CAPACITY MARKET CODE MODIFICATION PROPOSAL FORM			
Proposer *(Company)*	**Date of receipt** *(assigned by System Operators)*	**Type of Proposal** *(delete as appropriate) Standard/Urgent*	**Modification Proposal ID** *(assigned by System Operators)*
DRAI	**29th July 2025**	**Standard**	**CMC_16_25**

Contact Details for Modification Proposal Originator		
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Modification Proposal Title
CRM De-rating Factors for DSU

Documents affected *(delete as appropriate)*	**Section(s) Affected**	**Version number of CMC used in Drafting**
CMC main text, IAIP	**C.1.1.2, D.3.1.2, D.3.1.3**	**V12 – Nov 2024**

Explanation of Proposed Change
(mandatory by originator)

For new Capacity Auctions only, DRAI proposes transitioning to an approach where Demand Side Units (DSUs) are de-rated according to their unit-specific availability – not using a Technology Class approach with de-rating based on the average availability of all DSUs. This will address the following problems with the current approach:

- Due to the very high degree of variability between DSUs, units with high availability are penalised while those with low levels of availability are overpaid
- It encourages DSUs to be formulated to meet the de-rating factor rather than to maximise availability
- It leads to a downward pressure on de-rating factors for DSUs, which will ultimately lead to the units exiting the market

Similarly, instead of using historical availability to calculate DSU de-rating factors, we propose transitioning to an approach where the TSOs publish availability-based de-rating factors, and when selecting their de-rating factor, DSUs take on a binding commitment to deliver the promised level of availability, with a new DSU availability GPI created in tandem with this to hold such units to account versus this commitment. These proposals should be considered part of an inextricably linked bundle.

Legal Drafting Change
*(Clearly show proposed code change using **tracked** changes, if proposer fails to identify changes, please indicate best estimate of potential changes)*

Main Body of the CMC
Modify the following paragraph as shown:

C.1.1.2 Key concepts used in the Capacity Market include:

(g) a de-rating curve is specific to a technology class and defines the derating factor applicable to a specific value of initial capacity, initial maximum on time, and initial annual run hours limit. For DSUs this will also include projected availability. The de-rating curves are determined by the Regulatory Authorities; and

D.3.1.2 The Initial Auction Information Pack for a Capacity Auction shall set out:
(aAA) For DSUs it will also include a maximum derating factor table based on projected availability and Maximum Down Time;

D.3.1.3 The Regulatory Authorities shall determine the following parameters for each Capacity Auction and provide them to the System Operators for inclusion in the applicable Initial Auction Information Pack:
(aAA) For DSUs the maximum derating factor table based on projected availability and Maximum Down Time;

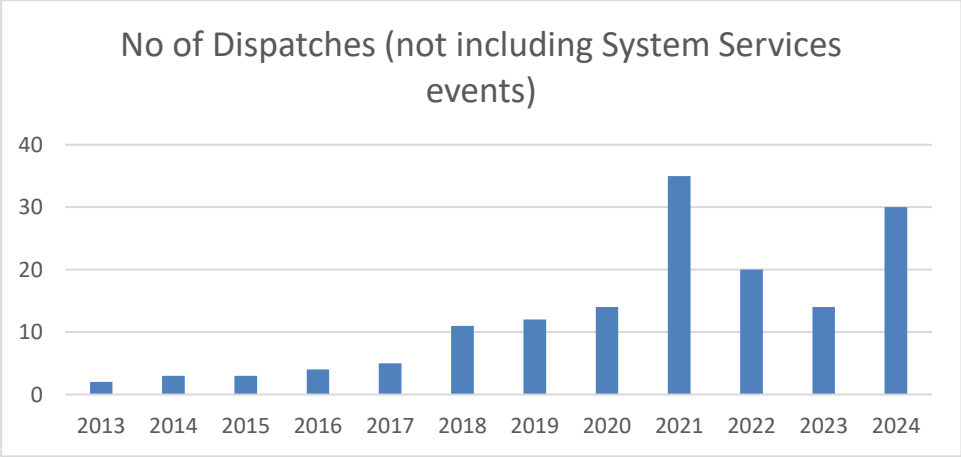
Modification Proposal Justification
(Clearly state the reason for the Modification)

Justification for Change

Demand Side units (DSUs) are electricity market participants that offer services (Energy, Capacity or System Services) by aggregating the flexibility that final customers can provide with regard to their demand. By getting customers to reduce their demand when required by the system operator, they can help balance the system. Customers who participate in DSUs generally reduce their demand by stopping non-essential processes such as pumping, chilling or processing for short periods of time (generally from 5 minutes to 8 hours) or by switching on local backup generators as an alternative power supply.

