enabling them to lower their capacity offer price. Longer price fix duration should facilitate investment in plant at reasonable prices by making it possible for entrants to raise financing and by reducing the uncertainty that entrants would attribute to capacity prices in the future in a market with only short term contracts.
- 5.2.17 Long term price fixes may be less important if investors had more certainty of the trajectory of capacity prices and reasonable confidence that they could be assured of receiving prices each year consistent with what they anticipated. The Federal Energy Regulatory Commission in the United States recognised this issue in its recent staff paper on centralised capacity markets, noting that ‘when a market is allowed to function without significant changes over multiple years, resulting price trends can inform rational bidding and investment strategies by market participants. This can lessen the need for the price certainty provided by longer-term commitment periods and, with them, a shifting of risk from suppliers to customers’³⁶. While it is possible that this may happen over time as experience is gained with the I-SEM capacity market, it is not realistic to assume that from the start of the capacity market this will be the case. Hence, long term price fixes are considered necessary at least for the initial years of market operation.
- 5.2.18 As experience is gained with the capacity market and elements such as a sloped demand curve are demonstrated, the need for long term price fixes is expected to diminish. It is anticipated that there will be periodic reviews of the need for long term price fixes and the length of these is expected to reduce over time.

New and Refurbished Plant

- 5.2.19 The SEM Committee notes that some other countries have differentiated between “new” and “upgraded” plant in determining the maximum length of price fix available.

³⁶ FERC also caution that ‘longer commitment period places greater reliance on the accuracy of long-term forecasts of energy prices, demand, and the economy and thus can transfer price risk, or the uncertainty in such long-term forecasts, from suppliers to customers’.

See: <https://www.ferc.gov/CalendarFiles/20130826142258-Staff%20Paper.pdf>

This approach is based on the assumptions that “upgraded” plant requires less investment than new plant, and so a shorter price fix.

5.2.20 Whilst the SEM Committee accepts the above logic:

- It sees significant practical difficulties in defining and policing what constitutes an upgrade; and
- It is unconvinced that lower levels of investment associated with upgrades cannot be secured through annual auctions. This is especially the case under the “balanced economic life” approach to setting the price fix length³⁷.

Vary by technology

5.2.21 There is a number of potential reasons to support varying the maximum contract length available to plant requiring investment with the type of technology used, notably:

- **Different plant life (technical or economic):** Technical and economic life will vary with plant type; and
- **Different risk profile following the price fix:** The type of plant may impact its ability to manage the risk of low option fees following the price fix. For example, there is an active secondary market for smaller generating plant (typically reciprocating engines and the smaller open-cycle gas turbines) which provides an effective floor on the future option fees they would accept. If the option fees and other net revenues for such small plant were lower than its “second hand” value, it would be sold and exit the market.

5.2.22 In practice, neither of these is easy to judge, and they may act in opposing directions. For example, if we consider “peaking” plant:

- Their technical and economic lives are both quite long – reflecting the low utilisation of a plant that is built mainly for capacity reasons. The SEM Committee have already implicitly acknowledged this in setting the BNE peaker costs based on a 20-year life – longer than the 15 years typically assumed for a CCGT
 - As there is an active second hand market for peaking plant, they face a lower risk (than larger CCGT plant) from the potential of low priced option fees after the end of any price fix. Over time, this “exit” cost for peaking plant will probably set a floor on the capacity price.
- a. The above two factors make it difficult to determine “equivalent” economic lives between peaking and CCGT plant. This complication has the potential to increase in the future – as new technologies emerge (e.g. as part of the push for a low carbon

³⁷ GB has generally adopted price fix lengths consistent with “economic life”, and has 3 years for upgraded plant. Shortening of this period (for the balanced economic life) would give a price fix little different from that available to existing plant.

economy). On this basis the SEM Committee favours that the maximum length of available price fix is set the same for all technologies. This approach would also appear consistent with EC's preference for technology neutrality.

Price fix length

5.2.23 The "price fix length" was referred to as the "contract length" in the Consultation Paper. However, as the CRM will be implemented as an evergreen multi-lateral contract, the term "price fix length" is used to refer to the period for which the price in the multi-lateral contract will be fixed for a plant.

5.2.24 The SEM Committee do not believe that a price fix should cover the full economic life of the relevant plant, but should be set on a "balanced" basis. The length of the price fix should balance a number of factors, notably:

- **Competition:** There are two competition effects arising from decisions over the length of price fix for Reliability Options:
 - **Plant with a long term price fix don't need to compete further once they have accepted the price fix:** awarding "long term" price fixes to plant requiring investment means, until the end of the price fix period, those plant will not compete in subsequent auctions. This will reduce competition in those auctions for what is already a small system. In the extreme, allowing plant requiring investment to fix contract length for its economic life could mean that plants close at the end of their price fix, so never contribute to competition beyond their initial auction.
 - **Required option fee for plant requiring investment may fall with length of price fix:** Some argue that a longer price fix will allow such plant to offer a lower option fee, and so compete more effectively with existing plant whose costs may be sunk. This argument is based on the assumption that option fees earned by the plant after the price fix are lower than those during the price fix. Without long term contracts for those plant requiring investment, such plant will have to factor in life cycle revenue into their bids and a large determinant of this will be the price of capacity during periods of projected excess. If depressed prices are anticipated over a large portion of the investment cycle (i.e. for years after the price fix), the price needed to attract entry will need to be high enough to compensate for such prices. Parameters in the capacity auction such as the auction price cap and the gradient of the slope of the demand curve will have a large impact on the level of capacity prices over the investment cycle and as stated in the third CRM Consultation paper SEM-16-010, the slope of the demand curve could also potentially be reflective of the value associated with the length and/or quantity of any longer term contracts.

- **Risk of Stranded Costs:** Whilst a plant benefits from a fixed option fee it is protected from competition from other (existing and new) plant. This increases the risk of stranded costs – where customers continue to pay for (and retain) a plant when it is no longer required, or it would be cheaper to replace it with a newer and more efficient plant. This risk increases as the length of the price fix approaches or exceeds current estimates of the economic life³⁸ of a plant, so is reduced by fixing price for a period that is prudently less than a plant’s economic life.
- **International Experience:** US Capacity markets have been successful in attracting new investment whilst offering maximum lengths of price fix that are in the range of annual to 7³⁹ years – albeit that much of this investment has come from existing utilities “on balance sheet” rather than using project finance. By contrast, the GB Capacity Market is the only such market that offers contracts that match plant economic life.

5.2.25 The SEM Committee notes that, at least initially, a number of factors will make the risks associated with future option fees in the I-SEM arguably higher than those observed elsewhere arguing (at least initially) for a longer price fix. Notably:

- The “newness” of the market – with no history of capacity prices;
- Uncertainty over the long-term future of CRMs within the EU; and
- Changes in the EU electricity portfolio arising from its policy of decarbonisation

SEM Committee Decision

5.2.26 The SEM Committee has 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’. We are continuing work to develop eligibility criteria and parameters to finalize the agreement lengths which to be offered initially.
 - Be no more than ten years, with the actual maximum value being confirmed in Decision 3 (July). This will build on analysis of measures in the auction design that are intended to reduce inter-annual volatility in the prices arising from

³⁸ The “Economic” life is an estimate of how long plant would be able to compete profitably with others in the market – and is often shorter than technical life. The end of the economic life is the point at which a plant could become “stranded”.

³⁹ ISO-New England has recently increased the maximum contract length to 7 years from an earlier value of 5 years, whilst PJM allows new-build plant to fix their capacity price for 3 years. New York ISO offers rolling 6 month contracts for new and existing resources.

those auctions. The resulting reduction in risk to investors could lead to the selection of a shorter length for the price fix.

- Be kept under review with a view to **amending** the length of the price fix as I-SEM develops.
- There will be no explicit distinction between new investment and refurbishment; however, to be classified as “plant requiring significant investment”, there will be a need to demonstrate:
 - €/MW investment above a threshold;
 - That this investment is directly linked to bringing into operation all or part of the equipment that is essential to the delivery of capacity by the plant; and
 - That the capacity of the plant is enhanced compared to a counterfactual of no investment.

Next Steps

- 5.2.27 Given the above considerations and the interrelationship between the contract duration and the auction design and market power mitigation measures set out in CRM Consultation 3 the SEM Committee has decided to make a minded to decision that the maximum contract length for Capacity Contracts will be based on ‘balanced economic life’. The final decision on this will be made as part of CRM Decision 3 in July 2016.
- 5.2.28 The RAs will conduct further analysis on the exact €/MW threshold for the identification of “plant requiring significant investment” as part of the parameters consultation.

5.3 OPTION FEE INDEXATION

Consultation Summary

- 5.3.1 It is anticipated that the bulk of capacity will be procured a number of years ahead of when it will be contracted to be available. This lead time is required to allow new capacity (which will take time to build) to compete on an effective basis with existing capacity.
- 5.3.2 Given there is a lag between the time of a capacity auction, and the time when capacity is delivered, there are potential benefits in indexing the price (option fee) that arises from the auction.

Summary of Responses

- 5.3.3 The overwhelming majority of respondents had no view on whether the option fee should be indexed. Those who did were in favour but little rationale was provided.

- 5.3.4 At the industry workshop on 5th April 2016 one participant stated that they favoured option fee indexation not because of debt being indexed, but because of participants' costs.

