



**Single Electricity Market
(SEM)**

**Capacity Remuneration Mechanism
2024/25 T-4 Capacity Auction Parameters and
Compliance with the Clean Energy Package**

**Consultation Paper
SEM-20-006**

5 February 2020

1. EXECUTIVE SUMMARY

Under the revised SEM arrangements, implemented in October 2018, capacity revenues are allocated by capacity auction for a relevant capacity year. Prior to each capacity auction, a number of capacity auction parameters must be set. The list of parameters to be determined by the Regulatory Authorities is described in paragraph D.3.1.3 of the Capacity Market Code.

This paper describes the SEM Committee's proposals for the relevant parameters to apply in the 2024/25 T-4 capacity auction, scheduled to take place in January 2021.

Most of the parameters proposed are the same as those to be used for the 2023/24 T-4 auction. The exception is the Existing Capacity Price Cap; although it is proposed to retain this at 0.5, comments are sought on reducing this to 0.4.

The paper also considers what amendments to the Capacity Remuneration Mechanism are required to ensure compliance with the Clean Energy Package. Specifically, it asks whether further de-rating is required for plant with high CO₂ emissions. If changes are required, it also asks when these should be implemented.

The proposed parameters for consultation are:

Parameter	Proposed Value for 2024/25 T-4 capacity auction
De-Rating Curves, defining De-Rating Factors by unit Initial Capacity and by Technology Class (including for Interconnectors)	To be determined by System Operators prior to publication of Initial Auction Information Pack.
Capacity Requirement	To be determined by System Operators prior to publication of Initial Auction Information Pack.
Indicative Demand Curve	Horizontal at the Auction Price Cap of 1.5 times Net CONE (Cost of New Entry), from 0MW to 92.5% of the adjusted Capacity Requirement.

	Slopes down in a straight line to 115% of the adjusted Capacity Requirement. The line passes through the point at where the volume is equal 100% of the adjusted Capacity Requirement and the price equals Net CONE.									
Auction Price Cap	1.5 times Net CONE i.e. €138,450 / de-rated MW / year									
Existing Capacity Price Cap	Comments are sought on reducing this to 0.4 Net CONE.									
New Capacity Investment Rate Threshold	€300,000 /de-rated MW / year.									
Annual Stop Loss Limit Factor	1.5									
Billing Period Stop Loss Factor	0.5									
Indicative Annual Capacity Exchange Rate	To be determined by System Operators prior to publication of Initial Auction Information Pack.									
Increase Tolerance and Decrease Tolerance by Technology Class	<table border="1"> <thead> <tr> <th>Technology Class</th> <th>Increase Tolerance (%)</th> <th>Decrease Tolerance (%)</th> </tr> </thead> <tbody> <tr> <td>All Except DSUs</td> <td>0</td> <td>0</td> </tr> <tr> <td>DSUs</td> <td>0</td> <td>100</td> </tr> </tbody> </table>	Technology Class	Increase Tolerance (%)	Decrease Tolerance (%)	All Except DSUs	0	0	DSUs	0	100
Technology Class	Increase Tolerance (%)	Decrease Tolerance (%)								
All Except DSUs	0	0								
DSUs	0	100								

Performance Security Posting Dates / Events		
	Date / Event	Performance Security Rate (€/MW)
	More than 13 months prior to the beginning of the Capacity Year	10,000
	From 13 months to beginning of Capacity Year	30,000
	From beginning of Capacity Year	40,000
Termination Charges		
	Date / Event	Termination Charge Rate (€/MW)
	More than 13 months prior to the beginning of the Capacity Year	10,000
	From 13 months to beginning of Capacity Year	30,000
	From beginning of Capacity Year	40,000
Full Administered Scarcity Price and Reserve Scarcity Price Curve	Short Term Reserve (MW)	Administered Scarcity Price (€/MWh)

	Demand Control	25% of VOLL
	0	25% of VOLL
	500	DSU Theoretical Price
Anticipated values to be applied in determining the Strike Price	Current values to be re-applied.	

In addition to the parameters which must be determined under D.3.1.3 of the Capacity Market Code, the RAs make the following proposals:

- Transmission constraints will continue to be included in the 2024/25 T-4 auction
- The 2024/25 will be based on Auction Format D.

Responses to the proposals within this consultation should be sent to Kenny Dane (kenny.dane@uregni.gov.uk) by 20 March 2020. We intend to publish all responses unless they have been marked as confidential.

2. CONTENTS

1. EXECUTIVE SUMMARY	2
2. CONTENTS	6
3. INTRODUCTION AND BACKGROUND	7
4. PARAMETERS REQUIRED BY THE CAPACITY MARKET CODE	10
5. COMPLIANCE WITH THE CLEAN ENERGY PACKAGE	25
6. AUCTION FORMAT	32
7. TREATMENT OF CONSTRAINTS	33
8. NEXT STEPS	34

3. INTRODUCTION AND BACKGROUND

The SEM Capacity Remuneration Mechanism (“**CRM**”) was developed through an extensive series of consultation and decision papers. The CRM allocates capacity payments through ex-ante capacity auctions.

Before each capacity auction, the Capacity Market Code (“**CMC**”) requires a number of auction parameters to be determined by the Regulatory Authorities (“**RAs**” (the Utility Regulator in Northern Ireland and the Commission for Regulation of Utilities (“**CRU**”) in Ireland).

Parameters to be determined

Paragraph D.3.1.3 of the CMC requires the Regulatory Authorities to determine the following parameters for each Capacity Auction, and provide them to the System Operators for inclusion in the applicable Initial Auction Information Pack:

- (a) the De-Rating Curves, defining De-Rating Factors by Technology Class (including for Interconnectors);
- (b) the Capacity Requirement;
- (c) an indicative Demand Curve;
- (d) the Auction Price Cap;
- (e) the Existing Capacity Price Cap;
- (f) the €/MW rate of the New Capacity Investment Rate Threshold;
- (g) the Annual Stop-Loss Limit Factor;
- (h) the Billing Period Stop-Loss Limit Factor;
- (i) the indicative Annual Capacity Payment Exchange Rate;
- (j) the Increase Tolerance and Decrease Tolerance by Tolerance Class that may be applied by a Participant in its Application for Qualification to Capacity Market Unit de-ratings;
- (k) in respect of Performance Securities:

- (i) the final Performance Security Posting Dates/ Events applicable to Awarded Capacity allocated in the Capacity Auction; and
 - (ii) for each Performance Security Posting Date/ Event, the final €/MW rate to be applied in setting Performance Securities applicable to Awarded Capacity allocated in the Capacity Auction;
- (l) the €/MW fee rates for calculating Termination Charges;
 - (m) values for the Full Administered Scarcity Price and the Reserve Scarcity Price; and
 - (n) anticipated values for the parameters to be applied in determining the Strike Price.

