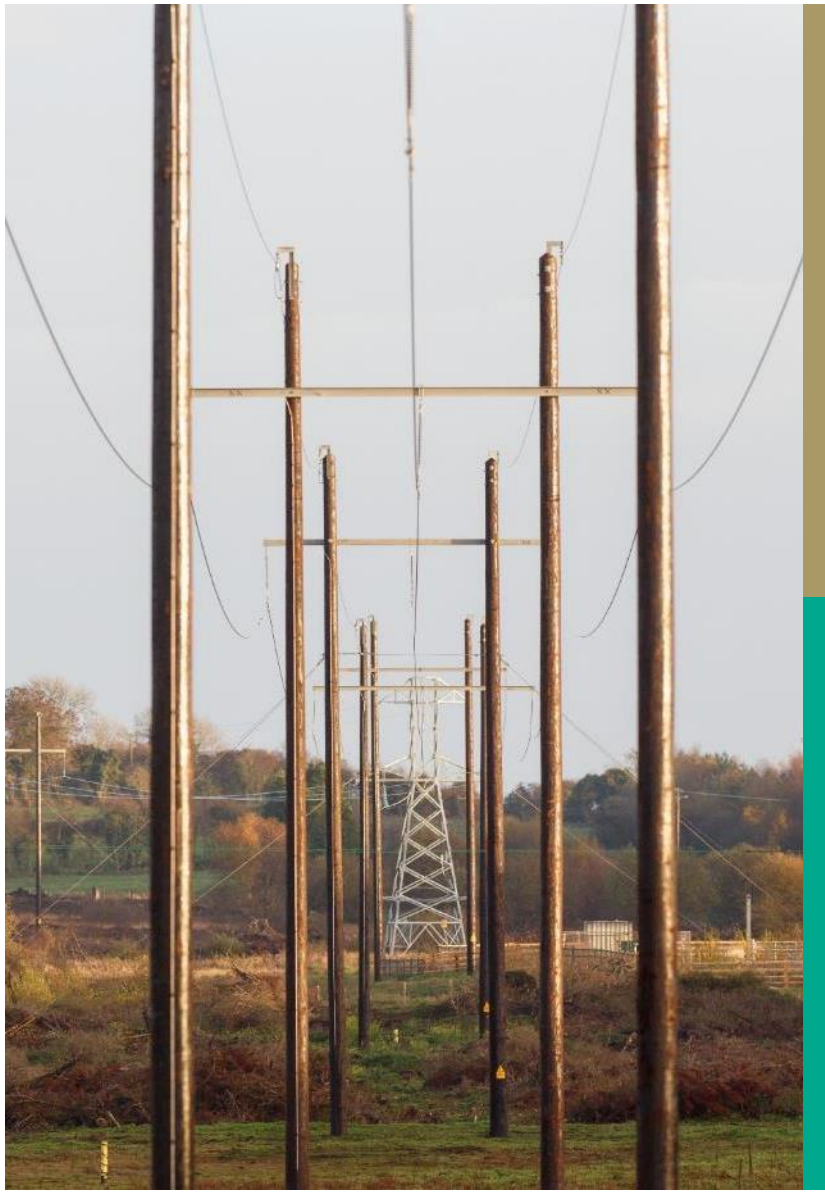
20/03/2025

Capacity Market Modification

CMC_03_25 - Clarification of Proportion of Delivered Capacity for multiple tranches

Generalisation of G.3.1.4

- It is important to emphasise, that the only substantial change being introduced here is to incorporate the change proposed in CMC_12_24.
- This change is important to ensure that measurement of delivery is on the same basis as the capacity was qualified.
- The remainder of the modification seeks only to generalise the formula for Proportion of Delivered Capacity to handle multiple contract register entries.
- It is common for the same Capacity Market Unit to have Awarded Capacity from multiple auctions and it is important there is clarity on how these are handled.



Generalisation of G.3.1.4

Representing G.3.1.4 PDC in algebraic form, we have:

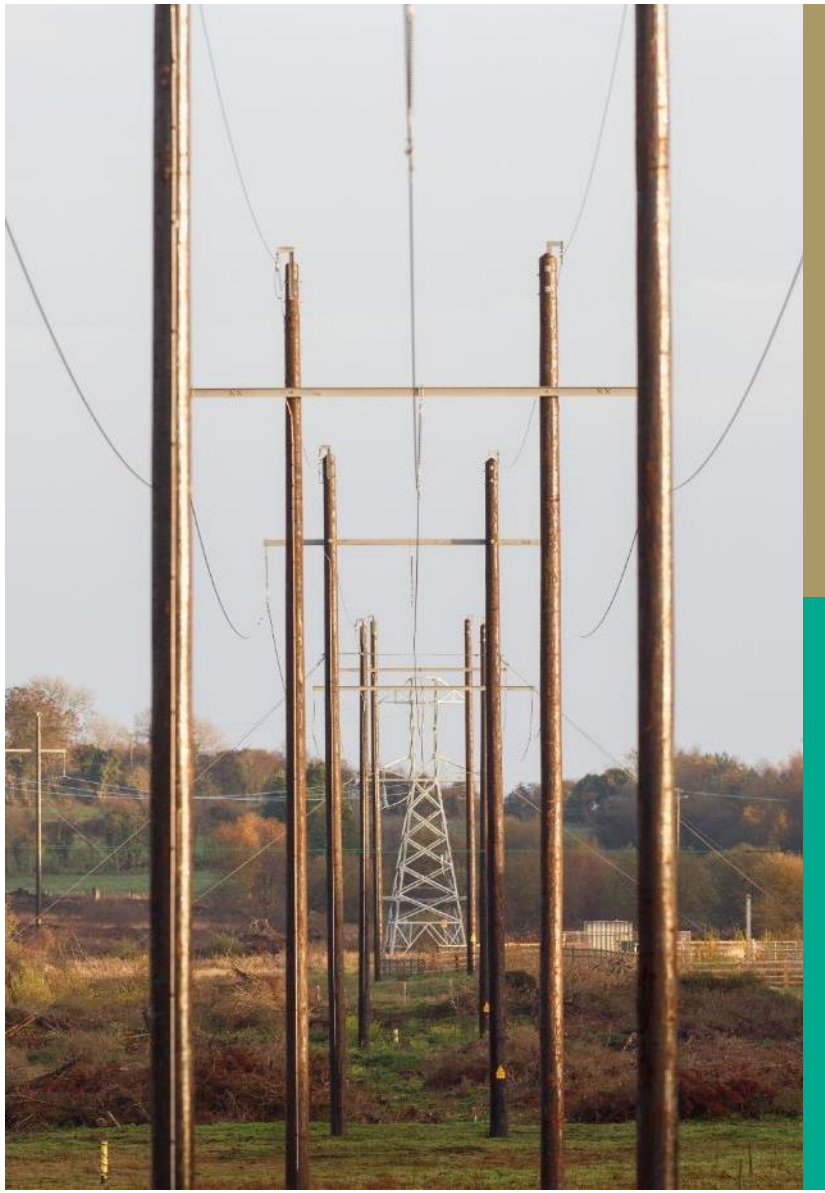
$$PDC_{\Omega} = Max\left(0, \frac{Min(DRGCCC_{\Omega}, AC_{\Omega}) - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}\right)$$

Expanding the term in the Min gives us:

$$PDC_{\Omega} = Max\left(0, Min\left(\frac{DRGCCC_{\Omega} - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}, \frac{AC_{\Omega} - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}\right)\right)$$

The right-hand term = 1 or in percentage terms, 100%

$$PDC_{\Omega} = Max\left(0, Min\left(\frac{DRGCCC_{\Omega} - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}, 100\%\right)\right)$$



Generalisation of G.3.1.4

Taking the denominator of the below relationship:

$$PDC_{\Omega} = Max\left(0, Min\left(\frac{DRGCCC_{\Omega} - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}, 100\%\right)\right)$$

we have: $AC_{\Omega} - AEC_{\Omega} = ANC_{\Omega} = \sum_{n \epsilon ANC_{\Omega y}} qC_{\Omega n}$,

where $qC_{\Omega n}$ is Contract Register Entry, n, of Awarded New Capacity (ANC) for Capacity Market Unit, Ω. $qC_{\Omega n}$ is the term used in the Trading and Settlement Code. The subscript, y, is introduced to clarify that we are referring to Contract Register Entries comprising Awarded New Capacity for a particular Capacity Year, y. This results in:

$$PDC_{\Omega y} = Max\left(0, Min\left(\frac{DRGCCC_{\Omega} - AEC_{\Omega y}}{\sum_{n \epsilon ANC_{\Omega y}} qC_{\Omega n}}, 100\%\right)\right)$$

Generalisation of G.3.1.4

Next, considering:

$$PDC_{\Omega y} = Max\left(0, Min\left(\frac{DRGCCC_{\Omega} - AEC_{\Omega y}}{\sum_{n \epsilon ANC_{\Omega y}} qC_{\Omega n}}, 100\%\right)\right)$$

we introduce the relationship originally defined in G.3.1.3 i.e. $DRGCCC_{\Omega} = \sum_{u \epsilon \Omega} DRGCCC_{u}$ so that DRGCCC is represented at Generator Unit / Interconnector level.