SEM Committee Response

- 5.3.5 While there is justification in inflating the Option Fee as outlined in the Consultation Paper there are compelling arguments that the absence of this would not be detrimental and would simplify the mechanism.
- 5.3.6 The RAs consider that this risk is better managed by participants in the Capacity Mechanism.
- 5.3.7 The RAs consider that while operational costs are subject to inflation the majority of projects operating in the capacity market do not have (and are unlikely to have) inflation linked debt, due to the size of projects operating in our market. If, however participants did consider inflation risk critical a proxy inflation factor taking account of different indices for Ireland and Northern Ireland could be a less effective way to manage this than an inflation swap.

SEM Committee Decision

- 5.3.8 The SEM Committee will not apply indexation to option fees.

5.4 STOP-LOSS LIMITS

Consultation Summary

- 5.4.1 The SEM Committee has decided (in SEM-15-103) that stop-loss limits should be applied to uncovered difference payments in the I-SEM. However, the details of these limits and their application were deferred to the second consultation.
- 5.4.2 To ensure that incentives on capacity providers were strong in periods when scarcity was most likely to occur, the consultation paper proposed that the Capacity Year should run from 1 October and annual stop-loss limits would be applied on that basis.
- 5.4.3 In order to ensure that incentives to perform are not exhausted too quickly, e.g. following a single or a small number of time-linked failures, the paper proposed also using separate daily (or event) and monthly stop-loss limits.
- 5.4.4 If a day (or event) limit is to be used, some care would be needed around the definition, e.g. if scarcity occurs over two consecutive evening peaks, but there is no scarcity in the intervening night, should this count as a single event?

- 5.4.5 The stop-loss limits are to be set as a multiple of the option fee related to the same period. The earlier SEM Committee decision gave a range from 1x to 2x the option fee as the annual stop-loss limit. The consultation paper requested stakeholder feedback on the level at which these multipliers should be set.

Summary of Responses

- 5.4.6 The majority of respondents agreed that the Capacity Year should run from 1 October. A small minority preferred to remain with the calendar year approach used in the SEM. One respondent raised a concern in respect of the first year if the project timetable slipped.
- 5.4.7 The majority of respondents support the use of a monthly stop-loss limit. A minority of respondents supported daily stop-loss limits or would consider their use. A few supported event-based stop-loss limits, but rather more respondents noted the difficulty of defining an 'event'.
- 5.4.8 Responses for the level of the annual stop-loss limit covered the full range from 1x to 2x the annual option fee. A few respondents who proposed a general limit greater than 1x proposed that wind should have a limit of 1x.
- 5.4.9 Few respondents suggested levels for either monthly or daily stop-loss limits. Several respondents recognised that the multiplier would need to be greater than a pro-rating of the annual limit if it is to have any effect.
- 5.4.10 A few respondents suggested that further analysis was needed to establish the level of stop-loss limits.

SEM Committee Response

- 5.4.11 The SEM Committee recognises that it is difficult to find an objective approach to the setting of stop-loss limits. In selecting a limit, there is a balance between providing an incentive for performance and placing excessive risk on capacity providers. In choosing a balance between annual and shorter limits there is a balance between maintaining the performance incentive while ensuring that a single incident or short series of incidents does not place excessive risk on a provider. Ultimately, placing too much risk on providers may discourage investment in plant and reduce competition or frustrate the purpose of the CRM.
- 5.4.12 While the consultation asked about monthly stop-loss limits, there are clear benefits to aligning the stop-loss limit with the billing period used for energy settlement. This will increase the possibilities for netting of payments and charges in settlement and will help to manage the credit risk from participants and improve the efficiency of the market. In consequence, the SEM Committee intend to use a stop-loss limit aligned with the settlement billing period, rather than use a monthly stop-loss limit. The SEM Committee

does not believe that it is appropriate to implement daily or event-based stop-loss limits at this stage. However, this decision will be kept under review.

- 5.4.13 Initially, the SEM Committee will set the annual stop-loss limit to 1.5x the annual option fee for all capacity providers.
- 5.4.14 The level of the billing period stop-loss limit will depend on the length of the billing period, which has yet to be decided. In particular, events of scarcity are more likely to affect multiple weekly billing periods than multiple monthly billing periods.
- 5.4.15 The SEM Committee is **minded to** set the billing period multiplier so that the stop-loss limit equals half of the annual stop-loss limit (i.e. 0.75x the annual option fee).
- 5.4.16 However, if scarcity events affect more than two billing periods, there will be limited CRM incentive to perform after the second billing period. This could be tackled by reducing the stop-loss limit progressively after each billing period in which it binds, e.g. if the limit binds in billing period B, then in billing period B+1 the limit could reduce to half its previous value (i.e. 0.375x the annual option fee) and if the limit again binds then for billing period B+2 it could halve again. The approach to mitigate this issue will be further developed through the implementation phase of the CRM detailed rules, with a view to maintaining an appropriate incentive on capacity providers to perform throughout each Capacity Year.
- 5.4.17 As a matter of principle, capacity obligations acquired through secondary trading should be subject to equivalent stop-loss limits as the same obligation acquired from the primary auction.
- 5.4.18 In this respect, the total annual stop-loss limit which applies to a unit participating in the secondary trading market, and which will be set to 1.5x its total option fees (valued based on the pro-rated annual option fee of the primary trade) for the year, will not be known until the end of the capacity year. To manage this issue there may be a need to 'true-up' the level of the uncovered difference payments (made for each billing period) with the annual stop-loss limit at the end of the year. We propose that the billing period stop-loss limit is determined as described above, based on the capacity obligations held in the billing period, and difference payments are made on this basis. At the end of the year, if the total uncovered difference payment exceeds the annual stop-loss limit, then the excess payment would be returned to the capacity provider.
- 5.4.19 The SEM Committee believes the approach described above provides a reasonable balance between the efficiency of the mechanism, equity between consumers and providers and will support continued competition for capacity and long-term security of supply. However, as noted above, it is difficult to set an objective approach for determination of stop-loss limits, particularly in advance of market operation. It will also be important to consider the penalties for non-delivery which would apply to existing capacity providers (driven by the annual stop-loss limit) in the context of those which apply to new capacity (driven by the level of the performance bond). The final value for

the billing period stop-loss multiplier will be set as part of the parameter consultation process.

SEM Committee Decision

- 5.4.20 The Capacity Year will run from 1 October.
- 5.4.21 For the start of the CRM, an annual and a billing period stop-loss limit will be used. This decision will be reviewed based on operation of the CRM.
- 5.4.22 The Committee will initially set the annual stop-loss limit to 1.5x the annual option fee for a capacity provider and is minded to set the billing period stop-loss limit to 0.5x the annual stop loss limit. Final values will be determined as part of the parameters consultation process.
- 5.4.23 The levels of the stop-loss limits will be kept under review, but any change is not expected to affect the values for any Reliability Option that have been allocated at that time. The new stop-loss limits would apply to any new Reliability Option commitments that a plant subsequently enters into – be that through capacity auctions or secondary trading.

Next Steps

- 5.4.24 The Parameters Consultation process will determine the values of the billing period stop-loss limits to be applied at I-SEM go-live.

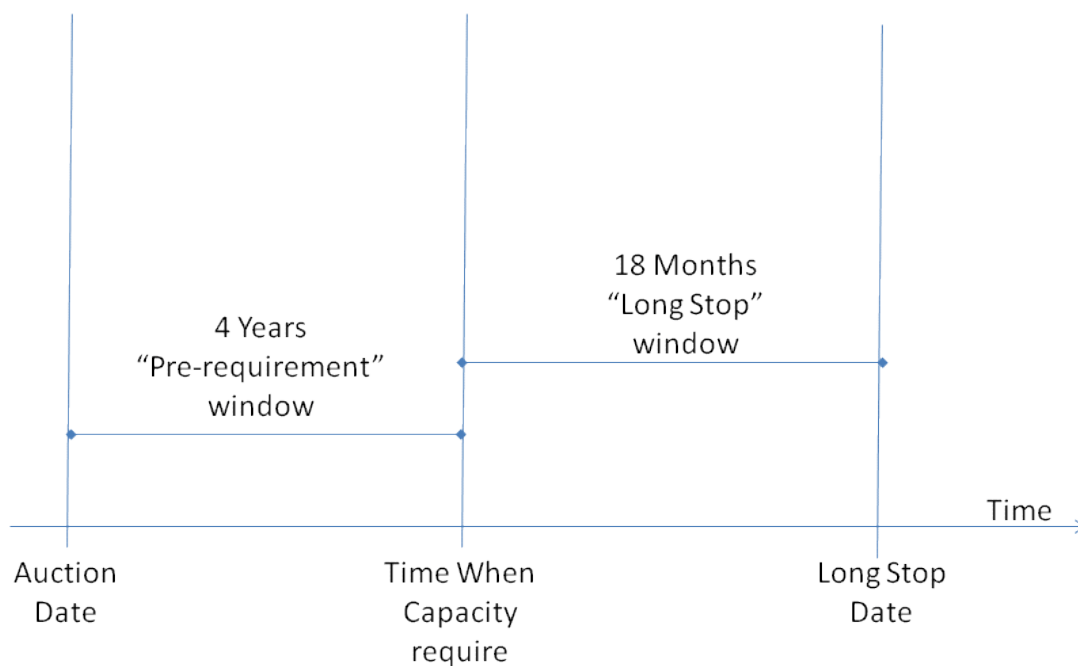
5.5 COMMISSIONING WINDOW

Consultation Summary

- 5.5.1 The Commissioning Window is the time from the date of the Capacity Auction until the point at which a Reliability Option will be terminated for failure to achieve Substantial Completion.
- 5.5.2 The Commissioning Window is divided into two parts (see Figure 14):
- **“Pre-requirement”**: The period from the Auction Date until the start of the first Delivery Year under the Reliability Option; and
 - **Long stop**: An additional period up to the Long Stop Date to give a project time to commission. This allows projects with longer construction times to participate in the capacity market. It also reduces the risk for project sponsors as a delayed project will still be able to access option fees for the vast majority of the length of its Reliability Option.