Clean Energy Package

In addition to the parameters outlined above we also consider within this paper the impacts of the Clean Energy Package on the CRM. EU Regulation 2019/943 sets limits on the funding through capacity mechanisms of plants with high CO₂ emissions limits. Specifically:

- (a) from 4 July 2019 at the latest, generation capacity that started commercial production on or after that date and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity shall not be committed or to receive payments or commitments for future payments under a capacity mechanism;
- (b) from 1 July 2025 at the latest, generation capacity that started commercial production before 4 July 2019 and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity and more than 350 kg CO₂ of fossil fuel origin on average per year per installed kW_e shall not be committed or receive payments or commitments for future payments under a capacity mechanism.

The Government of Ireland has also published its 2019 Climate Action Plan (CAP). The 2019 CAP set out targets for achieving 70% renewable electricity by 2030, which will involve phasing out coal-fired and peat-fired electricity generation plants. The 2019 CAP committed to ending the burning of coal at ESB's Moneypoint generation plant by 2025. The 2019 CAP also noted that Bord na Móna have announced that they will transition away from peat by 2028, and that as recommended by the Oireachtas Committee, the

Government of Ireland will keep the dates to phase out fossil fuels under ongoing review.

In addition to the parameters above, this consultation also seeks comment on how the CRM should be adapted to take account of these changes. It considers whether to:

- Allow high CO₂ emitting plant to continue to participate in the CRM, but be subject to additional derating factors (Option 1); or
- Make no change to the CRM, but ensure that any unit with emissions exceeding 550g CO₂ / kWh complies with Clean Energy Package (CEP) annual run-hours limitations. If scarcity occurs, at a point in time where they have already reached their annual emissions limits, the units will still be exposed to Reliability Option Difference Payments for failure to make capacity available (Option 2).

Because the provisions of the CEP apply from 1 July 2025, the paper asks that if additional de-rating is applied, whether these should be applied to the 2024/25 capacity year, or the held until the 2025/26 capacity year. An alternative to this approach is to amend the duration of the 2024/25 capacity year to nine months.

The document also considers whether other measures are appropriate to manage security of supply in the context of what is expected to be a very significant exit of existing capacity, and entry of new capacity. In particular, it is considered whether it is appropriate to change the Long Stop Date for the delivery of New Capacity, to reduce the risk that it is delivered late.

There are two other issues relevant to the functioning of the 2024/25 T-4 auction which are covered by this consultation:

- Treatment of constraints in T-4 auction.
- Auction format.

4. PARAMETERS REQUIRED BY THE CAPACITY MARKET CODE

As described, the Regulatory Authorities must determine the following parameters:

- (a) *the De-Rating Curves, defining De-Rating Factors by Technology Class (including for Interconnectors);*

A De-Rating Curve is a curve for a Technology Class that represents the De-Rating Factor applicable by unit Initial Capacity and Initial Maximum On Time to be used in a Capacity Auction. A De-Rating Factor describes the proportion of Initial Capacity of a Generator Unit or Interconnector that can contribute towards satisfying the Capacity Requirement to be used in a Capacity Auction.

The System Operators published a methodology for the Calculation of Capacity Requirement and De-rating factors prior to the 2019/20 T-1 capacity auction¹. This is a least-worst regrets analysis which selects the demand forecast level to be used for the Capacity Market auction. The De-Rating Factors are those that are used to derive the Capacity Requirement selected by the least-worst regrets analysis.

The Regulatory Authorities will follow this methodology in determining the de-rating factors for the 2024/25 T-4 auction, and are not inviting specific comments on this parameter.

As discussed in Chapter 5 of this paper, one of the options for meeting the requirements of the Clean Energy Package is to allow high CO₂ emitting plant to compete in the CRM, but be subject to additional de-rating factors. If this is the preferred option, these de-rating factors will be applied in either the 2024/25 or 2025/26 T-4 capacity auction.

- (b) *the Capacity Requirement;*

The Capacity Requirement is the de-rated capacity required to satisfy the SEM Security Standard for a specific Capacity Year to be used in a Capacity Auction. The SEM Security Standard is the standard specified by the Regulatory Authorities for the annual loss of

¹SEM-18-030a: <https://www.semcommittee.com/news-centre/i-sem-crm-t-1-cy201920-capacity-auction-parameters-and-enduring-de-rating-methodology>

load expectation to be maintained in the SEM i.e. the number of hours per year for which load curtailment may occur due to demand exceeding available capacity. In CRM Detailed Design Decision 1² the SEM Committee decided to retain the security standard at 8 hours LOLE.

The System Operators published a methodology for the Calculation of Capacity Requirement and De-rating factors prior to the 2019/20 T-1 capacity auction.

The Regulatory Authorities will follow this methodology in determining the de-rating factors for the 2024/25 T-4 auction, and are not inviting specific comments on this parameter.

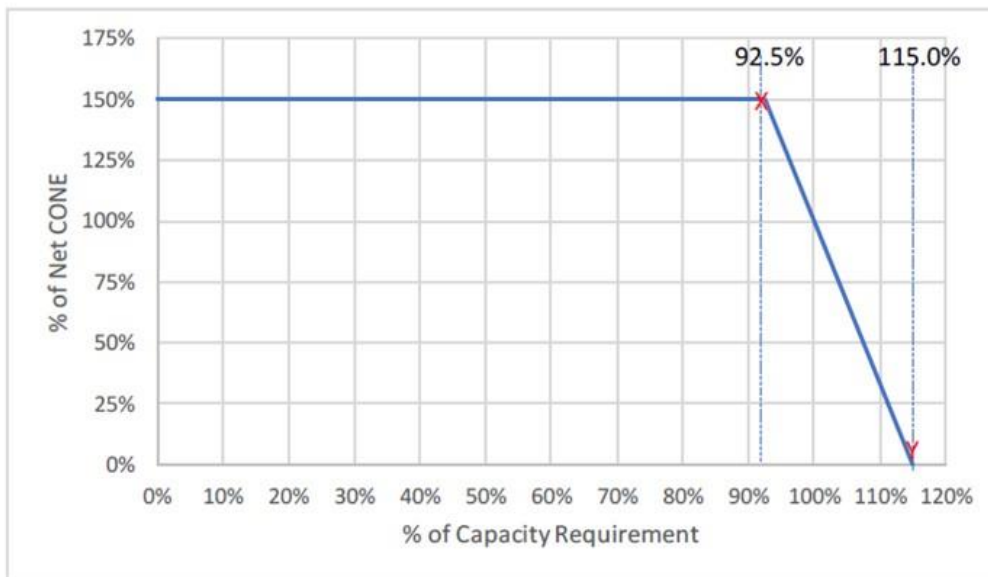
(c) *an indicative Demand Curve;*

The Demand Curve is a curve determined by the Regulatory Authorities representing the deemed per MW value of each level of capacity that could be awarded in the Capacity Auction.

