Department for Energy Security & Net Zero

6 March 2024

Accompanying Note to the Budget Notice for the Sixth Contracts for Difference Allocation Round, 2024

1. The Government is today publishing the Budget Notice that the Secretary of State is required to give to the EMR Delivery Body, National Grid ESO, ahead of the sixth Contracts for Difference (CfD) Allocation Round opening in March 2024. The requirement for a Budget Notice is set out in Regulation 11 'Budget Notices' of the Contracts for Difference (Allocation) Regulations 2014 (as amended).

CfD Budget

2. Table 1 in the Budget Notice sets out the CfD budget (in monetary terms) for the technology groups ("pots") for the sixth Allocation Round which will open in March 2024.

3. The available budget for this Allocation Round has been allocated across three technology pots and is presented by Delivery Year. The figures given are the total available for applications bidding into any Delivery Year in this Allocation Round.

4. We are opening 2026/27 and 2027/28 as Delivery Years for Pot 1,[1] 2027/28 and 2028/29 as Delivery Years for Pot 2,[2] and 2027/28 and 2028/29 as Delivery Years for Pot 3.[3] A Delivery Year is the year when a project can start receiving payments under its CfD contract.

5. A technology subject to a Minimum (see paragraph 11) will have first access to the specified part of the budget, but if that is not used then it will be available to other technologies in that pot. CfD contracts will then be allocated to the cheapest eligible projects first, regardless of their start date, if they fit within the monetary budget profile provided. If the monetary budget is exceeded in any Delivery Year or subsequent Valuation Year, the relevant auction will close (subject to the consideration of flexible bids). At that point, a single clearing price would apply across the delivery window (subject to Administrative Strike Prices rules).

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[1] Energy from Waste with CHP, Hydro (>5MW and <50MW), Landfill Gas, Onshore Wind (>5MW), Remote Island Wind (>5MW), Sewage Gas and Solar Photovoltaic (PV) (>5MW).
[2] Advanced Conversion Technologies, Anaerobic Digestion (>5MW), Dedicated Biomass with CHP, Floating Offshore Wind, Geothermal, Tidal Stream, and Wave.
[3] Offshore Wind.

6. The detailed rules about how the Allocation Round works are set out in the final AR6 Allocation Framework, published alongside the Budget Notice.

7. The overall budget of £1,025 million (in 2011/12 prices) is the maximum total amount of support available to be allocated in the sixth Allocation Round across all three technology pots. Projects that are successful in the round will receive support for 15 years, subject to contract terms.

8. We will release budget as follows for the sixth Allocation Round:

    - Pot 1: £120m (in 2011/12 prices) for projects for which the relevant Delivery Year is 2026/27 or 2027/28. A capacity cap will not apply to this pot.
    - Pot 2: £105m (in 2011/12 prices) for projects for which the relevant Delivery Year is 2027/28 or 2028/29. A capacity cap will not apply to this pot.
    - Pot 3: £800m (in 2011/12 prices) for projects for which the relevant Delivery Year is 2027/28 or 2028/29. A capacity cap will not apply to this pot.

9. Pursuant to Regulation 12 of the Contracts for Difference (Allocation) Regulations 2014, the Secretary of State retains the option of increasing the budget following the commencement of the Allocation Round via a budget revision notice.

Maxima and Minima

10. In Pot 1, there will be separate Maxima on Solar PV, Onshore Wind and Remote Island Wind projects, each totalling £120m.

11. In Pot 2, there will be a Maximum on Geothermal of £8m. In Pot 2, there is one Minimum for Tidal Stream. The Minimum allows projects of Tidal Stream (totalling up to £10m in 2011/12 prices) first access to the total Pot 2 budget of £105m (in 2011/12 prices), protected from competition from other technologies. However, if the budget assigned to the Minimum is not used fully, any remaining budget will be available to all technologies (including those subject to the Minimum) in the general Pot 2 auction.

12. In Pot 3, there will be separate Maxima on both ‘Permitted Reduction’ (see below) and AR6 projects Offshore Wind Projects of £800m. The Maxima will allow for technology-specific clearing prices and help ensure competitive tension between technologies.

13. Permitted Reduction projects are defined as those that formed part of projects awarded a CfD in a previous Allocation Round and where these projects have since gone through the Permitted Reduction process in the contract terms. This process has allowed projects to withdraw a maximum of 25% of their original total project capacity from their CfD contract and now use that reduced capacity to bid into AR6 as a standalone project.

14. A detailed description of how the Minimum and Maxima will operate within the CfD

allocation process is set out in the AR6 Allocation Framework, published alongside the Budget Notice.

Administrative Strike Prices (ASPs)

15. Table 2 in the Budget Notice sets out ASPs applicable to the sixth Allocation Round.

16. The methodology used to determine these ASPs is set out in the 'Methodology used to set Administrative Strike Prices for CfD Allocation Round 6' note published alongside the Core Parameters and Draft Allocation Framework in November 2023[4].

