

Offshore Wind Subsidies per MWh Generated Continue to Rise

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It is frequently claimed that the subsidy cost of offshore wind farms has fallen over the past few years. The UK government itself is on record as recently as [November 2020 claiming](#) that:

Government support to unleash the potential of offshore wind generation has seen the cost of it fall by two thirds in the last 5 years.

Echoes of these claims are commonplace. [The Times \(08.07.21\) reports](#) the think tank Policy Exchange as remarking that “the cost of offshore wind power had fallen steeply in recent years”.

As [work by Professor Gordon Hughes](#) has shown, the capital and operating costs of offshore wind do not support these observations, and, as this blog will demonstrate, it is a matter of fact that the cost of consumer subsidies to offshore wind per unit of electrical energy generated (MWh) has risen and continues to rise year on year.

As of the end of 2020, there were 41 operational offshore wind farms which receive a subsidy levied on consumer electricity bills via either the Renewables Obligation (RO) or the Contract for Difference (CfD) subsidy mechanisms. If one sums the subsidy paid to each offshore wind farm and divides this by the recorded generation it is possible to plot the average cost per MWh generated, as in Figure 1 below. It will be immediately apparent that far from falling, there has been a continued and substantial increase in average subsidy per MWh for offshore wind.

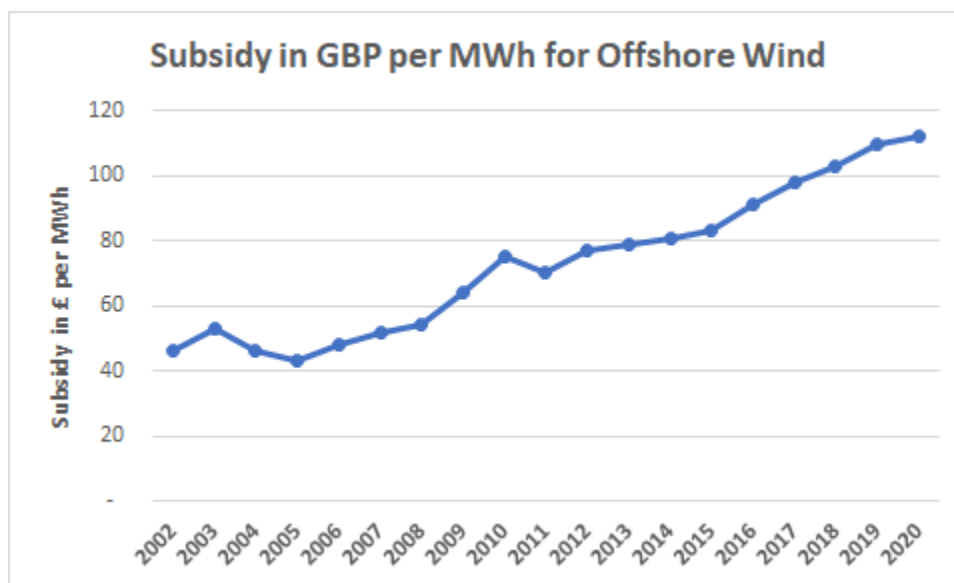


Figure 1. Subsidy in GB £ per MWh of Offshore Wind Generated. Source: Data: Ofgem; BMReports, Calculations by REF.

This trend will not be surprising to anyone who understands the (admittedly obscure) subsidy mechanisms for renewable generation in the UK, since it reflects the increasing levels of subsidy awarded by the UK Government to successive offshore wind farms as they have been built, and the fact that these subsidy rates are index linked and designed to persist for 15 or 20 years per site.

From 2002 until 2018 when the Renewables Obligation closed to new entrants, the number of Renewables Obligation Certificates (ROCs) issued to offshore wind per MWh changed several times for new entrants. The oldest offshore wind farms such as Scroby Sands, Kentish Flats, and Barrow, which were all built prior to 2006, received and continue to receive 1 ROC per MWh. Offshore wind farms built after 2006 receive (and continue to receive) either 2 ROCs per MWh, or 1.9 ROCs or 1.8 ROCs per MWh depending on when they were accredited by the regulator, Ofgem.