$$PDC_{\Omega y} = Max\left(0, Min\left(\frac{\sum_{u \epsilon \Omega} DRGCCC_{u} - AEC_{\Omega y}}{\sum_{n \epsilon ANC_{\Omega y}} qC_{\Omega n}}, 100\%\right)\right)$$

As ANC_{Ω} is not a single entry but multiple, we need to be able to calculate PDC for each Contract Register Entry, n. We do this as follows:

$$PDC_{\Omega ny} = Max\left(0, Min\left(\frac{\sum_{u \epsilon \Omega} DRGCCC_{u} - AEC_{\Omega}}{\sum_{i=1}^{n} qC_{\Omega i}}, 100\%\right)\right) \ldots (i \epsilon ANC_{\Omega}, y)$$

Generalisation of G.3.1.4

It is important to emphasise that the current G.3.1.4 PDC in algebraic form:

$$PDC_{\Omega} = Max\left(0, \frac{Min(DRGCCC_{\Omega}, AC_{\Omega}) - AEC_{\Omega}}{AC_{\Omega} - AEC_{\Omega}}\right)$$

And the proposed algebraic form:

$$PDC_{\Omega\mathrm{ny}} = Max\left(0, Min\left(\frac{\sum_{u\epsilon\Omega} DRGCCC_u - AEC_{\Omega}}{\sum_{i=1}^{n} qC_{\Omega\mathrm{i}}}, 100\%\right)\right) \ldots (i\ \epsilon\ ANC_{\Omega}, y)$$

both represent the same calculation. Whereas the current form of G.3.1.4 applies to a single Contract Register Entry, G.3.1.5 applies seeks to deal with multiple tranches, the new form incorporates both of the these paragraphs more clearly and unambiguously.

Generalisation of G.3.1.4

Finally, taking:

$$PDC_{\Omega \mathrm{ny}} = Max\left(0, Min\left(\frac{\sum_{u \epsilon \Omega} DRGCCC_u - AEC_{\Omega}}{\sum_{i=1}^{n} qC_{\Omega \mathrm{i}}}, 100\%\right)\right) \ldots (i \epsilon ANC_{\Omega}, y)$$

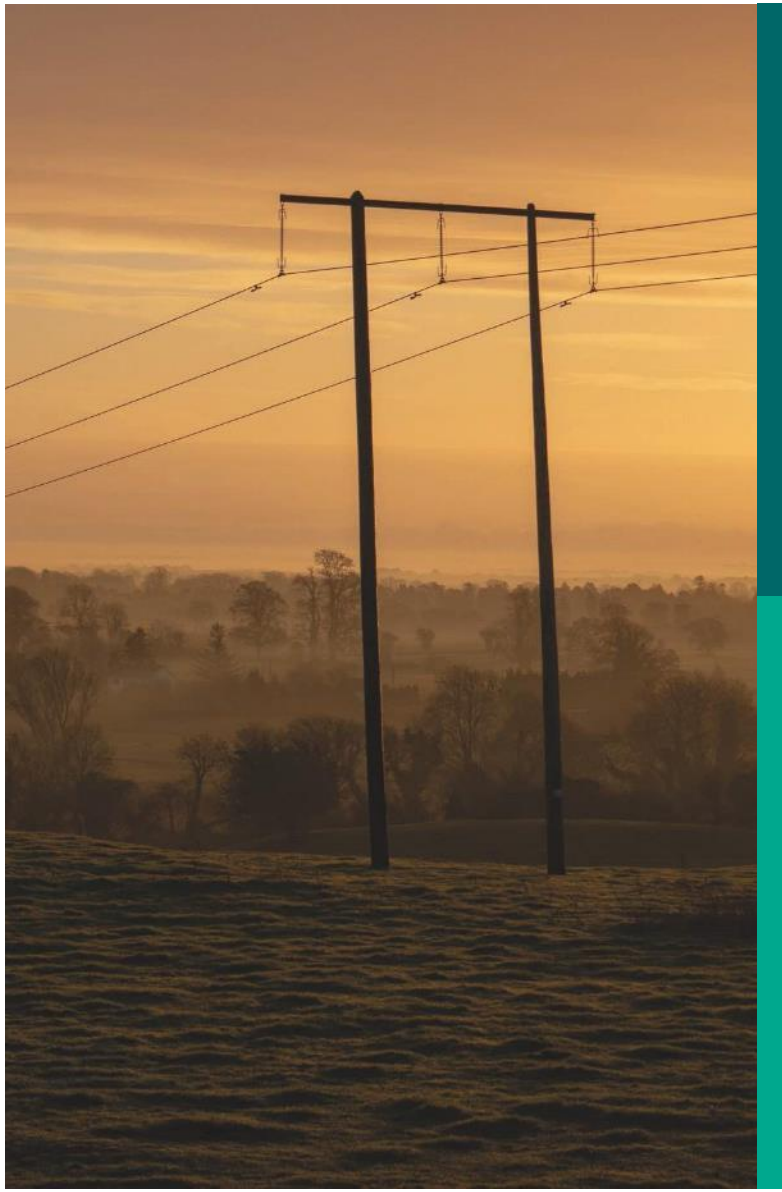
and adopting the proposed change set out in CMC_12_24, where AEC_{Ω} is replaced by De-Rated Initial Capacity Existing, the System Operators propose to replace AEC_{Ω} with Gross De-Rated Capacity (Existing), $GDRCE_{\Omega}$, which is aligns more with the qualification applications.

