

www.defra.gov.uk

Guidance on how to measure and report your greenhouse gas emissions



September 2009

Department for Environment, Food and Rural Affairs
Nobel House
17 Smith Square
London SW1P 3JR
Telephone: 020 7238 6000
Website: www.defra.gov.uk

© Crown copyright 2009

Copyright in the typographical arrangement and design rests with the Crown.

This publication (excluding the royal arms and departmental logos) may be re-used free of charge in any format or medium provided that it is re-used accurately and not used in a misleading context. The material must be acknowledged as crown copyright and the title of the publication specified.

Information about this publication and further copies are available from:

Defra
Area 5C
Ergon House
London
Telephone: 0207 238 1650
Email: ghgreporting@defra.gsi.gov.uk

This document is also available on the Defra website.
<http://www.defra.gov.uk/environment/business/reporting/index.htm>

Published by the Department for Environment, Food and Rural Affairs.

PB13309

September 2009

MINISTERIAL FOREWORD TO GUIDANCE ON HOW TO MEASURE AND REPORT YOUR GREENHOUSE GAS EMISSIONS

We all know that we need to make the transition to a low carbon economy. This is vital to ensure that we reduce our carbon emissions and to enable UK businesses to take advantage of new opportunities. We set out our strategy and plans for doing this in the July 2009 Low Carbon Transition Plan and the Low Carbon Industrial Strategy.

An important part of this transition is helping organisations understand how what they do generates greenhouse gas emissions and what they can do to minimise them. On the basis that 'what gets measured gets managed', the first step to reducing your carbon footprint is to measure it. This guidance provides advice on how to do this based on a step by step approach.

It is intended for all organisations not just big businesses that publish an annual report and accounts, but also small businesses and voluntary and public sector bodies.

Many businesses have found that once they start measuring their emissions they identify ways they can do things differently that save money as well as carbon. This applies to any businesses regardless of size. So this guidance can also help organisations manage their carbon risks and opportunities. This is something customers and investors are increasingly expecting businesses to do.

The guidance has been developed with the help of many individuals, businesses and organisations through extensive public consultation. We are grateful to the CBI, the Carbon Disclosure Project, the accountancy professional bodies, the Institute of Environmental Management and Assessment, the Aldersgate Group and many others who contributed to making it as practical as possible.

We hope you will use the guidance and send us any comments on how it can be further improved (to ghgreporting@defra.gsi.gov.uk). Over the coming years we will be monitoring use of the guidance to check how useful it has been. We will undertake further public consultation before a decision is made on whether or not emissions reporting should become mandatory.



A handwritten signature in black ink, appearing to read 'H. Benn'.

Hilary Benn



A handwritten signature in black ink, appearing to read 'Ed Milliband'.

Ed Milliband

Contents

Part 1: Introduction	2
Part 2: Overview of process	6
Part 3: Do I report on all parts of my organisation?	8
Part 4: Which activities in my organisation release greenhouse gas emissions?	10
Part 5: Which greenhouse gases should I measure?	14
Part 6: What information should I collect to calculate my greenhouse gas emissions?	15
Part 7: How do I calculate my greenhouse gas emissions?	20
Part 8: What do I need to report?	22
Part 9: How do I track my emissions over time?	26
Part 10: Should I get my emissions data verified?	28
Part 11: Should I set an emissions reduction target?	29
Annex A: Small Business Example	31
Annex B: GHG Accounting and Reporting principles	33
Annex C: Relationship of this Guidance to the CRC	34
Annex D: Which of my operations do I include?	35
Annex E: Do I include leased assets and activities I have outsourced?	40
Annex F: Which other indirect emissions should I measure and calculate?	44
Annex G: What can I count as an emission reduction?	49
Annex H: How to make emissions data more useful?	55
Annex I: Example Report template	59
Annex J: Recalculating your base year	62
Annex K: How do I set my emissions target?	64
Summary of recommendations	65
Glossary	66

Objectives of the guidance

This guidance aims to support UK organisations in reducing their contribution to climate change. It explains how to measure greenhouse gas (GHG) emissions and set targets to reduce them. It is intended for all sizes of business and for public and voluntary sector organisations.

There are direct benefits to organisations from measuring and reporting as they will benefit from lower energy and resource costs, a better understanding of their exposure to the risks of climate change and a demonstration of leadership which will help strengthen their green credentials in an increasingly environmentally conscious marketplace. A number of organisations are seeking information from their suppliers on greenhouse gas emissions and so many small businesses will increasingly be expected to measure and report on their emissions.

Organisations which use this guidance to measure and report are not required to submit reports nor otherwise make the data available to government. This data will not be used to calculate the UK national inventory. This guidance is to help organisations to take action themselves to manage and reduce emissions. As the main purpose is for organisations to understand the emissions that they are responsible for, organisations should not be concerned about the double-counting of their own emissions with those emissions being reported by others.

Quoted companies (as defined in the Companies Act 2006) already report information on environmental matters in their business review (to the extent it is necessary for an understanding of the development, performance or position of the company's business).¹ If a quoted company reports on its greenhouse gas emissions as part of its business review, this guidance may help.

It is recommended that all organisations publicly report their GHG emissions in the format set out below. This guidance explains how to do this.

Example Corporate Carbon Footprint			
GHG emissions data for period 1 January 2010 to 31 December 2010			
	Tonnes of CO ₂ e		Base year 2006
	2010	2009	
Scope 1	17,100	17,500	13,120
Scope 2	14,500	15,100	10,000
Scope 3	9,410	10,415	12,990
Total gross emissions	41,010	43,015	36,110
Carbon offsets	(5,000)		
Green tariff	(7,250)	(9,800)	
Total annual net emissions	28,760	33,215	36,110

Challenge of Climate Change

Climate change is a global problem and the United Nations Framework Convention on Climate Change (UNFCCC) sets an overall framework for intergovernmental efforts to tackle the challenges posed by climate change. The Kyoto Protocol is an international agreement² linked to the UNFCCC which sets binding targets for industrialised countries to reduce their greenhouse gas (GHG) emissions.

¹ Section 417 (5) & (6) of the Companies Act 2006

² The Kyoto agreement came into force in 2005 and committed signatories to a reduction in greenhouse gas (GHG) emissions to between 20-24 billion tonnes by 2050 (about 50-60% below 1990 global levels)

There is increasing evidence that early and rapid reductions in GHG emissions are needed to avoid the significant impacts of climate change. Moreover, the Stern report³ on the Economics of Climate Change provided evidence that, “the benefits of strong and early action far outweigh the economic costs of not acting.”

Within the UK, business produces a significant proportion of the UK’s GHG emissions and so has a direct influence over the management of these gases.

What is government doing to respond to the threat of climate change?

The UK’s Climate Change Act 2008 sets the framework for how the UK will manage and respond to the threat of climate change. Under the Act, the UK must reduce total GHG emissions by at least 80% below 1990 levels by 2050.

The Climate Change Act introduced legally binding carbon budgets which set a ceiling on the level of UK GHG emissions and in order to meet these budgets, we will have to collectively reduce our total emissions.

Government recognises that for organisations to take action to reduce their emissions they must have the appropriate tools and guidance. Measuring GHG emissions is the first step to effectively managing them.

The Climate Change Act requires Government to:

1. Publish guidance⁴ on the measurement or calculation of GHG emissions to assist with the reporting of emissions by the 1st October 2009.
2. Carry out a review by December 2010 to evaluate the contribution that reporting on GHG emissions is making to the achievement of Government’s climate change objectives.
3. Introduce regulations requiring the mandatory reporting of GHG emissions information under the Companies Act 2006⁵ by the 6th of April 2012 or lay a report to Parliament explaining why this has not happened. There will be a further consultation on this guidance before a decision is made on mandatory reporting requirements.

³ Stern Review on the Economics of Climate Change published October 2006

⁴ Part 5, section 83 of the Climate Change Act

⁵ Part 5, section 85 of the Climate Change Act

How does this guidance align with existing measuring and reporting schemes?

The guidance sets out broad general principles for how to measure and report greenhouse gas emissions⁶. It is based on the GHG Protocol, the internationally recognised standard for the corporate accounting and reporting of GHG emissions⁷. This means it aligns with many widely used national and international voluntary measuring and reporting schemes such as the International Organisation for Standardisation (ISO) 14064-1⁸ and the Carbon Trust Standard. The guidance also complements both PAS 2050⁹ and ISO 14040¹⁰ which can be used to measure the carbon footprint of products.

Some organisations already report emissions data for regulatory schemes such as the EU Emissions Trading System (EU ETS) and Climate Change Agreements (CCAs). Others will need to do so as part of the forthcoming CRC. These schemes only cover some of an organisation's GHG emissions, whereas this guidance covers an organisation's **total** GHG emissions (also known as its corporate carbon footprint) as illustrated in the following diagram.

Where your organisation reports GHG emissions data for regulatory schemes you may wish to use that emissions data for the purpose of reporting your organisation's total GHG emissions. Alternatively, you may choose to follow this guidance to measure and report all your organisation's total global emissions.

6 Generally accepted accounting and reporting principles are used in financial reporting to ensure that the financial data reported by companies is a true and fair reflection of that company. We recommend that you follow the principles set out at GHG Accounting and Reporting Principles (Annex B, Page 33) when you are deciding what data to collect, how to measure and report your emissions.

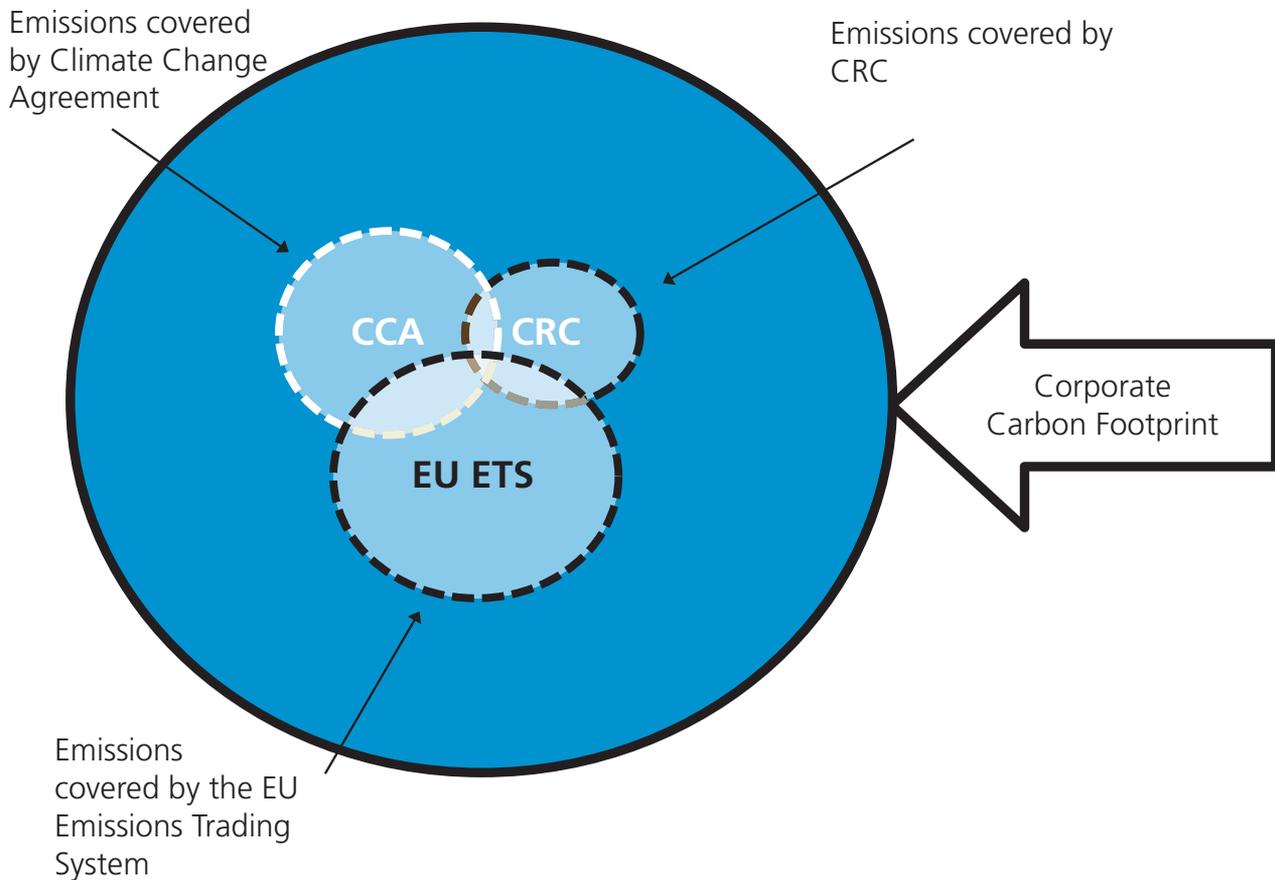
7 World Resources Institute / World Business Council for Sustainable Development's Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

8 ISO 14064-1 – Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

9 PAS 2050 – Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

10 ISO 14040 – Environmental management. Life cycle assessment. Principles and framework

Emissions reported under regulatory schemes form part of an organisation's total GHG emissions.