The Demand Curve for the 2022/23 T-4 auction and 2023/24 T-4 auction was set in relation to the Auction Price Cap, and in accordance with the following principles:

- Horizontal at the Auction Price Cap of 1.5 times Net CONE (Cost of New Entry), from 0MW to 92.5% of the adjusted Capacity Requirement.
- Slopes down in a straight line to 115% of the adjusted Capacity Requirement. The line passes through the point at where the volume is equal 100% of the adjusted Capacity Requirement and the price equals Net CONE.

² [SEM-15-103](#), section 2.2.16



The current Net CONE is €92,300 / de-rated MW / year. The Regulatory Authorities do not intend to review the Net CONE for the 2024/25 T-4 auction. The Demand Curve will therefore be set in relation to the adjusted Capacity Requirement, modified by:

- Capacity already awarded for the 2024/25 capacity year.
- Changes in forecast capacity requirements (as considered appropriate by the RAs).
- Capacity withheld from the auction to be procured in a subsequent auction for the 2024/25 capacity year.
- A forecast of non-participating capacity.
- Reserves to be included in the capacity auction

Adjustments to the Demand Curve for previous T-4 auctions

The final Demand Curve has not yet been determined for the 2023/24 T-4 auction. This will be published in the Final Auction Information Pack for that auction in March 2020. Adjustments were made to the Demand Curve for the 2022/23 T-4 auction to account for: non-participating capacity, reserves, withholding for DSU participation in the 2022/23 T-1 auction and withholding for demand uncertainty.

The adjustments are summarised in the following table³:

³ As originally published in the Information Note on T-4 CY2022/23 Capacity Auction Volumes ([SEM-19-021](#))

Area	Requirement pre Adjustment	Non-participating	Reserves	DSU	Uncertainty	Minimum Amounts
All-Island	7,524	-410	100	-144	-300	6,770
Northern Ireland	1,810	-120	150	-36	-50	1,754
Ireland	5,970	-290	225	-118	-250	5,537
Dublin	1,900	0	70	-38	-250	1,682
Implied Minimum All-Island	7,780	-410	375	-154	-250	7,341

(d) *the Auction Price Cap;*

The Auction Price Cap is the maximum bid price allowed in a Capacity Auction. For all previous auctions, this has been set at 1.5 times Net CONE. This was to allow a 50% margin in setting Net CONE.

Net CONE is currently €92,300 / de-rated MW / year, as determined in the T-4 CY2022/23 BNE Decision Paper⁴. The RAs are not reviewing the BNE for the 2024/25 capacity auction.

The SEM Committee propose to continue to apply a multiplier of 1.5 time Net CONE in setting the Auction Price Cap for the 2024/25 capacity auction. Auction Price Cap will therefore continue at €138,450 / de-rated MW / year.

(e) *the Existing Capacity Price Cap;*

The Existing Capacity Price Cap (“**ECPC**”) is the price cap applicable to Existing Capacity in a Capacity Auction. It is a uniform non-technology specific cap on the price that Existing Generators and interconnectors can offer volume at, unless they apply to

⁴ [SEM-18-156](#)

the RAs for a Unit Specific Price Cap (“**USPC**”)⁵. New Capacity and DSUs are not subject to the ECPC, and may bid up to the Auction Price Cap.

ECPC performs two key functions:

- Firstly, it limits the ability of generators with market power, but low Net Going Forward Costs (“**NGFCs**”) to exercise their market power through making high offers. Given the significant concerns about market power in the CRM (see SEM-16-010), it is important that the ECPC is not set at a level significantly above where the market is expected to clear in current market conditions.
- Secondly it provides a filter to ensure that only those USPC applications which the RAs need to scrutinise (because they may have a material impact on the clearing price or pay-as-bid prices) are scrutinised. If the ECPC is set too low, then offer prices which are below the clearing price (and therefore will have no impact on the clearing price or pay-as-bid prices) will need to be reviewed, imposing an unnecessary administrative burden on both the RAs and bidders.

In all capacity auctions to date, ECPC has been set at 0.5 times Net CONE. The rationale for this value was:

- It was estimated that the vast majority of plant required to meet the Capacity Requirement could bid at its Net Going Forward Cost without needing to apply for a USPC;
- It is consistent with relevant international benchmarks;
- It strikes an appropriate balance between the objectives of protecting consumers from the potential for bidders to exercise market power, and not placing an excessive workload on market participants and RAs from having to respectively submit and review significant volumes of USPC applications.

In the consultation on parameters for the 2020/21 T-1 and 2021/22 T-2 capacity auctions⁶, the RAs asked for feedback on reducing the value of ECPC. There was no support in the consultation responses for reducing the ECPC, and the SEM Committee decided not to amend the ECPC and to retain its value as 0.5 times Net CONE. The

⁵ Or submit an Opt-Out Notification on the grounds that they are going to close before the end of the relevant Capacity Year.

⁶ [SEM-19-010](#)

SEM Committee however committed to continuing to review this approach for future auctions.

The results of five capacity auctions (one T-4 auction and four transitional auctions) are now available. In all of these auctions, a considerable volume of capacity has bid at or just below the auction price cap. The SEM Committee is of the opinion that the ECPC may have become materially price affecting, rather than a bid limit within the auction.

The SEM Committee's proposal is to continue to set the ECPC at 0.5 times Net CONE (€46,150 / de-rated MW / year). However, it will observe the results of 2023/24 T-4 capacity auction (to be held in March 2020). Based on this and previous auctions, the SEM Committee remains open to reducing the ECPC to 0.4 times Net CONE for the 2023/24 T-4 auction.

Any existing capacity with Net Going Forward Costs higher than the Existing Capacity Price Cap will retain the option to submit a USPC application to the RAs.

(f) the €/MW rate of the New Capacity Investment Rate Threshold;

The New Capacity Investment Rate Threshold (“**NCIRT**”) is an amount determined by the RAs that must be exceeded by the cost per MW of constructing New Capacity for that capacity to be eligible to be allocated Awarded Capacity with a duration of more than one year.

New Capacity is eligible to bid to fix its Reliability Option for up to ten years. In order to do so, a capacity provider must meet a substantial financial commitment threshold. This threshold is known as the NCIRT.