- 5.5.3 SEM-15-104 examines a number of reference cases and issues that are considered in deciding the length of the Commissioning Window and in determining the timeline for procuring capacity.
- 5.5.4 A period between the Auction Date and the start of delivery under the Reliability Option of four years for new capacity was proposed.
- 5.5.5 The Long Stop Date defines a point beyond the end of the Commissioning Window after which a project that has failed to achieve substantial completion would trigger termination of the Reliability Option. A period of 18 months was proposed for Long Stop Date.

Figure 14: Two-part lead-time



Summary of Responses

- 5.5.6 The majority of respondents agreed, in principle, that four years was appropriate for the “pre-requirement” window shown in Figure 14 above. A few respondents suggested that the period from the auction to first delivery may need to be technology specific and that some technologies may, exceptionally, require a longer period.
- 5.5.7 Several respondents suggested that the Commissioning Window should run from contract award, rather than auction date, to allow for delays caused by disputes over the auction results.
- 5.5.8 Other responses included:
 - A three-year window – where one party believed that this period, when combined with an 18 month long stop period, is sufficient for most projects;

- A one-year window either in addition to the four-year window, with some capacity held back for the T-1, or as the preferred option, e.g. if there were no long-term contracts or to support DSU/DR [DRAI]; and
 - Capacity should be able to deliver early where there is a multi-year gap between auction and first delivery, but may have the issue of non-firm access in this early period.
- 5.5.9 The majority of respondents agreed that the Long Stop Date should be 18 months after first delivery under the RO, subject to the same broad caveats as for period to first delivery. A few respondents favoured a further 'remedy period' after the Long Stop Date.
- 5.5.10 Several respondents noted that the length of the Commissioning Window would depend on the level of maturity required for projects to qualify for the auctions. For example, if plants are required to have planning consents to qualify, the length of the commissioning window could be reduced.
- 5.5.11 Several respondents also wanted the Commissioning Window to be extended if the delay to commissioning was caused by events outside the project's control, e.g. delay to the grid connection, force majeure, political or regulatory intervention

SEM Committee Response

- 5.5.12 The SEM Committee takes into consideration the technical challenges of constructing a generation project of each eligible generation type. If plant requiring investment are to be able to compete effectively with existing, auctions have to be held some years in advance of the need for capacity. This gap between the auction and the need for capacity should allow most new-build plants to complete its financing and be built before the capacity is required. Judging how long this period needs to be is complicated by variations in the time to agree financing and then build different types of plant. Notable points here are:
- **CCGT – 4 years:** It is widely accepted that CCGT plant can complete its financing, then be built and operational in 4 years.
 - **Solar/battery – 1 year:** With limited need for civil engineering works, photovoltaic or battery farms can be operating within a year.
 - **More complex plant – >5 years:** Potential developers of more complex generation plant within the I-SEM have indicated that they would need a lead time of 5 years from the auction to complete their financing and construction.
- 5.5.13 In light of the above points, setting the lead time for plant requiring investment is then a trade-off between:
- Setting a long lead time – such that all plant requiring investment can compete; and

- Setting a shorter lead time – to reduce errors in forecasting the amount of capacity we need, and whether existing capacity will remain technically and economically available.

SEM Committee Decision

- 5.5.14 SEM Committee consider that a 4-year commissioning window is an appropriate time to allow most plant to be operational before capacity is required in I-SEM.
- 5.5.15 SEM Committee also considers the addition of an extra 18 month “long stop” window which leaves a total period of 5½ years between the auction results and the termination (with penalties) of the reliability options for any plant that has not become operational. We consider that this 5½ year period is sufficiently long to accommodate the more complex plant that the RAs are aware of being considered for participation in upcoming capacity auctions in the I-SEM.

5.6 IMPLEMENTATION AGREEMENT

Consultation Summary

- 5.6.1 The SEM Committee has decided (in SEM-15-103) that Implementation Agreements, based around a number of defined milestones, should be required of new capacity. As part of the Implementation Agreement, new projects will be required to post a Performance Bond which should provide “strong incentives to follow through with investment”.
- 5.6.2 A number of elements of the detailed design of the Implementation Agreements were deferred to the second consultation:
- The number, duration and measurement of milestones;
 - The consequence of failing to meet a milestone;
 - The size of the security bond; and
 - The extent to which this approach can and should be aligned with that for DS3.
- 5.6.3 The decision specified three project milestones and suggested that more would be required regarding:
- Substantial Financial Commitment;
 - Commencement of Construction; and
 - Substantial Completion.
- 5.6.4 SEM-15-104 proposed possible definitions for these three milestones and suggested a further set of additional milestones. Stakeholders were asked whether the enhanced list

of milestones was sufficient and/or appropriate, particularly prior to Substantial Financial Completion, and how the milestones should be defined.

- 5.6.5 The Consultation paper also discussed the topic of reporting against these milestones, requesting feedback on the frequency of this reporting and whether reports need to be independently verified.
- 5.6.6 It will be important for failing projects to be identified early to minimise the costs incurred by consumers for replacement or as a result of lowered security standards. SEM-15-104 proposed a number conditions under which a Reliability Option would be terminated:
- Failure to achieve the Substantial Financial Commitment milestone by a given date;
 - Failure to achieve Substantial Completion by the Long Stop Date; and
 - Submission of false or misleading information in the pre-qualification process.
- 5.6.7 The Consultation paper asked whether any additional milestones should give rise to termination of a Reliability Option. At termination a project would pay a termination fee, which would be covered by its Performance Bond.
- 5.6.8 In addition to full termination, it may be desirable only partially to terminate the Reliability Option of new capacity which, whilst unable to achieve Substantial Completion, could still deliver a lower level of capacity to the CRM. Under these circumstances, the termination fee would be reduced pro-rata. This in turn would lead to a return of that part of the Performance Bond not required to cover that (reduced) termination fee.
- 5.6.9 Setting the level of the termination fee (and hence the Performance Bond) will be a trade-off between compensating consumers for the costs incurred by the failure to deliver capacity and the diminution of competition as the level creates barriers to entry for capacity providers.
- 5.6.10 SEM-15-104 discussed a number of potential influences on the level of the termination fee (and hence the Performance Bond):
- **Time since auction:** the more time that has elapsed, the higher the cost to consumers.
 - **Size of project:** the failure of larger projects may have a disproportionate impact.
 - **Financial commitment:** increasing financial commitment by the project may reduce the level of bond needed.
 - **Termination incentives:** the financial incentives given by the Performance Bond should encourage early termination by the project, where appropriate.
 - **Transitional measures:** given the current healthy levels of capacity, should the level of Performance Bond be phased in?
- 5.6.11 The consultation recognised that many projects will be relying on revenue from both the CRM and DS3 to be viable. This suggests a consistent approach is needed to the design of the Implementation Agreement and Performance Bond.

Summary of Responses

DS3

5.6.12 There was very broad support for a consistent treatment of the Implementation Agreements in CRM and for DS3, where this was appropriate.

Milestones

5.6.13 The majority of respondents supported the list and definitions of milestones as given in the SEM-15-104. A very few additional milestones were proposed, including the splitting of the consents milestones.

5.6.14 Comment relating to specific milestones are set out below:

- **Substantial Completion:** Of those respondents who commented on the definition of the “Substantial Completion” milestone, most agreed with the proposal that this should require that 90% of contract quantity had been demonstrably delivered.
- **Minimum Completion:** Of those respondents who commented on the definition of the “Minimum Completion” milestone, most agreed with the proposal that this should require that 50% of contract quantity had been demonstrably delivered. A few noted that the level might be technology-specific, perhaps in relation to a modular unit.
- **Substantial Financial Completion:** Most respondents supported a time limit of 18 months from contract award to achieve Substantial Financial Completion. Several respondents suggested an additional short remedy period if a project was demonstrably close to achieving the milestone.

Reporting

5.6.15 The majority of respondents supported six-monthly reporting, providing this was not too onerous.

5.6.16 There was also broad support for independent verification of some reports, though concerns were expressed about the costs and several respondents suggested a lower frequency for independent reporting. A few respondents suggested that appropriate termination penalties and conditions could reduce the need for independent verification.

Termination Conditions

5.6.17 There was very little support for termination against milestone beside the Long Stop Date.

5.6.18 Several respondents noted a range of external influences which could impact a project’s ability to achieve a milestone, e.g. delay to network connection, change of planning

regulations. In these circumstances, respondents wanted an extension to the affected milestones.

- 5.6.19 There was broad support for terminating the implementation agreement if the pre-qualification data submission was found to contain false or misleading information. However, most respondents noted that termination should only occur if such information had an impact material on qualification.
- 5.6.20 There was only limited support for the sterilisation of a failed project, and a few respondents noted that such projects may be recoverable.