Structure of the guidance

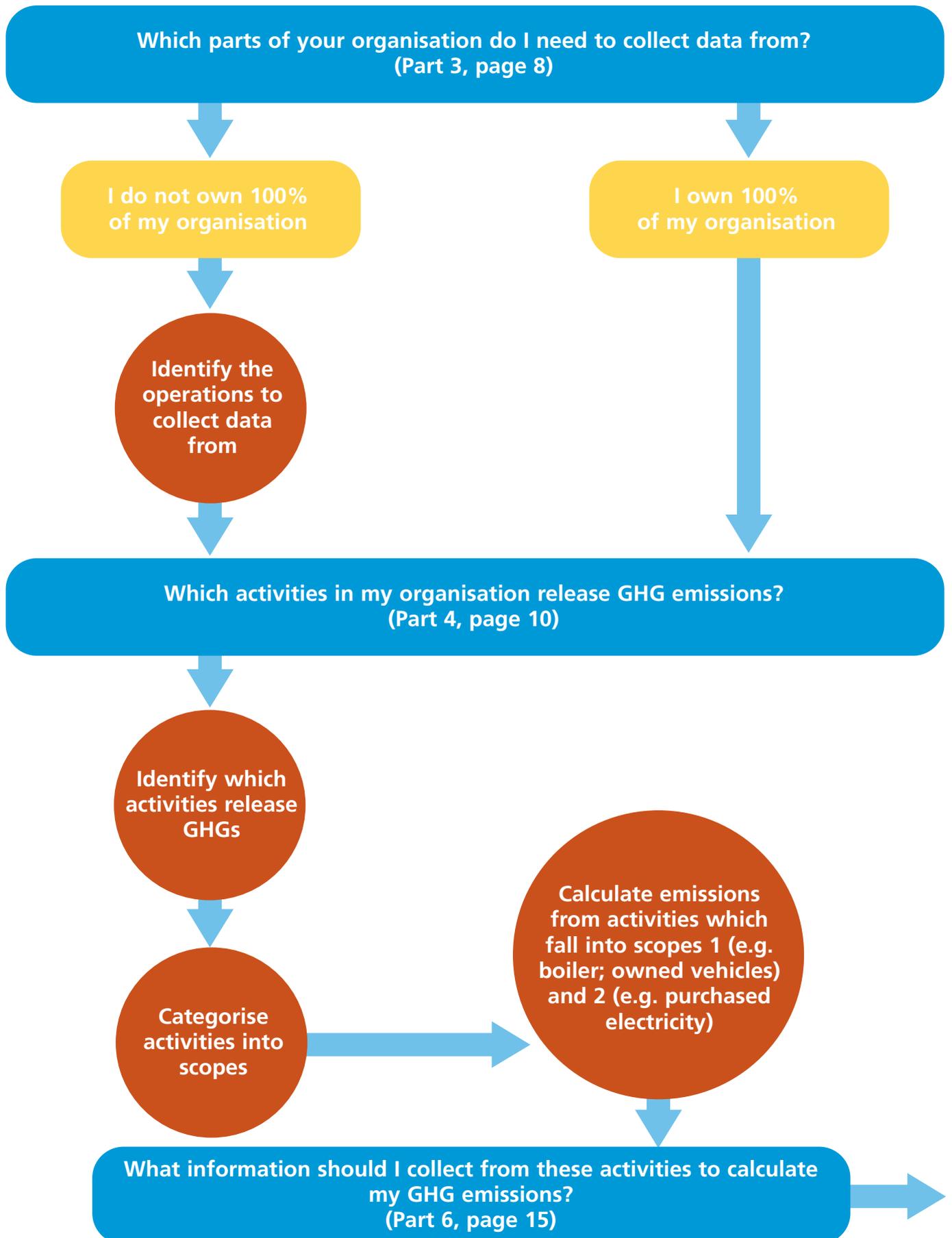
This guidance is structured to provide a step-by-step overview of the approach an organisation should take to measure and report its greenhouse gas emissions. This includes a number of recommendations on the minimum we encourage organisations to report. Further technical guidance is provided in Annexes which provide more detail on each step.

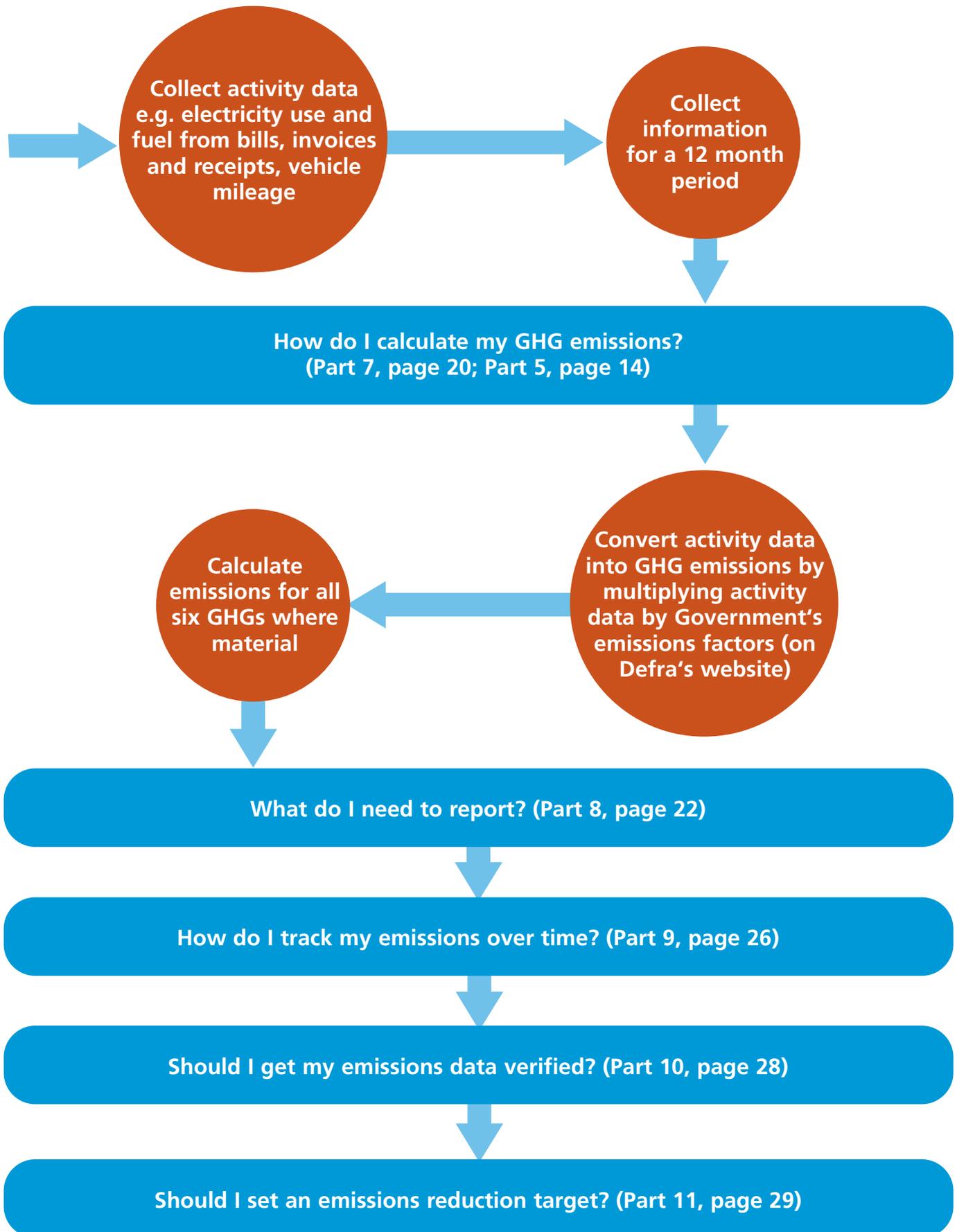
If you are new to reporting you might find it helpful to start by looking at the flow chart in Part 2 (page 6) and Annex A. There is also a Small Business User Guide¹¹ available at: <http://www.defra.gov.uk/environment/business/reporting/index.htm>.

If you have any questions on this guidance, please contact Defra at: ghgreporting@defra.gsi.gov.uk

¹¹ Small Business User Guide: Guidance on how to measure and report your greenhouse gas emissions

Part 2: Overview of process





Part 3: Do I report on all parts of my organisation?¹²

If you have a simple organisational structure and you own 100% of your operations, you do not need to read the rest of Part 3 but can move to Part 4 which tells you how to identify activities that release greenhouse gases.

To calculate your total GHG emissions, you need to identify from which parts of your organisation you need to collect information. Organisations vary in structure from sole traders to complex multi-nationals with large numbers of subsidiaries and joint ventures. The more complex the structure of the organisation, the more difficult it is to identify who has responsibility for the emissions produced by different operations.

If you own less than 100% of the operations in which you have some business involvement, you will need to identify the operations or share of operations for which GHG emissions need to be calculated. You can do this by reference to one of three established approaches. These are:

- The equity share approach – under which a company accounts for GHG emissions from operations according to its share of equity in the operation.
- The control approach – under which a company accounts for 100% of the GHG emissions from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control. Control can be defined in either financial or operational terms.
 - The financial control approach – a company has financial control over an operation if the company has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities.
 - The operational control approach – a company has operational control over an operation if the company or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation.

Recommendation 1

Apply your chosen approach consistently and for most organisations this will be the financial control approach.

The financial control approach is the recommended approach because it is the approach which aligns most consistently to financial accounting¹³. For more detailed definitions of these three approaches and further benefits to using the financial control approach, please refer to Which of my operations do I include? (Annex D, page 35)

However, it may be the case that the equity share approach or operational control approach is more appropriate for how you operate your businesses and you may wish to use either of these approaches instead.

Many UK organisations have operations and businesses overseas and therefore to get an understanding of total emissions you should include emissions related to your overseas activities¹⁴.

¹² This is referred to as setting your organisational boundary

¹³ The Financial Control approach is most closely aligned to the CRC approach which is based on legal ownership. However, there will still be some differences in organisational boundaries. These difference and others are highlighted in Relationship of this Guidance to the CRC, (Annex C, Page 34)

¹⁴ The guidance is primarily for UK based organisations. If the UK organisation is a subsidiary of an entity incorporated overseas we would not expect the overseas parent of that subsidiary to measure and report the GHG emissions following this guidance for the group unless they choose to do so.

Part 3: Do I report on all parts of my organisation?

It may be challenging to collect data from these overseas operations so you may wish to initially focus on measuring and calculating emissions from UK operations. However, you should make best endeavours to collect data from overseas operations to give a complete picture of your operations in line with your financial reports. You will need to make it clear when reporting your total global greenhouse gas emissions any geographical areas you have not included.

Recommendation 2

Measure or calculate your total emissions on a global basis.

For further guidance on how to determine which businesses / operations / facilities you need to collect data from please refer to Which of my operations do I include? (Annex D, page 35)

Part 4: Which activities in my organisation release greenhouse gas emissions?¹⁵

You need to identify which activities in your organisation / organisations are responsible for GHG emissions being released into the atmosphere.

The most widely accepted approach is to identify and categorise emissions-releasing activities into three groups (known as scopes¹⁶). The three scopes are:

Scope 1 (Direct emissions): Activities owned or controlled by your organisation that release emissions straight into the atmosphere. They are direct emissions. Examples of scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles; emissions from chemical production in owned or controlled process equipment.