It is important to note that the portfolio of customers who make up a DSU will likely change over time as businesses' energy requirements and processes change. A responsible DSU aggregator will regularly review the portfolio and add new customers with different characteristics depending on their market commitments and obligations.

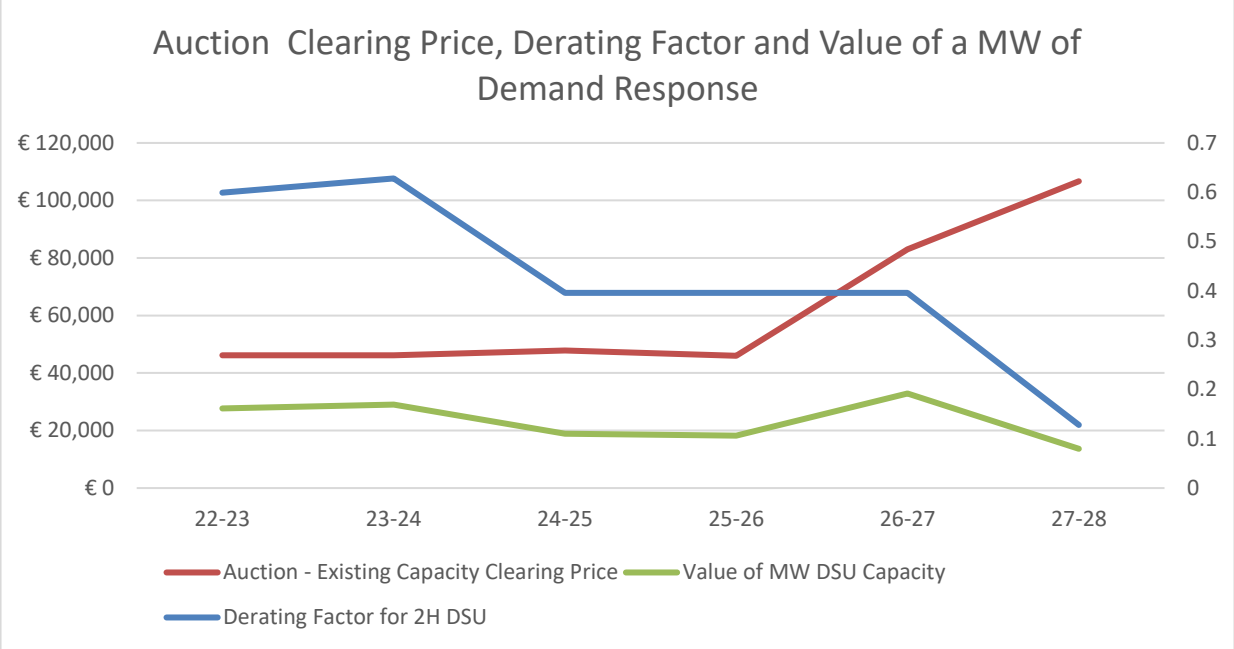
DSUs provide an important contribution to system adequacy, with most DSUs being primarily used by the system operator at times of low system reserve. That said, the system's need for such services is increasing and over the past few years they have been called upon to reduce demand on the system much more regularly.



As DSUs are currently not able to access energy payments, these units (and the industrial / commercial customers of which they are composed) rely heavily on the CRM for their primary price signal to participate. The capacity revenue that can be earned by a DSU can be summarised as per below

Revenue per MW = CRM Auction Price X De-rating Factor

The De-rating Factor is a metric developed and calculated by the system operator which puts a value on each unit's contribution to system adequacy. It takes all participants of each Technology Class and calculates de-rating factors based on their average historic availability.



