Single Electricity Market

(SEM)

Capacity Remuneration Mechanism

Annual Run Hours Limitation Deratings Factor

Consultation Paper

SEM-21-054

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1. INTRODUCTION AND BACKGROUND

A number of pieces of EU legislation, including the Industrial Emissions Directive (2010/75/EU), the Medium Combustion Plant Directive (2015/2193/EU) and the package of Directives and Regulations collectively known as the Clean Energy Package, have the impact of potentially limiting the annual run-hours of a significant proportion of both existing and new fossil-fueled capacity.

In SEM-18-009, the SEM Committee consulted upon the derating approach for emissions-limited plant, noting the emerging risk of some plant being limited in operating hours due to emissions. In the following decision document, SEM-18-030, the SEM Committee decided not to impose mandatory additional derating for emissions limited plant, but decided to allow market participants with emissions-limited plant, to voluntarily reduce the level of capacity they offer into the capacity auctionto reflect the limitation on its run hours (applying a parameter in the Capacity Market design named DECTOL[1]). The SEM Committee made the necessary changes to the Capacity Market Code (CMC) to allow this, and subsequent Initial Auction Information Packs have stated that "*where satisfactory evidence is provided to the System Operators, the DECTOL shall be 100% for a Candidate Unit that, due to relevant emissions legislation, has its running hours restricted to an extent that would reasonably be considered to prevent reliable delivery of their De-rated Capacity at times of scarcity*". This provision means that any Candidate Unit entering an auction,whether Existing Capacity or New Capacity, already has a high degree of freedom to risk-adjust down the volume it chooses to offer into an auction, to reflect its own assessment of the impact of the running hours limit on its ability to provide capacity. It has the freedom to offer any volume between the "standard" value for a unit of its size and technology, and zero. However, this provision has rarely, if ever, been used.

New factors are now combining to lead the SEM Committee to consider whether a purely voluntary DECTOL-based approach is still appropriate for emissions-limited plant. Based on evidence from the TSOs, the RAs understand that there is likely to be a large proportion of New Capacity considering applying for ten-year Reliability Option contracts

[1] DECTOL refers to the percentage Decrease Tolerance applicable to the Tolerance Class of the Generator Unit or Interconnector as specified in the relevant Initial Auction Information Pack.

in the T-3 2024/25 auction, which is expecting to choose technologies bound by the emissions restrictions resulting from updates to the relevant Best Available Techniques refence requirements under Implementing Decision (EU) 2017/1442. Given the new BAT reference technologies, some investors expect NOx emissions will constrain their New Capacity to a five-year average of 1,500 run-hours per annum (p.a.) (i.e. no more than 17%[2] of the year on average).

The SEM Committee is concerned by the new evidence that as older fossil-fueled plant is retired, the plant that replaces it could be annual run-hours constrained. The SEM Committee is concerned that if derating factors do not immediately take account of Annual Run Hour Limitations (AHRLs), a security of supply risk could result not just in the hours when "net" demand (demand less intermittent renewables output) is highest, but in other periods when "net" demand is lower. This risk is exacerbated by the growth in short-run time DSU and energy storage units which are subject to short (typically 2 or less) consecutive run-hour limits during a scarcity event.

The SEM Committee understands that the TSOs would like to apply extra ARHL derating factor(s) in future auctions for 2024/25 and subsequent years[3] for all New Capacity and Existing Capacity with an ARHL of 1,500 hours or less. This ARHL derating factor would be a multiplier to the relevant "standard" derating factor for a given unit.

