# De-rating factor methodology for conventional embedded generation technologies

Consultation Response Summary | 11 March 2022

## Executive Summary

The EMR Delivery Body, as part of National Grid Electricity System Operator (ESO), launched an industry consultation[1] in January 2022 on the proposed changes to the de-rating factor methodology for some conventional embedded generation technologies. As per the Capacity Market Rules, this consultation was concerned with the technical method of calculating de-rating factors and not the policy around Capacity Market (CM) participation or any other wider policy issues. While respondents raised some interesting policy-related comments and questions these are outside of the scope of this technical consultation and as such will be passed to BEIS and Ofgem for consideration as part of their wider consultation processes.

We have reviewed the responses and concerns raised by stakeholders on the proposed alternative method. While we believe there was merit in consulting on an alternative approach using the new data available, there were concerns on not being able to use metered generation output to represent asset availability in a sufficiently robust way. As such, we are not proposing to implement any changes to the de-rating factor methodology for these embedded generation technologies at the present time.

We continue to believe that improving this area of our modelling is in the interest of consumers. Therefore, as indicated in our consultation document, we are now intending to explore how we can work with industry stakeholders to obtain data that better reflects the availability of embedded generation assets. This will help us to calculate de-rating factors for embedded generation technologies directly from embedded generation data. We will provide further updates in Q1 2022/23.

This document provides a summary of the feedback we received to each of the eight consultation questions. We also offer some brief conclusions and provide an overview of next steps in response to the consultation and as part of ongoing planned work activities.

[1] Industry Consultation - De-rating Factor Methodology for Embedded Generation Technologies v1.0.pdf (emrdeliverybody.com)

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## Summary of responses

The EMR Delivery Body received a total of eleven responses to its industry consultation on the methodology for conventional embedded generation technologies. The summaries below set out respondent's views on the proposition put forward in our January consultation document.

Where we indicate the proportion of respondents that expressed a view on a proposition, this is from the total that commented on the specific question rather than the total number of responses we received to our consultation.

Please note that we do not intend to publish the consultation responses received.

### Question 1: Are the new data sources appropriate for calculating de-rating factors for the specified embedded generation technologies? If not, what data sources would be appropriate and how could these be made available to National Grid ESO?

Eight respondents addressed this question with a variety of responses. Some of the responses supported the proposal stating it would improve the accuracy of the data used for modelling and is expected to be more relevant than using transmission connected generation data sources.

Other responses expressed the concern that the data being used is not fit for purpose and that National Grid ESO needs to seek to get the equivalent of Maximum Export Limits (MEL) from embedded plant or continue to use the data collected from Balancing Mechanism Unit (BMU) to set the de-ratings for all parties.

There were responses that the new data sources may be considered not appropriate as the new data sources do not produce a fair representation of availability. Furthermore, this could lead to an unjustified impact on the revenue of reciprocating engine providers within the Capacity Market by reducing their de-rating factor. This was also thought to be counterintuitive as many of the embedded reciprocating units are newer than transmission. Following to say that using the current data sources of matching similar technologies to a transmission-based de-rating factor is a more suited measure

One suggested that creating a new process to record the availability of embedded reciprocating engines would be the most appropriate way forward.

It has been raised that using the embedded capacity register may not be appropriate as it may not contain all assets of the sample technology type on that DNO network i.e. may contain MPANs registered that are for assets that are not yet generating. Therefore, any metered data will not be representative of what the asset can do once fully operational or may be in testing.

One respondent noted that numerous embedded reciprocating engines are BMU's and participate in the Balancing Mechanism. MEL data from these assets would be a better measure of availability.

### National Grid ESO response

We acknowledge and welcome the wide and varied range of responses in relation to this question. We also welcome responses from the industry that agree with our statement that the current methodology of matching an embedded generating technologies de-rating to a transmission-based counterpart may not be appropriate.

