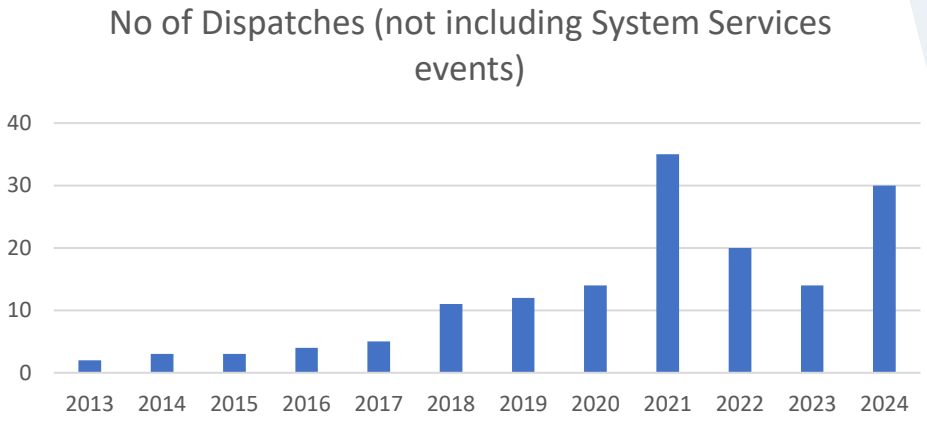
CRM De-rating Factors for DSU

What are DSUs



- Made up of one or more Individual Demand Sites (IDS) who agree to reduce their demand when dispatched to do so by the TSO
- Achieve reduction by
  - Switching off equipment which is running
  - Moving supply to onsite power generation

What are Derating Factors

- Published as part of the Auction Information Packs
- Group all participants of a particular “technology” together
- Apply a derating based on a number of factors, with average annual availability being a driving metric
- If a technology is incorrectly derated, it could lead to incorrect procurement of capacity quantities, causing risk to the system or unnecessary costs to customers

*Detailed methodology is not published

Table 1 - Initial Capacity Marginal De-Rating Curves by Technology Class and Initial Capacity

Initial Capacity (IC)(rated MW)	DSU[1]	Gas Turbine	Hydro	Steam Turbine	Interconnector[2,3]	System Wide[4]
0 ≤ IC ≤ 10	0.614	0.881	0.844	0.814	0.572	0.764
10 < IC ≤ 20	0.607	0.873	0.840	0.810	0.571	0.760
20 < IC ≤ 30	0.601	0.866	0.837	0.806	0.571	0.756
30 < IC ≤ 40	0.596	0.860	0.834	0.803	0.570	0.753
40 < IC ≤ 50	0.591	0.855	0.831	0.800	0.569	0.750
50 < IC ≤ 60	0.587	0.851	0.828	0.796	0.569	0.746
60 < IC ≤ 70	0.582	0.849	0.825	0.793	0.568	0.743
70 < IC ≤ 80	0.577	0.847	0.822	0.790	0.568	0.740
80 < IC ≤ 90	0.572	0.845	0.819	0.786	0.567	0.736
90 < IC ≤ 100	0.567	0.843	0.816	0.783	0.566	0.733
100 < IC ≤ 110	0.562	0.841	0.813	0.779	0.566	0.729
110 < IC ≤ 120	0.557	0.838	0.810	0.776	0.565	0.726
120 < IC ≤ 130	0.553	0.836	0.807	0.772	0.565	0.722
130 < IC ≤ 140	0.548	0.834	0.804	0.769	0.563	0.719
140 < IC ≤ 150	0.543	0.832	0.801	0.765	0.563	0.715
150 < IC ≤ 160	0.538	0.830	0.798	0.762	0.562	0.712
160 < IC ≤ 170	0.533	0.828	0.795	0.759	0.562	0.709
170 < IC ≤ 180	0.528	0.826	0.791	0.755	0.561	0.705
180 < IC ≤ 190	0.523	0.824	0.788	0.752	0.560	0.702
190 < IC ≤ 200	0.518	0.822	0.785	0.748	0.560	0.698
200 < IC ≤ 210	0.514	0.819	0.782	0.744	0.559	0.694
210 < IC ≤ 220	0.509	0.816	0.778	0.740	0.558	0.690
220 < IC ≤ 230	0.504	0.813	0.774	0.736	0.557	0.686
230 < IC ≤ 240	0.499	0.810	0.770	0.732	0.556	0.682
240 < IC ≤ 250	0.494	0.807	0.766	0.728	0.555	0.678
250 < IC ≤ 260	0.490	0.803	0.762	0.724	0.554	0.674
260 < IC ≤ 270	0.485	0.800	0.758	0.720	0.553	0.670
270 < IC ≤ 280	0.481	0.797	0.755	0.715	0.552	0.665
280 < IC ≤ 290	0.476	0.794	0.751	0.711	0.551	0.661
290 < IC ≤ 300	0.472	0.791	0.747	0.707	0.550	0.657
300 < IC ≤ 310	0.467	0.788	0.743	0.703	0.548	0.653
310 < IC ≤ 320	0.463	0.785	0.739	0.699	0.548	0.649
320 < IC ≤ 330	0.458	0.782	0.735	0.695	0.547	0.645
330 < IC ≤ 340	0.454	0.778	0.731	0.691	0.545	0.641
340 < IC ≤ 350	0.450	0.775	0.727	0.686	0.545	0.636
350 < IC ≤ 360	0.445	0.772	0.723	0.682	0.544	0.632