The intention of setting the NCIRT is to ensure that only plant making a substantial financial commitment equivalent to the commitment for a new build plant is able to obtain a multi-year Reliability Option. Multi-year ROs should not be available to plant making a minor refurbishment. However, the threshold should not penalise investors who are able to build efficiently at low capital cost.

As described in the initial CRM parameters decision paper⁷, NCIRT for the first transitional auction was set at approximately 40% of the gross BNE cost, or €300,000 / de-rated MW. The BNE was re-evaluated in 2018 for the 2022/23 T-4 capacity auction. However, there was insufficient evidence to support a change in the NCIRT⁸. The SEM Committee therefore decided to retain the NCIRT at €300,000 / de-rated MW.

Because there has been no review of the BNE, the SEM Committee proposes to retain the value of NCIRT at €300,000 / de-rated MW for the 2024/25 T-4 auction.

(g) the Annual Stop-Loss Limit Factor

The Annual Stop Loss Limit is the multiplier used to establish the annual stop-loss limit for Non-Performing Difference Charges from a Capacity Market Unit.

A stop-loss is a cap on Reliability Option Difference Payments. Reliability Option Difference Payments are charges that must be paid by a generator during a scarcity event. The purpose of the cap is to limit risk on the generator and improve investability. However, a cap on RODPs means that there will be insufficient money to hedge suppliers, which has to be funded through the socialisation fund.

The stop-loss limit applies only to uncovered difference payments. It does not apply where the capacity provider has received revenue through the energy market to cover the difference payment.

Consider the example whereby a capacity provider has an annual stop-loss limit of €15,000 on an RO volume of 1MW, with the stop-loss limit based on uncovered difference payments. A RO strike price of €500/MWh is assumed. We also assume that there are two scarcity events, each of which lasts two hours, and during each the Administered Scarcity Price rises to €10,000/MWh.

During the first scarcity event, the generator has sold its 1MW of capacity in the energy market and receives €20,000 for its two hours of production. Under the Reliability Option, it must pay back €19,000 (2MWh * (€10,000/MWh - €500/MWh)) of this revenue in

⁷ [SEM-17-022](#), paragraph 7.2.18

⁸ [SEM-18-155, CY2022/23 Parameters Decision Paper](#), paragraph 9.4.3.

difference payments, and will therefore have net revenue of €1,000. Because the capacity provider had covered revenue from the energy market, the €19,000 does not count towards the stop-loss limit.

During the second event, the capacity provider was on forced outage, and has not sold any output. In the absence of a stop-loss, the capacity provider would have to pay the €19,000 in difference payments, without having any energy revenue to cover this cost. However, the stop-loss limit means that it only has to pay out up to a maximum of €15,000. There is therefore a €4,000 shortfall in RO difference payments. This shortfall is funded through the socialisation fund.

If the stop-loss had been based on all difference payments, the generator would have paid only €15,000 “stop-loss” on the first event and no payments on the second event. The total shortfall in RO difference payments across both events would be €23,000 instead of €4,000.

The stop-loss limit applies to the annual option fee. To date in the capacity market, the Annual Stop-Loss Limit Factor has been set at 1.5.

The SEM Committee propose to retain the Annual Stop-Loss Limit Factor at 1.5 for the 2024/25 capacity year.

(h) the Billing Period Stop-Loss Limit Factor;

The Billing Period Stop Loss Limit Factor is a multiplier used to establish the billing period stop-loss limit for Non-Performance Difference Charges from a Capacity Market Unit.

The purpose of stop-loss limits is described above. The purpose of the Billing Period Stop Limit Factor is to limit the level of losses in any one Billing Period (week).

If there were no Billing Period Stop Loss Limit Factor, and there were a number of scarcity events at the start of the Capacity Year so that a capacity provider reached its Annual Stop Loss Limit, that capacity provider would have a reduced incentive to maximise its availability for the remainder of the capacity year. By limiting the losses that

can apply in any one Billing Period, the incentive to remain available for the remainder of the Capacity Year is maximised.

The Billing Period Stop Loss Limit Factor is currently 0.5⁹. The SEM Committee proposes to retain this value for the 2024/25 capacity year.

(i) *the indicative Annual Capacity Payment Exchange Rate;*

The Annual Capacity Payment Exchange Rate is an exchange rate applicable to a Capacity Year which converts the Capacity Payment Price for a Primary Trade or a Secondary Trade from Euros to Sterling. This is determined by the System Operators using a methodology approved by the RAs.

Only the indicative exchange rate is calculated for the Initial Auction Information Pack. This will be calculated immediately prior to its publication. The exchange rate will then be updated for inclusion in the Final Auction Information Pack.

(j) *the Increase Tolerance and Decrease Tolerance by Tolerance Class that may be applied by a Participant in its Application for Qualification to Capacity Market Unit de-ratings;*

The Increase Tolerance is a percentage upwards tolerance that a Participant is permitted to apply to Capacity Market Unit de-ratings in an Application for Qualification. There may be different Increase Tolerances for different Technology Classes.

A Decrease Tolerance is a percentage downwards tolerance that a Participant is permitted to apply to Capacity market Unit de-ratings in an Application for Qualification. There may be different Decrease Tolerances for different Technology Classes.

⁹ Note: in the parameters decision paper for the first capacity auction ([SEM-17-022](#)), the SEM Committee decided that the Billing Period Stop-Loss Limit should be 50% of the Annual Stop-Loss Limit. Because the Annual Stop-Loss Limit Factor was set to 1.5, the Billing Period Stop-Loss Limit Factor was set to 0.75. However, because of the way the Annual and Billing Period Stop Loss Limit Factors interact within paragraph F.18.3.2 and F.18.3.4 of the Trading and Settlement Code, in order to achieve a relation of 50%, a Billing Period Stop-Loss Limit Factor of 0.5 is required.

CRM Decision 1¹⁰ allowed for the possibility of tolerance bands to be applied to the unit-level De-Rating Factors determined for capacity providers. These tolerance bands would allow some flexibility in the level of participation required from dispatchable plant in the auction. This allowance was made in relation to mandatory participation; although all generators would still be required to participate. It would reflect the fact that not all generators of the same technology class have the same degree of reliability.

In the CRM Capacity Requirement and De-Rating Factor Methodology Decision paper¹¹, the SEM Committee decided that, with the exception of DSUs, the tolerance bands will be set to zero for the transitional auctions, with the decision to be reviewed for the enduring auctions once the enduring value of Full Administered Scarcity Price has been determined.