We agree with the sentiment that the new data sources using metered generation output is not the same as availability. We attempted to use generation output to try and estimate availability through narrowing the range of the de-rating factor. Despite this, it was felt that there were too many scenarios where a unit may be available and not generate to be able to derive a robust measure from this.

We note the suggestion that using MEL data from current embedded units within the Balancing Mechanism may be used to derive a technology de-rating factor using the traditional calculation. However, we believe that the embedded capacity register provides a good opportunity for a much larger sample of units from a technology fleet to be considered and with over 80% of the generating capacity matched in the analysis, would be representative of the fleet. Using only current embedded units within the Balancing Mechanism could risk setting a generating technology de-rating factor from a small minority of units.

**Question 2: Is it appropriate to assume that metered output can be used to represent availability of a CMU given the time periods included within the calculation (i.e. do these time periods represent periods we would reasonably expect these units to be generating if they were available)?**

Eight respondents addressed this question. Two respondents agreed whereas the rest disagreed. For those who disagreed the reasons included.

- There are situations where plants may or may not run in the periods identified, there is no obligation on any plant to run irrelevant of how high demand or prices are.
- Metered output is not a good representation of availability.
- Factoring unit output over peak time periods does not provide an accurate representation of reciprocating engines' true contribution to the system security. This gives transmission-connected capacity an unfair disadvantage when setting de-rating factors, as transmission capacity will be rewarded for only their availability, whereas distribution connected capacity is rewarded for output alone.

**National Grid ESO response**

While we have attempted to present a method where metered output generation may act as an indicator of availability, we remain aware that this is not strictly a representation of availability of a unit and therefore its use in the calculation of a de-rating factor may not be robust.

Many responses stated that the electricity market complexities create circumstances where a unit may be available but not run including due to economics, fuel prices and emission limits. We agree that the modelling and calculation suggested does not capture the full range of reasons and time frames that may accurately represent a unit's availability. We note concerns that the method suggested would create an imbalance between transmission and distribution connected technologies where similar thermal technologies are rewarded on a different basis.

We do however note that some responses voiced in favour of the suggested method of using metered generation output and that this data would be appropriate for a new calculation.

**Question 3: Is the shorter history of 3 years appropriate as the basis for the alternative de-rating factor methodology or do we need to consider a longer history (e.g. 7 years) to increase the robustness of the methodology?**

This question was answered by eight respondents. Two agreed that shorter history of three years is appropriate given the limited availability of metered output data at this time and may better reflect the reliability of plants. However, they also noted that a longer time period would be preferable to improve the reliability of the data used for the methodology.

The remaining six respondent all disagreed and supported consideration for a longer history to increase the robustness of the methodology. One noted that they do not consider a total of 36 peaks from across three winters presents a particularly robust data set.

It was also suggested that the implementation of this methodology be delayed until the same period of continuous data has been acquired for reciprocating engines exists for transmission connected capacity (7 years). Respondents furthermore requested clarification that as the number of years of available data increases in the future, the number of years used to calculate the de-rating factors will also increase in parallel.

**National Grid ESO response**

We acknowledge the fact that 3 years of data history may be considered too short and is a product of the data available to us rather than an explicit choice. The de-rating factor process for transmission-level units uses a 7-year data history and given time, a rolling data history of 7 years could be achieved using the metered generation output dataset.

We do not believe that having a full 7-year data history is a necessity for change and building up from a shorter history (e.g. 3 years) to a rolling 7 years would be an acceptable approach.

**Question 4: Is it appropriate to only use gas units in the de-rating factor calculation for reciprocating engines or should both gas and diesel be included?**

Eight respondents addressed this question with a variety of responses and comments raised.

It has been suggested that as a minimum, the indicative de-rating factor for gas reciprocating engines should be applied to both fuels.

Others expressed that it is better to include both diesel and gas units in the de-rating factor calculation for reciprocating engines. Furthermore, recommended dividing the reciprocating engine technology class into fuel types so that diesel reciprocating engines get a lower derating factor, this supporting the UK's overall transition towards Net Zero.

