Impact on wider TNUoS Charges – Annuity Payment

The UK has set an ambitious target of reaching 50 GW of offshore wind capacity by 2030[1], and up to 125GW by 2050[2]. To achieve both goals, it is necessary to add approximately 3.5 GW of offshore wind capacity each year. The number of DRCEs required to support this new offshore wind capacity has been estimated by considering SVCs specifically. SVCs were used as costs were readily available, but STATCOMs are also used as DRCE in offshore wind. Including different types of DRCE in the analysis would be expected to further improve the benefits of this proposed solution. This is because the same cost-saving calculations used for SVCs are applicable to the typically higher costs of other DRCE equipment.

Each SVC is assumed to cost £17.9m for 100 MVar[3], which is capable of supporting roughly 300 MW of offshore wind. This cost was arrived at by using the mid-range 100MVar SVC cost from ETYS 2015 – Appendix E and inflating to pre-Covid prices in 2020[4].

With a 3.5 GW annual increase in offshore wind capacity, 1155 MVAr of DRCE capacity will be needed each year to support this expansion. As a result, the total cost of these DRCE will be around £207m per year.

To calculate the increase in the wider TNUoS tariff to recover the cost of £207m worth of DRCEs, a net present value calculation has been carried out, using similar financial assumptions to those used in the CUSC for Gross Asset Value (GAV) calculations.

Two values were assumed for asset lifetime, 25 years, in-line with the TRS payment period and 45 years according to National Grid asset life[5]. The discount rate (rate of return) for OFTOs varies by location and year[6] but 7.5%[7] was considered as a conservative value. Additionally, a 1.5% annual operation and maintenance cost has been assumed through extensive workgroup discussions. In this case, the annuity formula can be used to determine the annual payment that would recover the cost of the assets over their lifetime:

$$Annuity\ Due\ Payment\ = \frac{(Asset\ Cost\ \times\ Discount\ Rate)}{(1 - (1\ +\ Discount\ Rate)^{-Lifetime}) \times (1 + \text{Discount Rate})}$$

$$Annuity\ Due\ Payment = \frac{(£207m\ \times\ 0.075)}{(1 - (1\ +\ 0.075)^{-25}) \times (1 + 0.075)} = £17.3\text{m}$$

$$Annuity\ Due\ Payment = \frac{(£207m\ \times\ 0.075)}{(1\ -\ (1\ +\ 0.075)^{-45}) \times (1 + 0.075)} = £15.0\text{m}$$

$$Operation\ and\ Maintenance\ Payment\ = £207m\ \times\ 0.015 = £3.1\text{m}$$

[1] Offshore Wind Net Zero Investment Roadmap, HM Government, 2023
[2] Climate Change Committee (2020), 'The Sixth Carbon Budget: The UK's path to Net Zero'
[3] ETYS 2015 - Appendix E, 2015
[4] Bank of England Inflation Calculator
OFGEM, RIIO-2 Framework Decision, 2018
[6] Offshore Electricity Transmission (OFTO) landing page and associated documents, Ofgem
[7] Grant Thornton, Renewable energy discount rate survey results, 2018

Under these assumptions, the wider TNUoS charges would increase by ~£18.9m–£21.2m per year, compared with the revenue base of £4.08bn for 2023/2024[8], to recover the cost of the £207 million worth of DRCEs over their 25-year lifetime. Of this £4.08bn, £3.16bn is due to be recovered by demand and 0.92bn is due to be recovered by generation. This amount will result in step increases for the next 7 years. It should be noted that this calculation does not consider additional factors such as inflation adjustments and regulatory considerations.