Capacity Revenue earned by a participant = Capacity Price * Derating factor * Registered Capacity

Reason for Modification

- Due to the very high degree of variability between DSUs
  - units with high availability are penalised
  - low levels of availability are overpaid
- Current Methodology encourages DSUs to be formulated to meet the de-rating factor rather than to maximise availability
- Leads to a downward pressure on de-rating factors for DSUs, which will ultimately lead to the units exiting the market and higher costs for consumers
- Incorrect allocation of awarded capacity to DSU pushed up the capacity clearing price, disadvantaging customers

Proposal would

- Fair reward for capacity provided
- Incentivise availability in line with obligation

DSUs and Availability

- DSUs are generally made up by aggregating many individual demand sites (IDS) who each provide demand reduction based on their demand at that time
- If their demand is lower, then their availability is lower
- Individual DSU units rarely have zero availability
- Generally have availability that is lower than their maximum capacity (as not all the IDS are using their maximum demand at all times)

DSU types and customer recruitment

- A DSU may be made up of 1 IDS who is available 100% all the time
  - Average Availability would be similar to Registered Capacity
- Alternatively it could be made up of hundreds of smaller IDS with varying availability
  - Average Availability would be a fraction of Registered Capacity
- In both cases the DSU will be derated and paid the same
- Actual capacity provided could be an order of magnitude different

DSUs differing availability

DSUs under-rewarding IDSs

DSUs are competitors – IDS will move away from DSUs who are under-rewarding them to those who are fairly rewarding them

DSUs over-rewarding IDSs

	Awarded Capacity Av 2023	% Availability Vs QCOB
DSU 1	1.3505	305%
DSU 2	1.3505	270%
DSU 3	6.9455	204%
DSU 4	1.816	185%
DSU 5	5.613	144%
DSU 6	9.15	137%
DSU 7	13.224	109%
DSU 8	11.3475	107%
DSU 9	12.175	104%
DSU 10	7.968	98%
DSU 11	9.845	87%
DSU 12	8.9125	82%
DSU 13	11.7715	79%
DSU 14	28.6265	77%
DSU 15	32.2655	74%
DSU 16	9.5485	73%
DSU 17	5.87	72%
DSU 18	9.3975	67%
DSU 19	9.594	66%
DSU 20	44.173	45%

Incentives

- CRM Incentive system (Difference Payments) uses derating factor as a metric

- Capacity Market Participants are only incentivised to provide capacity up to their derated capacity (risk difference payments)