It was put forward that with the new methodology calculation, the cheapest fuel type will generate more often, and in doing so will have a higher de-rating factor applied (despite all technologies contributing equally to the available capacity).

**National Grid ESO response**

While we acknowledge the sentiment of the responses that suggested separate de-rating factors for gas and diesel reciprocating engines, we believe this falls outside the scope of this consultation as it would require changes to the generating technology classes in the Capacity Market. The insight from our modelling showed a potential for significant differences for different fuel types within an existing generating technology class, as this is an area we would seek to explore further in the next steps.

**Question 5: Is it appropriate to include Short Term Operating Reserve (STOR) units in the de-rating factor calculation and assume they are fully available on the basis that they receive availability payments? Is it more appropriate to include STOR units on this basis or exclude them from the calculation?**

Eight respondents addressed this question where 6 respondents agreed that STOR contracted units should be assumed as fully available and 2 disagreed

The respondents that agreed, stated that STOR units should be included in the calculation, with some adding considerations such as, it is not just STOR units that affects running hours, assumes their full availability, and it would make the sense to calculate de-rating by using the average of all STOR availability of that technology type over the peak. The response was shared that calculated deratings should apply to embedded STOR and furthermore the inability to reflect unit availability is one of the key deficiencies in the proposed methodology.

For those who disagreed they stated that the deratings will be based on an assumed level of availability, adding this therefore assumes that STOR units are contractually obliged for availability regardless of a utilisation call taking place or not. It has been suggested that by definition not using metered data as a measure of availability. We also received response that stated it is not just STOR that affects running hours and other services such as fast reserve and frequency response should be accounted for.

**National Grid ESO response**

We recognise that we have not considered a full enough range of ancillary services that units may be contracted to which may affect their operations over peak periods. We acknowledge views that STOR contracted units should be considered fully available for contracted periods and be included in the proposed calculation.

We do not believe that calculating a technology de-rating factor from the submitted availabilities of STOR units would form a representative and robust result and could mean that the de-rating factor for an entire generation technology class would be determined by a minority of the fleet. We also acknowledge that in including STOR contracted units as fully available, we are making assumptions about availability that are not based on

generation metered output. We would however consider the inclusion of this assumption as an overall benefit to the calculation but not undermine the remaining calculation that is based on metered generation.

### Question 6: Is it more appropriate to focus on high peak demand or high price days in any new de-rating factor methodology?

Eight respondents addressed this question.

Three agreed that it is more appropriate to focus on high peak demand for the new methodology, stating that as system prices are dependent on numerous other factors (such as unavailability of other generating units).

Five expressed that neither are particularly appropriate. The respondents expressed that they do not believe it is appropriate to be guided by prices alone. It has been suggested that a dual-methodology should be used to select the peak periods that balances high peaks with high prices.

### National Grid ESO response

We continue to believe that focussing analysis on high demand days is an appropriate metric. Peak demand days being currently in use in the transmission-based methodology gives this method credibility and is part of our intention to mirror that methodology where possible.

While using a dual method of combining highest price and demand days has merit, there are many factors that feed into higher prices which creates additional complexity.

### Question 7: Is this alternative method more effective than the existing method, which assumes these embedded generation technologies can be represented by one of the transmission generation technologies? If not, why?

Eight respondents addressed this question with a variety of responses and comments raised.

Three respondents stated that the alternative method is a step in the right direction and should be introduced as an interim solution (with a separate category for diesel reciprocating engines) as the data being used is more relevant than a reliance on data from transmission connected CMUs. Going forward with more accurate data available, it is believed that the de-rating factors for gas reciprocating engines and waste technologies should be updated to reflect their respective contributions to security of supply. These respondents did raise concerns regarding the usage of the new data sources and commented that the new methodology needs improvement.