The SEM Committee is proposing to retain this decision for the 2024/25 T-4 auction, but requests comments on introducing flexibility into the tolerance bands. The indicative proposal is therefore:

Technology Class	Increase Tolerance (%)	Decrease Tolerance (%)
All Except DSUs	0	0
DSUs	0	100

- (k) *in respect of Performance Securities:*
- (i) *the final Performance Security Posting Dates/ Events applicable to Awarded Capacity allocated in the Capacity Auction; and*
 - (ii) *for each Performance Security Posting Date/ Event, the final €/MW rate to be applied in setting Performance Securities applicable to Awarded Capacity allocated in the Capacity Auction.*

A Performance Security is a security required as a condition of capacity award for Awarded New Capacity that has not reached Substantial Completion. A Performance Security Posting Date/ Event is a date or event from which a specified €/MW rate shall be applied to Awarded Capacity in setting Performance Securities. There may be

¹⁰ [SEM-15-103](#)

¹¹ [SEM-16-082](#), paragraph 4.5.1

multiple different Performance Security Posting Dates/ Events. The Performance Security Posting Dates / Events applicable to Awarded Capacity allocated in a Capacity Auction are determined by the Regulatory Authorities and provided to the System Operators.

In the parameters decision paper for the first capacity auction (SEM-17-022) the SEM Committee decided that all capacity is required to post a Performance Bond to cover 100% of its Termination Fee. The SEM Committee proposes to retain this policy, and therefore proposes that the Performance Security Rates should be as follows:

Date / Event	Performance Security Rate (€/MW)
More than 13 months prior to the beginning of the Capacity Year	10,000
From 13 months to beginning of Capacity Year	30,000
From beginning of Capacity Year	40,000

If, following consultation, the Termination Charges are amended for the 2024/25 capacity year, the Performance Security fees will be amended.

(l) the €/MW fee rates for calculating Termination Charges

A Termination Charge is a fee payable by a Participant where Awarded New Capacity is terminated.

The CRM detailed design decision paper 2¹² noted that it is important that New Capacity is required to pay a Termination Fee if it fails to deliver capacity. The Termination Fee will be payable if the project:

- fails to deliver the Substantial Financial Completion milestones by the given date;
- or
- fails to achieve Substantial Completion by the Long Stop Date; or

¹² [SEM-16-022](#)

- submits false or misleading information in the Qualification process.

For all capacity auctions to date, the Termination Charges have been set in accordance with the following table:

Date / Event	Termination Charge Rate (€/MW)
More than 13 months prior to the beginning of the Capacity Year	10,000
From 13 months to beginning of Capacity Year	30,000
From beginning of Capacity Year	40,000

The SEM Committee proposes to retain these rates for the 2024/25 T-4 capacity auction.

(m) values for the Full Administered Scarcity Price and the Reserve Scarcity Price; and

The Administered Scarcity Price (“**ASP**”) sets a floor on the Balancing Market price when a scarcity event occurs. The Full Administered Scarcity Price is the maximum value of the Administered Scarcity Price. The Reserve Scarcity Price Curve is a piecewise linear curve defining the relationship between the Reserve Scarcity price and the Short Term Reserve Quantity.

For the first two transitional auctions, Full ASP was set at the day ahead market price cap of €3,000/MWh. For the 2022/23 T-4 auction (held in March 2019), Full ASP was set at 25% of the Value of Lost Load (“**VOLL**”). It has been set at this value for all auctions since.

The SEM Committee proposes to retain setting the value of Full ASP in relation to VOLL. Specifically, Full ASP will be set to 25% of VOLL.

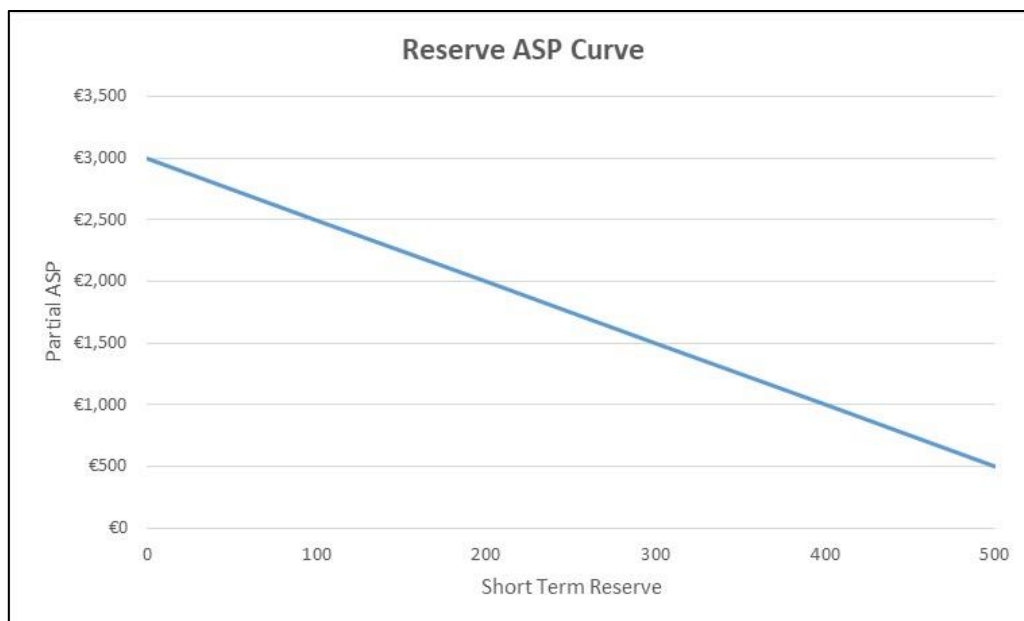
In the second CRM detailed design decision paper¹³, the SEM Committee decided that the piece-wise linear function of ASP will be static, and the price from which the function begins will be the Reliability Option Strike Price.

However, the Reliability Option Strike Price is not strictly static. As described below, it is set in relation to monthly carbon, gas and oil prices, but has a floor price equal to the theoretical price of a Demand Side Unit (which in recent years has been set at €500/MWh).

The SEM Committee propose to set the price at which the piece-wise linear function of ASP begins at the floor of the Strike Price, as determined below. The Administered Scarcity Price will therefore be set in accordance with the following table:

Short Term Reserve (MW)	Administered Scarcity Price (€/MWh)
Demand Control	25% of VOLL
0	25% of VOLL
500	RO Strike Price

For example, for the 2023/24 capacity year, VOLL is €11,979.57. Full ASP is therefore €2,994.89/MWh. The Reserve Scarcity Price Curve for 2023/24 is therefore:



¹³ [SEM-16-022](#), section 6.4

To clarify, ASP only applies when the available Short Term Reserve is less than the operating reserve requirement. If the operating reserve requirement is only 450MW, and the available Short Term Reserve falls to 490MW, the ASP function does not apply and prices will be market determined.