17. In line with the single clearing price process explained above, an ASP applies to each technology within its relevant applicable Delivery and Valuation Years.

Further information on budget parameters

18. The text below provides additional information on the methodology and assumptions underpinning the Reference Price and Load Factor estimates published as part of the Contracts for Difference Allocation Round 6 (CfD AR6) Allocation Framework (Schedule 2, Appendices 2 and 3). Alongside the ASP methodology note (published in November 2023), this is intended to provide auction participants and other stakeholders with greater transparency around the method by which the Government has determined these parameters.

19. In summary, Load Factors and Reference Prices impact the overall magnitude of the Budget, but their value does not significantly impact the running of the auction or which projects may be successful. This is because Budgets are set based on a wide range of factors such as an assessment of the pipeline of projects that could participate in the auction, rather than being a pre-determined Monetary constraint.

Reference Prices

20. A Reference Price is an estimate of the average GB market price for electricity captured by the relevant technology. Under the CfD scheme, payments are made to generators based on the difference between their strike price and the market Reference Price.

21. Technology specific Reference Prices are estimates of average future wholesale electricity prices, used to calculate the estimated budgetary impact of each application during the Allocation Round, published in the Allocation Framework. Five different Reference Prices are applied across different technologies, reflecting differences in when each technology is expected to typically generate

[4] https://www.gov.uk/government/publications/contracts-for-difference-cfd-allocation-round-6-core-parameters
https://www.gov.uk/government/publications/contracts-for-difference-cfd-allocation-round-6-administrative-strike-prices-methodology-note

(accounting for variables like time of day and estimated output correlation with other generation). These are forecasts and do not influence the outturn Reference Prices applied by the Low Carbon Contracts Company (LCCC) to calculate CfD payments in-life under the CfD contract entered into by LCCC with each successful applicant. Under the CfD contract, the LCCC use the Baseload Market Reference Price, 'BMRP', and the Intermittent Market Reference Price, 'IMRP' to calculate payments.

Methodology

22. Reference Prices are modelled outputs from the Department's in-house power sector model – the Dynamic Dispatch Model (DDM). Wholesale electricity prices are driven by many factors including electricity demand profiles (from National Grid, DfT and DESNZ on heat electrification), as well as fuel price assumptions and carbon price assumptions.

23. The DDM is a peer-reviewed, comprehensive fully integrated power market model covering the GB power market over the medium to long term. The model enables analysis of electricity dispatch from GB power generators and investment decisions for generating capacity from 2010 through to 2050. It considers electricity demand and supply on a half hourly basis for sample days. Investment decisions are based on projected revenue and cashflows allowing for policy impacts and changes in the generation mix. The full lifecycle of power generation plant is modelled, from planning through to decommissioning, allowing for risk and uncertainty involved in investment decisions. The DDM enables analysis comparing the impact of different policy decisions on generation, capacity, costs, prices, security of supply and carbon emissions, and also outputs comprehensive and consistent Cost-Benefit Analysis results.[5]

24. Using the DDM, the Department produces two illustrative, Net Zero-consistent electricity demand and generation scenarios for UK and GB, that are consistent with our Nationally Determined Contribution (NDC) for 2030 and Carbon Budget 6 (CB6). More information on these scenarios can be found in Annex O of the 'Energy and emissions projections: 2021 to 2040' publication.[6] These scenarios are used across Government as counterfactuals in power sector analysis to assess the impact of policies against a scenario consistent with reaching emissions targets. Of these two Net Zero-consistent scenarios, DESNZ uses the scenario with higher assumed electrification[7] and lower wholesale electricity prices to reduce the risk that the levy costs of a round (ultimately borne by billpayers) are underestimated. This is in line with the approach taken for other parameters, including Load Factors (see below).

25. Reference Prices are used to estimate the expected revenue of different technologies. For baseload technologies this uses the modelled Season Ahead

[5] The Dynamic Dispatch Model: a fully integrated power market model - GOV.UK (www.gov.uk)
[6] Energy and emissions projections: 2021 to 2040 - GOV.UK (www.gov.uk)
[7] In the higher electrification scenario, there is more renewable electricity generation which suppresses the wholesale electricity price.

price (average wholesale price). For intermittent technologies, Day Ahead hourly prices are estimated based on intra-day half-hourly prices. Technology-specific estimates are calculated for the average price each technology could achieve in the market based on when they are expected to generate; the "capture price".

26. The Department recognises that Reference Prices, as published, represent one illustrative scenario consistent with the above criteria, which is a necessity of the operating mechanism of the Valuation Formula (Schedule 2 in the Allocation Framework). Other market commentator forecasts can vary from this scenario. Typically, this is due to variation in assumptions about the future capacity mix, demand, technology development, and whether or not they are consistent with the UK's legally binding decarbonisation commitments. The future generation mix also varies depending on what happens in other parts of the energy sector.