For those disagreeing they stated that they are not confident that the current methodology is more effective than the existing Technology Class Weighted Average Availability (TCWAA) method. It was proposed that for now the current methodology of applying the deratings from BMUs to similar technologies is used (that are not BMUs) and when enough assets in a technology class are providing MELs then that technology class can be derated on that basis. Respondents also expressed that distribution connected generation should not be de-rated beyond the expected loss through using distribution lines, given the similarity in technology connected to the transmission level, other units can be expected to have similar availability. It was also suggested that as there are numerous embedded reciprocating gas assets that are BMU and submit MELs. By using this data as a basis for availability during the 17.00-19.00 period on the top 10 demand days between Nov-Feb would be a more reliable benchmark of availability.

### National Grid ESO response

We recognise the response that the methodology proposed may not be more effective than the current TCWAA method due to a lack of availability data being used in the calculation. We have attempted to draw out assumed availability from metered generation output and recognise that the method proposed is not sufficiently robust at this time. We welcome the view that the consultation represents a step in the right direction and the intention behind it was to address a concern that existing methodologies may also have limitations.

**Question 8: Are there any other considerations that could limit the effectiveness of this alternative methodology? If so, what could they be and what impact would they have?**

Four respondents provided comments to this question.

The respondents believe the methodology proposed is not fit for purpose as it does not pick up availability. There are concerns it will penalise the most expensive units more than the least expensive, and that by applying a lower than truly representative de-rating factor for embedded plants distorts competition (by making embedded plant able to gain lower capacity revenue per installed MW).

A further concern is there has been no assessment of whether any given type of plant would operate on the days chosen, and it is considered too simplistic that running by flexible assets would align with either wholesale price or demand. It is also perceived that the methodology does not take account of whether or not CMUs that share a connection could simultaneously generate in a system stress event.

## National Grid ESO response

We recognise the fact that currently, Capacity Market units have an obligation only to generate during a system stress event, which we have not seen on Great Britain's electricity system. Due to this, the de-rating process is based on availabilities at times where units do not contractually have to generate. This statement is true of the current transmission-based methodology as well as the proposed alternative methodology.

## Conclusions and Next Steps

National Grid ESO ran a consultation on a proposed alternative methodology for calculating de-rating factors for specific embedded generation technology classes.

We were pleased to receive the responses and appreciate the time and effort that were put into thorough and considered answers. Of the responses we received through this consultation, there was an underlying theme on the limitations of using the proposed alternative method. The primary concerns of the alternative method being that using metered generation output cannot give a reliable and robust estimate of maximum export limit and therefore its inclusion in a calculation of de-rating factors should not be implemented.

We have attempted to make the proposed calculation more relevant to availability by narrowing the analysis time period to points where we would reasonably expect a unit to be generating if it is available. We recognise that the proposal may still be too simplistic and not capture the full range of scenarios where units may choose not to generate, even though they could.

Given the concerns raised of the proposed alternative method and the potential disproportionate impact it would have on some capacity market providers, we have chosen not to implement any changes to the de-rating methodology at this time. While we acknowledge that some capacity providers would have benefitted from the alternative methodology, we believe that partial implementation of the alternative method would create additional complexity. We would therefore prefer to explore alternative ways to develop more robust de-rating factor methodologies that can apply across the different embedded generation technologies in a harmonised way. This is similar to the current approach where the existing de-rating factor methodology applies consistently across all generating technology classes.

Despite not implementing any changes at this time, we still recognise the fact that using transmission based de-rating factors for embedded technologies still have limitations, a sentiment that was echoed by respondents of the consultation. Given this and the increasing levels of embedded generation entering the Capacity Market, we believe that we have a firm mandate to explore better data options that provide a measure of availability.

We believe that we do not have a robust enough dataset to be able to derive de-rating factors for certain embedded generating technologies. There are embedded units in the capacity market that are part of the balancing mechanism and submit availability data, but participation is not a requirement. We will therefore be exploring how National Grid ESO can obtain better data to improve how we measure availability of these embedded units and intend to provide an update on this during Q1 2022/23.