Example

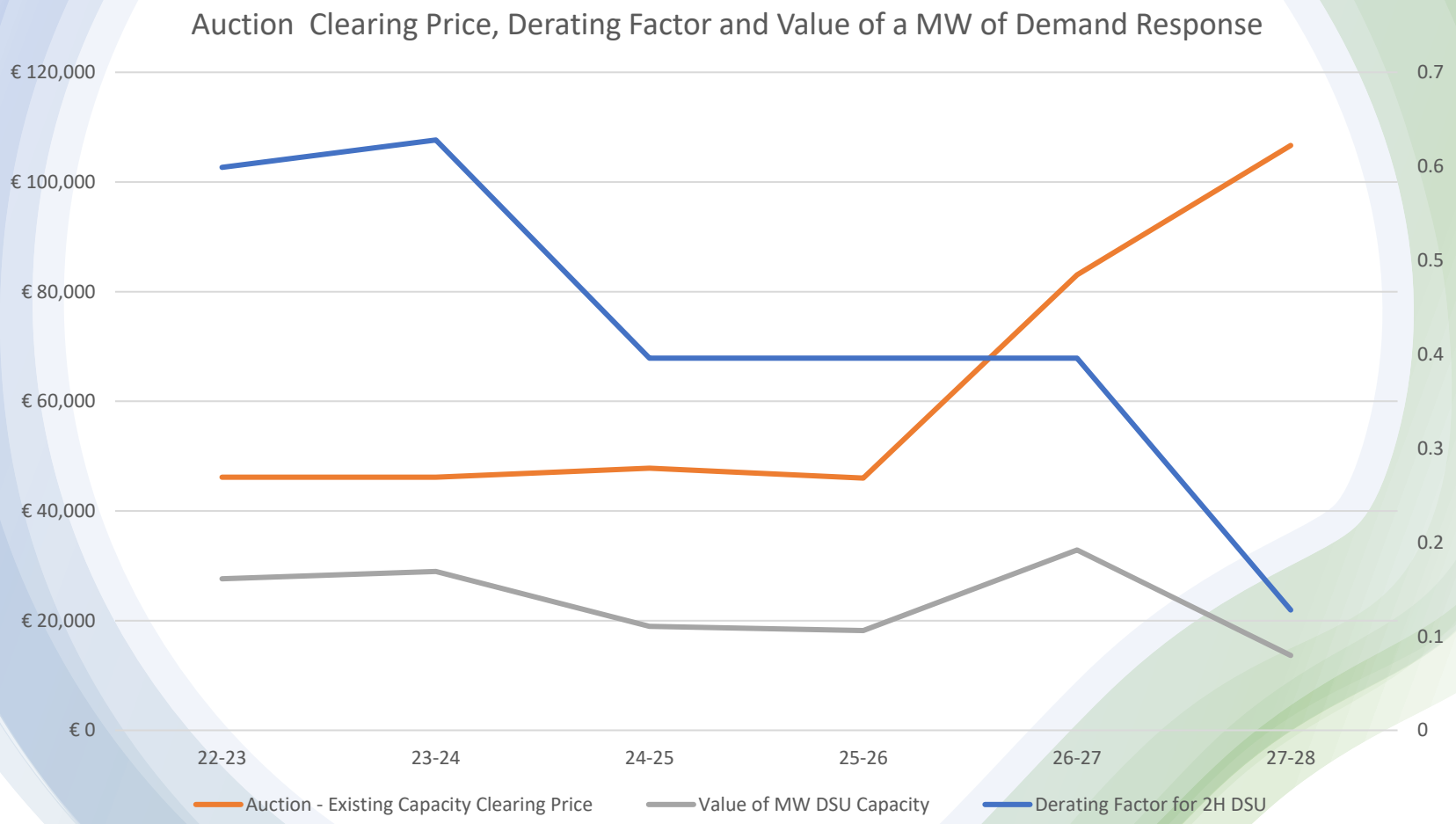
- The incentive on a unit with a derating of 0.8 is 80% of their registered capacity
- The incentive on a unit with a derating of 0.6 is 60% of their registered capacity

- For DSUs this means that the incentive on them drives them to be available in line with their derating factor

