Department for
Business, Energy
& Industrial Strategy

UPDATED SHORT-TERM TRADED CARBON VALUES

Used for UK public policy appraisal

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Background

BEIS's short-term traded carbon values for UK public policy appraisal are used for valuing the impact of government policies on emissions in the traded sector, i.e. those sectors covered by the EU Emissions Trading System (EU ETS). Short-term values quoted in this paper correspond to the period up to 2030 and long-term values correspond to the period post-2030.

In 2009, the Department of Energy and Climate Change (DECC) set out a methodology for producing traded sector carbon values to 2050 in the paper 'Carbon Valuation in UK Public Policy Appraisal: A Revised Approach'[1] (July 2009). The paper advocated moving from a social cost of carbon/damage cost approach for valuing carbon to a target consistent resource-cost approach.

In 2012, the hybrid methodology for producing short-term traded carbon values was adopted and involved using a market-based approach using futures prices to produce short-term traded carbon values in the central scenario, and fundamentals-based high and low scenarios for sensitivity purposes[2].

These values are being revised again as part of the annual process for updating BEIS's analytical projections and assumptions.

Methodology

The 2018 updated short-term traded carbon values are based on the same hybrid methodology as in previous years although the high series is constructed differently, by exception for this year, to reflect a wider range of uncertainty for policy development (see later). As for previous years, updated inputs and assumptions to 2020 include market prices of EU allowances (EUA) futures contracts and revised assumptions underpinning

[1] Available online at:https://www.gov.uk/government/publications/carbon-valuation-in-uk-policy-appraisal-a-revised-approach

[2] 2012 short-term traded carbon values update publication: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/245385/6667-update-short-term-traded-carbon-values-for-uk-publ.pdf

the fundamentals approach for the low sensitivity (Business As Usual (BAU) emissions projections and corresponding Marginal Abatement Cost Curves (MACCs)).

The short-term traded carbon values for UK public policy appraisal are produced for the period up to 2020 under all three scenarios (central, high and low), and are linearly extended beyond 2020 to reach BEIS's long-term carbon values for the period beyond 2030[3]. These long-term carbon values reflect the costs required to limit global temperature increases to 2 degrees centigrade above pre-industrial levels.

NOTE: On 23 June 2016, the EU referendum took place and the people of the United Kingdom voted to leave the European Union. Until the date of exit, the UK remains a full member of the European Union and all the rights and obligations of EU membership remain in force. While exit negotiations and future economic partnership discussions remain in progress, the update to the short term traded carbon values are produced on that basis and consequently, include no explicit assumptions about post EU exit impacts on emissions projections and demand for EUAs.

Consequently, care should be taken in considering whether these values are appropriate for use in analysis.

Central scenario

Short-term traded values in the central scenario are estimated based on the average daily settlement prices of end year EUA futures contracts of 2018 and 2019 vintages, averaged over a period of three months.

The volume of traded futures contracts decreases rapidly the further out the settlement date for contracts. In light of this limited liquidity in the futures market beyond a few years, prices are averaged for those futures with settlement dates up to 2019, where there are still a reasonable number of futures contracts, and then extrapolated to 2020 using a real discount rate of 3.8% in line with that used in the BCPM. These are then linearly extended beyond 2020 to reach BEIS's long-term carbon values for the period beyond 2030[4].

[3] GUIDANCE ON ESTIMATING CARBON VALUES BEYOND 2050: AN INTERIM APPROACH. Annex 2 (page12): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48108/1_20100120165619_e___carbonvaluesbeyond2050.pdf

[4] GUIDANCE ON ESTIMATING CARBON VALUES BEYOND 2050: AN INTERIM APPROACH. Annex 2 (page12): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48108/1_20100120165619_e___carbonvaluesbeyond2050.pdf

High scenario

Replicating the hybrid approach of previous years, this year of market data to 2020 in the central scenario and a fundamental methodology for the high scenario, led to the central and high scenarios being very close together for projected early years. This is due to recent, significantly increasing, EUA futures prices. Consequently, such a high scenario would not capture the uncertainty that one can infer from observing historical short-term volatility and uncertainty that the fundamental approach reflects in the longer term (many of factors of which will also be uncertain in the shorter term). Therefore, this year we have chosen to set the short-term traded carbon values in the high scenario (to 2020) as double the central series in order to better reflect recent market uncertainty and provide a meaningful range for sensitivity testing purposes.