Load Factors

Methodology

27. Gross load factors for the wind technologies are calculated using an internal departmental model, which combines a theoretical turbine power curve (power output as a function of wind speed, modelled using turbine technology parameters including rotor swept area and hub height) with historic site-specific Virtual Met Mast (VMM) hourly wind speed data sourced from the UK Met Office for offshore wind and the MERRA-2 for onshore wind.

28. The VMM accounts for local complexity such as the effects of local topography and near-coast effect at a resolution of 4.4km x 4.4km and covers a period of over 34 years whereas the MERRA-2 data is a re-analysis dataset, using satellite data to provide predictions of wind speeds at a resolution of 0.5 degrees x 0.625 degrees over a 40-year period. The use of satellite re-analysis datasets to simulate generation output is a standard technique in the field. The approaches used to model power outputs from weather data inputs are standardly used in the industry for renewable generation modelling, and in several published and peer-reviewed sources[8].

29. The gross load factor considers both windy and non-windy years to account for normal variation in yearly generation, so will be different to actual gross load factor for a specific year. Gross load factors do not take into account outages due to curtailment, maintenance, or wake effects. To convert gross load factors to net load factors an availability assumption is applied. The availability assumption is constant so does not reflect that the availability might be lower in the first years of operation due to debugging and because some assets may not yet be on-stream.

Introduction of economic curtailment into Load Factor assumptions

[8] The methodology used is peer-reviewed and published here: https://www.mdpi.com/2673-4826/3/1/2 other relevant papers include:
https://www.sciencedirect.com/science/article/pii/S0360544216311811?via%3Dihub
https://www.sciencedirect.com/science/article/pii/S096014811400651X
https://www.mdpi.com/2079-9276/4/1/155

30. For AR6, estimated economic curtailment has been factored into the Load Factors set out in the Valuation Formula (Appendix 3 in the Allocation Framework). This change is intended to reflect future market conditions as renewables penetration increases, and has led to a moderate reduction in the estimated Load Factor for technologies for which a technology specific Reference Price is applied.

31. The Load Factors published in the Allocation Framework differ from those published in the ASP methodology note. The table below explains the key differences.

Table 1 – Difference in Valuation Formula and ASP Load Factor

	Valuation Formula Load Factor (Allocation Framework)	**Administrative Strike Price Load Factor**
Load Factor (generation)	A high value is taken from DESNZ internal Load Factor range, to reduce the likelihood that actual in-life generation exceeds forecast, which (all else equal) would lead to the allocated Budget being exceeded.	Central value is taken from DESNZ internal Load Factor range.
Economic Curtailment	Applied to the net Load Factor.	Applied to the generation profile as a separate factor to the Load Factor for ASPs only.

32. Table 1 shows that the difference between assumptions used in the Valuation Formula and ASPs is whether a central or high value is taken from the Load Factor range. For both the Valuation Formula and ASPs, economic curtailment is applied, the difference is presentational as to whether this is applied to the Load Factor or as a separate factor of the generation calculation.

Interaction between Reference Prices, Load Factors and other parameters

33. Reference Price and Load Factor assumptions have a variety of interactions with other parameters in the auction, which should be acknowledged.
    - **Reference Prices** - all else being equal, *a higher Reference Price series would reduce Budget impact* – this is because it would imply smaller 'top up' CfD payments between the wholesale electricity price and the strike price.
    - **Load Factors** – conversely, a *higher Load Factor for a given technology would increase Budget impact* – this is because it would imply more generation from that technology, and so greater CfD payments.

34. Monetary Budgets are set based on a wide range of factors, including an assessment of the pipeline of projects that could participate in the auction. Although acting as an important control on the amount of levy spend layered onto electricity bills, Budgets are not a pre-determined monetary constraint. Instead, Government sets them at a level that balances competing objectives, including but not limited to ensuring auctions are competitive, whilst maintaining deployment to enable sufficient progress towards our decarbonisation commitments.

35. This means that all things being equal, an increase in Reference Prices (or a decrease in Load Factors) would typically lead to the Department setting a lower headline Budget. This would be to maintain competition in the auction, in the context of a reduced Budget impact at any given strike price. As such, the impact of a change in Reference Prices or Load Factors on the functioning of the auction - including the successful capacity - can typically be considered minimal.

36. Similarly, the Administrative Strike Price (ASP) revenue calculation uses the same Reference Price series to estimate revenues (including post-CfD revenue) as that described above for use in the Valuation Formula, albeit over a longer time horizon. This means that all things being equal, an increase or decrease in Reference Prices would imply lower or higher ASPs, respectively.

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