Table 1 - Estimated increase in revenue base due to DRCE cost reallocation

Year	Increase in revenue base			Increase (on £4.08bn forecasted for 2023/2024)
	Total	Generation	Demand	
2024	£18.9m–£21.2m	£4.3m–£4.8m	£14.6m–£16.4m	0.46%–0.52%
2025	£33.3m–£38.5m	£7.6m–£8.7m	£26.3m–£29.8m	0.83%–0.94%
2026	£49.0m–£55.7m	£11.0m–£12.6m	£38m–£43.2m	1.2%–1.36%
2027	£64.0m–£73.0m	£14.4m–£16.5m	£49.6m–£56.6m	1.57%–1.79%
2028	£79.1m–£90.3m	£17.8m–£20.3m	£61.3m–£70.0m	1.93%–2.21%
2029	£94.1m–£107.6m	£21.2m–£24.2m	£72.9m–£83.4m	2.3%–2.63%
2030	£109.1m–£124.9m	£24.6m–£28.1m	£84.6m–£96.8m	2.67%–3.06%
2035	£184.3m–£211.4m	£41.5m–£47.6m	£142.8m–£163.8m	4.51%–5.17%
2040	£259.5m–£297.8m	£58.5m–£67.1m	£201.1m–£230.8m	6.35%–7.29%
2045	£334.7m–£384.3m	£75.4m–£86.6m	£259.3m–£297.8m	8.19%–9.41%
2050	£409.9m–£470.8m	£92.3m–£106.0m	£317.6m–£364.7m	10.03%–11.52%

If the average generation and demand tariffs, as forecasted for 2023/2024, increased by the up to 3.06%/11.52% estimated by 2030/2050 to cover additional costs of DRCEs, these tariffs would increase 36p/£1.37 from £11.91/kW to £12.27/kW/£13.28 for generation, by 16p/61p from £5.28/kW to £5.44/kW/£5.89 for half-hourly metered (generally commercial), and non-half-hourly metered would increase by 1p/3p from £0.25/kW to £0.26/kW/£0.28/kW (generally domestic, or smaller premises that do not have a smart meter). In terms of cost to the average end consumer, an extra £1.23/£4.62 would be required annually, increasing the total payable due to TNUoS from £40.09 to £41.32/£44.71. It should be noted that these calculations do not include any interactions with the EU Generation Cap of €2.50/MWh since the EU Limiting Regulation states that "transmission charges paid by producers for physical assets required for connection to the system or the upgrade of the

[8] National Grid ESO, August Forecast of TNUoS Tariffs for 2023/2024, 2022

connection" should be excluded from the calculation of the range, and DRCEs are considered physical assets.[9]

Impact on Wind Farm Development Costs

The impact of the proposed solution to socialize costs through the TNUoS on wind farm development costs can be seen as twofold: a direct impact that mirrors the increase in TNUoS costs, and an indirect benefit stemming from reduced volatility and financial uncertainty.

Since offshore wind projects participate in the Contracts for Difference (CfD) scheme, which provides a long-term guarantee on price per MWh, these savings have the potential to reduce the CfD price by an amount equal to the annual saving. The costs paid by wind farms would decrease by the same amount paid through TNUoS. Assuming 3.5GW a year is added by 2030/2050 (24.5GW/94.5GW), this would cost up to £124.9m/£470.8m to fund via the current methodology. Across 8760 hours in a year and assuming a 45% load factor, this annual cost is equivalent to £1.29/MWh. This is compared to current offshore wind CfD prices in the latest allocation round of £45.37/MWh.[10]

Reducing the unpredictability of TRS payments by removing DRCE costs, provides a reduction in financial risk for developers, leading to lower financing costs and reducing potential mispricing in CfD auctions. This is supported by analysis by NERA Economic Consulting[11], which suggests that reduced volatility and improved financial planning could lead to decreased costs to consumers. The proposed solution would thus lead to a net decrease in consumer costs compared to the current methodology.

[9] NGESO, Calculation of the Generator TNUoS Adjustment Tariff for the purposes of the Limiting Regulation — Guidance for 2023/24, 2023

[10] CfD Register, Low Carbon Contracts

[11] Offshore Wind Transmission Charges, Scottish Hydro Electric Transmission, September 2021