Over recent years, the de-rating factors for DSUs (as well as for some other technologies) have fallen significantly. The exit signal this provides has been somewhat masked by the coincident material increase which has been seen in the Capacity Auction Clearing Prices over the same period. Taken together, these two factors mean that the final revenue that can be received by participating customers has not fallen excessively. However, if the Capacity Auction Clearing Price begins to normalise to historic levels, this will lead to a significant reduction in DSU revenue and will likely make continued market participation infeasible for many customers.

The reduction in de-rating factors is based on calculations made by the TSO using historic availability data. The DRAI believe that this methodology is flawed, as it is based on the registered capacity of the DSUs rather than their obliged quantity in the market. As explained above, DSUs are made up of multiple customers offering their flexibility to reduce demand. These customers will achieve this in a diverse number of ways and their demand characteristics will differ greatly. A responsible DSU operator will build a portfolio based on their estimate of the aggregated customers' availability and their goal should be do deliver the obligated quantity they are required to provide.

Importantly however, by generalising all DSUs with into one Technology Class, DSUs with lower average availability pull down the average for all and so lead to a worse de-rating factor for the group. This means that there is little incentive for any individual participants to increase their availability. Rather, they are incentivised to allow their availability to reduce to the average to be more inline with the applied de-rating factor. Instead of penalising only the potential low availability DSU actor, all DSUs receive lower capacity payments and are encouraged to build portfolios to match these lowering of de-rating factors. To do otherwise would reduce the DSU's income per available MW and so render the DSU uncompetitive: customers would be lured away by the promise of higher payments from other aggregators.

As the de-rating factor falls, all DSUs are incentivised to allow their availability to reduce further and so a vicious cycle is created. If this flawed market signal is allowed to persist, DSUs availability performance will continue to reduce year on year until the technology provides minimal capacity to the market.

De-rating factors are part of the CRM Design in which each "Technology Class" is given de-rating factors which largely reflects their average annual availability and so their relative contribution to system adequacy.
In the case of DSUs this Technology Class approach is flawed. Ultimately, DSUs differ from each other far more than other technologies. Some DSUs comprise of the aggregated ability of many small sites to reduce demand via switching off loads or switching on backup generation, while others may only contain a single site. The loads available to be switched off or onsite generation may only be available for parts of the day while production is running, while in others it may be available over the full 24-hour period.

This treatment currently leads to adverse consequences. Namely:

- Unfairly low capacity payments to sites with high availability - Capacity provided by customers with high availability is paid at a lower rate due to de-rating. This disincentivises them from participating and ultimately encourages them to stop participating in DSU
- Unfairly high capacity payment to sites with low availability - Capacity provided by customers with low availability are paid at a higher rate than they should due to average de-rating of all providers being used. This overpayment is unfair to other market participants.

This removes an important signal for customers / units to improve their availability and causes a vicious cycle of progressively poorer availability.

Method for introducing a more granular system

This modification sets out a possible methodology for creating a more equitable system for de-rating DSUs, based largely on the architecture of the CRM as it was originally designed.

Effectively, instead of publishing DSU de-rating factors based on a Technology Class approach using historical availability data taking an average for all DSUs, the TSOs would publish DSU de-rating factors as a function of a unit's availability (along with other characteristics such as duration). DSUs would then select a de-rating factor based on their projected availability, and this would result in them taking on a binding commitment to deliver that promised level of availability for the Capacity Years in question.

This method would mean that DSUs would receive a de-rating factor that more fairly represents the availability characteristics of each DSU while maintaining the CRM's architectural philosophy.

In this methodology, each DSU would nominate the availability metric they commit to that unit meeting, based on the guidance information provided in the IAIP, and receive an appropriate de-rating factor for a unit with that level of availability. This methodology would provide the greatest accuracy and so the highest incentive for better performance to all DSUs.