Scope 2 (Energy indirect): Emissions being released into the atmosphere associated with your consumption of purchased electricity, heat, steam and cooling. These are indirect emissions that are a consequence of your organisation's activities but which occur at sources you do not own or control.

Scope 3 (Other indirect): Emissions that are a consequence of your actions, which occur at sources which you do not own or control and which are not classed as scope 2 emissions. Examples of scope 3 emissions are business travel by means not owned or controlled by your organisation, waste disposal, or purchased materials or fuels.

Carbon dioxide produced from the combustion of biomass / biofuels¹⁷ should be reported separately to emissions in scopes 1, 2, and 3¹⁸. Carbon dioxide produced from biomass / biofuels not as a result of the combustion of biomass / biofuels (e.g. industrial fermentation) should be reported within the scopes.

¹⁵ This is referred to as defining your operational boundary

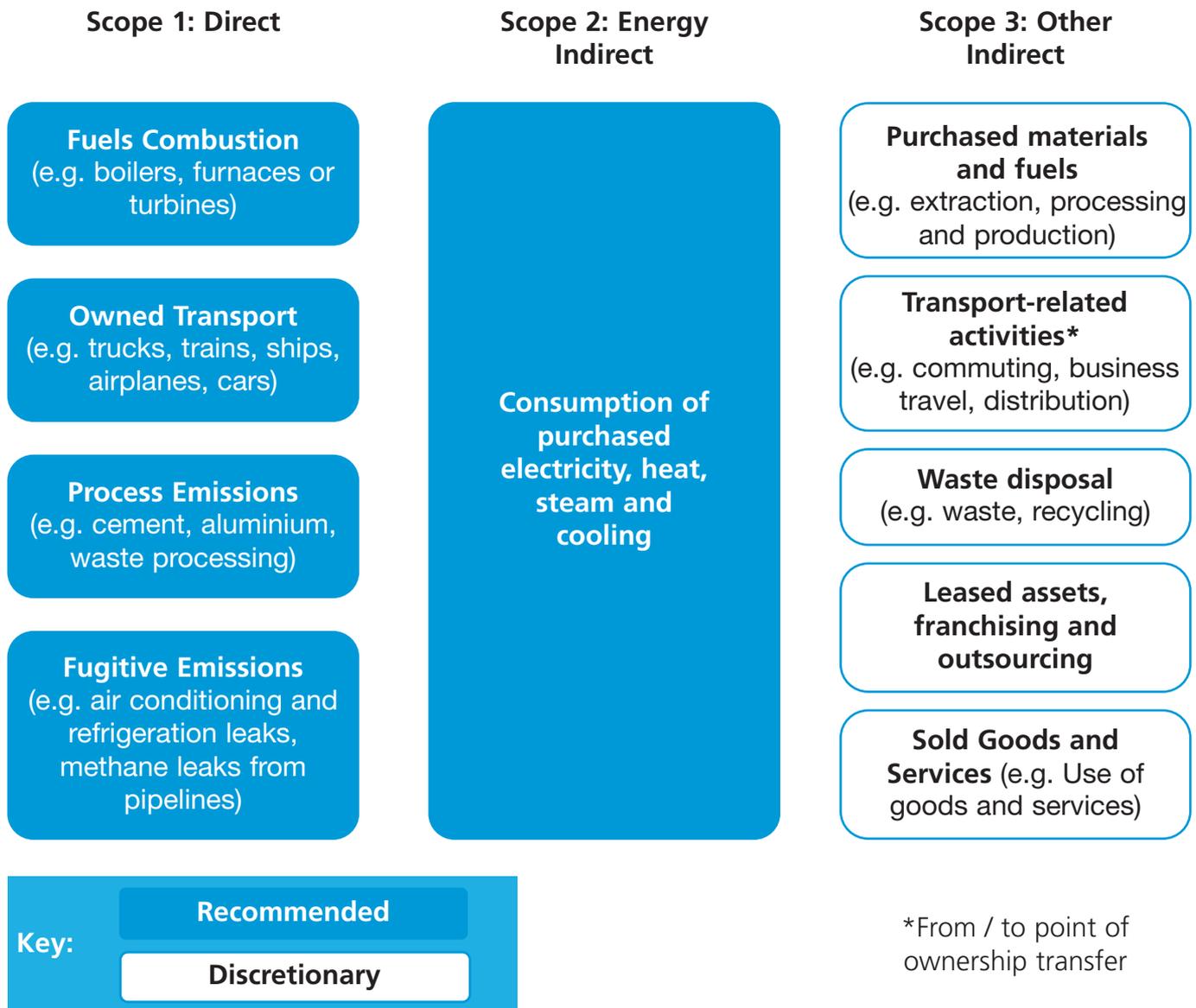
¹⁶ WRI / WBCSD The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

¹⁷ For example, combustion of biomass for electricity and / or heat generation

¹⁸ This is because the carbon dioxide would have been emitted anyway when the plants – from which the biomass is derived – decayed naturally at the end of their life. However, two other GHGs – nitrous oxide and methane – are commonly emitted when biomass is combusted. These would not be emitted during natural decay and any nitrous oxide or methane emissions from biomass / biofuel consumption should therefore be included in your emissions under the three scopes.

Part 4: Which activities in my organisation release greenhouse gas emissions?

The following diagram identifies the main types of emissions sources under each scope:



In some instances, it may be difficult to identify whether emissions should be categorised as scope 1 or scope 3 emissions. For example, this may be because your emissions sources come from outsourced activities, leased assets or tenanted buildings. For further guidance on emissions from leased assets or outsourced activities, please refer to Do I include leased assets and activities I have outsourced? (Annex E, page 40)

For some organisations, emissions within scope 3 may be the largest proportion of total emissions. By calculating your scope 3 emissions, you will get a more complete understanding of your organisation's total impact on climate change. Identifying your organisation's scope 3 emissions will also help increase your awareness of where your organisation sits within the supply chain and enable you to engage with other organisations in the supply chain. However it is acknowledged

Part 4: Which activities in my organisation release greenhouse gas emissions?

that it can be difficult to measure and calculate your scope 3 emissions so it is recommended you focus on your 'significant' scope 3 emissions. For further guidance on deciding what scope 3 emissions to measure and calculate, please refer to Which other indirect emissions should I measure and calculate? (Annex F, page 44)

Recommendation 3

Measure or calculate emissions that fall into your scopes 1 and 2.

Discretionary: Measure or calculate your significant scope 3 emissions in addition to your scopes 1 and 2.

CASE STUDY: Tesco plc – How does a large organisation identify which of its activities release GHG emissions into the atmosphere?

Tesco has been reporting on its Group direct carbon footprint since 2007, and prior to that had been reporting on the energy use of its stores since 2002.

The starting-point for deciding what to include in the reported carbon footprint was that it should include all operations over which Tesco or its subsidiaries had direct control. The aim was to inform where to focus emissions reductions measures within the business, as well as providing a comprehensive and transparent picture for external stakeholders.

The main direct Tesco emissions-generating activities are the operation of stores and distribution centres ("property"), the transport of goods ("distribution") and employee business travel.

Other activities are excluded for two main reasons: a lack of data (e.g. emissions from waste) or because they fall outside Tesco's direct control (e.g. use phase of goods). It is possible that any of the activities currently excluded may be included as better information becomes available or as Tesco is able to influence those activities more directly. It is also important to note that Tesco is taking steps to reduce emissions in some areas even though full data is not yet reported, e.g. through carbon footprinting products and diverting 100% of waste from landfill.

Tesco reports overall emissions figures in its annual Corporate Responsibility Report: this includes a total carbon footprint, a carbon intensity footprint (emissions per square foot net sales area), and specific KPI figures for emissions from stores and distribution operations. More detailed figures are published on the company website:

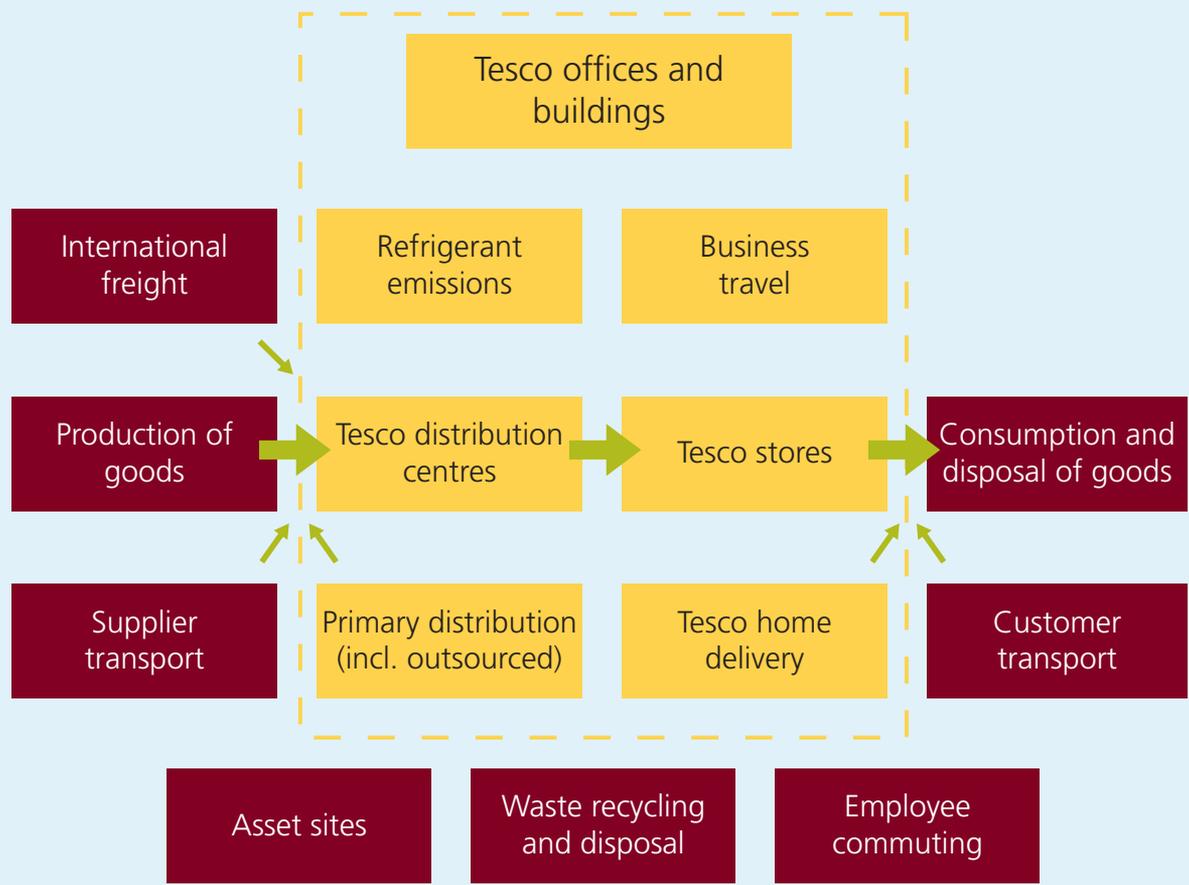
www.tescopl.com/plc/corporate_responsibility_09/environment/climate_change/leading_by_example/carbon_footprint

Tesco also reports annually to the Carbon Disclosure Project, and in 2009 was awarded the Carbon Trust Standard for year-on-year reductions to its emissions in the UK. Its carbon footprint reporting is externally assured by external auditors, with the assurance statement published on the website. The Tesco diagram below shows which activities were included and excluded in its 2009 emissions reporting.

Part 4: Which activities in my organisation release greenhouse gas emissions?



Boundary for direct carbon footprint



Part 5: Which greenhouse gases should I measure?

A number of gases contribute to climate change and six main GHGs are covered by the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), hydrofluorocarbons (HFCs), nitrous oxide (N₂O), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆)¹⁹. Different activities emit different gases, for example, burning fossil fuels releases carbon dioxide, methane and nitrous oxide into the atmosphere, while producing aluminium releases carbon dioxide and perfluorocarbons. Organisations should refer to Defra / DECC's GHG Conversion Factors to see which emissions they are most likely to emit. These Greenhouse Gas Conversion Factors enable you to calculate your emissions for greenhouse gases covered by the Kyoto Protocol for a range of activities.