The SEM Committee acknowledges that this proposal is being consulted on at short notice and in tight timescales, but is of the view that the new information about emerging risks merits this intervention. In particular, the SEM Committee notes that:

- there is likely to be a need to contract several hundred MW of New Capacity in the T-3 2024/25 auction; and,
- if the SEM Committee delays implementing some form of ARHL derating factor there is:
    - A risk of locking in a large volume of capacity for 10 years in the T-3 2024/25 auction which can only run for 1,500 hours per year

[2] 1,500 hours divided by 8,760 hours p.a.
[3] so including both the T-3 2024/25 and the T-4 2025/26, but not including the 2022/23 T-1 for which the Qualification Application Date has already passed

- A risk of missing an opportunity to incentivise investors in hundreds of MW in the 2024/25 T-3 to switch their investment away from plant which fails to meet NOx limits to plant that can. There is a risk of locking consumers into paying for hundreds of MW of New Capacity which must run on restricted hours, for a 10-year period.

The SEM Committee consider that the objective of the ARHL derating factor should be to incentivise the investor to change their choice of technology, and invest in a technology which is not subject to run hours limitations. However, we recognise that there are a number of risks/costs associated with making an intervention for the T-3 2024/25 auction at this stage in the process, including;

- there is limited time for applicants to change their choice of technology. To some extent, we would propose to mitigate this risk by changing the Auction Timetable, without delaying the Auction Run Start Date- see further discussion in Section 4; and,
- incentivising investment in non-ARHL capacity could add to costs which investors need to bid into the auction, and may justify an increase in the Auction Price Cap to avoid choking off investment. Reports suggest that the capital cost of plant which would not be subject to ARHLs would add around 10-20% to the cost of their currently planned investment.

Consultation Questions

The SEM Committee seeks consultation feedback on the following questions:

1. Is the SEM Committee's understanding correct that a significant proportion of New Capacity likely to apply to qualify for the 2024/25 T-3 auction would be subject to an ARHL of an average of 1,500 hours per year? If yes, how much extra investment (in nameplate €/kW) would be required to alleviate ARHLs?
2. Do stakeholders consider that it is appropriate to introduce an Annual Run Hours Limit derating factor for the 2024/25 T-3 auction, or alternatively defer implementation until the 2025/26 T-4 auction or a later auction? Please explain the differential impact of deferring implementation until the 2025/26 T-4 or later auctions.

3. Would investors be able to make appropriate changes to their investment plans in time for the 2024/25 T-3 to ensure that they are able to qualify plant that will not be subject to ARHLs, if the Qualification Application Date is delayed by about 6 weeks to around 10 September 2021?
4. Would investors be able to make appropriate changes to their investment plans in time for the 2025/26 T-4 (expected Qualification Application Date, 1 October 2021) to ensure that they are able to qualify plant that will not be subject to ARHLs?

2. APPROACH TO SETTING THE ARHL DERATING FACTOR

Introduction

Given the time available it is likely to be necessary to use an 'interim' approach and to set a simple ARHL for the T-3 2024/25, and probably the T-4 2025/26 as well.

We outline a potential 'interim' approach below. We then outline some of the issues that could be explored to develop a longer-term approach and illustrate some of the reasons why it will not be possible in short timescales.

Interim approach

A key objective of the interim approach would be to provide an incentive for investors in the 2024/25 T-3 auction to switch their investment plans to capacity which will meet relevant emissions requirements, to avoid being subject to an ARHL. However, the SEM Committee is also mindful that it is important that sufficient investment is forthcoming in the 2024/25 T-3 to ensure the security of supply standard is met, and that that is likely to require several hundred MW of investment. Therefore, the SEM Committee does not wish to preclude investors who are not able to change their investment plans in time for the 2024/25 T-3 auction.

Initial high-level consideration thus far would suggest that that an additional ARHL derating factor in the range of 75-90% may provide investors with sufficient incentive to switch plans, whilst not precluding investors proceeding with current plans.