Performance Bond

- 5.6.21 There was broad agreement that the costs to consumers from project failure rise over time. However, there were few responses as to how this should feed into the Performance Bond and no agreement as to the temporal escalation of levels.
- 5.6.22 Several respondents stated that the performance bond should not exceed the recourse to construction liquidated damages likely to be available to projects. Some suggested a maximum level of 10-20% of the EPC⁴⁰ Contract value.
- 5.6.23 A couple of respondents suggested that the level of the Performance Bond should be reviewed after the first auction.
- 5.6.24 There was only very limited support for a different determination of level for the Performance Bond for larger projects. The majority of responses preferred use of a fixed €/kW determination for all projects.
- 5.6.25 The only responses which proposed an initial level for the Performance Bond to avoid creating a barrier to entry were in line with GB at either 5€/kW or 5£/kW.

SEM Committee Response

- 5.6.26 The key area of the Implementation Agreement requiring more analysis relates to the size of the termination fee – and hence the performance bond. The SEM Committee recognise that the level of this termination fee (and bond) represents a trade-off between:
- **Equity:** The equity criterion is most clearly satisfied if the level of termination fee reflects the cost to consumers of failure to deliver a project. Earlier analysis would indicate such a cost of €55/kW⁴¹.

⁴⁰ Engineering, Procurement and Construction Management Contract

⁴¹ TSO analysis for the potential change in LOLE standard from 8 hours to 3 hours suggested that losing 200MW of capacity would create an additional 1000MWh of lost load over the course of a year. I.e. roughly speaking for every 1MW of missing capacity there is an additional 5MWh of lost load. Valuing this lost load at VoLL would suggest a cost to consumer of 55€/kW.

- **Competition and security of supply:** The termination fee and associated performance bond may act as a barrier to entry for new capacity, with a consequential impact on the competition and security of supply criteria. Given the responses to consultation, the SEM Committee believes this will not occur if termination fees are within liquidated damages for the underlying EPC contract. In this respect, the SEM Committee notes that the liquidated damages for the assumed 2013 Best New Entrant would be in the range €47/kW to €94/kW⁴².

5.6.27 The SEM Committee notes the potential to increase termination fees progressively through the lifecycle of a project. This has the attraction of:

- Providing incentives for failing projects to declare their failure early – and so avoid increased Performance Bonds; and
- Allowing Performance Bonds, at least initially, to be more similar to those used in GB – and so reducing the risk that the Performance Bond would act as a barrier to entry.

5.6.28 In respect of the latter point above, the SEM Committee notes:

- GB Performance Bond is currently £5/kW (€6.25/kW), but is proposed to increase to £10/kW (€12.50/kW); and
- GB termination fees rise to £25/kW (€31.25/kW).

SEM Committee Decision

DS3

5.6.29 The SEM Committee agrees that the Implementation Agreements for CRM and DS3 should be aligned as far as practical. This should support the **cost/practicality** objective.

Milestones

5.6.30 The SEM Committee will proceed on the basis of the list of milestones given in the consultation paper. These will need to be kept under review as the pre-qualification requirements are firmed-up and during detailed drafting of the implementation agreement itself.

5.6.31 We believe that these milestones should also be appropriate for DS3. However, the analogous definitions of Substantial and Minimum Completion will need to be adapted to relate to the relevant system services rather than MW capacity.

⁴² This is based on EPC liquidated damages being in the order of 10% to 20% of contract value. The 2013 BNE calculation shows an EPC contract cost of €92.5 million for a capacity of 196.5MW., based on a GT13E2 OCGT unit. Using the above percentage range of liquidated damages, a performance bond of 47-94€/kW would be fully covered.

- 5.6.32 The SEM Committee has decided that 90% of contracted capacity will be the definition for Substantial Completion and 50% of contracted capacity for Minimum Capacity.
- 5.6.33 The SEM Committee has decided that 18 months from contract award is sufficient time to achieve Substantial Financial Completion. However, this may need to be adjusted if pre-qualification requirements are tighter than currently anticipated.
- 5.6.34 The SEM Committee has decided that the RAs will have the discretion to offer a short remedy period following the Substantial Financial Completion milestone, if it is warranted by the reported project status.

Reporting

- 5.6.35 The SEM Committee has decided that reporting against milestones should be six monthly, though the exact schedule will need to be integrated with the auction timetable.
- 5.6.36 The SEM Committee has decided that independent verification of reports should only be required for critical reports. This would include the report demonstrating Substantial Financial Close which would then be used by the RAs to determine whether a further remedy period is warranted.
- 5.6.37 The SEM Committee has decided that a further critical report is the last report prior to the T-1 auction. This is the last opportunity for the market to acquire capacity to replace contracted capacity which will not be delivered due to delays to completion.

Termination

- 5.6.38 The SEM Committee has decided that the Implementation Agreement will be terminated in the event of:
- Failure to achieve Minimum Completion by the Long Stop Date;
 - Failure to achieve Substantial Financial Completion within 18 months of contract award; or
 - Material information submitted for pre-qualification being found to be false or misleading.
- 5.6.39 The SEM Committee does not believe there is sufficient benefit to the market to justify sterilisation of failed projects. The financial penalties for termination should be sufficient to exclude frivolous projects from coming forward.
- 5.6.40 If a project is delayed, but will still be delivered before the Long Stop Date, there will be a period during which consumers are exposed to a lower security of supply than desired. If this is to be avoided, additional capacity would need to be acquired in the T-1 auction prior to delivery. To prevent buying the same capacity twice, if the independently verified report prior to the T-1 auction indicates that a project will not commence delivery under its reliability option until after a certain point (e.g. 1 April) in year T, the

first year of the late delivered RO will be terminated and the missing capacity will be entered into the T-1 Auction. The date from which this first year termination will occur will be decided during the detailed drafting of the implementation agreement, but should take account of the period for which reliability options are most likely to offer a critical hedge to consumers.

- 5.6.41 The SEM Committee notes the concerns of some respondents about external events, outside a project's control, that could delay achievement of a milestone against which a termination condition exists. The SEM Committee have considered the events identified by respondents, and does not believe that they merit any extension to the milestones.

Performance Bond

- 5.6.42 The SEM Committee has decided that the level of termination fee (and hence Performance Bond) should rise progressively over the lifetime of a project to build new capacity. Specifically:

- It should start at a low level – potentially linked to the levels used for the GB CRM; and
- It should reach its full level just before the last routine event through which alternative capacity could be procured to replace a failing project. This will be the point at which the capacity requirement is set for the T-1 auction covering the first year in which the relevant plant could (if commissioned) receive option fees.

- 5.6.43 The “full level” of the termination fee (and hence Performance Bond) should be set based on analysis of:

- The cost to consumers of undelivered capacity;
- The level of delay liquidated damages available from a typical EPC Contract; and
- The level of penalties for undelivered capacity to which an existing unit would be exposed.

- 5.6.44 The initial analysis of these values indicates a value in the range of €47/kW to €55/kW, as set out in the SEM Committee response above.

Next Steps

- 5.6.45 The final levels for termination fees and performance bonds will be considered as part of the consultation on parameters.

5.7 SUMMARY OF SEM COMMITTEE DECISIONS

- 5.7.1 The SEM Committee has 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’. We are continuing work to develop eligibility criteria and parameters to finalise the agreement lengths which to be offered initially.
 - Be no more than ten years, with the actual maximum value being confirmed in Decision 3 (July). This will build on analysis of measures in the auction design that are intended to reduce inter-annual volatility in the prices arising from those auctions. The resulting reduction in risk to investors could lead to the selection of a shorter length for the price fix.
 - Be kept under review with a view to amending the length of price fix available as the I-SEM matures.
- That to be classified as “plant requiring significant investment”, there will be a need to demonstrate:
 - €/MW investment above a threshold;
 - That this investment is directly linked to bringing into operation all or part of the equipment that is essential to the delivery of capacity by the plant; and
 - That the capacity of the plant is enhanced compared to a counterfactual of no investment.

5.7.2 The SEM Committee will not apply indexation to option fees.

5.7.3 The Capacity Year will run from 1 October.

5.7.4 For the start of the CRM, an annual and a billing period stop-loss limit will be used. This decision will be reviewed based on operation of the CRM.

5.7.5 The SEM Committee will set the annual stop-loss limit to 1.5x the annual option fee for a capacity provider and is minded to set the billing period stop-loss limit to 0.5x the annual option fee for a capacity provider. Final values will be determined as part of the parameters consultation process.

5.7.6 The levels of the stop-loss limits will be kept under review, but the levels in any Reliability Option will be grand-fathered.

5.7.7 SEM Committee consider that a 4-year commissioning window is an appropriate time to allow most plant to be operational before capacity is required in I-SEM.

5.7.8 SEM Committee approves the addition of extra 18 month “long stop” window which leaves a total period of 5½ years between the auction results and the termination (with penalties) of the reliability options for any plant that has not become operational. This 5½ year period is sufficiently long to accommodate the more complex plant that the project team is aware of being considered for the I-SEM.