There are a number of other greenhouse gases that enter the atmosphere because of human activities not covered by the Kyoto Protocol. There are relatively few organisations that emit these gases²⁰.

A list of both GHGs covered by the Kyoto Protocol and those not covered and the sources which release them can be found in Defra / DECC's GHG Conversion Factors. Organisations should consider whether a gas is material to the total of their greenhouse gas emissions. Information is material if its omission or misstatement could influence the economic decisions of users²¹.

Recommendation 4

Measure or calculate emissions from the six GHGs covered by the Kyoto Protocol

You may also choose to measure or calculate emission from other gases in addition to the six covered by the Kyoto Protocol if these are material to your total greenhouse gas emissions.

¹⁹ The UK GHG reduction targets which align to the Kyoto Protocol cover all six gases

²⁰ Greenhouse gases covered by the Kyoto Protocol account for over 99% of global greenhouse gas emissions

²¹ Materiality depends upon the circumstances of individual companies. For guidance on how to determine materiality, you may wish to consult:

- The AA1000 AccountAbility Principles Standard 2008 on the principle of materiality, and/or
- The Materiality Framework produced by AccountAbility in association with BT Group and Lloyds Register Quality Assurance.

Part 6: What information should I collect to calculate my greenhouse gas emissions?

The most common approach used to calculate GHG emissions is to apply documented emission factors to known activity data from the organisation²².

$$\text{Activity Data} \times \text{Emission Factor} = \text{GHG emissions}$$

Activity data is information used to calculate GHG emissions from combustion and other processes, for example, this could be litres of fuel consumed by your organisation's vehicles. Most activity data is easy to obtain, relatively accurate and can be found on bills, invoices and receipts. The table below sets out common emission-releasing activities and sources of information to change this data into GHG emissions.

It is best to collect activity data by **volume or mass** (e.g. litres of petrol used) as emissions can be calculated more accurately.

Emission-releasing activity	Source of information
Electricity use	Total kilowatt hours (kWh) used from electricity bills
Natural gas use	Total kilowatt hours (kWh) used from gas bills
Water supply	Total water supplied in cubic metres (m ³) from water bill
Water treatment	Total water treated in cubic metres (m ³) from water bill
Fuel used in company owned vehicles	Litres of fuel purchased from invoices and receipts (more accurate); or Vehicle mileage from vehicle log books / odometers (less accurate)
Employee passenger travel	Receipts for details of travel, and use distance calculation websites to obtain flight, rail and road distances
Waste disposal / recycling	Tonnes of waste-treated by waste type (e.g. paper, glass, waste to landfill) from waste collection provider.

There are a number of ways to collect and manage this activity data at a corporate level. For example, this could include direct entry of activity data by operational staff onto secure Internet or Intranet databases; or standard spreadsheet templates completed and emailed to a central point where data can be processed. Ideally, GHG reporting should be integrated into existing reporting tools and processes of your organisation.

When collecting data at a corporate level, using a standardised reporting format is recommended to ensure that data received from different business units and operations is comparable. You may wish to establish a quality management system to ensure that you produce a high quality corporate carbon footprint. A quality management system provides a systematic process for preventing and correcting errors in your organisation's GHG emissions data²³.

²² Other approaches are: A) Direct monitoring and measurement of GHG emissions. This is expensive and may not be appropriate. B) Calculating emissions based on mass balance or theoretical combustion specific to a facility or process. This is most applicable to process related emissions such as those from cement, aluminium, waste processing.

²³ For further practical advice on data collection at a corporate level, please refer to Chapter 6 of the GHG Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) or Section 3 of the Institute of Environmental Management and Assessment (2005) Environmental Data Management: for emissions trading and other purposes.

Part 6: What information should I collect to calculate my greenhouse gas emissions?

If it is not possible for you to calculate your emissions from known activity data, you will need to estimate:

$$\text{Estimated Activity Data} \times \text{Emission Factor} = \text{GHG emissions}$$

You may wish to extrapolate on the basis of known activity data.

If you do estimate, we recommend that you are transparent about the estimation technique used and apply quality measures such as comparing your estimated data to historical data to ensure that it falls within a reasonable range.

Can I use existing emissions data?

Where your organisation reports GHG emissions data for regulatory schemes (e.g. EU ETS, CCAs, the forthcoming CRC, and regulatory schemes in other administrations), you may wish to use this emissions data for the purposes of reporting your organisation's total GHG emissions. As there are some differences²⁴ in approach between the regulatory schemes and this reporting guidance you should provide information on the calculation approach and conversion factors used for those emissions reported for regulatory purposes.

Where your GHG emissions data reported for existing regulatory schemes does not cover all the emissions sources or greenhouse gases that your organisation is responsible for, you should use the approach outlined in this guidance to measure or calculate those remaining emissions. You should also use the recommended format in this Guidance for reporting your emissions data.

However, given the differences in approaches between the regulatory schemes and this reporting guidance you may wish to measure, calculate and report **all** your total global GHG emissions, for purposes other than reporting for the regulatory schemes, using the approach in this guidance.

What period should I collect data for?

The period for which you collect data must suit your internal and external reporting needs. We recommend that your reporting period should be for 12 months. Your emissions year should ideally correspond with your financial year, but where they are different, the majority of your emission reporting year should fall within your financial year.

²⁴ Please refer to Relationship of this Guidance to the CRC (Annex C, Page 34)

Part 6: What information should I collect to calculate my greenhouse gas emissions?

CASE STUDY: Global Action Plan – How can I estimate emissions from staff commuting?

Global Action Plan is an environmental charity that works with people across the UK to help them to reduce their environmental impact. As part of a wider travel survey to quantify our greenhouse gas emissions for our environmental management system (BS8555), Global Action Plan carried out an assessment with staff to estimate the emissions associated with staff commuting to and from work. Staff commuting in vehicles that are not owned or controlled by Global Action Plan fall within our scope 3 emissions.

In order to estimate these emissions, one of our Environmental Business Mentors developed a short and simple online survey using Survey Monkey – a free web based questionnaire tool (<http://www.surveymonkey.com/>). First, the questionnaire asked staff how long they had worked at the company in months over the preceding year. Following this, employees were asked the number of days per week that they travelled to work by each transport mode. They were then asked the distance of a return journey in miles and were given a link to the AA route planner tool to help them estimate the distance relatively accurately.

The survey attracted a high response rate from staff. Where staff had not answered the questionnaire, their staff commuting mileage and transport mode was extrapolated based on the average of all respondents. This helped us to quantify 100% of our staff commuting travel. The Business Mentor then calculated emissions from staff commuting by combining questionnaire data and the number of staff working days per year with emission factors for vehicle and passenger mileage in Defra's GHG conversion factors (<http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>).

GAP - London Office Travel Survey
Commuter travel

40%

What mode of transport do you use to travel to work (over a typical week)?
The route planner link below will help to calculate the distance travelled
http://www.theaa.com/travelwatch/inc/planner_main_redirect.jsp

	Number of days per week	Distance travelled in miles (1 return journey)
Walk	2	0-1
Cycle	3	10
Trains		
Tube	2	9
Bus		
Car (alone)		
Car (share)		
Park & Ride		
Motorcycle		
Work at home		
Taxi		
"Green Taxi"		

<< Prev Next >>

Part 6: What information should I collect to calculate my greenhouse gas emissions?

CASE STUDY: Ernst & Young – How do I calculate emissions from air travel when complete activity data does not exist for all journeys?

Ernst & Young has been measuring the UK firm's carbon emissions since 2004. It has identified that its biggest sources of emissions are electricity consumption and business travel.

To get a complete understanding of its emissions from all business travel Ernst & Young uses both known activity data and extrapolation.

In respect of air travel, Ernst & Young uses the number of long and short haul miles that are known, and reported through its travel management company (TMC), and uses the total cost of those to calculate a cost per mile for long and short haul flights.

To ensure that all air travel trips undertaken by Ernst & Young staff are included in its carbon reporting, it is necessary to extrapolate to provide a more accurate figure. To do this, Ernst & Young compares the total expenditure on air travel booked directly through the TMC to the total amount claimed for air travel through Ernst & Young's expenses.

It makes assumptions on long haul and short haul based on percentages of that reported through the TMC. As the overall amount of air travel booked through the travel company represents the vast majority of the total it is a very good indicator of the likely balance of long and short haul travel booked separately. So, if the split of long haul and short haul is, say, 60/40 when booked through the TMC, it can be assumed that the same percentage balance for that booked separately should apply. Using the known cost per mile for long and short haul travel it is then possible to extrapolate the number of miles flown in total.

Although business travel is a necessity, Ernst & Young has a programme in place to reduce air travel as far as possible. The initial challenge is not to travel at all and to use some of the technology-based solutions that are available instead. When travel is critical, the aim is to use the best available option from an environmental, cost and efficiency perspective.

Part 6: What information should I collect to calculate my greenhouse gas emissions?

EDF Energy – How do I estimate emissions from personal vehicles used for business travel when only monetary value is available?

In 2007, EDF Energy sought to quantify their emissions associated with employee business travel to help them track progress towards meeting their Climate Commitments. For some forms of business travel, this was relatively straight-forward such as air travel as there was already data available. However for other areas this was more difficult and the data needed to be reconciled from a number of different data sources to provide a company wide view – in this case, emissions from employees' personal vehicles used for business travel, and for fuel claims for hire cars.

EDF Energy did not have detailed information about employee vehicles and their CO₂ emission factors. All that was known was the number of miles travelled. In addition, car fuel was recorded as amount spent (in £) but the mileage and fuel type was sometimes unknown. Since these emissions accounted for a small proportion of the overall transport emissions for EDF Energy, they decided to try to estimate their greenhouse gas emissions following the development of a suitable methodology.

They were aware that the price of fuel fluctuated. Therefore they looked for a reliable information source that provided the price of fuel on a monthly basis so that an annual average fuel price could be applied consistently for a year. They used the Fuel Price Reports on the AA's website for average monthly fuel prices for petrol and diesel from UK garages and supermarkets: http://www.theaa.com/motoring_advice/fuel/.

EDF Energy is constantly reviewing how they can collect information on litres of fuel consumed to reduce the uncertainty associated with their emission data from employee business travel.

Part 7: How do I calculate my greenhouse gas emissions?

This guidance provides web links to Defra / DECC GHG Conversion Factors which are annually updated excel spreadsheets with emissions factors²⁵ and supporting guidance that converts the data you have collected into GHG emissions. In the automated spreadsheets, you simply need to add activity data to the appropriate emissions factor and this will calculate your emissions data for you. These should only be used for UK emissions and overseas electricity use.

Those organisations which have global operations should use overseas emissions factors for these activities to give a more accurate account of their emissions data.

It is standard practice to report GHG emissions in tonnes of CO₂ equivalents (CO₂e)²⁶. The spreadsheets convert data by source into emissions of CO₂e for each GHG separately. Please click on the link below to visit the webpage where these GHG Conversion Factors are located: <http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>

The following lists the annexes of conversion tables that you will see at the link (above) on the Defra website:

Which Conversion Factors should I use?

To calculate emissions from the combustion of Fuels, see **Annex 1**

To calculate emissions from Combined Heat and Power (CHP) where you are the generator, see **Annex 2**

To calculate emissions from the consumption of Electricity, see **Annex 3**

To understand which industrial processes lead to GHG emissions, see **Annex 4**

To convert greenhouse gases into carbon dioxide equivalents, see **Annex 5**

To calculate emissions associated with Passenger Transport, see **Annex 6**

To calculate emissions associated with Freight Transport, see **Annex 7**

To calculate emissions from the use of Refrigeration and Air Conditioning Equipment, see **Annex 8**

To calculate life-cycle emissions from the use of Water, Biomass and Biofuels, and from Waste Disposal, see **Annex 9**

To calculate emissions from the use of Overseas Electricity, see **Annex 10**

For the typical Calorific Values and Densities of UK Fuels, see **Annex 11**

To convert between common units of energy, volume, mass and distance, see **Annex 12**

To estimate emissions from your supply chain, see **Annex 13**

²⁵ Some organisations may have site specific emission factors which they should use if they will give a more accurate measurement of GHG emissions

²⁶ A universal unit of measurement used to indicate the global warming potential of a greenhouse gas, expressed in terms of the global warming potential of one unit of carbon dioxide

Part 7: How do I calculate my greenhouse gas emissions?

