

## 4. Greenhouse Gases

### 4.1 Introduction

- 4.1.1 The Climate Change Act, as amended in 2019, commits the UK to Net Zero by 2050. The original act, passed in 2008, committed the UK to an 80% reduction of greenhouse gas (GHG, shorthand: 'carbon') emissions by 2050, compared to 1990 levels.<sup>18</sup> To drive progress towards this target, the Act introduced five-year Carbon Budgets, which define the emissions pathway to the 2050 target by limiting the total carbon emissions allowed in each five-year period.
- 4.1.2 The first five Carbon Budgets cover the periods 2008-2012, 2013-2017, 2018-2022, 2023-2027 and 2028-2032. They require carbon emissions reductions of 23%, 29%, 35%, 50% and 57% respectively below 1990 levels, in line with the recommendations of the Climate Change Committee. In April 2021, the sixth Carbon Budget was announced, amounting to an emissions reduction of 78% on 1990 levels over the years 2033-2037. It is expected that further Carbon Budgets will be announced in the future. Each sector must play its part in taking action to achieve these budgets.
- 4.1.3 It is therefore important that the impacts of proposed transport schemes on greenhouse gas emissions over their whole lifecycle – whether they result in increases or decreases in emissions during these periods – are incorporated within appraisal in a consistent and transparent way.
- 4.1.4 The monetary value of the impacts of proposed transport schemes on carbon emissions over their whole lifecycle should also be calculated. When carrying out monetary valuation, it is important to distinguish between the emissions from those sectors that are included within the UK Emissions Trading System (UK ETS) – the 'traded sector' – and those that are not – the 'non-traded sector'. The traded sector covers emissions from power and heat generation, energy-intensive industry, some aviation and electricity production consumed in transport. The non-traded sector covers all other carbon emissions and therefore includes tailpipe emissions from the consumption of other types of transport fuel, including petrol, diesel and gas oil.
- 4.1.5 Inclusion in the traded sector caps relevant emissions and creates a market for them. The cost of any permits to cover traded emissions will be reflected in the purchase price of traded sector goods. Since the purchase price is used in transport appraisal, the cost of the relevant permits will be included in the cost benefit analysis.
- 4.1.6 Appraisal should consider all greenhouse gas emissions, including those resulting from the production of materials used in any infrastructure, for example cement, steel etc (otherwise known as capital carbon), as well as those

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<sup>18</sup> The base year is 1990 for carbon dioxide, nitrous oxide and methane, and 1995 for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

resulting from changes to the use of transport fuels. The majority of such capital carbon emissions are likely to be covered by the UK ETS.

- 4.1.7 Any change in carbon emissions due to a transport intervention should be valued using carbon appraisal values provided in [TAG Data Book](#) Table A3.4, irrespective of whether the emissions are “traded” or “non-traded”.<sup>19</sup>
- 4.1.8 To avoid double-counting, the valuation of “traded” carbon emissions should include appropriate adjustments to exclude any portion already accounted for within carbon pricing regimes such as the UK ETS. These adjustments should be informed by carbon price data from reliable sources and supported by reasonable assumptions. Analysts should exercise caution and judgement when using any single source of carbon price data and should document all assumptions used for adjustments.
- 4.1.9 Where capital emissions are not covered by the UK ETS, e.g. imported materials from countries with no carbon pricing or emissions from the transport of waste and materials to and from sites, they should be considered and valued within the appraisal where it is considered feasible to do so. Where it is not possible to obtain the necessary appropriate data or assumptions for valuing traded sector emissions outside the scope of the UK ETS, these emissions should be valued without an adjustment.
- 4.1.10 The global warming potential of carbon emissions is measured in terms of the equivalent amount of CO<sub>2</sub> that would give this warming. The standard unit of account is tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e), and this is how estimates of carbon emissions should be presented.
- 4.1.11 The guidance below assumes that greenhouse gas impacts are measured in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). Note that, before November 2011, TAG guidance assumed greenhouse gas impacts were measured in tonnes of carbon equivalents. Carbon equivalent emissions can be converted to carbon dioxide equivalent emissions by multiplying by the conversion factor of 44/12 based on the relative molecular mass of carbon dioxide relative to carbon. This means 1 tonne of carbon emissions is equivalent to approximately 3.67 tonnes of carbon dioxide emissions.
- 4.1.12 The rest of this chapter is structured as follows. Section 4.2 provides the four-step process for appraising the impact of schemes on GHGs. Section 4.3 highlights the appraisal of GHG impacts in TUBA and the TAG Greenhouse Gases Workbook, while Section 4.4 sets out how GHG impacts should be reported and presented.