- 5.7.9 The SEM Committee agrees that the Implementation Agreements for CRM and DS3 should be aligned as far as practical. This should support the cost/practicality objective.
- 5.7.10 The SEM Committee will proceed on the basis of the list of milestones given in the consultation paper. These will need to be kept under review as the pre-qualification requirements are firmed-up and during detailed drafting of the implementation agreement itself.
- 5.7.11 We believe that these milestones should also be appropriate for DS3. However, the analogous definitions of Substantial and Minimum Completion will need to be adapted to relate to the relevant system services rather than MW capacity.
- 5.7.12 The SEM Committee has decided that 90% of contracted capacity will be the definition for Substantial Completion and 50% of contracted capacity for Minimum Capacity.
- 5.7.13 The SEM Committee has decided that 18 months from contract award is sufficient time to achieve Substantial Financial Completion. However, this may need to be adjusted if pre-qualification requirements are tighter than currently anticipated.
- 5.7.14 The SEM Committee has decided that the RAs will have the discretion to offer a short remedy period following the Substantial Financial Completion milestone, if it is warranted by the reported project status.
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- 5.7.18 The SEM Committee has decided that the Implementation Agreement will be terminated in the event of:
- Failure to achieve Minimum Completion by the Long Stop Date;
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 - Material information submitted for pre-qualification being found to be false or misleading.
- 5.7.19 The SEM Committee does not believe there is sufficient benefit to the market to justify sterilisation of failed projects. The financial penalties for termination should be sufficient to exclude frivolous projects from coming forward.

- 5.7.20 If a project is delayed, but will still be delivered before the Long Stop Date, there will be a period during which consumers are exposed to a lower security of supply than desired. If this is to be avoided, additional capacity would need to be acquired in the T-1 auction prior to delivery. To prevent buying the same capacity twice, if the independently verified report prior to the T-1 auction indicates that a project will not commence delivery under its reliability option until after a certain point (e.g. 1 April) in year T, the first year of the late delivered RO will be terminated and the missing capacity will be entered into the T-1 Auction. The date from which this first year termination will occur will be decided during the detailed drafting of the implementation agreement, but should take account of the period for which reliability options are most likely to offer a critical hedge to consumers.
- 5.7.21 The SEM Committee has decided that the level of termination fee (and hence Performance Bond) should rise progressively over the lifetime of a project to build new capacity. Specifically:
- It should start at a low level – potentially linked to the levels used for the GB CRM; and
 - It should reach its full level just before the last routine event through which alternative capacity could be procured to replace a failing project. This will be the point at which the capacity requirement is set for the T-1 auction covering the first year in which the relevant plant could (if commissioned) receive option fees.
- 5.7.22 The “full level” of the termination fee (and hence Performance Bond) should be set based on analysis of:
- The cost to consumers of undelivered capacity;
 - The level of delay liquidated damages available from a typical EPC Contract; and
 - The level of penalties for undelivered capacity to which an existing unit would be exposed.
- 5.7.23 The initial analysis of these values indicates a value in the range of €47/kW to €55/kW, however, the final values for the levels of termination fees and performance bonds will be considered as part of a consultation on parameters scheduled for Q3 2016.

6. LEVEL OF ADMINISTERED SCARCITY PRICE

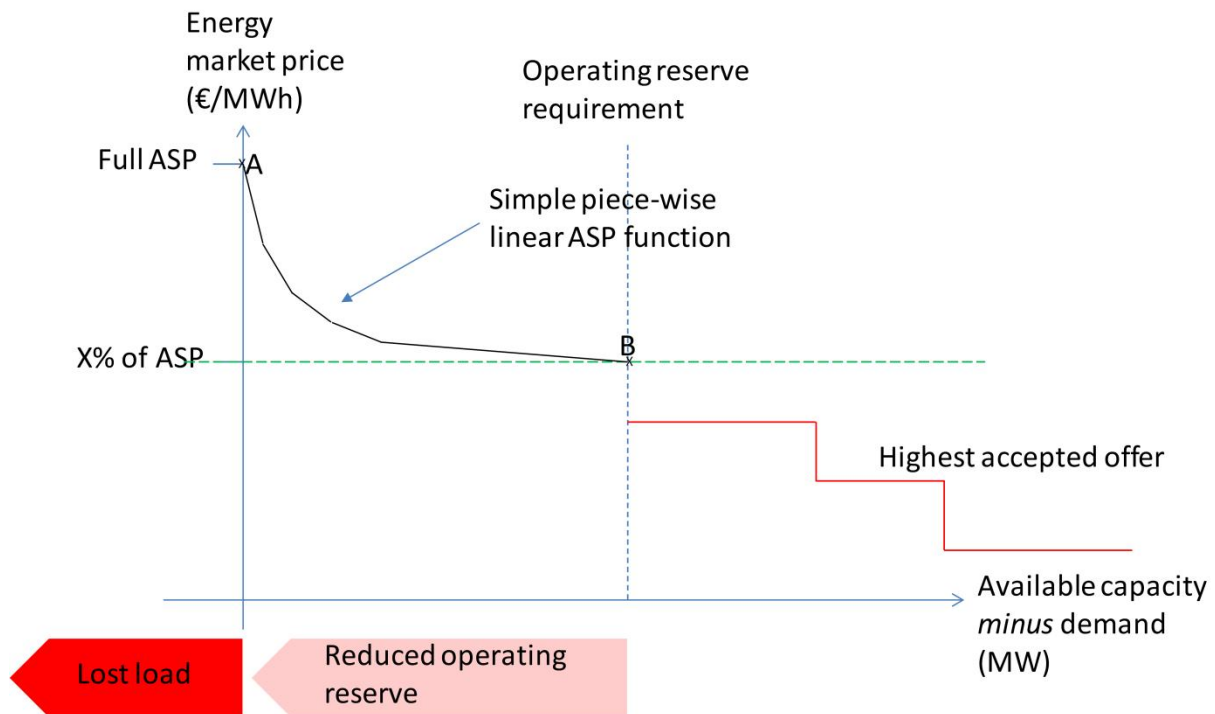
6.1 INTRODUCTION

- 6.1.1 The SEM Committee has decided that Administered Scarcity Pricing should be introduced into the energy imbalance price. This Administered Scarcity Price will apply when there is insufficient available capacity to cover the combination of demand and the target level of operating reserve⁴³.
- 6.1.2 The level of the Administered Scarcity Price acts as a floor on energy prices⁴⁴, and will increase as the margin of spare capacity is eroded, ultimately resulting in the forced reduction in the load of some or all customers in the I-SEM. This increase in the Administered Scarcity Price will be controlled by a five-part piecewise linear function (see Figure 15), the parameters of which will be determined by the SEM Committee on a periodic basis. In Figure 15 the Administered Scarcity Price starts applying at point B, when the available capacity drops below the target operating reserve, and the price increases further until the point when full load shedding occurs at point A, when the Full Administered Scarcity Price applies.
- 6.1.3 SEM-15-104 considered a number of issues relating to the precise definition of the Administered Scarcity Price. Specifically, these covered:
- The precise definition of load shedding- i.e. when the FASP will apply;
 - The appropriate level for the Full Administered Scarcity Pricing, i.e. the level of Administered Scarcity to apply in the event of “load shedding”;
 - Whether it is appropriate to have a phased approach to introduction of ASP, introducing ASP at a lower level during some transition period;
 - The precise definition of target operating reserve requirement, and what advance signalling of potential scarcity should be made available to the generality of the market by the TSOs; and
 - The initial parameters for the piecewise linear function.

⁴³ Scarcity will not apply where operating reserve is reduced below target levels because the TSO uses reserve which has already been deployed (for instance to cover a forced outage), but additional capacity is available to replenish reserve

⁴⁴ The price during scarcity will be the higher of a market determined price and the relevant Administered Scarcity Price. Therefore, if an accepted market based bid is higher than the Administered Scarcity Price, the imbalance price can rise to reflect the market based bid

Figure 15: Piecewise linear Administered Scarcity Pricing Function



6.2 DEFINITION OF LOAD SHEDDING

Consultation Summary

Load Shedding

- 6.2.1 Load shedding is the point at which Full Administered Scarcity Price (FASP) applies, i.e. point A in Figure 15.
- 6.2.2 SEM-15-103 stated that, broadly speaking, the definition of full load shedding should correspond to the current definition of Eirgrid red alerts. Eirgrid issues a red alert when one of the following four has occurred:
- The system frequency has deviated significantly below normal levels;
 - System voltage has deviated significantly below normal levels;
 - Consumer load has been shed (involuntarily); or
 - In the period immediately ahead there is a high risk of failing to meet system demand or maintaining normal voltage and frequency.
- 6.2.3 We would anticipate that load shedding would be deemed to have occurred and the Full Administered Scarcity Price to apply when any of these events has occurred.
- 6.2.4 These events are broadly similar to a Demand Control Event as defined in OC6 of the GB Grid Code, i.e.:

- Demand disconnection;
- Voltage reduction; or
- Low Frequency Demand Disconnection.

Depletion of Target Operating Reserve

- 6.2.5 Administered Scarcity Pricing starts to apply when there is insufficient available capacity to maintain the target operating reserve (at point B in Figure). The level of this target operating reserve needs to be defined.
- 6.2.6 The TSOs (Eirgrid and SONI) operate a common operating reserve requirement across the island of Ireland. The requirement is primarily driven in practice by the size of the largest in-feed, which varies dynamically and could be around 500MW if the East-West interconnector is importing at full capacity, or might be driven at other times by the size of one of the CCGTs or a Moneypoint unit (285MW).
- 6.2.7 However, the target operating reserve requirement is likely to change as a result of the DS3 programme and the move to target System Non-Synchronous Penetration of 75% by 2020.
- 6.2.8 The SEM Committee has decided that ASP will apply whenever there is insufficient available capacity to meet target operating reserve. Note that Administered Scarcity Pricing will not apply at times when there is sufficient available capacity, but it cannot start/ramp-up fast enough leading to a short term reduction in operating reserve – a frequent event.
- 6.2.9 The TSOs will be responsible for monitoring available capacity in real time.