If Defra has not been able to provide the appropriate spreadsheet for your activity data or you have overseas operations, we recommend you refer to the emissions factors in the GHG Protocol calculation tools²⁷. Other sources of emission factors are:

- Overseas national emission factors from other Government sources (e.g. United States Environmental Protection Agency)
- National emission factors from other credible sources (e.g. Universities & Research Institutions)
- International emission factors (e.g. EU level, International Energy Agency)
- Global emission factors (e.g. IPCC level: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/>)

Recommendation 5

Where your organisation is using standard emission factors, you should use the Defra / DECC GHG conversion factors for UK emissions. If you require other emission factors you should refer to the emission factors in the GHG Protocol calculation tools.

²⁷ If you are unable to identify appropriate emission factors please e-mail the Defra team for assistance at ghgreporting@defra.gsi.gov.uk.

Part 8: What do I need to report?

What emissions data do I need to report?

You should report GHG emissions as a **gross** figure in tonnes of CO₂e. Gross emissions are your total GHG emissions before accounting for any emission reductions that you have purchased or sold. This should be your reported headline figure.

Recommendation 6

Report total GHG emissions as a **gross** figure in tonnes of CO₂e.

Where your organisation has purchased or sold emission reductions (i.e. carbon credits and green tariffs) that meet certain 'good quality' emission reduction criteria, we recommend that you report on all purchased or sold emissions reductions – either for the purposes of compliance²⁸ or offsetting. For further information on the 'good quality' emission reduction criteria please refer to What can I count as an emission reduction? (Annex G, page 49). We recommend that organisations account for these emissions reductions against their gross figure to report a net figure in tonnes of CO₂e. This net figure should be **additional** to your gross figure and should not replace it. For further guidance on Defra's criteria and worked examples on how to apply this, please refer to What can I count as an emission reduction? (Annex G, page 49)

Recommendation 7

Report purchased or sold emissions reductions that meet the 'good quality' emission reduction criteria. Then report a **net** figure in tonnes of CO₂e, in addition to the gross figure.

Organisations should normalise their total global scope 1 and 2 emissions using an intensity ratio. Intensity ratios compare emissions data with an appropriate business metric or financial indicator, such as sales revenue or square metres of floor space. Using an intensity ratio allows you to compare your performance over time and with other similar types of organisations. For further guidance on which intensity ratios to use, please refer to How do I make emissions data more useful? (Annex H, page 55)

Recommendation 8

Report on total scopes 1 and 2 emissions using an intensity ratio.

It is recommended you report a summary table of your GHG emissions data for your chosen annual reporting period, your previous year's performance and your base year. An example of this summary table is shown at page 2.

²⁸ Credits purchased for EU ETS can be included.

Gross emissions data you should report	Format of the information
Total annual gross global Scope 1 GHG emissions	In tonnes of CO ₂ e
Total annual gross global Scope 2 GHG emissions	In tonnes of CO ₂ e
Discretionary: Significant annual gross global Scope 3 GHG emissions	In tonnes of CO ₂ e
Total annual gross global GHG emissions	In tonnes of CO ₂ e for all scopes reported
Comparative emissions data from previous reporting year	In tonnes of CO ₂ e for all scopes reported
Base year data	In tonnes of CO ₂ e for all scopes reported
An intensity measurement for your total global gross emissions for scope 1 and 2 emissions combined	Reported separately from total gross global figure State intensity measurement used

We recommend organisations report on emission reduction activities (i.e. carbon offsets and green tariffs) that meet Defra’s good quality criteria. Below we outline the format in which you should report this information. For further guidance on the emission reduction activities eligible and the ‘good quality’ criteria these must meet, please refer to What can I count as an emission reduction? (Annex G, Page 49)

Net emissions data we recommend you report (where applicable)	Format of the information
Total tonnes of CO ₂ e associated with purchased or sold emission reductions	Broken down into specific external GHG reduction projects.
Total net global GHG emissions in tonnes of CO ₂ e	Reported separately from total gross global figure

If you report on carbon dioxide emissions from the combustion of biomass/biofuels and emissions of non-Kyoto GHGs, these should be reported in tonnes of CO₂e separate to the emissions data reported in the scopes.

Where it aids your management of emissions you may wish to further subdivide the emissions data collected and reported by business units / facilities, country, source types (e.g. stationary combustion, process emissions), and activity types (e.g. production of electricity, transportation).

What supporting explanations do I need to provide?

We recommend that you provide some written explanations when you report your greenhouse gas emissions. This will help to explain how these figures have been calculated and provide context for the data for your stakeholders. We recommend that these supporting explanations are provided as notes to your reported emissions data. The table below lists the supporting explanations we recommend you report and the title of the note in which it should be included.

Part 8: What do I need to report?

	Recommended supporting explanations	Notes section
1	General company information	Company information
2	State the reporting period covered	Reporting period
3	State the reason for any significant changes in emissions since previous year	Changes in emissions
4	State the measuring and reporting approach followed	Measuring and reporting approach
5	State the approach chosen to identify the operations you have collected data from	Organisational boundary
6	State the scopes included. Provide a list specifying the activity types included in each scope	Operational scopes
7	Provide detail of any specific exclusions of emissions from scopes 1 and 2 (including estimation of the % this is)	Operational scopes
8	Provide a brief explanation for the reason for any exclusions from scopes 1 and 2	Operational scopes
9	State the calculation approach used, specifically stating for each activity the % of activity data estimated	Operational scopes
10	State the conversion tools / emission factors you used	Operational scopes
11	Provide a breakdown by country of total GHG emissions	Geographical breakdown
12	Provide detail of any exclusions of countries if a global total is reported	Geographical breakdown
13	State the base year chosen and approach used to set the base year	Base year
14	State base year recalculation policy	Base year
15	State appropriate context for any significant emissions changes that trigger base year emissions recalculation (acquisitions/divestitures, outsourcing/insourcing, changes in reporting boundaries or calculation methodologies, etc.).	Base year
16	State your target, including scopes covered and target completion date. Provide a brief overview of progress towards target.	Target
17	State the name of the person(s) responsible for achievement of this target and their position in your organisation	Target
18	State the reason for your intensity measurement choice	Intensity measurement
19	State the reason for any significant changes in your intensity measurement from the previous year	Intensity measurement
20	Provide an outline of any external assurance received and a copy of any assurance statement, if applicable	External Assurance Statement
21	For purchased carbon credits state the reduction in tonnes of CO ₂ e per year	Carbon Offsetting
22	<p>State the type of carbon credit (Kyoto compliant or non-Kyoto compliant credit)</p> <ul style="list-style-type: none"> • If carbon credits are Kyoto-compliant, organisations should specify which external GHG programme has approved them, provide the name of the supplier and a hyperlink to the project documentation where possible • If carbon credits are non-Kyoto compliant, organisations should provide the name of the supplier, a hyperlink to the project documentation where possible, details of who developed the quantification methodology, how the project was validated and verified and how other 'good quality criteria' were met. 	Carbon Offsetting

	Recommended supporting explanations	Notes section
23	For purchased green tariffs state the reduction in tonnes of CO ₂ e per year	Green tariffs
24	State the supplier and the name of the tariff	Green tariffs
25	State the additional carbon saving associated with the tariff as a percentage (%)	Green tariffs
26	State in MWh the amount of electricity generated from owned or controlled sources. State if the owned or controlled source is onsite or offsite.	Electricity generation
27	State if applicable in MWh the amount of own generated renewable electricity exported to the grid and if this is backed by REGOs within the UK.	Electricity generation
28	State the amount of incentive received (e.g. ROCs) if applicable.	Electricity generation
29	State in MWh the amount of heat generated from owned or controlled sources. State if the owned or controlled source is offsite or onsite	Heat generation

Recommendation 9

Provide supporting explanations

In what format should I present my emissions data and supporting explanations?

An example reporting template has been provided at Annex I to help clarify the reporting format expected of companies using this guidance.

Where should I report this information?

Quoted companies already report information on environmental matters (to the extent it is necessary for an understanding of the development, performance or position of the company's business) in their business review which forms part of their Annual Report and Accounts. They will want to consider if they wish to include this information there.

We encourage organisations to publish their GHG emissions data and supporting explanations. Where you report your data is a matter of choice: for some companies it may be their annual report / business review or it may be in a separate corporate responsibility / sustainability report.

Organisations which do not publish such external reports may wish to publicly disclose this information on their website.

Part 9: How do I track my emissions over time?

To help you maintain a meaningful and consistent comparison of emissions over time, you will need to choose and report on a base year.

Recommendation 10

Choose and report on a base year. Your base year should be:

- The earliest year that verifiable emissions data is available for
- Either a single year, or a multi-year average (e.g. 2006-2008)

For consistent tracking of performance over time, you may need to recalculate your base year so that you can compare your current emissions with your historic emissions.

You should develop a base year recalculation policy which clearly explains the basis and context for any recalculations. If applicable, you should state any **significance threshold** applied for deciding on historic emissions recalculation.

You should consider recalculating your base year emissions in the following cases:

- Structural changes that have a significant impact on the company's base year emissions, such as the transfer of ownership or control of emissions-releasing activities or operations from your company to another. While a single structural change might not have a significant impact on the base year emissions, the cumulative effect of a number of minor structural changes can result in a significant impact. Structural changes include:
 - Mergers, acquisitions, and divestments
 - Outsourcing and insourcing of emitting activities
- Changes in calculation methods or improvements in the accuracy of emission factors or activity data that result in a significant impact on the base year emissions data.²⁹
- Discovery of significant errors, or a number of cumulative errors, that are collectively significant.

You do not need to recalculate base year emissions in the following cases:

- Economic growth or decline – refers to changes in production output, and closures and openings of operating units owned or controlled by your organisation
- Outsourcing or insourcing of emitting activities – Structural changes due to “outsourcing” or “insourcing” do not trigger base year emissions recalculation if your organisation is reporting its other indirect (scope 3) emissions from relevant outsourced or insourced activities. Only where the emitting activities move outside the scope of your reported GHGs, or emitting activities move within the scope of your reported GHGs, should you include them.
- Operations acquired or sold that did not exist in the base year – You should not recalculate your base year where you acquire (or insource) and divest (or outsource) of operations that did not exist in your base year.

²⁹ Please refer to the introduction to DECC / Defra GHG Conversion Factors for more guidance on updating your emissions when emission factors change.

Part 9: How do I track my emissions over time?

Once your organisation has developed its policy on how it will recalculate base year emissions, you should apply this policy in a consistent manner.

For further guidance on recalculating your base year, please refer to Recalculating your base year (Annex J, Page 62)

Recommendation 11

Develop a base year recalculation policy. Update your base year following significant changes that meet your significance threshold against the criteria outlined above.

Part 10: Should I get my emissions data verified?

Organisations that externally report their emissions data may wish to receive independent assurance over the reported GHG emissions.

An independent firm would provide an assurance statement setting out their opinion on the accuracy, completeness and consistency of GHG emissions data reported based upon the evidence they have collected.

There is no requirement for you to obtain any level of assurance over your emissions data³⁰. Firms choose to receive assurance because it can help to increase stakeholder confidence in the accuracy and completeness of GHG emissions data. There will be a cost associated with receiving any type of assurance.

This is an evolving issue and there are many different levels of assurance so we recommend that you talk to an assurance expert.

³⁰ For those companies where an audit is required, in respect of information on environmental matters reported in their Annual Report and Accounts this information will be read by the External Auditors to assess whether it is consistent with the Financial Statements.

Part 11: Should I set an emissions reduction target?

Why should I set a target?

Once you have measured and calculated your total GHG emissions, setting an emission reduction target is the logical next step. There are a number of good business reasons to do this:

- To improve cost efficiency – cost savings can be made by identifying opportunities to increase resource and energy efficiency. This may help to improve your competitive advantage.
- To demonstrate leadership – by setting ambitious targets, measuring, managing, reporting and reducing GHG emissions.
- To improve brand recognition in an increasingly environmentally conscious marketplace – consumers and employees have a greater awareness of corporate social responsibility and expect business to take a leadership role in the management of GHG emissions.