(n) *anticipated values for the parameters to be applied in determining the Strike Price.*

If the Market Reference Price exceeds the Strike Price, holders of Reliability Options must make Difference Payments.

The formula for the calculation of the monthly Strike Price ($PSTR_m$) is contained in the Trading and Settlement Code as follows:

$$PSTR_m = \text{Max} \left(\frac{1}{FTHEORYPU_y} \times \text{Max} \left(PFUELNG_m + (PCARBON_m \times FCARBONING_y), PFUELO_m + (PCARBON_m \times FCARBONIO_y) \right), PTHEORYDSU_y \right)$$

where:

- $FTHEORYPU_y$ is the Peaking Unit Theoretical Efficiency for Capacity Year, y;
- $PFUELNG_m$ is the Natural Gas Fuel Price for Month, m;
- $FCARBONING_y$ is the Natural Gas Carbon Intensity Factor for Capacity Year, y;
- $PFUELO_m$ is the Oil Fuel Price for Month, m;
- $FCARBONIO_y$ is the Oil Carbon Intensity Factor for Capacity Year, y;
- $PCARBON_m$ is the Carbon Price for Month, m; and
- $PTHEORYDSU_y$ is the Demand Side Unit Theoretical Price for Capacity Year, y, d.

This formula bases the Strike Price on the cost of a hypothetical low efficiency peaking unit, and includes a floor price on the strike price at the price of a theoretical demand side unit in €/MWh; this reflects the cost incurred by the DSU is switching off, which may not be related to the cost of energy.

The values of each of these parameters for the 2023/24 T-4 capacity auction were:

Strike Price Component	Value	Unit
PCARBON _m	PCARBON _m Index	€/tCO _{2e}
PFUELNG _m	[PFUELNG _m Index (p/therm) x 0.01 (£/p) + PFUELNG _m Transport (£/therm)] x Exchange Rate (€/£) x 9.48 (therm/GJ) x 3.6 (GJ/MWh)	€/MWh
PFUELO _m	[PFUELO _m Index (\$/t) x Exchange Rate (€/£) + PFUELO _m Transport (£/t) x 0.025 (t/GJ) x 3.6 (GJ/MWh)	€/MWh
PCARBON _m Index	ICE ECX EUA Futures – EUA - (monthly) ¹⁴	€/tCO _{2e}
PFUELNG _m Index	ICE UK Natural Gas Index (monthly)	p/therm
PFUELNG _m Transport	0.0424 ¹⁵	£/therm
PFUELO _m Index	Platt's Forward Curve (monthly) for monthly swap transactions for 1% sulphur free on board (FOB) fuel oil cargoes in North West Europe (NWE) for the relevant month (AAEGR00)	\$/t
PFUELO _m Transport	50 ¹⁶	€/t
FTHEORYPU _y	15	%
FCARBONING _y	0.202	tCO _{2e} /MWh
FCARBONINO _y	0.277	tCO _{2e} /MWh
PTHEORYDSU _y	500	€/MWh
Exchange Rate (€/£)	The Trading Day Exchange Rate as defined in the Trading and Settlement Code	€/£
Exchange Rate (€/£)	The rate set at 17:00 the day before the Trading Day, from the same source as used for the Trading Day Exchange Rate	€/£
therm per GJ	9.48 ¹⁷	therm/GJ
LSFO calorific value	0.025 ¹⁸	t/GJ

The SEM Committee proposes to retain these parameter values for the 2024/25 capacity year.

¹⁴ The December price for a given year will apply to all months falling within that year.

¹⁵ NI natural gas transport adder used in I-SEM PLEXOS Forecast Model 2016-17.

¹⁶ Based on ROI LSFO transport adder used in I-SEM PLEXOS Forecast Model 2016-17.

¹⁷ I-SEM PLEXOS Forecast Model 2017-17

¹⁸ I-SEM PLEXOS Forecast Model 2016-17

5. COMPLIANCE WITH THE CLEAN ENERGY PACKAGE

The EC's latest energy package is made up of a number of Directives and Regulations, and are collectively referred to as the Clean Energy Package (CEP). The first tranche of these (listed below) came into force on 24 December 2018:

- The Renewable Energy Directive (2001/2018);
- The Energy Efficiency Directive (2002/2018); and
- The Governance Regulation (1998/2018).

The remaining elements of the package entered into force on 4 July 2019 and apply from 1 January 2020. These are:

- Regulation on risk preparedness in the electricity sector (2019/941);
- Regulation to establish ACER (2019/942);
- Electricity Regulation (2019/943); and
- The Electricity Directive (2019/944).

EU Regulation 2019/943 sets limits on the funding through capacity mechanisms of plants with high CO₂ emissions limits. Specifically Article 22(4) stipulates:

- (a) from 4 July 2019 at the latest, generation capacity that started commercial production on or after that date and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity shall not be committed or to receive payments or commitments for future payments under a capacity mechanism;
- (b) from 1 July 2025 at the latest, generation capacity that started commercial production before 4 July 2019 and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity and more than 350 kg CO₂ of fossil fuel origin on average per year per installed kW_e shall not be committed or receive payments or commitments for future payments under a capacity mechanism.

Any auctions held after 31 December 2019 will be subject to the above emissions limits. To give effect to the CEP emissions limits the enduring arrangements for future capacity auctions will require changes to the Capacity Market Code (CMC) e.g. application and qualification requirements. Furthermore, it is likely that following this policy consultation, further CMC modifications will be required to strengthen CEP compliance.

The Government of Ireland has also published its 2019 Climate Action Plan (CAP). The 2019 CAP set out targets for achieving 70% renewable electricity by 2030, which will involve phasing out coal-fired and peat-fired electricity generation plants. The 2019 CAP committed to ending the burning of coal at ESB's Moneypoint generation plant by 2025. The 2019 CAP also noted that Bord na Móna have announced that they will transition away from peat by 2028, and that as recommended by the Oireachtas Committee, the Government of Ireland will keep the dates to phase out fossil fuels under ongoing review.

In addition to the parameters above, this consultation also seeks comment on how the CRM should be adapted to take account of these changes. It considers whether to:

- Allow high CO₂ emitting plant to continue to participate in the CRM, but be subject to additional derating factors (Option 1); or
- Make no change to the CRM, but ensure that any unit with emissions exceeding 550g CO₂ / kWh comply with CEP annual run-hours limitations. If scarcity occurs, at a point in time where they have already reached their annual emissions limits, the units will still be exposed to Reliability Option Difference Payments for failure to make capacity available (Option 2).