From 2021 onwards, the high trajectory is extended to reach BEIS's long-term carbon values for the period to 2030[5].

Low scenario

Short-term traded carbon values under this scenario are fundamentals-based up to 2020 and have been derived using the BEIS Carbon Price Model (BCPM)[6] under a certain set of assumptions that produce low prices. For instance:

- Business As Usual (BAU) emissions projections and corresponding MACCs are produced using assumptions about (a) low economic growth and (b) high prices of coal relative to gas, which lead to lower demand for coal, lower emissions and consequently, a lower demand for allowances.

- Carbon prices are entirely driven by market fundamentals up to 2020 i.e. the cost of abatement needed to meet the cap (which is zero up to 2020). This reflects a situation of continued oversupply of allowances in the market driven by depressed economic activity in recent years.

[5] GUIDANCE ON ESTIMATING CARBON VALUES BEYOND 2050: AN INTERIM APPROACH. Annex 2 (page12): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48108/1_20100120165619_e_carbonvaluesbeyond2050.pdf

[6] See BEIS short-term traded carbon values for modelling purposes for further information: https://www.gov.uk/government/publications/updated-short-term-traded-carbon-values-used-for-modelling-purposes-2018

– The length of perfect foresight for the low scenario is six years and the discount rate is 3.8 per cent (which are used for the low and central scenarios for traded carbon values for modelling purposes).

From 2021 onwards, the low trajectory is extended to reach BEIS's long-term carbon values for the period to 2030 with a -50% sensitivity in line with government guidance on long term carbon valuation[7].

2018 updated short-term traded carbon values

BEIS's 2018 updated short-term traded values are shown below in Table 1 and represented graphically in Figure 1 later in this document. Further detail on the underlying assumptions and an explanation of the reasons for the differences with the 2017 values is provided in the subsequent section.

Table 1: BEIS updated short-term traded sector carbon values for policy appraisal, £/tCO2e (real 2018)

Year	Low	Central	High
2018	2.33	12.76	25.51
2019	0.00	13.15	26.30
2020	0.00	13.84	27.69
2021	4.04	20.54	37.04
2022	8.08	27.24	46.40
2023	12.12	33.94	55.75
2024	16.17	40.64	65.11
2025	20.21	47.33	74.46
2026	24.25	54.03	83.82
2027	28.29	60.73	93.17
2028	32.33	67.43	102.53
2029	36.37	74.13	111.88
2030	40.41	80.83	121.24

Caveats and limitations

Please note these values are based on a specific set of assumptions with respect to the policy mix post-2020, cost of fuels, level of emissions etc. Consequently, these values