What kind of target should I set?

Organisations can set:

- an absolute GHG reduction target which compares total GHG emissions in the target year to those in a base year; or
- an intensity target based on a decrease in GHG emissions intensity using an appropriate normalising factor (e.g. tonnes / gross CO₂e per tonne of product, floor space or Full Time Equivalent). This takes into account increases or decreases in production over time.

The advantages and disadvantages of both types of target are outlined below:

Comparing absolute and intensity targets

Absolute Targets	
Advantages	Disadvantages
<ul style="list-style-type: none">• Designed to achieve a reduction in a specified quantity of GHGs emitted to the atmosphere	<ul style="list-style-type: none">• Target base year recalculations for significant structural changes to the organisation will be necessary. These add complexity to tracking progress over time
<ul style="list-style-type: none">• Environmentally robust as it entails a commitment to reduce GHG emissions by a specified amount	<ul style="list-style-type: none">• Does not allow comparisons of GHG intensity / efficiency
<ul style="list-style-type: none">• Transparently addresses potential stakeholder concerns about the need to manage absolute emissions	<ul style="list-style-type: none">• May be difficult to achieve if the company grows unexpectedly or growth is linked to GHG emissions

Part 11: Should I set an emissions reduction target?

Intensity Targets	
Advantages	Disadvantages
<ul style="list-style-type: none">• Reflects GHG performance improvements independent of organic growth or decline	<ul style="list-style-type: none">• No guarantee that GHG emissions will be reduced – absolute emissions may rise even if intensity goes down and output increases
<ul style="list-style-type: none">• Target base year recalculations for structural changes are usually not required	<ul style="list-style-type: none">• Companies with diverse operations may find it difficult to define a single common business metric
<ul style="list-style-type: none">• May increase the comparability of GHG performance amongst companies	<ul style="list-style-type: none">• If a monetary variable is used for the business metric, such as £ million of sales, it must be recalculated for changes in product prices and product mix, as well as inflation, adding complexity to the process

When setting your target, you should consider whether it should be:

- An organisation-wide target (including all UK and overseas emissions);
- Inclusive of all emissions (scope 1, 2 and 3) that you measure and report on;
- Based on the most recent base year data that you have available;
- Achieved over 5 to 10 years.

Recommendation 12

Set a reduction target and choose the approach to use.

For further guidance on setting a GHG reduction target, please refer to How do I set my emissions target? (Annex K, page 64)

This is an example of a small business – **The Limes Bed & Breakfast (www.limesbb.co.uk)** – which is measuring its carbon footprint.

The Limes Bed & Breakfast is a small Bed & Breakfast 12 miles from Bristol, set in the North Somerset countryside. We pride ourselves on our green credentials.

We are open throughout the year and our customer base is mainly business people. However weekends and the summer are busy with holiday-makers, those attending weddings and parties locally, or people breaking their journey along the M5.

The house is a Victorian Cottage set in a $\frac{3}{4}$ acre smallholding, with chickens, pigs, a vegetable garden and orchard.

We started the Bed & Breakfast 4 years ago, operating out of our family home. The business is run along our life principles to “tread lightly on the earth”.

Having won the Business in the Community C+ Carbon Positive Award for Micro-businesses in the South West in 2008, we were encouraged to calculate our carbon footprint and publish this information.

We found this a surprisingly easy exercise to complete.

We chose January to December as our reporting year. At the end of the year we already had our electricity, propane gas and oil bills, as these were needed to calculate our tax bill. The bills contained the fuel usage, so we calculated how much of each fuel we had used during the year and put the figures into The Carbon Trust carbon calculator in the appropriate sections.

We record our business mileage each month for our tax bill and we know the engine capacity of the car, so the total mileage and engine capacity was also put into the carbon calculator. This calculated our carbon footprint for us.

We have no staff and we both live on site, so there was no mileage commuting to work to calculate.

We then emailed this information to Businesses in the Community to include in their web site.

The fuels we consume in the course of our business are electricity, propane gas, heating oil and petrol for the car. We also use scrap wood & solar water heating which are carbon neutral.

We used the Carbon Trust Carbon Calculator to make these calculations

The Limes B&B fuel consumption for 2008

	Amount in units	Tonnes of CO ₂ e
Electricity	6620.00 kwh	3.55
Propane Gas	755.00 litres	1.13
Oil	2,000 litres	5.04
Petrol / mileage	2,927 miles	1.01

Our total business emissions are 10.72 tonnes of CO₂e and this figure includes 3 people living permanently on site.

For more details of how we have saved energy please look at the environmental pages at www.limesbb.co.uk

Annex A: Small Business Example

The advantage of monitoring our carbon footprint is that it gives us accurate information on our fuel consumption. It will give us a year-on-year comparison as to how much fuel we are using.

It also allows us to compare ourselves with the National Average and this gives us a benchmark to decide if we personally consider our fuel consumption is acceptable or sustainable.

Commentary

Step 1: *Do I report on all parts of my organisation?*

The Limes is a family run, 100% owned B&B so they account for all of the direct and energy indirect emissions related to the activities of the Limes.

Step 2: *Which activities in my organisation release GHG emissions?*

The Limes identified that their heating, lighting and vehicle use were responsible for emissions.

Step 3: *What information should I collect from these activities to calculate my GHG emissions?*

The Limes followed the recommended approach and calculated their scope 1 and 2 emissions. They also identified their reporting year as January to December. They collected their electricity, propane gas and heating oil bills which provided them with the information they needed. They also had their vehicle mileage and engine capacity for their car. (A more accurate method would be to record actual fuel purchased and consumed rather than mileage).

- To calculate their emissions from their car which they use to transport guests and to collect food and supplies for the guests, they keep a record of their business mileage.
- To calculate their emissions from the consumption of electricity, they use information from their electricity bill in kilowatt hours (kWh).

There is no information they can currently use to quantify their refrigerant emissions from their fridge. As a result, they do not measure this.

Step 4: *How do I calculate my GHG emissions?*

Once they have collected their information, they converted this into GHG emissions. To do this, they used the Carbon Trust Carbon Calculator (<http://www.carbontrust.co.uk/solutions/CarbonFootprinting/FootprintCalculators.htm>).

Alternatively they could have used a comprehensive list of annually updated worksheets on the Defra website (<http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>) where they could enter the amount used per year for electricity, gas, heating oil, etc and car mileage into the correct cells on these worksheets. The worksheets automatically calculate the emissions for each relevant GHG and add these GHGs together to produce a total GHG figure.

Step 5: *What do I need to report?*

Once they have calculated their emissions for their 12 month period they arranged for this information to be made available on the Business in the Community website.

Step 6: *How do I set my emissions reduction target?*

The Limes know the total scope 1 and 2 emissions that their B&B business is responsible for and could now consider setting an emission reduction target.

Annex B: GHG Accounting and Reporting principles

Relevance: Ensure the GHG emissions you report appropriately reflect the emissions of your organisation and serves the decision-making needs of users – both internal and external to the organisation.

Completeness: Measure and report on all GHG emissions sources and activities from the businesses / operations for which you are collecting GHG data³¹. Disclose and justify any specific exclusions.

Consistency: Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, changes in your organisational boundary, methods, or any other relevant factors.

Transparency: Address all relevant issues in a factual and coherent manner, keeping a record of all assumptions, calculations, and methodologies used. Report on any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

Accuracy: As far as can be judged, ensure that your reported GHG emissions data is systematically neither over nor under your actual emissions. Seek to reduce uncertainties in your reported GHG emissions where practical. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

³¹ It may not be possible for you to measure and report all emissions – see page 11.

Annex C: Relationship of this Guidance to the CRC

The CRC is a mandatory scheme aimed at driving improvements in energy efficiency. It covers groups of organisations consuming more than 6000MWh of electricity through half hourly meters. This scheme requires specific detailed reporting of emissions from energy use, and is therefore narrower in scope than this guidance. It has specific requirements on treatment of organisations, for example, the relationship between landlords and tenants. For further information, see: http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/crc/crc.aspx

We have aligned the requirements of the CRC and the approach in this guidance as far as possible in order to reduce reporting burdens, but recognise there are differences in some areas. This guidance explains how organisations should measure and report their GHG emissions and aligns with the Greenhouse Gas Protocol which has informed the development of ISO 14064:1 and the Carbon Trust Standard. This will help to ensure consistency with international reporting schemes, whilst the CRC is a UK statutory scheme with specific objectives.

This guidance differs from the CRC in the following ways:

- This guidance covers all UK organisations and there is **no size threshold for inclusion**. Government encourages all organisations to use the guidance to measure and report on their greenhouse gas emissions;
- This guidance **does not specify a minimum level of reporting**. Organisations are encouraged to follow the completeness principle and account for 100% of emissions.
- Under this guidance **the way you define your organisation may be different** from under the CRC. Please refer to Do I report on all parts of my organisation for more guidance on establishing your organisational boundary;
- This guidance covers **global emissions**. Please refer to Do I report on all parts of my organisation for further information;
- This guidance covers a **larger number of emission sources**. Organisations can measure and report on all emissions that they are responsible for – both direct emissions and indirect emissions. Please refer to What activities in my organisation release greenhouse gas emissions to find out what emissions are covered;
- This guidance covers **all 6 Kyoto greenhouse gases**. Please refer to Which greenhouse gases should I measure for further information on these greenhouse gases;
- Under this guidance, Greenhouse Gas Conversion Factors are updated annually. Please refer to How do I calculate my greenhouse gas emissions for further information on which conversion factors to use;
- Under the CRC, the emphasis is on reporting fuels and electricity consumed (regardless of generation) to drive energy efficiency, whilst under this guidance the own generation of electricity from renewable sources may be accounted for differently. Please refer to **What can I count as an emission** reduction for further information.
- Under this guidance, responsibility for emissions under landlord / tenant agreements is determined by the **terms and conditions of the lease**. For more guidance on how to account for these emissions, please refer to Do I include leased assets and activities I have outsourced (Annex E).

Annex D: Which of my operations do I include?

Step 1: Work out your organisational structure³²

If you wholly own all operations within your organisation you will measure and account for all the GHG emissions from all of these entities³³. Where you have operations which you do not wholly own you will need to identify the financial reporting relationship between the parent company and the other entities to identify how much of the GHG emissions from these other entities you are responsible for and should report³⁴.

Step 2: Choose an approach to identify which GHG emissions you have responsibility for in the operations in your organisation

Once you have identified the accounting classification for the operations, you need to decide which approach is best to use to report the GHG emissions you have responsibility for in your organisation. There are three established approaches:

Equity Share

The equity share reflects the extent of the rights a company has to the risks and rewards from an operation based on the company's equity interest. Equity share will therefore be the same as the ownership percentage.

Control approach

Control can be defined in either financial or operational terms. In most cases, whether an operation is controlled by the company or not does not vary based on whether the financial control or operational control criterion is used. A notable exception is the oil and gas industry, which often has complex ownership/operator structures.

- **Financial Control**

A company has financial control over the operation if the former directly or indirectly has the ability to direct the financial and operating policies of the latter with a view to gaining economic benefits from the operation's activities. For example, financial control usually exists if the organisation has the right to the majority of benefits of the operation. Similarly, an organisation is considered to financially control an operation if it retains the majority risks and rewards of ownership of the operation's assets.

A company has financial control over an operation for GHG accounting purposes if the operation is considered a subsidiary for the purposes of financial reporting, i.e., if the operation is fully consolidated in the reporting company's financial statements. This approach follows the guidance set out in International Financial Reporting Standards and in UK Generally Accepted Accounting Principles (GAAP), such that the economic substance of the relationship takes precedence over the legal ownership. Therefore a company may have financial control over an operation even if it has less than a 50 percent interest in that operation.

³² Terminology used:

"organisation" is a general reference only

"company" refers to the parent / reporting entity

"operations" refers to entities within the organisation and specific terms such as "subsidiary" are used when specifically required.

³³ Similar to financial reporting, an organisation that comprises of a group of entities reports its emissions for the group rather than for the parent company alone.

³⁴ The financial reporting relationship follows the accounting classification of the operations in your organisation (e.g. is the entity a subsidiary or an associate?).