The value of a ROC increases year on year with the retail price index (RPI) and is further boosted if the total number of ROCs in any year is less than required by Government, such that in 2002 the value of a ROC was £46 whereas in 2020 it is approximately £55. Thus, the wind farms in the 1 ROC per MWh band, such as Scroby Sands, cost £55 in subsidy per MWh generated in 2020, whereas those in the 2 ROCs per MWh band, such as London Array, Thanet, and Gwynt y Mor, cost £110 in subsidy per MWh generated.

Generators will receive index linked subsidy in their allocated RO subsidy bands for 20 years from accreditation. This means, for example, that Humber Gateway which was accredited in 2015 will continue to be subsidised at 2 ROCs per MWh until 2035.

There are three special case offshore wind farms subsidised under the RO with extremely high levels of subsidy, namely the Aberdeen Offshore demonstration unit which receives 2.5 ROCs per MWh, and two floating offshore wind farms, Hywind and Kincardine, which receive 3.5 ROCs per MWh. The latter two wind farms are the most expensive for the subsidising consumer in that they cost £193 per MWh generated.

The subsidy cost per MWh for RO supported generators will not fall because the support mechanism is designed such that the subsidy increases. The total subsidy burden on the consumer will only fall as the 20 year support duration ends for individual sites and they cease to be subsidised.

There are six live offshore wind farm sites subsidised via Contracts for Difference as at the end of 2020. The CfD provides subsidy as a top up payment that the generator receives over and above a reference price (essentially the wholesale market price for electricity) to match a strike price, in essence a guaranteed price, that the wind farm owners were awarded in their contracts.

Strike prices increase annually in line with the consumer price index (CPI) and the contracts are for 15 years.

The following table gives a very simplified outline of the subsidy calculation. The strike prices are those for each wind farm as at the end of 2020. If one uses the average reference price in 2020 which was £35 per MWh, the subsidy paid by the consumer for the CfD supported offshore wind farms ranged from £104 per MWh to £139 per MWh. In fact, the hourly reference price in 2020 ranged from - £39 per MWh to £350 per MWh and the calculation of total subsidy which we have made for this blog uses the actual reference price for each hour of the year.

Wind Farm	Strike Price per MWh as at end 2020	Given Reference Price of £35 per MWh, Subsidy per MWh would be ...
Burbo Bank Extension Offshore	£174	£139
Dudgeon Offshore	£174	£139
Walney Extension Offshore	£174	£139
Hornsea Offshore	£162	£127
Beatrice Offshore	£162	£127
East Anglia 1 Offshore	£139	£104

Unlike RO-supported generators, the subsidy cost per MWh for CfD supported generators can fall if the wholesale price of electricity, and thus the reference price, increases. For example, for a reference price of £70 per MWh which would arise if the wholesale price of electricity doubles, the subsidy per MWh in the table above would range from £104 per MWh to £69 per MWh. However, this is of no comfort to the electricity consumer because the component of their bills that covers wholesale electricity costs will have risen to cancel out any potential savings on CfD subsidy savings.

It is important to recall that some of the highly subsidised offshore wind farms are large and consuming a substantial proportion of the total subsidy provided to the industry.

On the basis of official RO and CfD data we estimate the total subsidy in 2020 for offshore wind to be over £4.3 billion. Eight of the 41 offshore wind farms took more than 50% of that total, with Hornsea taking 11% or £480 million.

Generator	GWh	Est Subsidy £ million	Subsidy cost £/MWh	Share of Total Subsidy for Year
Hornsea Offshore	3782	479	127	11%
Walney Extension Offshore	2746	381	139	9%
Beatrice Offshore	2407	303	126	7%
London Array Offshore	2592	285	110	6%
Dudgeon Offshore	1748	242	139	6%
Race Bank	2389	236	99	5%
East Anglia 1 Offshore	2158	223	103	5%
Greater Gabbard	1934	212	110	5%

Statements from official sources, carelessly echoed in the press, may have given the impression that the unit subsidy cost in £/MWh, and thus the total cost to consumers of subsidy to offshore wind has been falling. As this basic survey of the facts shows, this is simply not the case.