## 4.2 Methodology

- 4.2.1 A four-step process is needed to carry out the appraisal of the impacts of a scheme on GHGs:

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<sup>19</sup> For further details, see DESNZ carbon valuation guidance:  
<https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal>.

- Scoping;
- Estimation of changes in energy consumption;
- Estimation of changes in emissions of carbon; and
- Monetary valuation of changes in carbon.

4.2.2 The energy consumption and emissions calculations should be done for the project opening year and at least one other forecast year. The choice of forecast years (other than the opening year) should be consistent with forecast years adopted for modelling and/or environmental assessment. Interpolation and extrapolation techniques should be used to extend estimates of the change in carbon dioxide equivalent (CO<sub>2</sub>e) emissions across the whole appraisal period. [TAG Unit A1.1 - Cost Benefit Analysis](#) describes the factors that should be considered when interpolating between modelled years and extrapolating beyond the last modelled year. It is important that the assumptions used to extrapolate and interpolate modelled estimates of the change in emissions across the whole appraisal period are consistent with those used for other economic benefits (e.g. changes in vehicle operating costs).

### Scoping

4.2.3 The **first** step, scoping, should be consistent with the environmental assessment. The carbon appraisal should be proportional to the scheme and its proposed impact. Analysis shall be sufficiently robust to support decision making. It is recommended that whole life carbon assessments are undertaken for schemes. The scope of the full appraisal should be agreed with the Department before it is undertaken.

4.2.4 For road-based schemes, standards on scoping the carbon environmental assessment is provided in Section 3 of LA 114 of the Design Manual for Roads and Bridges. For other modes, the guidance in DMRB may provide a useful starting point.

### Estimating the impact of the transport scheme on energy consumption

4.2.5 The **second** step of the process is to assess the impact of the proposed scheme on energy consumption. Carbon emissions are assumed to be proportionate to the number of litres of fuel burnt or the number of kilowatt-hours (kWh) of electricity used, with different rates for different fuels and vehicle types. This means that, for both the 'with scheme' and 'without scheme' cases in each year, the analyst first needs to estimate fuel and electricity consumption, distinguishing between petrol, diesel, road electricity, gas oil (for rail use), and rail electricity.

4.2.6 The amount of fuel consumed, and therefore the amount of carbon emissions per vehicle kilometre varies considerably by vehicle type. Therefore, for both road and rail schemes, predictions of emissions will be more accurate the more disaggregated is the data on traffic flow by vehicle type. For example, for rail, data disaggregated by individual train types will lead to more accurate estimates

of emissions. Similarly for roads, more disaggregated data on traffic flow by vehicle type (e.g. car, light goods vehicle, rigid HGV, articulated HGV and coaches/buses) will lead to more accurate estimates. Grossly aggregated data can lead to significant errors and expert opinion may be required in order to determine the validity of any conclusions drawn from numerical differences in calculated emissions.

4.2.7 **For road transport**, fuel and electricity consumption is estimated using the formula and parameters given in [TAG Data Book Tables A1.3.8 and A1.3.9](#). The amount of fuel consumed by different vehicle types - expressed in litres (or kilowatt-hours) per kilometre travelled - is approximated as a function of average speed in kilometres per hour (km/h).

4.2.8 DfT has developed recommended energy consumption rates (by stock type) for use in appraisal of **rail schemes**. These can be accessed by contacting the Department. Diesel consumption rates should be uplifted over time to account for the expected increase in use of biofuel, using the rates provided in [TAG Data Book Table A1.3.10](#). Should practitioners decide to use alternative assumptions, the supporting written documentation should report the rates adopted and make clear the business case impact of not using DfT's recommended values.

### **Estimating the impact of the transport scheme on greenhouse gas emissions**

4.2.9 The **third** step of the process is to assess the impact of the proposed scheme on carbon emissions. Where possible, this should include emissions over the whole project lifecycle.