Summary of Responses

- 6.2.10 Respondents gave a variety of answers, ranging from broad acceptance of the definition given to significantly different design proposals. A majority of respondents, however, was in favour of the given definitions as stated, or with small changes.
- 6.2.11 In terms of type of events that constitute load shedding, the range of responses included:
- Drop in frequency leading to involuntary load shedding
 - Voltage drop leading to involuntary load shedding
 - Frequency and voltage drops only
- 6.2.12 In terms of severity of event:
- Pre-emptive preventative
 - Commercial options exhausted
 - Demand exceeding capacity prior to involuntary load shed
 - Only when load is shed
 - Only complete black out

- 6.2.13 Several respondents were concerned that minor excursions in frequency or voltage should not trigger Administrative Scarcity.
- 6.2.14 Some respondents suggested that a warning be issued in advance of a potential scarcity event. Suggestions included an indication 8 hours ahead and 30 minutes before gate closure to allow for commercial optimization.
- 6.2.15 Amongst other points noted:
- The trigger for Administered Scarcity needs to be objectively defined, i.e. free of TSO judgment;
 - The gas network may provide a signal that can be used
- 6.2.16 A number of respondents noted the potential for TSO actions to impact a declaration of load shedding. Many of the responses centred on the need to clarify how this is accommodated in the rules, particularly in light of 5.3.10 of SEM-15-104, where it was noted that scarcity may be declared at times of sufficient capacity but insufficient ramping time; in such a case, the efficiency of actions taken by the TSO may have a bearing on when scarcity occurs.

SEM Committee Response

Load Shedding

- 6.2.17 The SEM Committee agrees with respondents that the trigger for Administrative Scarcity should be objectively defined and that the trigger should not be invoked for trivial excursions of frequency or voltage. As a result, the Eirgrid Grid Code definition of a Red Alert is not considered to form a suitable trigger for Administered Scarcity.
- 6.2.18 The Committee takes the view that Administrative Scarcity exists to maintain an appropriate price signal in the market at those times when, in order to balance consumption and supply, the TSO is forced to take otherwise unpriced actions.
- 6.2.19 The TSO should only be taking such actions when all market options, including priced demand response, have been exhausted.
- 6.2.20 The Committee is keen for the definition of load shedding to be based on the relevant Grid Codes.
- 6.2.21 Under the SONI Grid Code, the following defined events would be considered to trigger Administrative Scarcity:
- Customer Voltage Reduction
 - Planned or Emergency Manual Disconnection (including Rota Disconnection); and
 - Automatic Load Shedding
- 6.2.22 Note: Customer Demand Management would not be a trigger for Administrative Scarcity as this is a commercial activity within the scope of the market.

- 6.2.23 Under version 6 of the Eirgrid Grid Code, an analogous list of events can be identified. However, there is an issue as the code does not recognise commercially driven customer demand control.
- 6.2.24 Major failure of the transmission or distribution systems, e.g. Total or Partial Shutdown, or any situations where normal functioning of the I-SEM market is suspended should not lead to administered scarcity being triggered.
- 6.2.25 The Grid Codes already provide for warnings to be issued to the market relating to impending demand control events where this is possible. We propose that these warnings are reviewed as part of the implementation phase to ensure they are consistent and adequate for Administrative Scarcity Events.
- 6.2.26 The Committee does not believe it is desirable to include a further test as to whether the Grid Code derived trigger for Administrative Scarcity was caused by an absolute shortage of available capacity or by a shortfall in capacity constrained by its run-up or ramp rates. However, given the range of reserve services being procured by the TSOs under DS3 any event of Administered Scarcity triggered when available capacity exceeds demand would warrant review by the RAs.

Depletion of Target Operating Reserve

- 6.2.27 In addition to defining the trigger for Administrative Scarcity (point A in Figure 15) it is also necessary to define where the piece-wise linear curve should start (point B).
- 6.2.28 The Consultation Paper proposes that B should be the point at which operating reserves are unavoidably eroded. Clearly, reserves exist to be eroded and so B should be set where reserves have been eroded and cannot be replaced.
- 6.2.29 We consider that operating reserve (i.e. POR, SOR and TOR1 and TOR2) can be replaced if the TSO can call upon sufficient Replacement Reserve (RRS or RRD) or Ramping Margin 1 (RM1) to cover any temporary shortfall caused by utilisation. If the total of RRS, RRD and RM1 available is insufficient to replace used operating reserve then Administered Scarcity Pricing is triggered. The Administered Scarcity Price to be used is identified from the piece-wise linear curve running from point B to A using the shortfall in operating reserve that cannot be replaced within one hour.

SEM Committee Decision

- 6.2.30 The SEM Committee has decided as follows:
- Administered Scarcity will be triggered when an event corresponding to any of **Customer Voltage Reduction, Planned or Emergency Manual Disconnection or Automatic Load Shedding** *either* as defined in the SONI Grid Code *or* a direct equivalent event defined in the Eirgrid Grid Code is declared.
 - The RAs will investigate any events of Administered Scarcity which occur during operation of the market.

- Target Operating Reserve will be deemed to have been depleted if operating reserve (i.e. POR, SOR, TOR1 and TOR2) cannot be replaced from replacement reserve or ramping marking within one hour.

Next Steps

- 6.2.31 The two Grid Codes will be reviewed to ensure consistency between the trigger events for Administered Scarcity and to ensure suitable and equivalent warnings are issued in advance of such events, where such warning is feasible.

6.3 LEVEL OF FULL ADMINISTERED SCARCITY PRICE

Consultation Summary

- 6.3.1 The SEM Committee decided in SEM-15-103 that a piece-wise linear function will be used to define the level of Administrative Scarcity Price. However, it was acknowledged in that Decision paper that this second Decision paper would address:

- The price level of FASP;
- The percentage of ASP (X%) used as the start point of the function;
- Whether any transitional arrangements are required

- 6.3.2 There is a number of options for the level of FASP:

- **VoLL:** FASP is set to the current estimate of the Value of Lost Load for the I-SEM system. For 2016 this is €11,017.98. Under the current SEM, this value will increase on an annual basis in line with inflation.
- **EU Consistent:** FASP is set consistent with its equivalent value in neighbouring electricity markets. This currently is the GB market, implying a value of €4,170/MWh rising to €8,340/MWh from late 2018;
- **Euphemia Cap:** FASP is set at the Euphemia cap for the day-ahead market. This is currently €3,000/MWh
- **PCAP:** FASP is set at the current (€1,000/MWh) Pool Price Cap in the SEM

Summary of Responses

Level of FASP

- 6.3.3 Of the four options proposed in SEM-15-104 concerning the value of FASP, respondents expressed a variety of preferences, with each option receiving some support, as both enduring and interim price levels. These are explored in further detail below

- 6.3.4 The use of **VoLL** on an enduring basis was supported by roughly one third of those who responded to this section, although in only one case was there support for this to be

introduced in the transition period. The alternative responses had no consensus on what the introductory price should be, with all other alternatives receiving some support.

- 6.3.5 The main argument in favour of VoLL was that of ensuring the strongest incentives to make capacity available during a scarcity event. There was also comment that VoLL would be the most equitable option.
- 6.3.6 A number of respondents expressed concern that use of VoLL must be aligned to GB VoLL calculations or be reviewed in the context of other workstreams, in order to enhance credibility and ensure that it does not have adverse market impacts. Some expressed fears that using VoLL might be too great a burden for small suppliers and that differences in how VoLL is calculated between connected markets could lead to inter-market distortions that accelerate extreme prices further.
- 6.3.7 The use of an approach **consistent with GB** on an enduring basis received support from almost one half of all responses to this section, making it the most popular answer. Around one half of such responses suggested that it be adopted in the transition period, and alternatively there was some support for using the Euphemia price cap in the transition period instead.
- 6.3.8 The most common argument in favour of this approach was to avoid distorting cross-border flows in a scarcity event and reducing arbitrage opportunities between markets.
- 6.3.9 Concern with this approach was expressed by a small number of respondents. This included the concern that the GB market alone does not ensure EU consistency, and that a GB scarcity event could enhance rather than mitigate an I-SEM scarcity event under this approach.
- 6.3.10 The use of the **Euphemia price cap** was not popular as an enduring price for FASP, but was popular as a transition period price, with the majority of those respondents who were in favour of an introductory price preferring for this to be based on the Euphemia cap.
- 6.3.11 There was consensus that a price lower than the Euphemia cap has potential to distort markets. Other responses suggested that the Euphemia cap would be particularly suitable to the combined market nature of the I-SEM, and that it is a price level deemed sufficient for the purposes desired.
- 6.3.12 The use of **PCAP** as an enduring FASP was supported by a small number of respondents, all of whom supported PCAP in the transition period too. An even smaller number expressed preference for PCAP in the transition period, moving to an alternative on an enduring basis.
- 6.3.13 Reasons posited for PCAP included the historic success of PCAP and the benefits of having FASP set at a low level, particularly to benefit smaller participants on non-dispatchable, intermittent generators.
- 6.3.14 Additionally, of those in favour of an introductory FASP there was:

- A desire to see the introductory price last for a minimum number of years (suggested variously between 2 to 4) before moving to an enduring solution.
- Some support for defining an enduring level only later, after there has been sufficient experience within the transition period to assess the best approach to take.