Annex D: Which of my operations do I include?

- **Operational Control**

A company has operational control over an operation if the former or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation. Such arrangements commonly arise in the oil and gas industry, where one of the investors in a joint venture or consortium is nominated to operate the joint venture activity on behalf of other investors.

It is recommended that organisations apply their chosen approach consistently which for most organisations will be the financial control approach.

The financial control approach is often the preferred approach for the following reasons:

- An organisation takes full ownership of all GHG emissions that it can directly influence and reduce
- The accounting for the GHG emissions is aligned to International Financial Reporting Standards
- Managers can only be held accountable for the activities and hence the GHG emissions under their control and therefore performance management schemes can be used effectively
- Companies will have better access to GHG emissions data and will have greater control over its quality when collecting it from operations they control
- Companies will have more ability to demonstrate completeness of reporting as the information needed to determine organisational structure will already exist for financial reporting purposes
- Closer alignment with CRC

However you should use the equity approach or the operational control approach if that is more appropriate to your organisation.

Step 3: Apply your chosen approach

The approach you choose to consolidate your organisation's GHG emissions must be applied consistently to all your operations.

Financial control approach

For each operation you have identified in your organisational structure you need to identify if you have financial control over that operation.

The fourth column in table 1 sets out for each type of accounting category the percentage of GHG emissions which should be included in the total amount when reporting at the organisational level using the financial control approach.

Operational control approach

For each operation you have identified in your organisational structure you need to identify if you have operational control over that operation.

The fifth column in table 1 below sets out for each type of accounting category the percentage of GHG emissions which should be included in the total amount when reporting at the organisational level using the operational approach.

Equity share approach

For each operation you need to identify your ownership interest in the operation.

The third column in table 1 below sets out for each type of accounting category the percentage of GHG emissions which should be included in the total amount for the organisational level using the equity share approach.

Annex D: Which of my operations do I include?

Table 1: Accounting for GHG emissions

Accounting classification	Accounting definition	Accounting for GHG Emissions		
		Equity share approach	Financial control	Control Approach Operational control
Subsidiary	The investor controls the operation through its ability to direct the financial and operating policies of the operation with a view to gaining economic benefits. Typically, the investor holds more than 50% of the voting rights of the operation.	Equity share of GHG emissions	100% of GHG emissions	100 percent of GHG emissions (if operational control)
Associate	The investor has significant influence over the financial and operating policies of the operation but does not have control. Typically, the investor holds less than 50% of the voting rights of the operation.	Equity share of GHG emissions	0% of GHG emissions	100 percent of GHG emissions (if operational control) 0 percent of GHG emissions (if no operational control)
Jointly controlled entity / Incorporated joint venture	The investor enters into a joint venture agreement with other investor(s) to share control over the operation, which is incorporated.	Equity share of GHG emissions	0% of GHG emissions ³⁵	100 percent of GHG emissions (if operational control) 0 percent of GHG emissions (if no operational control)
Jointly controlled asset or operations / Unincorporated joint venture	The investor enters into a joint venture agreement with other investor(s) to share control over the operation, which is unincorporated.	Equity share of GHG emissions	Equity share of GHG emissions	100 percent of GHG emissions (if operational control) 0 percent of GHG emissions (if no operational control)
Other equity investments	The investor does not have control, joint control or significant influence over the operation.	0% of GHG emissions	0% of GHG emissions	0% of GHG emissions
Franchises	A franchise is a separate legal entity usually not under the financial or operational control of the franchiser, and which gives the franchise holder rights to sell a product or service. Where the franchiser holds an equity interest in the franchise, the treatments described above will apply.	0% of GHG emissions, unless the franchiser holds an equity interest	0% of GHG emissions unless the franchiser holds a controlling equity interest	100% share of GHG emissions (if the franchiser has operational control) 0% of GHG emissions (if the franchiser does not have operational control)

³⁵ Under International Financial Reporting Standards, jointly controlled entities may be accounted for using either the proportionate consolidation method or the equity method. Under UK GAAP, unincorporated joint ventures are accounted for using the gross equity method. The GHG Protocol assumes that the equity method is applied, as for associates.

Annex D: Which of my operations do I include?

Worked Example

Diagram 1 outlines the organisational structure for ABC Industries based on the economic interest held by ABC Industries.

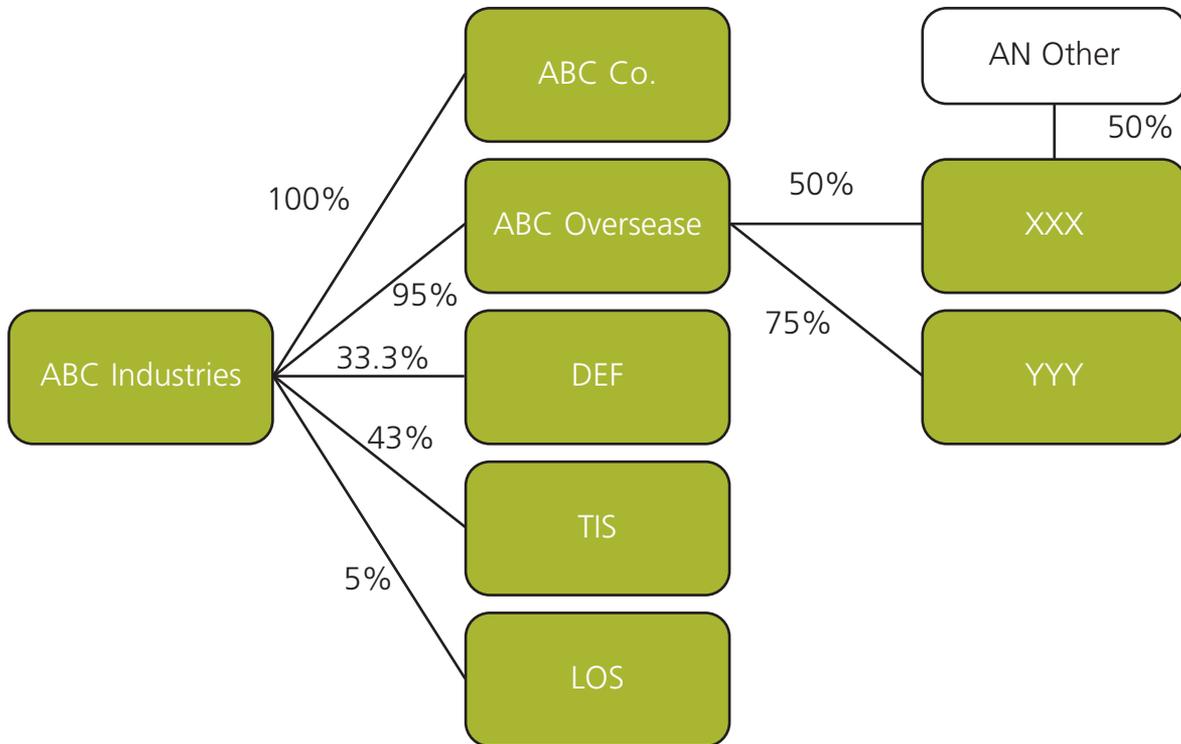


Table 2 sets out those GHG emissions for which ABC Industries has responsibility. The table demonstrates how you would apply the three established approaches for consolidating organisational wide emissions.

Annex D: Which of my operations do I include?

Table 2: Accounting for GHG Emissions within ABC Industries

Entities within ABC Industries	Economic interest held by ABC Industries	Nature of economic interest held by ABC Industries	Controlling entity	Accounting treatment in ABC Industries financial statements	GHG emissions reported		
					Equity share	Financial Control	Operational Control
ABC Co	100%	Subsidiary	ABC Industries	Fully consolidated	100%	100%	100%
ABC Overseas	95%	Subsidiary	ABC Industries	Fully consolidated	95%	100%	100%
XXX	50% by ABC Overseas	Unincorporated joint venture between ABC Overseas and AN Other	Franco has operational control	Proportionately consolidated	47.5% (50% x 95%)	50% (50% x 100%)	0%
YYY	75% by ABC Overseas	Subsidiary	ABC Overseas	Fully consolidated	71.25% (75% x 95%)	100%	100%
DEF	33.3%	Unincorporated joint venture with two other parties	ABC Industries has operational control	Proportionately consolidated	33.3%	33.3%	100%
TIS	43%	Associate	n/a	Equity method	43%	0%	0%
LOS	5%	Other equity investment	n/a	Carried at cost or fair value	0%	0%	0%

Step 4: Disclose the approach used

You should disclose the approach you are taking so that the user understands the basis underlying the collation of the GHG emissions information, and can better compare emissions performance across different organisations.

Additional guidance

- **Leases**

If you own leased assets you should follow the same consolidation approach for including the GHG emissions from the leased assets as you used for your organisational boundary. However you will need to know what type of lease applies to your assets. For further information on leases please go to Do I include leased assets and activities I have outsourced? (Annex E, page 40)

Annex E: Do I include leased assets and activities I have outsourced?

Leased assets

Many companies lease assets, for example, vehicles. This annex sets out how to account for GHG emissions associated with leased assets.

Step 1: Identify the type of contract used to obtain the leased assets

Leases can be classified into either finance or operating leases. The distinction between a finance lease and an operating lease will usually be evident from the terms of the contract between the lessor and the lessee.

- A finance lease transfers substantially all the risks and rewards of ownership of an asset to the lessee. The asset leased will be treated as an asset wholly owned by the lessee as defined in financial accounting standards and is recorded as such on the company's balance sheet.
- An operating lease is a lease other than a finance lease. The lessee will have operational control but not ownership or financial control.

If you are unclear if your assets are leased under a finance lease or an operating lease your company accountant or the Leasing Company will be able to provide you with this information.

Step 2: Apply your chosen organisational boundary

The approach you have chosen to determine your organisation's boundary will determine the emissions you report from your leased assets and if they should be categorised as scope 1, 2 or 3. (See part 3, page 8)

For a lessee

Using financial control³⁶ or equity approach: you should account for emissions from assets that you are leasing if the lease is a finance lease. If the lease is an operating lease it is optional whether you include your emissions from the assets obtained from this lease depending upon which scopes of emissions you are reporting. This is because the emissions from these assets which you are not deemed to own or have financial control over are classified as indirect emissions (scope 3). This is discussed in more detail later. If you do include these emissions from the operating lease you should disclose this.

Using operational control: You should only account for emissions from assets that you are leasing if the operational criterion applies: the lessee has the ability to track energy use and / or emissions from the lease. This criterion applies to assets hired under a finance lease and those assets hired under an operating lease. It is usually assumed that under an operating lease the lessee has operational control (but not ownership or financial control) and therefore the lessee should include these emissions if using the operational control approach.

	Type of lease	
	Finance	Operating
Equity share	Include	Optional
Financial control	Include	Optional
Operational control	Include	Include

³⁶ Financial control is the recommended approach

Annex E: Do I include leased assets and activities I have outsourced?

For a lessor

Using financial control or equity approach: you should account for emissions from assets that you are leasing to another organisation if the lease under which they have been hired is an operating lease. If the lease is a finance lease it is optional whether you include your emissions from the assets obtained from this lease depending upon which scopes of emissions you are reporting. If you do include these emissions from the finance lease you should disclose this.

Using operational control: it is optional whether you include your emissions from the assets obtained from both finance and operating leases depending upon which scopes of emissions you are reporting. If you do include these emissions you should disclose this.

	Type of lease	
	Finance	Operating
Equity share	Optional	Include
Financial control	Optional	Include
Operational control	Optional	Optional

Step 3: Determine in which scope direct emissions should be reported

For a lessee

Using financial control or equity approach: you should report direct emissions as scope 1 if the assets have been hired under a finance lease. If the assets were hired under an operating lease the direct emissions should be reported as scope 3 emissions.

Using operational control: you should report direct emissions as scope 1 for both finance and operating leases.

	Type of lease	
	Finance	Operating
Equity share	Scope 1	Scope 3
Financial control	Scope 1	Scope 3
Operational control	Scope 1	Scope 1 ³⁷

For a lessor

Using financial control or equity approach: you should report direct emissions as scope 3 if the assets have been hired under a finance lease. If the assets were hired under an operating lease the direct emissions should be reported as scope 1 emissions.