4.2.10 It is important that the impacts of proposed transport schemes on greenhouse gas emissions over their whole lifecycle are incorporated within appraisal in a consistent and transparent way. To support the consideration of schemes' WLC impacts, it is recommended that, where feasible, proportionate whole life carbon assessments are conducted in accordance with the principles of the PAS 2080 framework, which are elaborated further in the RICS professional statement [Whole life carbon assessment for the built environment](#) (2017).

4.2.11 The whole life carbon (WLC) impacts of a scheme include **capital carbon** (emissions associated with scheme construction), **operational carbon** (emissions associated with scheme operation and maintenance), and **user carbon** (emissions associated with scheme users, such as changes in emissions due to mode shift).

4.2.12 Please note that the level of detail and data required in a WLC assessment should be commensurate to the development stage of a project. In addition, undertaking a WLC assessment should not by itself change the economic appraisal period chosen for a scheme, and there is no need to appraise residual GHG impacts at the end of the appraisal period for schemes where asset demolition and removal is expected to fall under the purview of a successor project. The Department should be contacted with any queries regarding WLC assessments.

- 4.2.13 The fuel/electricity consumption estimated from the second step should be converted into carbon dioxide equivalent (CO<sub>2</sub>e) emissions. This is calculated by multiplying by the quantity of carbon dioxide equivalent (CO<sub>2</sub>e) estimated to be released from the consumption of one unit of fuel/energy using the relevant marginal emissions factor given in [TAG Data Book Table A3.3, Carbon dioxide equivalent emissions per litre of fuel burnt/kWh used](#). This table provides marginal emissions factors for petrol, diesel and electricity for road use and gas oil and electricity for rail use. The emissions factors include nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) emitted as well as carbon dioxide (CO<sub>2</sub>).
- 4.2.14 Marginal emissions factors for petrol, diesel and gas oil reflect the blending of biofuels into transport fuel. The Renewable Transport Fuel Obligations order 2007 (RTFO) came into effect in April 2008 and requires fuel suppliers to ensure that by 2014, 4.74% of their total aggregate fuel sales for UK road transport is made up of renewable fuels (blended into road transport fuel and gas oil). Therefore, it is estimated that the introduction of biofuels will result in a reduction in the grams of CO<sub>2</sub>e released per litre of fuel burnt.
- 4.2.15 The emissions factors provided in [TAG Data Book Table A3.3](#) are on a consumption basis, not a lifecycle basis. In other words, they do not currently include emissions from the production or processing of biofuels. Biofuels are considered to produce zero emissions when combusted, as the carbon released in combustion is offset by the carbon absorbed as the biofuel feedstock was grown. Emissions relating to the production and processing of biofuels are usually attributed to the agricultural and industrial sectors and vary widely from fuel to fuel. For this reason, the emissions factors currently only cover the combustion stage of the biofuel lifecycle, where emissions are zero.
- 4.2.16 The energy content of biofuels is lower than for conventional fuels, so a greater volume of fuel will be needed to travel the same distance as the blend of biofuel increases. This effect is taken into account in the assumed vehicle fuel efficiency values given in [TAG Data Book Table A1.3.11](#).
- 4.2.17 The electricity emissions factors are based on the most recent release of BEIS guidance available at the time of the definitive release of this unit). For electricity used as road transport fuel, in electric cars, for example, the relevant emissions factor is the long run marginal emissions factor for domestic consumption. For electricity used in rail, the generation based marginal emissions factor uplifted by 1.5% is used. The 1.5% uplift is the estimate of the distribution and transmission losses in the supply of electricity to the rail network (AEA, 2007).
- 4.2.18 Having calculated the carbon dioxide equivalent (CO<sub>2</sub>e) emission levels for each year, the change between the 'with scheme' and 'without scheme' cases for each year can be calculated. Carbon dioxide equivalent emissions from the traded sector will need to be calculated separately from carbon dioxide equivalent emissions in the non-traded sector. For example, CO<sub>2</sub>e emissions for electric vehicles need to be reported separately from petrol and diesel vehicles, as electricity emissions are in the traded sector.

- 4.2.19 Where a scheme impacts upon emissions from more than one transport mode, the net change in carbon dioxide equivalent (CO<sub>2</sub>e) emissions for impacts on each mode should be estimated. That is, the difference between the sum of emissions from each mode in the 'with scheme' case and the sum of emissions from each mode in the 'without scheme' case should be estimated for each year.