6.3.15 Respondents were invited to comment on the potential for “virtual bidding” (where both buying and selling in the DAM could be used in order to allow further participation in later markets) to mitigate the risk of volume being withheld from earlier markets. A range of responses was received, with the majority comfortable with or agnostic to the principle. However, a number raised concerns that the potential for market power remains, while others requested further clarity on how such “virtual bidding” can be used in practice.

The piece-wise linear function

6.3.16 A majority of respondents commented that using the remaining MW of available operating reserve to set the piece-wise linear function is reasonable. The use of a static approach to the FASP curve at I-SEM inception also received the majority of support.

6.3.17 In responding to the question of what value to give X (the percentage of ASP from which the linear function begins), a number of respondents answered the question more broadly, suggesting a threshold price from which to begin the linear function, rather than limiting the methodology simply to taking a percentage of FASP.

6.3.18 Where suggestions were made that gave an explicit value of X, this ranged from 5-20% of FASP. Where suggestions were broader, there was general consensus that the threshold price needed to be bounded below by the Reliability Option Strike Price. A number of respondents suggested that it should be set equal to the Strike Price.

SEM Committee Response

Level of FASP

6.3.19 A number of respondents requested more information on “virtual bidding” and how this can reduce withholding of trade volumes. The SEM Committee believes it is important to make this clear, as this approach can play a significant role in providing assurance of how price risks and operating reserve decisions can be managed in DAM and ID timeframes. This in turn makes the choice of certain FASP options more appropriate, without concern of volume being withheld from DAM and IDM timeframes. Appendix A provides an explanation of how this can be used.

6.3.20 The SEM Committee believes that the FASP should not be set at a level below the GB equivalent. This will ensure power continues to flow to whichever market is experiencing scarcity, which is in turn consistent with the intent of the I-SEM.

- 6.3.21 The SEM Committee also notes the analysis stated in SEM-15-104 that in order to meet criteria of internal electricity market, competition, equitability, stability and security of supply, there is a need for FASP to reflect true measures of scarcity in the market, and should be allowed to reflect the true value to the system of lost load. The SEM Committee believes that setting FASP at PCAP or the Euphemia price cap on an enduring basis will not capture this approach, nor be consistent with the GB approach. Therefore, FASP should be based on VoLL on an enduring basis.
- 6.3.22 The SEM Committee recognises the concerns of basing FASP on VoLL at initial implementation, as noted by a number of participants. Therefore, the SEM Committee has decided that the following measures will be implemented to alleviate the concerns:
- At implementation, FASP will be set at an introductory price level equal to the Euphemia price cap. This aligns with the GB approach and allows for an initial period of market transition; and
 - The transition to using a VoLL basis should follow the transition period, with a change from the Euphemia price cap to VoLL basis occurring at the end of the transition period. This ensures scarcity is reflected in FASP for delivery of all T-4 auction volumes;

The piece-wise linear function

- 6.3.23 The SEM Committee agrees with the majority of respondents that using the remaining MW of operating reserve is a sensible approach to take in defining the function. This will form a key parameter in the next step of proposing the function, which the TSO will be asked to calculate for RA approval.
- 6.3.24 A static approach to the linear function represents the best solution. As a pragmatic approach, it would be relatively simple to implement, known in advance, easy to keep under review and a reasonable approximation to the true Loss of Load Probability (LoLP) curve. This in turn reduces the forecasting burden placed on participants and is the favoured approach.
- 6.3.25 The SEM Committee recognises the need to make a firmer definition of the function, and that further modelling is required in order to achieve this and continued to keep it under review.
- 6.3.26 The SEM Committee believes that the discussion of the price threshold (the price from which the linear function begins) should be widened beyond simply taking a percentage of FASP, as suggested by several respondents. This is because several constraints exist that need to be considered in setting this threshold, which may not be directly captured in the value of FASP:
- The threshold should not be below the Reliability Option Strike Price, in order to ensure that all market participants' short run marginal costs are met; and

- The price should reflect the fact that normal balancing energy actions have been exhausted at the threshold.
- 6.3.27 The constraint of reaching a price that reflects the exhausting of normal balancing actions is likely to coincide with the Reliability Option Strike Price. For this reason, setting the threshold price to the strike price would be a sensible, pragmatic solution. This ensures that Reliability Option holders are incentivised to be available and contribute to addressing scarcity.
- 6.3.28 The SEM Committee agrees that there needs to be a sufficient notice period to allow for participants to cost their bids accurately. Therefore, the static function should be communicated ahead of the T-1 auction to which it pertains. This should be released no later than 2 months before the auction in question, to allow adequate time for participants to incorporate the information into their decision making.

SEM Committee Decision

- 6.3.29 The value of FASP will be set at the Euphemia day ahead price cap of €3,000/MWh. This will exist throughout the transition period; after which it will be based on VoLL. The exact percentage of VoLL used will be defined at a later point in time, but will be no greater than 100%.
- 6.3.30 To ensure suitability, the VoLL calculation will be reviewed on a regular basis.
- 6.3.31 The piece-wise linear function will be static, with MW of operating reserve used as the basis for its definition. It will be communicated no later than 2 months before the auction in question.
- 6.3.32 The price from which the function begins will be the Reliability Option Strike Price.

Next Steps

- 6.3.33 The exact percentage of VoLL used to make up the value of FASP and the construction of the linear function will be defined following further modelling as part of the parameters consultation.

6.4 SUMMARY OF SEM COMMITTEE DECISIONS

- 6.4.1 Administered Scarcity will be triggered when an event corresponding to any of **Customer Voltage Reduction, Planned or Emergency Manual Disconnection or Automatic Load Shedding** *either* as defined in the SONI Grid Code *or* a direct equivalent event defined in the Eirgrid Grid Code is declared.
- 6.4.2 The RAs will investigate any events of Administered Scarcity which occur during operation of the market.

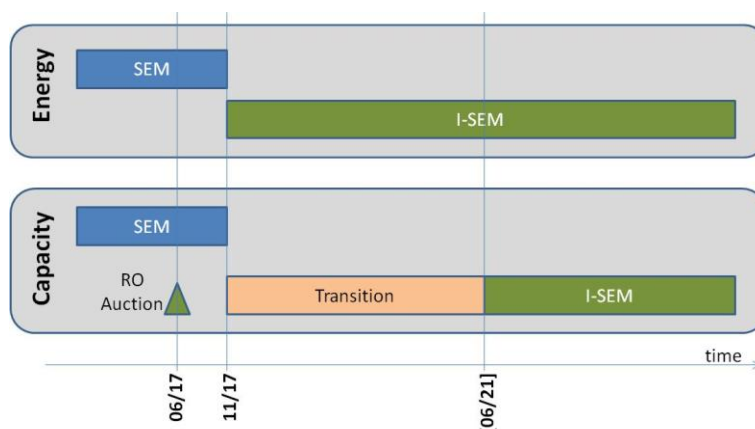
- 6.4.3 Target Operating Reserve will be deemed to have been depleted if operating reserve (i.e. POR, SOR, TOR1 and TOR2) cannot be replaced from replacement reserve or ramping marking within one hour.
- 6.4.4 The value of FASP will be set at the Euphemia day ahead price cap of €3,000/MWh. This will exist throughout the transition period; after which it will be based on VoLL. The exact percentage of VoLL used will be defined at a later point in time, but will be no greater than 100%.
- 6.4.5 To ensure suitability, the VoLL calculation will be reviewed on a regular basis.
- 6.4.6 The piece-wise linear function will be static, with MW of operating reserve used as the basis for its definition.
- 6.4.7 The price from which the function begins will be the Reliability Option Strike Price.

7. TRANSITIONAL ISSUES

7.1 CONSULTATION SUMMARY

7.1.1 As illustrated in Figure.16, the anticipated lead time between the first main auction for the allocation of Reliability Options and the start of those options leads to a transitional period. Neither the existing SEM CRM, nor the Reliability Options from that first auction, will be paying for capacity that operates during this transitional period. We have to decide which providers are paid for capacity, and the rate at which they are paid.

Figure.16: Moving from the SEM CRM to the I-SEM CRM



7.1.2 We have considered three options for the treatment of this transitional period:

- **Auction each year separately:** Under this option each round of capacity auctions would procure the balance of capacity required for the Capacity Year immediately following those auctions, as well as the bulk of the capacity required for Capacity Year + n⁴⁵. For the first “n” years, the year-ahead auctions will be procuring all of the capacity required for that capacity year;
- **Auction as a block:** Under this option the first (June 2017) round of capacity auctions would procure the bulk of the required capacity required for each of the transition years, as well as for the following Capacity Year (year + n). Each subsequent annual round of auctions auction would procure the bulk of the required capacity for “year + n”, as well as a small amount of capacity to fine-tune the level of contracted capacity for the Capacity Year immediately following those auctions.
- **Do Nothing:** Under this option, Capacity Providers receive no Capacity Payments during the transition period. This may be combined with a low level of Administered Scarcity Price for the transitional period.