DSUs change over time

- Over time the makeup of a multisite DSU will change
- Some IDSs will stop participating, others will join
- Current incentive encourages a DSU aggregator to blend make up to match the derating factor
- If a DSU aggregator exceed the derating factor, they are not rewarded, they instead under reward their IDSs – IDSs will move to an alternative provider

DSU Rewards over time



Current Situation

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

International Comparison

Electricity System	Derating Factor Name	Derating Percent for forthcoming auction	Obligation a 10 MW variable Demand could enter for	Link
PJM (East USA)	Effective Load Carrying Capability (ELCC)	92 % for 2027/28 BR Auction	9.2 MW	https://www.pjm.com/-/media/DotCom/committees-groups/committees/mrc/2025/20250723/20250723-item-04---1-2027-2028-bra-fpr-and-irm---presentation.pdf
NESO (Great Britain)	De-rating Factor	85.58% for T-1 26-27 and T-4 29-30	8.558 MW	https://nationalenergyso-emr.my.salesforce.com/sfc/p/#8d000002dUGC/a/J70000005jrf/5td1H5_C9WwsMJbr0XqFm2IDVpqE7NrQWL7gBKm.NL8
SEMO (Ireland	De-rating Factor	12.8% For T-4 2029-2030	1.28 MW	https://www.sem-o.com/sites/semo/files/2025-08/IAIP2930T-4.pdf

Proposal

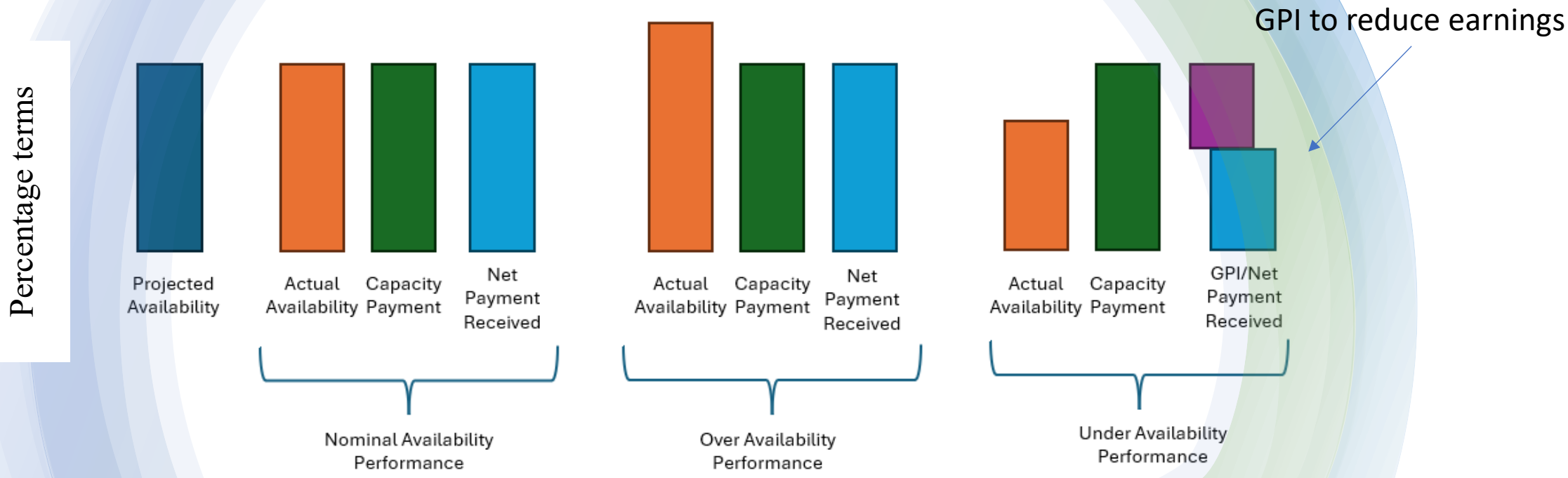
Specific and Binding derating factors for each DSU with an incentive system to penalise poor performance

TSO to produce new derating table

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

Incentive System – GPI based on availability Vs Projected



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

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

Details on proposed change

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 above. 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.

Changes required - Main Body of the CMC

- 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;

Thank you

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