While this would allow highly available DSUs to avail of a better de-rating factor (and be renumerated accordingly), this would also likely benefit from an additional incentive mechanism to ensure that DSUs availing of a higher de-rating factor are appropriately held to account to deliver the promised availability. A supporting proposal in this view in included below.

If implemented correctly, this proposal should not result in any net additional Awarded Capacity or CRM revenues being secured by DSUs, it will solely affect the distribution of same among DSUs. DSUs with above average availability will be rewarded better versus the status quo, and DSUs with below average availability will be penalised versus the status quo, with no net impact on consumers. However, importantly there would be a positive signal incentivising availability performance and maximising the positive contribution demand flexibility has to play on the power system.

Implementation

The proposal set out would not require material changes to capacity market processes, nor radical modifications to the Capacity Market Code (CMC). Foreseen changes include:

- CMC Modifications requiring the TSOs to publish projected availability-based de-rating factor tables for DSUs as part of the auction parameters / IAIP for each Capacity Auction.
- TSOs to implement the proposed GPI process based on the proposal set out below. This function would likely sit outside the CRM but might be prudently codified in the IAIP in the same way the anticipated values used to calculate the Reliability Option Strike Price are currently included in the IAIP, despite the associated mechanics being actually calculated in accordance with the Trading and Settlement Code.

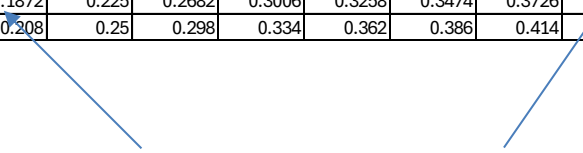
This modification outlines the need for, and the approach to, changes that should be made to how DSUs are de-rated. The driving principle related to the availability of DSUs and ensuring that an appropriate de-rating factor is applied to each DSU, such that a balance is struck between encouraging better availability and discouraging lower availability.

This proposal does not propose changes to the de-rating factor system associated with other elements which play a part in de-rating factors to be applied to DSUs. Besides technology type and availability, we understand that the other major element in assessing the de-rating factor of a DSU is the Maximum Down Time of the unit (this relates to the quantity of time a DSU can provide load reduction during a single dispatch). As part of this proposal, we would require a table to be provided as part of the IAIP for each Capacity Auction, identifying the upper limits of possible de-rating suitable for a unit with different levels of availability versus Maximum Down Time. A sample of such table is shown below. This would be required to allow a DSU to identify the appropriate de-rating factor for their unit based upon their projected availability.

Maximum Down Time (period for which the DSU can provide reduction

Availability Metric

	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	>6
10%	0.0086	0.015	0.0208	0.025	0.0298	0.0334	0.0362	0.0386	0.0414	0.044	0.0476	0.0512	0.085
20%	0.0172	0.03	0.0416	0.05	0.0596	0.0668	0.0724	0.0772	0.0828	0.088	0.0952	0.1024	0.17
30%	0.0258	0.045	0.0624	0.075	0.0894	0.1002	0.1086	0.1158	0.1242	0.132	0.1428	0.1536	0.255
40%	0.0344	0.06	0.0832	0.1	0.1192	0.1336	0.1448	0.1544	0.1656	0.176	0.1904	0.2048	0.34
50%	0.043	0.075	0.104	0.125	0.149	0.167	0.181	0.193	0.207	0.22	0.238	0.256	0.425
60%	0.0516	0.09	0.1248	0.15	0.1788	0.2004	0.2172	0.2316	0.2484	0.264	0.2856	0.3072	0.51
70%	0.0602	0.105	0.1456	0.175	0.2086	0.2338	0.2534	0.2702	0.2898	0.308	0.3332	0.3584	0.595
80%	0.0688	0.12	0.1664	0.2	0.2384	0.2672	0.2896	0.3088	0.3312	0.352	0.3808	0.4096	0.68
90%	0.0774	0.135	0.1872	0.225	0.2682	0.3006	0.3258	0.3474	0.3726	0.396	0.4284	0.4608	0.765
100%	0.086	0.15	0.208	0.25	0.298	0.334	0.362	0.386	0.414	0.44	0.476	0.512	0.85



2x Current derating factor for 100% availability

An additional update to the current model is the removal of the publication of the table presenting DSU de-rating factors as a function of DSU size in the IAIP as this would no longer be required for DSUs if the proposed solution is implemented, providing the TSO with a resource saving which would provide resource time for the new table we have proposed. DRAI has always contended that this table did not make sense in the context of DSUs. If the proposed solution is implemented, DSU de-rating factors would be published as a function of Hours of Demand Reduction Capacity and projected availability, rather than Hours of Demand Reduction Capability and Initial Capacity (unit size, MW).