Currently, within the CRM, generation with emissions limitations or run-hour limitations (other than Demand Side Units (“**DSUs**”) and storage technology classes which have separate arrangements) can apply a voluntary decrease tolerance (“**DECTOL**”). This provision was introduced in the 2019/20 T-1 Auction Parameters and Enduring De-rating Methodology decision¹⁹, to allow for restrictions such as those set by the Industrial Emission Directive²⁰, and places the onus on the capacity provider to apply for lower levels of capacity within the auction due to run hour limitations. This sets the context for the options being proposed in this consultation given the emissions limits stipulated in the Clean Energy Package.

Option 1: Continuing reliance on emissions limited plant, further de-rated to reflect run-hour limitations.

¹⁹ [SEM-18-030](#)

²⁰ [Directive 2010/75/EU](#)

Continued reliance on run-hours limited units could be viewed in the context of the recent growth of DSU and battery capacity, much of which is also run-hours limited. In the diagram below, an illustration is provided of the potential effect of having approximately 1,200MW of de-rated capacity limited to 400 run hours per annum, for various reasons. This might be comprised of, for example:

- The 600MWs of all-island distillate capacity, assumed in the 2019 GCS to be operational at the end of 2025; and
- A further 600MWs of DSU capacity, which is broadly the current level of DSU participation.

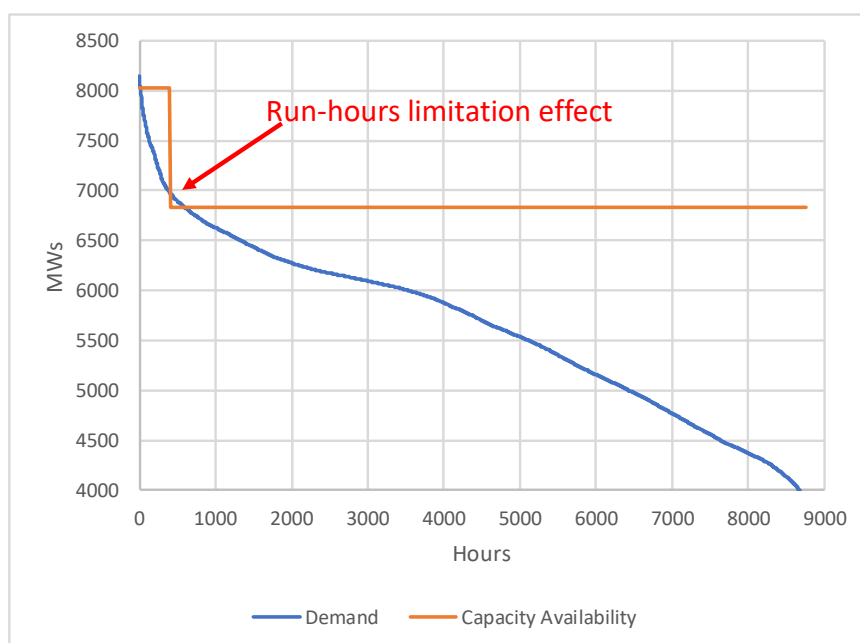


Figure 1: Illustrative Example of run-hours limitation effect.

Figure 1 illustrates the all-island load duration curve in blue, scaled to the 2019 Generation Capacity Statement median Total Electricity Requirement (TER) peak demand forecast of 8,150MW. The Capacity Requirement is then calibrated to the 8 hour Loss of Load Expectation (“LOLE”) standard. A load duration curve ranks all hours of the year from highest demand in hour 1 to the lowest demand in the 8760th hour. The Available Capacity line, illustrated in brown, is then adjusted for 1,200 de-rated MW that are only made available in the 400 highest demand hours.

When the available de-rated capacity drops in the 401st hour, the available capacity line falls below the load duration curve, and remains below the load duration curve until around the

600th hour. Whilst this analysis is high level, and takes no account of the likelihood of procuring more than the Capacity Requirement for a variety of reasons, it illustrates the potential for additional significant lost load, resulting from the reliance on a significant level of run-hours limited plant.

In Northern Ireland, 6 of the 11 units (all of the peaking units currently in operation) identified by the 2019 GCS as continuing to operate, post 2025, are assumed to be subject to significant run hour limitations. These units account for around 300 de-rated MW, therefore the effect of limited run hours can also be expected to be significant in the Northern Ireland Locational Capacity Constraint Area (LCCA), if current transmission constraints continue.

If Option 1 is applied, the RAs will work with the System Operators to define appropriate derating factors for affected units. The factors would reflect the limited *annual* running hours, in a similar way that existing derating factors for energy storage units and DSUs reflect limitations on their ability to run for limited consecutive hours. We envisage that it could result in, for instance, an oil-fired gas-turbine (GT), which fails to meet the 550g CO₂/ kWh threshold, being de-rated to a significantly greater extent than a gas-fired GT which meets the threshold. We would expect the additional derating factor to reflect the level of the run-hours constraint, and the risk to system security resulting from that constraint. The increased derating is likely to make the run-hours limited plant less competitive in the CRM auction, as it will have to recover the same amount of “missing money”²¹ over a smaller MWs of Reliability Option. There are limits on an existing unit’s ability to do this, as it cannot bid more than the Existing Capacity Price Cap, currently 0.5 x Net Cost of New Entry (Net CONE) or if agreed by the RAs a Unit Specific Price Cap (USPC), which cannot exceed the Auction Price Cap of 1.5 x Net CONE.

Option 2: No change to the existing arrangements

Option 2 advocates no change to the CRM, only that units comply with the CEP run-hour limitations applicable to them. In a scarcity event, if a unit has already reached its annual emissions limits, they will be exposed to Reliability Option Difference Payments for failure to make capacity available.

²¹ i.e. its Net Going Forward Costs (NGFC)

Although Option 2 would be straightforward to implement, it carries the highest long-term risk, as out of each of the options it is likely to subject the SEM to the highest level of reliance on heavily run-hours limited capacity. Furthermore, units are unlikely to want to bear the risk of being caught in a scarcity event and potentially being subject to significant Reliability Option Difference Payments. This in itself may send an exit signal to such units.

Evaluation of Options

Proceeding with Option 1 would mean that the SEM could still be reliant on some CEP run-hours limited plant to provide capacity, but less so, as this plant will be further de-rated. More nameplate capacity would need to be procured to compensate for the increased de-rating of the run-hours limited plant.