### Monetary valuation of greenhouse gas impacts

- 4.2.20 The **fourth** step is to apply monetary values to the estimates of changes in carbon emissions. The Department for Energy Security & Net Zero (DESNZ) publish guidance on the [valuation of greenhouse gas emissions for policy appraisal](#). This sets out the methodology for carbon valuation in UK policy appraisal based on the estimated abatement costs per tonne of carbon dioxide equivalent to achieve the government's emissions targets.
- 4.2.21 Where impacts are in the **non-traded** sector (petrol, diesel and gas oil emissions), they are to be valued using the values given in [TAG Data Book Table A3.4, £ per Tonne of CO<sub>2</sub>e](#), which are based on those referred to in the DESNZ guidance. These values are estimated by the target-consistent marginal abatement costs consistent with the Government's commitments on carbon emissions. The values will be updated periodically to reflect updates published by DESNZ. Higher and lower estimated values are provided for sensitivity analysis.
- 4.2.22 The value per tonne of CO<sub>2</sub>e emissions, which varies for each year, should be applied to the difference in emissions in each year. This should then be discounted at standard HM Treasury rates (see [TAG Data Book Table A1.1.1](#)) and summated to give the NPV of the change in non-traded sector fuel consumption related CO<sub>2</sub>e emissions over the appraisal period. A positive number would suggest there has been an overall reduction in CO<sub>2</sub>e emissions and conversely a negative number would suggest that there has been an overall increase in CO<sub>2</sub>e emissions.
- 4.2.23 For transport appraisal purposes, estimates of monetised carbon impacts based on the appraisal values in TAG Data Book Table A3.4 should be assumed to reflect the "factor cost" unit of account, following the explanation of appraisal units of account in [TAG Unit A1.1: Cost-Benefit Analysis](#). Therefore, estimates of monetised carbon impacts should be updated by the indirect tax correction factor provided in TAG Data Book Table A1.3.1 to ensure comparability with other monetised impacts typically presented in the "market price" unit of account.
- 4.2.24 Where there are changes to the use of transport fuel that is in the **traded** sector, for example electricity, the changes in emissions should be valued using the carbon appraisal values provided in TAG Data Book Table A3.4 but with an appropriate adjustment for existing carbon pricing mechanisms – refer to 4.1.8 for further details.



4.2.25 To be consistent with the accounting of traded sector emissions across Government, the following approach should be used (again using electricity for illustration)<sup>20</sup>:

- estimate the electricity consumption in the 'with scheme' and 'without scheme' cases as discussed in step two above;
- use electricity prices which include the UK ETS allowance price (see [TAG Data Book Table A1.3.7](#));
- account for electricity costs in the 'with scheme' and 'without scheme' cases in line with standard guidance, which sets out where such transport fuel costs should feature in the appraisal. See [TAG Unit A1.2 – Scheme Costs](#).

4.2.26 The Department should be contacted with any queries regarding this approach.

## 4.3 Software

4.3.1 For road and multi-modal schemes using the TUBA program, the net present value of the change in carbon dioxide equivalent (CO<sub>2</sub>e) emissions from road-based fuel consumption that is in the non-traded sector will be presented as an automatic output of the program in the Department's standard base year prices and values for the whole appraisal period. Please note that **if TUBA is being used to estimate the change in carbon dioxide emissions it is essential that all 8,760 hours of the year are included and properly represented in the analysis**. Note also that TUBA estimates fuel consumption based on the average speed for an entire journey. In some circumstances, this may result in biases. For more details on TUBA, see the TUBA Manual (Mott MacDonald, 2006). The non-traded carbon dioxide values for the Department's standard base year and the annual growth rate are programmed as default into the TUBA software. The TUBA program also outputs the NPV based on the upper and lower estimates of the carbon dioxide values.