Table 4 - Initial Capacity Marginal De-Rating Curves for DSUs with Maximum Down Time ≤ 6 hours

	Hours of Demand Reduction Capability												
Initial Capacity (IC) (MW)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	≤ 6.0
0 ≤ IC ≤ 10	0	0.043	0.075	0.104	0.128	0.149	0.167	0.181	0.193	0.207	0.220	0.238	0.256
10 < IC ≤ 20	0	0.041	0.073	0.102	0.126	0.146	0.164	0.179	0.192	0.205	0.218	0.236	0.253
20 < IC ≤ 30	0	0.040	0.072	0.101	0.124	0.144	0.162	0.177	0.190	0.203	0.217	0.234	0.251
30 < IC ≤ 40	0	0.039	0.072	0.100	0.123	0.143	0.160	0.175	0.189	0.202	0.216	0.233	0.250
40 < IC ≤ 50	0	0.038	0.071	0.098	0.121	0.141	0.158	0.174	0.188	0.201	0.214	0.232	0.248
50 < IC ≤ 60	0	0.037	0.070	0.097	0.120	0.140	0.157	0.173	0.187	0.200	0.214	0.231	0.246
60 < IC ≤ 70	0	0.037	0.069	0.096	0.119	0.139	0.157	0.172	0.186	0.199	0.214	0.230	0.245
70 < IC ≤ 80	0	0.036	0.069	0.096	0.119	0.138	0.156	0.172	0.186	0.199	0.213	0.229	0.244
80 < IC ≤ 90	0	0.036	0.068	0.095	0.118	0.138	0.155	0.171	0.185	0.199	0.213	0.228	0.243
90 < IC ≤ 100	0	0.036	0.067	0.094	0.117	0.137	0.154	0.170	0.184	0.198	0.213	0.227	0.241
100 < IC ≤ 110	0	0.035	0.067	0.093	0.116	0.136	0.154	0.169	0.184	0.197	0.212	0.226	0.240
110 < IC ≤ 120	0	0.035	0.066	0.093	0.115	0.135	0.153	0.168	0.182	0.196	0.211	0.225	0.238
120 < IC ≤ 130	0	0.035	0.066	0.092	0.114	0.134	0.152	0.167	0.181	0.195	0.210	0.223	0.236
130 < IC ≤ 140	0	0.035	0.065	0.091	0.114	0.133	0.151	0.166	0.180	0.194	0.208	0.222	0.235
140 < IC ≤ 150	0	0.034	0.065	0.091	0.113	0.132	0.150	0.165	0.179	0.193	0.207	0.220	0.233
150 < IC ≤ 160	0	0.034	0.064	0.090	0.112	0.131	0.149	0.164	0.178	0.192	0.206	0.219	0.232
160 < IC ≤ 170	0	0.034	0.064	0.089	0.111	0.131	0.148	0.163	0.177	0.191	0.204	0.217	0.230
170 < IC ≤ 180	0	0.034	0.063	0.089	0.111	0.130	0.147	0.162	0.176	0.190	0.203	0.216	0.228
180 < IC ≤ 190	0	0.034	0.063	0.088	0.110	0.129	0.146	0.161	0.174	0.188	0.202	0.214	0.227
IC > 190	0	0.034	0.063	0.087	0.109	0.128	0.145	0.160	0.173	0.187	0.200	0.213	0.225

Additional Incentive Proposal

In addition to Reliability Option Difference Charges which form a core element of the CRM and provide a strong financial incentive for units to be available at times of system stress, we believe an additional incentive should be considered, specifically for units availing of a higher de-rating factor as considered above.