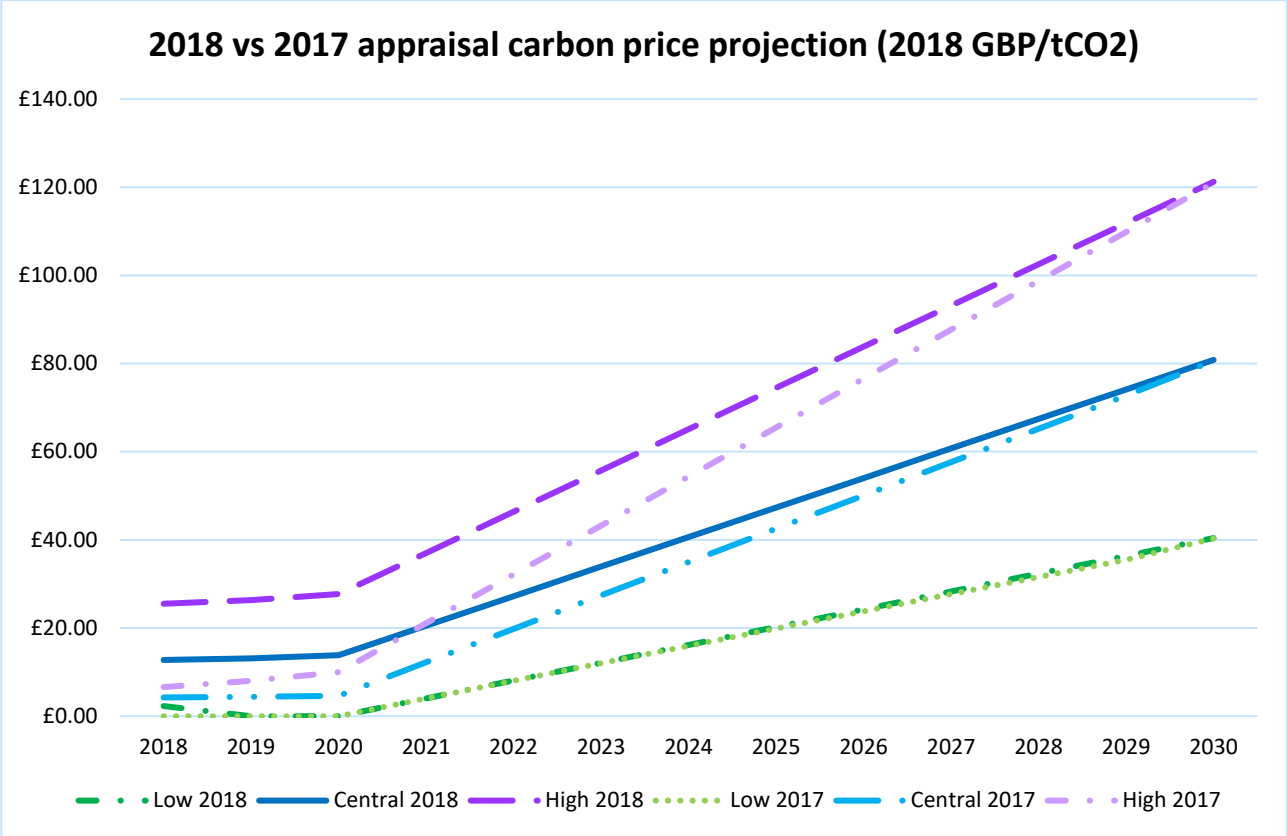
[7] GUIDANCE ON ESTIMATING CARBON VALUES BEYOND 2050: AN INTERIM APPROACH. Annex 2 (page12): https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48108/1_20100120165619_e___carbonvaluesbeyond2050.pdf

should not be considered as “forecasts” of future prices and BEIS accepts no responsibility for any outcomes arising from the use of these figures.

Comparison with 2017 short-term traded carbon values

The figure below provides a comparison of the updated 2018 values with those published in 2017. The reasons for the differences between each scenario are explained in the following paragraphs.

Figure 1: BEIS’s updated short term traded carbon values for appraisal, £/tCO2e in real 2018 terms



Central scenario

Appraisal values in the central trajectory are produced using the same methodological approach as in 2017 which uses the modelling series until 2020. The 2018 updated short-term traded carbon values for modelling purposes in the central scenario are higher compared to last year’s values, driven by:

1. Higher futures prices - In the 2017 update, average futures price for 2018 delivery was £4.19/t (£4.25/t when adjusted to 2018 values). In this year's update, the average futures price for end 2018 delivery has risen to £12.76/t.

2. Upwards revision in historical emissions data - The 2017 update incorporated historical emissions data up to 2016, whereas the 2018 update includes historical data up to 2017. This has shown that actual emissions were above what was previously projected for 2017 resulting in an increased demand for allowances.

High scenario

Current modelling of high carbon values are higher than those projected in 2017 for the 2018-2020 period, and, consequently, beyond, because of the rise in average EUA futures prices used in the central and the approach adopted for the high scenario as described in the previous section.

Low scenario

Updated carbon values in the low scenario up to 2020 use entirely fundamentals-based modelling (BCPM) and are almost the same as those from last year. This scenario represents a pessimistic view of the future where there is a continued chronic oversupply of allowances in the carbon market relative to demand that drives low prices.

The key assumptions underpinning the low series are:

i. Low BAU scenario (based on low economic growth and a high price of coal relative to gas) and corresponding MACCs.

ii. Perfect foresight window of six years as in the 2017 publication (appropriate for the low series since this would produce lower prices than longer perfect foresight).

iii. Discount rate of 3.8% in real terms as in the 2017 publication. Note that a higher discount rate would not change the result.

iv. EU ETS cap that is consistent with a 43% EU GHG emissions reduction target and introduction of the MSR (Market Stability Reserve).

From 2020 onwards, the low carbon values for appraisal in this year's update remain essentially the same as in the 2017 publication, the only difference being that they are adjusted to real 2018 prices.

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