4.3.2 Alternatively, road-based fuel consumption related carbon dioxide equivalent emissions for the 'with scheme' and 'without scheme' cases can be estimated using the DMRB LA 105 air quality screening spreadsheet. Note, however, that the screening method requires adjustment to correct for biases. If these adjustments are not made, a comment should be provided in the 'Key Impacts' column of the Appraisal Summary Table (AST). **DMRB guidance on carbon is presented in units of carbon equivalent. These must be converted to units of carbon dioxide equivalent by multiplying by a factor of 44/12.**

4.3.3 Where TUBA is not used and for rail schemes, the [TAG Greenhouse Gases Workbook](#) which accompanies this unit can be used to carry out the monetisation, generating the same outputs as TUBA. **Users of the DMRB spreadsheet can also use the TAG Greenhouse Gases excel spreadsheet to calculate the valuation of the emissions, but it is essential that they**

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<sup>20</sup> Guidance on the appraisal of GHG emissions associated with aviation schemes and policies is provided in [TAG Unit A5.2: Aviation Appraisal](#).

**check which units are being used (whether carbon equivalent emissions or carbon dioxide equivalent emissions). If the units are carbon equivalent emissions, these must be converted to carbon dioxide equivalent units using the standard conversion factor (44/12).**

- 4.3.4 Carbon dioxide equivalent emissions in tonnes, split by traded and non-traded sectors, for the 'with scheme' and 'without scheme' cases for each year of the appraisal period should be entered into the [TAG Greenhouse Gases Workbook](#). The opening year of the scheme and the current year of appraisal must also be entered into the spreadsheet.
- 4.3.5 Internally the spreadsheet then calculates the change between the 'with scheme' and 'without scheme' cases for each year, split by traded and non-traded sectors. These results are then summed over the appraisal period to provide information for reporting purposes.
- 4.3.6 The spreadsheet then multiplies the change in non-traded and traded sector carbon dioxide equivalent (CO<sub>2</sub>e) emissions by the value per tonne of carbon dioxide equivalent emissions for the year in which it is emitted. The value of the change in emissions in each year is then discounted at standard HM Treasury rates (see [TAG Data Book Table A1.1.1](#)) to give a net present value in the Department's standard base year of carbon dioxide equivalent emissions for that particular year. This is then summated over the appraisal period, to give the NPV of the change in carbon dioxide equivalent emissions for the scheme in question.
- 4.3.7 In addition to the primary output of the central NPV value, and in order to inform sensitivity analysis, the upper and lower NPV estimates will also be output from the spreadsheet.

## 4.4 Reporting Requirements

- 4.4.1 Greenhouse gas impacts should be reported and presented appropriately to enable decision makers to understand the carbon impacts of transport schemes. The TAG Greenhouse Gases Workbook calculates and summarises monetised carbon impacts, and hence can provide inputs for the Appraisal Summary Table (AST) and the Carbon Summary Table (CST), which synthesise the scheme's key appraisal and carbon information respectively.

### The Greenhouse Gases Worksheet

- 4.4.2 The 'Greenhouse Gases Worksheet 1' that heads the [TAG Greenhouse Gases Workbook](#) summarises the analyses outlined above, and the information set out there should be provided for all appraisals, including those not using the [TAG Greenhouse Gases Workbook](#). Promoters who are using the TUBA program should extract suitable information from program outputs in completing the worksheet.
- 4.4.3 As well as the standard outputs described below, the worksheet enables more detailed information to be documented on assumptions made, sensitivity



analysis, and data sources. The worksheet should record the assessment method used, e.g. TUBA, DMRB or other, and whether rail emissions have been taken into account and, where they have, the basis of the calculations. Any uncertainties involved in the calculation of emissions should also be recorded. This worksheet will provide a basis for the required input into the Appraisal Summary Table (AST) and Carbon Summary Table (CST).