Our proposal would see DSUs required to commit to a certain level of availability when selecting their De-Rating Factor, and then to be liable for a new Generator Performance Incentive (GPI) based upon their outturn availability versus their expected availably component of the de-rating factor they have nominated.

The calculation methodology for the proposed GPI would be structured to create an increased incentive for DSUs to accurately predict their availability. In the event the DSU demonstrated availability above or in line with their obligated capacity quantity, the DSU would receive their capacity payment and not be liable for the GPI. Note that even if they exceeded their availability, the capacity payment would not be increased above that associated with their predicted / committed availability.

In the event that the DSU demonstrated available below the predicted availability, the DSU would be paid their full capacity payment but in this case be liable for a GPI which is proportional to the degree to which the unit's availability is below the committed availability. The incentive could be calculated as follows

$GPI = Q_{UA} \text{ X } C_{RATE} \text{ X } M_I$

Whereby

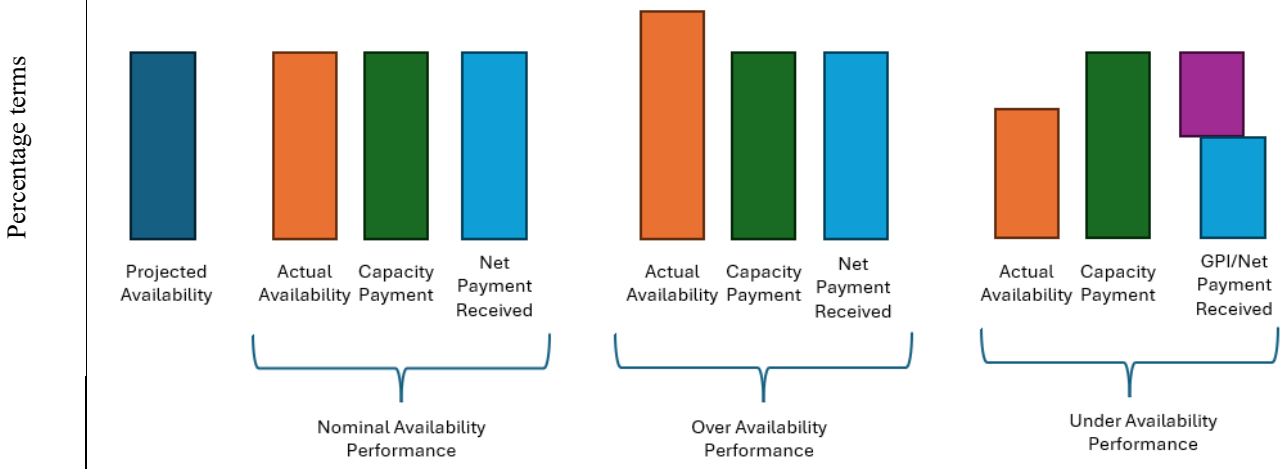
Q_{UA} is the Quantity by which the DSU has underachieved their availability

C_{RATE} is the capacity market clearing price

M_I is the incentive multiplier

The incentive multiplier should be set at a figure which is greater than 1 but not so high that it discourages units who are unavailable for a portion of the measurement period from making themselves available for later parts of the period. The DRAI proposes an incentive multiplier of 1.1. The incentive multiplier means that a DSU always has more to lose from overstating its projected availability than it does from understating it. A value above 1 is therefore important to ensure this asymmetry and avoid creating a perverse incentive for units to overstate their availability, on the basis the additional revenue from doing so will likely exceed the associated penalties. However, a value materially higher than 1 will only serve to incentivise DSUs to be extremely conservative in their availability projections – ultimately reducing the amount of capacity they are able to make available. Therefore, DRAI recommends an Incentive Multiplier of 1.1. This could potentially be reviewed by the RAs after one year of operation under the new system.

An example of how the system would work is shown below



Additionally note that when a DSU has altered their Awarded Capacity/Obligation using secondary trading, that the GPI would need to take this change into account. Similarly, when a DSU changed their registered capacity it would

be possible for the updated unit to meet the obligation using different availability characteristics without being liable for a GPI.