The degree to which Option 1 will continue to retain high CO₂ emission plant will depend on the additional de-rating factors applied. If derating factors are very low, they could drive up the unit's NGFCs per de-rated kW of affected plant above the Net CONE, making it uncompetitive compared to new entry, or even drive the unit's NGFCs per de-rated kW above the Auction Price Cap.

Option 1 would slow the transition to a low carbon economy, but this effect may be more a question of "optics", if the de-rated plant is rarely run.

Option 2 could lead to a reliance on a large volume of run-hours limited plant. To some extent, it could be argued that some units are already SO₂ and NO_x run hours limited, due to the Industrial Emissions Directive (IED) restrictions. However, the CEP restrictions are likely to impose greater restrictions on the running of certain units. The application of CEP constraints will also affect some units' ability to earn infra-marginal rent in the energy market, and could drive up their CRM auction bid costs as a result. So even Option 2, which entails limited intervention could lead to the exit of much of the CEP affected plant, and an increase in consumer CRM bills.

Regardless of the option chosen, the further detail required to define how the 550g CO₂/kWh and 350 kg CO₂ per installed kW_e per year limits are applied must be taken into account. In accordance with Article 22(4) of the Clean Energy Package Regulation, on

17 December ACER issued their opinion providing technical guidance on the calculation of the emissions values (as referenced on page 25 of this consultation)²². Within Section 6.1, a formula is provided for the calculation of Specific Emissions. Within 6.2, they provided the opinion that historical operation should be taken into account when calculating the value of Annual Emissions of the generation capacity. The Agency recommends to consider the average Annual Emissions over the last three full calendar years before qualification.

Timing of Changes and Phased Approach

The provisions of the Clean Energy Package regarding existing generation apply from 1 July 2025. If the SEM Committee decided to apply additional de-rating, the date from when these apply should be considered, specifically whether the changes to de-rating should apply to the 2024/25 capacity year, or held until the 2025/26 capacity year.

Implementing the required changes for the 2024/25 capacity year provides some mitigation against late delivery of capacity. If New Capacity in the auction is delivered late, then high emission capacity could still enter the T-1 auction for 2024/25, if required.

An alternative approach could be to amend the duration of the 2024/25 capacity year to nine months, with the 2025/26 capacity year increased to 15 months so that future capacity years commence in October as usual. This is likely to require a modification to the CMC.

Long Stop Date

If Minimum Completion has not been achieved by the Long Stop Date, the System Operators shall terminate all the Awarded New Capacity in respect of a new or refurbished Generator Unit or Interconnector Unit.

²²

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%202022-2019%20on%20the%20calculation%20values%20of%20CO2%20emission%20limits.pdf

- For a capacity award with a capacity duration greater than one year, the Long Stop Date is 18 months after the start of the first Capacity Year in which the New Capacity is to be provided.
- For a capacity award with a capacity duration of one year or less, the Long Stop Date is the end of the first month after the start of the first capacity year in which the awarded new capacity is to be provided.

The long stop date of 18 months for a capacity award with duration greater than one year means that successful new capacity in the 2024/25 T-4 capacity auction could be delivered as late as March 2026 without breaching the Long Stop Date. Given the scale of new entry likely to be required, earlier intervention may be required. It may therefore be necessary to reduce the Long Stop Date.

Consultation Questions

- Which of Option 1 (allow high CO₂ emitting plant to participate in the CRM, but be subject to additional derating) and Option 2 (make no changes to the CRM, but ensure that any unit with emissions exceeding 550g CO₂ / kWh comply with CEP annual run-hours limitations) is your preferred approach?
- If the additional de-rating is applied, should it be applied for the 2024/25 capacity year, or held until the 2025/26 capacity year? Alternatively, should the duration of the 2024/25 capacity year be reduced to nine months?
- Should the Long Stop Date be reduced from 18 months to (for example) 12 months or 6 months?

6. AUCTION FORMAT

Within the CRM design, a number of options were proposed for the Auction Format. The first two transitional auctions utilised Auction Format B: simple sealed bid with locational capacity secured to meet constraints being additional to that which clears the unconstrained auction. This was a transitional measure, with the intent to move to Auction Format D (full combinatorial) on an enduring basis.

As part of the State Aid process, the Regulatory Authorities gave an undertaking to the EC that from Capacity Year 2020/21 onwards, any capacity awarded out-of-merit Reliability Options for locational capacity constraint reasons should not be additional to the capacity secured in merit. Consequently, if out-of-merit volumes need to be procured to satisfy locational constraints, this will displace in-merit generation elsewhere.

Because of these State Aid commitments, the SEM Committee decided to utilise Auction Format C for the 2022/23 T-4 capacity auction. This is a simple sealed bid auction, with a heuristic based second step to offset additional locational capacity secured. This has been used in all auctions since.

For the 2024/25 auction, the SEM Committee proposes to utilise Auction Format D. The SEM Committee has already written to the System Operators stating that the development of Auction Format D should be completed and available for this auction. Respondents to the consultation are invited to comment on this proposal.

7. TREATMENT OF CONSTRAINTS

For the purposes of a Capacity Auction, a number of Locational Capacity Constraints Areas (“LCCA”) can be determined by the System Operators. A Locational Capacity Constraint Required Quantity is the minimum de-rated capacity quantity that is required to satisfy the Locational Capacity Constraint.

For all capacity auctions to date, there have been two Level 1 LCCAs (Northern Ireland and Ireland) and one Level 2 LCCA (Greater Dublin, associated with the Ireland Level 1 constraint).

The Capacity Auction is initially ran on an unconstrained (i.e. location agnostic) basis. If following the initial solution, any of the Locational Capacity Constraints has not been satisfied, additional capacity must be procured²³. This capacity will be procured on a pay-as-bid basis.

When procuring this additional capacity, New Capacity with an offered capacity duration of more than one year should be excluded. However, if there is insufficient capacity within an LCCA to allow the constraint to be met without it, this new, multi-year, Capacity must be considered.

For the 2024/25 capacity auction, the SEM Committee remains open to allowing the auction to solve using multi-year New Capacity. A decision on this will be made prior to the publication of the Final Auction Information Pack, after the System Operators have provided the relevant information on LCCA.

²³ Under Auction Format C and D, this constrained capacity can replace capacity that was used to satisfy the initial solution.

8. NEXT STEPS

Responses to the proposals within this consultation should be sent to Kenny Dane (kenny.dane@uregni.gov.uk) and Kevin Lenaghan (kevin.lenaghan@uregni.gov.uk) by 20 March 2020. We intend to publish all responses unless they have been marked confidential.

A decision on the parameter values will be published in May, and the parameter values included in the Initial Auction Information Pack developed by the System Operators.