Taking the example that the 'base' derating factor for a 200MW Gas Turbine is 88.3%[4], and the ARHL derating factor was set at 80%, then:

- A 200MW Gas Turbine not subject to an ARHL would have a derating factor of 88.3%
- A 200MW Gas Turbine subject to an ARHL of an average of 1,500 hours p.a. or less would have a derating factor of 88.3% x 80% = 70.64%

[4] i.e. the same value as in the 2024/25 T-4 auction

By comparison, 1,500 hours p.a. equates to about 4.1 hours per day. An equivalent nameplate MW 'other storage' unit with a consecutive run-hours limit of 4.1 hours had a derating factor of 53.6% in the 2024/25 T-4 auction, but arguably a unit which can run throughout an extended peak from morning to evening in winter by focusing its hours on relevant Winter days has more capacity value than a unit that can only run for 4.1 hours in a scarcity event without needing to re-charge. The 1,500 hours p.a. limit is an annual average value over 5 years, and the flexibility to run more than 1,500 hours in some years (e.g. years with low wind and/or significant outages) and less in other years is likely to have significant value. Additionally, the ability to run more than 1,500 hours in 2024/25 and less hours in the late 2020s, when there is likely to be more interconnection capacity and more intermittent renewables capacity may also have value.

This approach would apply to both New Capacity and Existing Capacity. However, in practice, all Existing Capacity (and some New Capacity) which is likely to qualify for the 2024/25 T-3 auction was already awarded a Reliability Option in the T-4 auction, without the application of the ARHL derating factor.

However, this approach could have a substantial impact on the volume of derated MW of Existing Capacity that qualifies for the 2025/26 T-4 auction.

The approach would apply equally to all technologies, other than DSU and Other Storage with consecutive run hours of less than 6 hours, which are already subject to greater derating to reflect consecutive run-hours constraints. Thus, for instance, a DSU which is backed by gas-fired generation (and hence potentially able to run for more than 6 consecutive hours) would be subject to the same ARHL as an equivalent unit participating as a generator.

Longer-term approach

The SEM Committee recognises that this simplified approach may not perfectly reflect a Capacity Market Unit's contribution to meeting demand during a scarcity event. For instance, it may be argued that an approach which has a stronger theoretical foundation would be to:

- base ARHL derating factors for capacity limited to 1,500 hours p.a. on the sum of the Loss of Load Probabilities (LOLPs) in the top 1,500 hours of LOLP, as a percentage of LOLP for all 8,760 hours; or,
- Set ARHL derating factors as a continuous function of the magnitude of hours limitation (taking account of all relevant limits). Thus, for instance, a unit limited to 400 hours p.a. by other emissions legislation would have a different ARHL derating factor to a unit limited to 1500 hours p.a..

As explained in SEM-21-025, the SEM Committee noted a number of issues with existing deratings methodologies and approaches, and decided to instigate a review into the Derating Factor (DRF) methodology and assumptions.

The 2025/26 T-4 parameters consultation paper will explain more detail about these issues, particularly as they relate to the DRFs of DSUs and energy storage CMUs which can only deliver capacity for less than 6 consecutive hours. The 2025/26 T-4 parameters paper will explain how the DRFs are quite sensitive to the assumptions about how much run hours limited capacity (both annual run-hours limited and consecutive run-hours limited) is on the system. Equally the ability of any given 1,500 p.a. ARHL unit to meet its capacity obligations depends significantly upon whether it is the only ARHL unit on the system, or one of many.

The SEM Committee intends to include the review the treatment of ARHLs, as well as treatment of units such as DSUs and energy storage (<6 hours) as a part of the wider review announced in SEM-21-025.

However, there is a range of considerations about the detail of the methodology, assumptions and tools that would underpin such an approach, including the ability of the TSOs' existing convolution model to accurately model the impact of ARHL and consecutive run-hours limited plant. In practice, it will not be necessarily possible to solve these issues and make appropriate adaptations to the TSOs' models in time for the T-3 2024/25 auction, and probably not in time for the issuing of the 2025/26 T-4 IAIP (IAIP expected 1 September 2021).