### The Appraisal Summary Table (AST)

- 4.4.4 The following describes the information that should be recorded and presented in the AST.
- 4.4.5 The entry in the "**Monetary**" column of the AST should give the net present value of the monetary value of the total change in the non-traded and traded sector carbon dioxide equivalent (CO<sub>2</sub>e) emissions between the 'with scheme' and 'without scheme' cases over the whole appraisal period. A positive value will reflect a net benefit, i.e. there would be a reduction in carbon dioxide equivalent (CO<sub>2</sub>e) emissions over the whole appraisal period in comparison to the 'without scheme' case.
- 4.4.6 The traded sector component of this net present value should include appropriate adjustments to exclude any portion already accounted for within carbon pricing regimes such as the UK ETS, as set out in section 4.1.8..
- 4.4.7 The entries in the '**Quantitative**' column of the AST should present the total impact on non-traded carbon dioxide equivalent (CO<sub>2</sub>e) emissions and (separately) the total impact on traded carbon dioxide equivalent (CO<sub>2</sub>e) emissions between the 'with scheme' and 'without scheme' cases for the whole appraisal period (which is the sum of the changes in each year) expressed in units of tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). In this instance, a positive number will suggest an increase in carbon dioxide equivalent (CO<sub>2</sub>e) emissions (relative to the without-scheme case), i.e. the scheme has an adverse impact on carbon. Alternatively a negative number will suggest that the scheme tends to reduce carbon dioxide equivalent (CO<sub>2</sub>e) emissions from the 'without scheme' case and hence there is a relative improvement in carbon gases.
- 4.4.8 The '**Summary of Key Impacts**' column of the AST should be used to indicate any special features of the appraisal, along with an indication of the key drivers which are responsible for any change in conditions. Any uncertainties involved in the calculation of emissions should also be identified in this column.
- 4.4.9 Note that the '**Qualitative**' column should not be used.

### The Carbon Summary Table (CST)

- 4.4.10 Scheme promoters should complete the CST, which further raises the prominence of carbon impacts by providing a standardised format synthesising the scheme's key carbon information.<sup>21</sup>

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<sup>21</sup> <https://www.gov.uk/government/publications/webtag-appraisal-tables>

- 4.4.11 It includes information about total carbon impacts (in tonnes and monetary terms) and disaggregated carbon impacts (by whole life carbon stage and by traded/non-traded sector) and additional relevant information such as the methodologies used to derive carbon estimates, sensitivity of carbon impacts to key assumptions, and mitigation strategies for reducing scheme emissions.
- 4.4.12 It also includes three quantitative carbon metrics that help articulate the trade-offs (or co-benefits) associated with the scheme's carbon impacts: the cost effectiveness indicator (CEI), the weighted average cost comparator (WACC), and the carbon efficiency metric (CEM). The [TAG Greenhouse Gases Workbook](#) can help compute these metrics.
- 4.4.13 Scheme promoters should refer to Appendix D: of this unit for more information on how to complete the CST, and compute and interpret the carbon metrics.

### **Other Reporting**

- 4.4.14 In addition, given the legally binding carbon budgets to which the Government has committed under the Climate Change Act 2008, it is important that appraisals are consistent with cross Whitehall guidance and therefore produce emission figures (expressed in millions of tonnes of carbon dioxide equivalent, MtCO<sub>2e</sub>) needed for carbon budget accounting and reporting requirements. Therefore the appraisal should also present:
- i) The impact on carbon dioxide equivalent emissions relative to the 'without scheme' case in the scheme opening year, reported as a breakdown between the traded and non-traded emissions
  - ii) The impact on carbon dioxide equivalent emissions relative to the 'without scheme' case in each of the five-year carbon budget periods (2008-2012, 2013-2017, 2018-2022, 2023-2027, 2028-2032 and any additional periods announced in the future), reported as a breakdown between the traded and non-traded emissions.
- 4.4.15 This information may be obtained from the [TAG Greenhouse Gases Workbook](#).
- 4.4.16 It should be noted that because most transport energy sources – except electricity - generate carbon dioxide emissions in the non-traded sector, the carbon dioxide equivalent emissions impacts would therefore affect the UK's net carbon account, and hence the need for it to be reported. Where a scheme leads to a change in for example electricity use, then because this is in the traded sector it would not have an impact on the UK net carbon account. Such impacts should however also be reported because it illustrates the implications for the purchase of UK ETS allowances to cover those emissions. However, as discussed above, traded sector emissions should not be valued and included in the Net Present Value.
- 4.4.17 For those schemes that reduce emissions, a cost-effectiveness indicator may be required. This is the case if the reduction exceeds a given threshold. There are two separate thresholds to be considered:

- if the stream of CO<sub>2</sub>e savings (scheme lifetime less than 20 years) exceeds 0.1MtCO<sub>2</sub>e average per year, or
- if the stream of CO<sub>2</sub>e savings (scheme lifetime more than 20 years) exceeds 2.0MtCO<sub>2</sub>e over the lifetime and exceed an average per year of 0.05 MtCO<sub>2</sub>e.