⁴⁵ “n” is the length of time (in years) allowed for plant construction

Summary of Responses

- 7.1.3 The majority of respondents who had a view on transitional arrangements had a preference for annual auctions. There was no clear preference as to whether these should be auctioned each year or all 4 separate years auctioned at once. One respondent who did indicate a preference for auctioning all four years at once suggested that these annual auctions should be held a month apart.
- 7.1.4 A number of respondents had either no preference for either block or annual or their preference for one over the other was minimal.
- 7.1.5 There was a number of respondents who favoured an option which was not consulted upon. This 'glide path' option was considered at an early stage by the RAs but was not considered a viable option by SEMC. The RAs did not receive any compelling evidence that would warrant the inclusion of this option at this stage.
- 7.1.6 Only 2 respondents favoured a low FASP in a 'do nothing' scenario, the remaining respondents with a view considered this inappropriate.

SEM Committee Response

- 7.1.7 The team's minded to position is to auction each year separately. The demand curve for these auctions would be modified to reduce the risk of early closure of plant that is required towards the end of the transition period.
- 7.1.8 The team's assessment of the options is trying to balance the following factors:
- **Risk of Lost Load (estimated at ~€6.6m for the final transition year):** The current I-SEM capacity statement indicated that the need for capacity will grow by 150MW over the transitional period. This shortage could increase the Loss of Load expectation by ~4⁴⁶ hours, leading to ~600⁴⁷ MWh of lost load. The LoLP number used for the SEM is ~€11,000/MWh, giving a cost in that year of €6.6m. There is a Grid Code requirement that plant give 3 years notice before closing – which means the shortfall is unlikely to occur in those first three transition years.
 - **Risk of buying too much capacity (estimated at <€7.5m):** If we assume that demand grows linearly over the transition period, and we buy the 150MW across all that period, this would lead us to buying 300MW too much capacity over the transition period:
 - 150MW too much in Year 1
 - 100MW too much in Year 2
 - 50MW too much in Year 3

⁴⁶ TSO modelling indicated that the move from 8 hour LOLE to 3 hour LOLE would require ~200MW of capacity.

⁴⁷ 4 hours x 150MW.

- At the prices arising from the GB Capacity Auction (~£19k/MWyear, ~€25k/MWyear), this equates to €7.5m.
- **Risk of paying too high a capacity price (not estimated):** It is possible that participants will reduce their offers into the capacity market over time. This would occur as participants build an understanding of the extent to which their fixed costs will be covered by energy payments – and hence the revenue they require from capacity.
- **Complexity and deliverability of solution:** The “Auction as block” option is a more complicated “combinatorial” auction. The combination of the CRM design and implementation timelines may mean that it is not possible to deliver a complex combinatorial auction for summer 2017.

7.1.9 Figure 17 summarises the impact of these factors across the three credible options:

Figure 17: Risks associated with auction designs

	Auction each year separately		Auction as a block
	Buy Capacity Required for That Year	Buy Maximum Capacity Required for Balance of Transition	
Risk of Lost Load	€6.6m	0	0
Risk of Buying Too Much Capacity	N/A	<€7.5m	<€7.5m
Risk of too high capacity price	N/A	N/A	✓
May not be implementable	N/A	N/A	✓

SEM Committee Decision

7.1.10 In the transition period, the required capacity will be procured through annual auctions that procure each year separately. The demand curve for each of these auctions will be modified to ensure plant needed at the end of the transitional period does not close having not been awarded a contract for the start of the period.

Next Steps

7.1.11 Auction design and demand curve specifications will be progressed as outlined above.

8. NEXT STEPS

8.1.1 A number of “next steps” have been identified associated with the decisions set out in this paper. These next steps fall into the following areas:

- **Methodologies:** There are a number of areas where specific methodologies need to be developed to support decisions in this paper. Specifically:
 - **Interconnector Derating:** The Regulatory Authorities will develop a methodology to determine the derating factors to be applied to interconnectors. This will form part of a consultation paper, planned for Q3 2016, covering derating methodologies.
 - **Load following for secondary trading:** Plant will be allowed to sell any capacity “freed up” by load following through direct secondary trading. The level of load following that can be assumed at the time of secondary trading will be considered as part of the parameters consultation.
- **Hybrid model for cross border:** The Regulatory Authorities, in conjunction with DECC and Ofgem will develop an implementation plan for the “hybrid” model for cross border participation. At this stage, the target is to implement the hybrid model for the I-SEM CRM for 2019.
- **Parameters:** A number of decisions in this paper are subject to specific parameters that will be set (and kept under review) by the SEM Committee. The following parameters will be considered as part of Consultation 3:
 - **Price fix length:** The length of “price fix” available to plant requiring investment will be determined as part of the third CRM Decision. This will build on analysis of the potential to reduce the risk faced by such plant by using a sloping demand curve in capacity auctions;

The following parameters will be considered as part of a separate consultation paper on CRM parameters:

- **Investment Threshold:** The €/MW threshold for plant to be classified as “requiring significant investment”, and so be able to avail of a price fix for more than one year.
- **Enduring FASP:** The administered scarcity price that should be used on an enduring basis when customers have involuntarily reduced load as a result of insufficient capacity. The value of “Full Administered Scarcity Price” will be expressed as a percentage of the then I-SEM Value of Lost Load (VoLL).
- **Termination Fee:** The €/MW fee that will be charged to new-build capacity that fails to deliver the required capacity in the required timescales. This fee will be paid up-front by developers, in the form of a performance bond.
- **Billing period stop loss limit:** The stop loss limit (as a multiple of annual option fees) that should apply for each CRM billing period.

- **Secondary Trading Venue:** The Regulatory Authorities will continue to work with the TSOs towards developing an auction solution for the secondary trading of Reliability Options.

APPENDIX A. VIRTUAL BIDDING

In the proposed I-SEM mechanism, market participants will be able to trade in DAM, thereby providing information to the TSO about their delivery volume. At this stage, while there is no obligation to submit this information, generators and demand side participants wishing to manage their risk and be entered into the central dispatch would be likely to do so.

In the event of an anticipated scarcity event, a participant in the energy market may see entering the DAM as a disadvantage because such trading is subject to the Euphemia price cap of €3,000/MWh. If volumes are withheld at this point, it introduces a risk that the TSO would not receive visibility of available providers at day ahead stage, therefore would not be able to make adequate provisions for managing the reserve necessary to ensure network stability (which would be of particular concern if a scarcity event were anticipated).

In order to allow participants to follow their commercial strategies, while maintaining a signal to be given to the TSO regarding their availabilities, “virtual bidding” proposes that a participant can submit both bids and offers into the DAM. If both orders are placed at similar prices, then both trades would either be accepted or declined, resulting in zero net volume of trades in either case. The participant would no longer be restricted by the Euphemia price cap in order to notify the TSO of their availability (who could use the set of bids and offers as the basis for managing reserve for the next day).

In order to be effective, DAM needs a facility for such bid-offer pairs to be flagged and treated in such a way that either both are accepted or rejected, in order to preserve a zero net volume of trades for a participant. The workings for this should be included in the TSO’s design of DAM systems and processes.

APPENDIX B. TRANSFER OF STOP-LOSS LIMITS

Consider the following example. Two pre-qualified asset operators Party A and Party B agree to a secondary trade. Party A holds a Reliability Option for 100MW from a previous auction, whereas Party B does not hold any capacity obligations and has never previously held any capacity obligations. Let us assume that the total stop-loss limit for Party A was set at €1m, and that €500k of this remains when the obligation is transferred to Party B.

The trade is agreed to cover a two-week period, for which time Party B holds the obligation. Furthermore, let us assume that during this period, Party B accrues a loss of €200k against its stop-loss limit (in week 3). Figure 18 shows this scenario in a situation where the limit is retained by Party A and reset for Party B.

Figure 18: Retain and reset scenario

Date	Party A				Party B			
	Capacity obligation/MW	Limit	Losses accrued to date	Remaining "stop-loss" limit	Capacity obligation/MW	Limit	Losses accrued to date	Remaining "stop-loss" limit
Week 1	100	€1m	€500k	€500k	0	n/a	0	n/a
Week 2	0	n/a	€500k	n/a	100	€1m	0	€1m
Week 3	0	n/a	€500k	n/a	100	€1m	€200k	€800k
Week 4	100	€1m	€500k	€500k	0	n/a	€200k	n/a

The performance of neither party has impacted the loss accrual of the other. In Figure 19, the alternative of transferring the "stop-loss" limit is shown.

Figure 19: Transfer scenario

Date	Party A				Party B			
	Capacity obligation/MW	Limit	Losses accrued to date	Remaining "stop-loss" limit	Capacity obligation/MW	Limit	Losses accrued to date	Remaining "stop-loss" limit
Week 1	100	€1m	€500k	€500k	0	n/a	n/a	n/a
Week 2	0	n/a	n/a	n/a	100	€1m	€500k	€500k
Week 3	0	n/a	n/a	n/a	100	€1m	€700k	€300k
Week 4	100	€1m	€700k	€300k	0	n/a	n/a	n/a

The total loss accrual held by Party A and Party B is the same in both cases, but distributed according to historic performance in the first case. Also note that in the transfer scenario, Party A would need to take additional measures to ensure its protection from Party B's non-performance.