Consultation Questions

The SEM Committee seeks consultation feedback on the following questions:

5. What are stakeholders' views on the proposed interim approach?
6. Do you agree with the SEM Committee that an additional ARHL in the range of 75-90% may provide investors with sufficient incentive to switch plans, whilst not precluding investors proceeding with current plans, and what value do you consider appropriate?
7. Do you have any other suggestions for an alternative approach that could be implemented in time for the 2024/25 T-3, or possibly the 2025/26 T-4?

3. QUALIFICATION PROCESS AND CMC AMENDMENTS

As per the ongoing 2022/23 T-1 auction process, Qualification applicants will be required to submit an estimate of any annual run-hours limits on their CMU in the 2024/25 T-3 Qualification Application. This estimate should be the minimum average annual run hours capability that a CMU commits to achieving.

It is the SEM Committee's intention to propose a range of changes to the Capacity Market Code (CMC) to tie the Substantial Completion and Minimum Completion tests for New Capacity to demonstrating that the ARHL estimate submitted in the Qualification application has been met.

The SEM Committee can address this via an urgent modification that would be implemented in the Capacity Market Code ahead of the Qualification results being finalised, but applicants would be forewarned of this intention to make the change prior to the Qualification Application Date.

Based on an initial assessment, the primary changes needed would be as follows:

- Add a new sub-section C.3.8 to establish the concept of an Annual Run Hour Limit.
- E.7.8.2 (Alternative Qualification Process) would need to be modified to select the DRF applicable given the ARHL.
- E.8.2 (Gross De-Rating Factor) would need to be modified so that the definitions of DRFE and DRFT (the De-Rating Factors applicable to the Technology Class for Existing and Total Initial Capacity and Initial Maximum On Time in the determination of Gross De-Rated Capacities) refer to the ARHL.
- J.2.1.2 (Substantial Completion) will need to have a test that the unit can achieve its ARHL.
- J.6.1.1 (Minimum Completion) will need to have a test that the unit can achieve its ARHL.
- Appendix D will need to collect information on ARHL.
- Appendix E 3(b)(iii) will need to be modified to take account of the ARHL.

The SEM Committee may also consider whether it is necessary or appropriate to put in any additional compliance measures

- To validate whether Existing Capacity (which will not be subject to Substantial Completion or Minimum Completion tests) is compliant with the ARHL stated in its Qualification application. In practice, this may not be material for the 2024/25 T-3 auction, since most Existing Capacity has already been awarded ROs in the T-4 2024/25 auction.
- Restrict gaming, e.g. by ensuring that the stated ARHL capability is met at the time of the Substantial Completion and Minimum Completion test, as well as being maintained over the duration of the RO.

Consultation Question

8. Do stakeholders have any comments on the proposed approach to implementing an ARHL framework in the CMC as set out in this Section?

4. POTENTIAL REVISED AUCTION TIMETABLE

The SEM Committee is considering altering the T-3 2024/25 Auction Timetable to accommodate this consultation and allow time for investors to revise their investment plans accordingly. Selected key dates within the current Auction Timetable and indicative dates for the revised Auction Timetable are shown in the table below.

Event	**Existing Published Auction Timetable**	**Indicative Revised Auction Timetable**
This consultation closes		19 July 2021 (noon)
Consultation decision		2 August 2021
IAIP published	1 July 2021	2 August 2021
Exception Application Date	26 July 2021	10 September 2021
Qualification Application Date	26 July 2021	10 September 2021
Qualification Results Publication Date	8 December 2021	23 December 2021
FAIP published	8 December 2021	23 December 2021
Capacity Auction Run Start Date	20 January 2022	20 January 2022

5. NEXT STEPS

Responses to the proposals within this consultation should be sent to Kevin Baron (Kevin.Baron@uregni.gov.uk) and Billy Walker (Billy.Walker@uregni.gov.uk) by 12pm on 19 July 2021. We intend to publish all responses unless they have been marked confidential.