Period and method of measurement

The proposed period for measuring the availability of the DSU units for the purposes of calculating the GPI is proposed to be 1 month to match the existing processes via which the TSO's administer Other System Charges and GPIs.

Code Objectives Furthered

(State the Code Objectives the Proposal furthers, see Sub-Section A.1.2 of the CMC Code Objectives)

Ultimately, the case for change to the current de-rating system for DSUs is clear. The main arguments can be summarised as follows

- **Incentive to encourage superior performance** – Rather than incentivising higher availability as the de-rating system is intended to do, the current system incentivises lower availability by all DSUs. A more granular system would encourage better availability and so assist the TSO in delivering a more secure system.
- **Cost to the customer** – A system which appropriately rewards capacity with high availability will also ultimately lead to lower capacity market prices and so reduce the cost of electricity for the customer.
- **Risk to Security of Supply** – Under the current system units with high availability are not appropriately renumerated. The increasing cost of capacity in the CRM has meant that the effect of falling prices has been masked, but in the event of a reduction in this price it is likely that many high availability customers will stop participating and so create a risk to security of supply.

Implication of not implementing the Modification Proposal

(State the possible outcomes should the Modification Proposal not be implemented)

DSU availability will continue to fall leading to the removal of that capacity from the system

Impacts

(Indicate the impacts on systems, resources, processes and/or procedures)

Changes to the creation of the IAIP

Please return this form to the System Operators by email to modifications@sem-o.com

Notes on completing Modification Proposal Form:

1. **If a person submits a Modification Proposal on behalf of another person, that person who proposes the material of the change should be identified on the Modification Proposal Form as the Modification Proposal Originator.**
2. **Any person raising a Modification Proposal shall ensure that their proposal is clear and substantiated with the appropriate detail including the way in which it furthers the Code Objectives to enable it to be fully considered by the Regulatory Authorities.**
3. **Each Modification Proposal will include a draft text of the proposed Modification to the Code unless, if raising a Provisional Modification Proposal whereby legal drafting text is not imperative.**
4. **For the purposes of this Modification Proposal Form, the following terms shall have the following meanings:**

CMC / Code:	**means the Capacity Market Code for the Single Electricity Market**
Modification Proposal:	**means the proposal to modify the Code as set out in the attached form**
Derivative Work:	**means any text or work which incorporates or contains all or part of the Modification Proposal or any adaptation, abridgement, expansion or other modification of the Modification Proposal**

The terms "System Operators" and "Regulatory Authorities" shall have the meanings assigned to those terms in the Code.

In consideration for the right to submit, and have the Modification Proposal assessed in accordance with the terms of Section B.12 of the Code, which I have read and understand, I agree as follows:

1. **I hereby grant a worldwide, perpetual, royalty-free, non-exclusive licence:**

   1.1 **to the System Operators and the Regulatory Authorities to publish and/or distribute the Modification Proposal for free and unrestricted access;**

   1.2 **to the Regulatory Authorities to amend, adapt, combine, abridge, expand or otherwise modify the Modification Proposal at their sole discretion for the purpose of developing the Modification Proposal in accordance with the Code;**

   1.3 **to the System Operators and the Regulatory Authorities to incorporate the Modification Proposal into the Code;**

   1.4 **to all Parties to the Code and the Regulatory Authorities to use, reproduce and distribute the Modification Proposal, whether as part of the Code or otherwise, for any purpose arising out of or in connection with the Code.**

2. **The licences set out in clause 1 shall equally apply to any Derivative Works.**

3. **I hereby waive in favour of the Parties to the Code and the Regulatory Authorities any and all moral rights I may have arising out of or in connection with the Modification Proposal or any Derivative Works.**

4. **I hereby warrant that, except where expressly indicated otherwise, I am the owner of the copyright and any other intellectual property and proprietary rights in the Modification Proposal and, where not the owner, I have the requisite permissions to grant the rights set out in this form.**

5. **I hereby acknowledge that the Modification Proposal may be rejected by the Regulatory Authorities and that there is no guarantee that my Modification Proposal will be incorporated into the Code.**