We introduce the Generator Unit version of $GDRCE_{\Omega} = \sum_{u \epsilon \Omega} GDRCE_u$

$$PDC_{\Omega \mathrm{n}} = Max\left(0, Min\left(\frac{\sum_{u \epsilon \Omega}(DRGCCC_u - GDRCE_{\mathrm{u}})}{\sum_{i=1}^{n} qC_{\Omega \mathrm{i}}}, 100\%\right)\right) \ldots (i \epsilon ANC_{\Omega}, y)$$

Example of Multiple Contract Register Entries

Capacity Market Unit = A	Auction 1	Auction 2	Auction 3	Auction 4
Initial Capacity Existing (ICE):	100	100	100	100
Initial Capacity New (ICN):	0	10	20	50
Derating factor (DRF):	0.8	0.7	0.6	0.7
Gross Derated Capacity Existing (GDRCE):	80	70	60	70
Gross De-Rated Capacity New (GDRCN):	0	7	12	35
Awarded Existing Capacity:	0	80	80	80
Awarded New Capacity:	0	0	7	12
Net De-Rated Capacity Existing (NDRCE)	80	0	0	0
Net De-Rated Capacity New (NDRCN)	0	7	5	23
Capacity Cleared in Auction	80	7	5	10



Delivered Quantites	n=1	n=2	n=3	n=4
Awarded Capacity (qC)	Existing 80	New 7	New 5	New 10
Grid Code Commissioned Capacity	120	120	120	120
De-Rating Factor	0.8	0.7	0.6	0.7
De-rated Grid Code Commissioned Capacity	n/a	84	72	84
Gross De-Rated Capacity Existing		70	60	70

$$PDC_{\Omega n} = Max\left(0, Min\left(\frac{\sum_{u\epsilon\Omega}(DRGCCC_u - GDRCE_u)}{\sum_{i=1}^{n} qC_{\Omega i}}, 100\%\right)\right) \ldots (i \epsilon ANC_{\Omega}, y)$$

Tranche 2: $PDC_{A1y} = Max(0, Min\left(\frac{84-70}{7}, 100\%\right)) = 100\%$ ✓

Tranche 3: $PDC_{A2y} = Max(0, Min\left(\frac{72-60}{7+5}, 100\%\right)) = 100\%$ ✓

Tranche 4: $PDC_{A3y} = Max(0, Min\left(\frac{84-70}{(10+7+5)}, 100\%\right)) = 64\%$

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Delivered Quantites	n=1	n=2	n=3	n=4
Awarded Capacity (qC)	Existing 80	New 7	New 5	New 10
Grid Code Commissioned Capacity	130	130	130	130
De-Rating Factor	0.8	0.7	0.6	0.7
De-rated Grid Code Commissioned Capacity	n/a	91	78	91
Gross De-Rated Capacity Existing		70	60	70

$$PDC_{\Omega n} = Max\left(0, Min\left(\frac{\sum_{u\epsilon\Omega}(DRGCCC_u - GDRCE_u)}{\sum_{i=1}^{n} qC_{\Omega i}}, 100\%\right)\right) \ldots (i \epsilon ANC_{\Omega}, y)$$

Tranche 2: $PDC_{A1y} = Max(0, Min\left(\frac{91-70}{7}, 100\%\right))$= 100%

Tranche 3: $PDC_{A2y} = Max(0, Min\left(\frac{78-60}{7+5}, 100\%\right))$= 100%

Tranche 4: $PDC_{A3y} = Max(0, Min\left(\frac{91-70}{(10+7+5)}, 100\%\right))$= 95% ✓

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Thank you.

Questions?

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