Using operational control: you should report direct emissions as scope 3 for both finance and operating leases.

³⁷ Some companies may be able to demonstrate that they do not have operational control over a leased asset held under an operating lease. In this case, the company may report these emissions as scope 3 but must explain why operational control is not perceived to hold.

Annex E: Do I include leased assets and activities I have outsourced?

	Type of lease	
	Finance	Operating
Equity share	Scope 3	Scope 1
Financial control	Scope 3	Scope 1
Operational control	Scope 3	Scope 3 ³⁸

Step 4: Determine in which scope purchased electricity should be reported

For a lessee

Using financial control or equity approach: you should report emissions from purchased electricity as scope 2 if the assets have been hired under a finance lease. If the assets were hired under an operating lease the emissions should be reported as scope 3 emissions.

Using operational control: you should report emissions as scope 2 for both finance and operating leases.

	Type of lease	
	Finance	Operating
Equity share	Scope 2	Scope 3
Financial control	Scope 2	Scope 3
Operational control	Scope 2	Scope 2

For a lessor

Using financial control or equity approach: you should report direct emissions as scope 3 if the assets have been hired under a finance lease. If the assets were hired under an operating lease the direct emissions should be reported as scope 2 emissions.

Using operational control: you should report direct emissions as scope 3 for both finance and operating leases.

	Type of lease	
	Finance	Operating
Equity share	Scope 3	Scope 2
Financial control	Scope 3	Scope 2
Operational control	Scope 3	Scope 3

³⁸ Some companies may be able to demonstrate operational control over an asset, leased to another company under an operating lease especially when operational control is not perceived by the lessee. Therefore the lessor can report these GHG emission as scope 1.

Annex E: Do I include leased assets and activities I have outsourced?

Outsourcing

There are certain arrangements that do not take the legal form of a lease but convey rights to use items for an agreed time period for payment, e.g. the outsourcing of an activity to be run by a third party which was previously done by the business. Common examples include HR services, IT services, Security, Call Centres.

Outsourcing is characterised by a multitude of different types of contractual arrangements. Therefore to categorise the emissions from an outsourced activity reference must be made back to the specific contract for that activity.

Typically an outsourcing arrangement will have a principal (one who employs another to act for him) and an agent (a person who acts for or represents another). For example, a law firm may outsource their IT function to an external IT company. In this case, the law firm will be the principal and the IT company will be the agent.

If the law firm has delegated total authority to the IT company for them to make all arrangements in relation to the IT function the emissions from the IT function will be included in the law firm's **scope 3 emissions** (rather than in the law firm's scopes 1 and 2). The IT company will include the emissions in its scopes 1 and 2.

Annex F: Which other indirect emissions should I measure and calculate?

Other indirect emissions (scope 3³⁹) are a consequence of your actions, which occur at sources which you do not own or control and which are not classed as scope 2 emissions. Other indirect emissions (scope 3) are often harder to measure than direct (scope 1) and energy indirect (scope 2) emissions because the data and tools needed are often not available. As a result, there is likely to be a higher degree of estimation and extrapolation and therefore lower levels of accuracy associated with your scope 3 emissions data. However if you measure your organisation's scope 3 emissions, you will get a more complete understanding of your organisation's total emissions and potential exposure to climate change risks. It will help you to understand the relative magnitude of, and possible changes in your scope 3 emissions. If you choose to measure your scope 3 emissions, you should focus on those emissions that are most **significant** for your organisation (Significant is explained below).

Where organisations work within an energy-intensive sector, your organisation may choose to use PAS 2050⁴⁰ (e.g. power sector, oil & gas, cement & lime, ceramics, chemicals, etc) to assess the lifecycle greenhouse gas emissions of your key goods and services. This will help your organisation to understand your emissions from a product-based perspective.

To identify and quantify your **significant** scope 3 emissions, you might find it helpful to follow the process set out below:

Step 1: Identify where your organisation sits in the supply chain

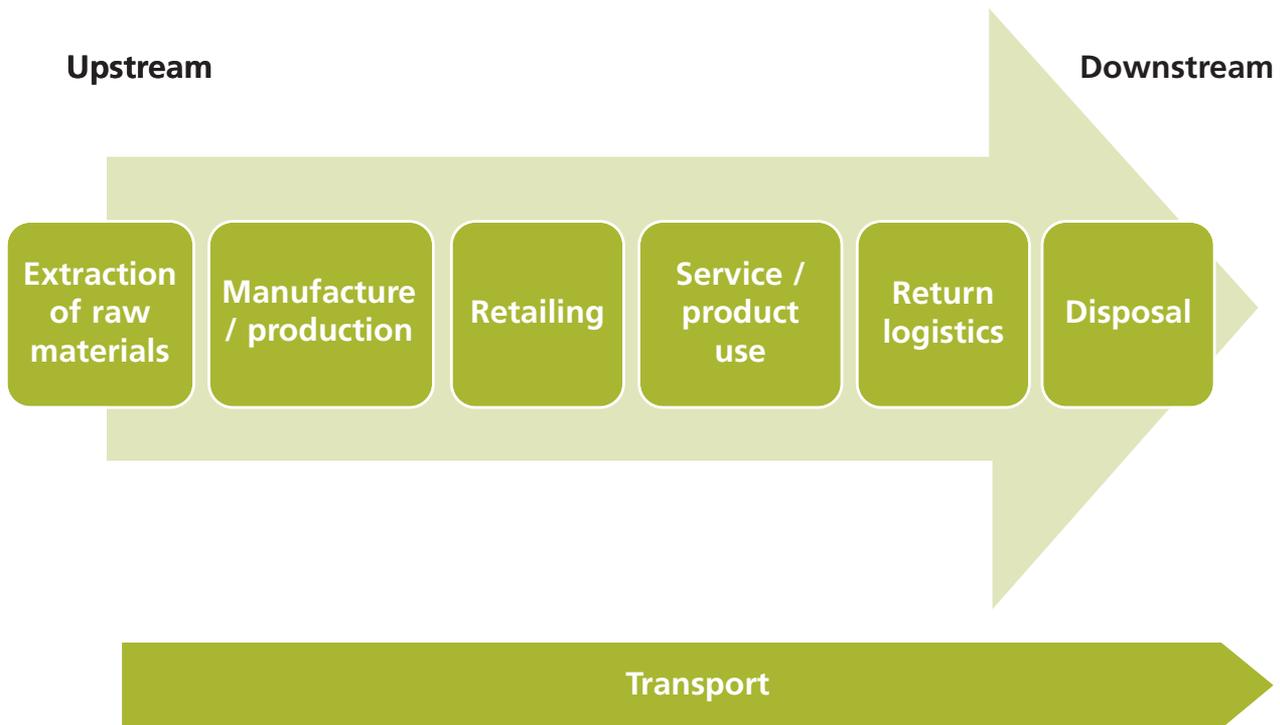
To start with, you should identify where your organisation sits in the supply chain. This will help you to determine the activities which are relevant to your organisation and from where you may need to collect data. A supply chain is the system of organisations, activities, technologies, information and resources that move a product or service from supplier to customer. Your organisation may sit in one specific area or within a number of different areas depending on the complexity of the supply chain. The diagram below should help you to determine where you sit in your supply chain:

³⁹ GHG Protocol Corporate Standard provides only limited guidance on scope 3 emissions. An additional Standard is currently being developed to provide additional guidelines on Corporate Scope 3 emissions accounting and reporting: <http://www.ghgprotocol.org/standards/product-and-supply-chain-standard>

⁴⁰ <http://www.bsi-global.com/Standards-and-Publications/How-we-can-help-you/Professional-Standards-Service/PAS-2050/>

Annex F: Which other indirect emissions should I measure and calculate?

An example supply chain:



Step 2: Map out activities connected with the operations of your organisation that you do not own or control

Once you have identified where you sit in your supply chain this should help you to map out the activities at operations which you do not own or control. This will help you to understand where you need to get activity data from for your scope 3 emissions and also enable you to engage with other organisations in your supply chain. It may be easier to do this in the form of a **flow chart** or **process map**.

The following table provides a checklist which should help you do this. Please note that this list is not exhaustive and there may be other GHG related activities that your organisation is connected with:

Emissions Category	Sub-Category
Purchased assets, materials and fuels	<ul style="list-style-type: none"> Extraction of materials and fuels (e.g. mining or drilling) Production of goods and services that are purchased or used by your organisation (e.g. buildings, plant & machinery, office equipment, vehicles, IT services) Water supply
Transport-related activities	<ul style="list-style-type: none"> Transportation of purchased materials or goods Transportation of purchased fuels Employee business travel by non-owned means (e.g. public transport, passenger air travel) Employees commuting to and from work Distribution of finished goods Transportation of waste

Annex F: Which other indirect emissions should I measure and calculate?

Emissions Category	Sub-Category
Electricity-related activities not included in scope 2	<ul style="list-style-type: none"> Extraction, production, and transportation of fuels consumed in the generation of electricity Purchase of electricity that is sold to an end user (reported by utility company) Generation of electricity that is lost in transmission and distribution to the end user (reported by end user)⁴¹
Leased assets, franchises and outsourced activities	<ul style="list-style-type: none"> Emissions from contractual relationships that are not included within your minimum required emissions due to the consolidation approach chosen (e.g. leased vehicles, tenanted buildings, IT data centres) For more guidance on treatment of leased assets, please refer to Do I include leased assets and activities I have outsourced?
Sold goods and services	<ul style="list-style-type: none"> Use of goods or services by consumer downstream.
Waste disposal	<ul style="list-style-type: none"> Disposal of waste generated in operations Disposal of waste generated in the production of purchased materials and fuels Disposal of sold goods and services at the end of their life Waste water

Step 3: Identify which scope 3 emissions are most significant

Only some types of emissions will be **significant** for your organisation. In order to determine which emissions are significant to your organisation, you should make an assessment of your other indirect emissions using the following 4 criteria. To determine which emissions are **significant**, it is recommended that organisations initially focus on scale and then use the remaining 3 criteria:

- **Scale:** What are the largest indirect emissions-causing activities with which your organisation is connected?
- **Importance to your business:** Are there any sources of GHG emissions that are particularly important to your business or increase the company's climate change risk, (e.g. electricity consumption in the case of consumer use of energy using products or emissions from vehicle use for motor manufacturers)?
- **Importance to stakeholders:** Which emission causing activities do your interested parties (e.g. customers, suppliers, investors) expect you to report?
- **Potential for reductions:** Where is there potential for your company to influence or reduce emissions from indirect emission activities?

In order to determine scale, you will need to screen your scope 3 emissions using a range of estimation approaches. Annex 13 of the 2009 Defra / DECC GHG Conversion Factors⁴² is a diagnostic tool that will help you to produce indicative estimates of the greenhouse gas emissions relating to the production of goods and services purchased by your organisation. You can use this tool in combination with other information (e.g. Defra / DECC GHG conversion factors, LCA emission factors⁴², staff surveys and customer use surveys) to estimate your scope 3 emissions by category.

It is recommended that your organisation develops a scope 3 emissions policy which clearly explains the approach and process for determining which scope 3 emissions are **significant**. If applicable, you should state any **significance threshold**⁴³ applied. It will help to refer to the concept of materiality when setting your **significance threshold**.

⁴¹ Electricity that is lost in transmission and distribution to the end user is accounted for in the UK 'grid rolling average' factor.

⁴² <http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>

⁴³ Significance threshold is a qualitative and / or quantitative criterion used to define significance.

Annex F: Which other indirect emissions should I measure and calculate?

Step 4: Collect activity / emissions data

The level of data availability and reliability may be a limiting factor when you try to calculate your other indirect GHG emissions. This is because you will often be relying on other people and organisations to measure and calculate their emissions in a transparent and consistent manner. As a result, accuracy will be lower.

Where possible, it is better to use actual activity / emissions data to calculate your emissions but estimates and extrapolation are acceptable where:

- you are transparent about your approach; and
- the data used is adequate to support the objectives for which you are measuring and reporting your GHG emissions.

Step 5: Quantify other indirect emissions

The Government provides a range of spreadsheets to help you calculate your indirect emissions. This is not an exhaustive list. As a result, both you and your suppliers may not be able to calculate all of your other indirect emissions. The Government will continue to develop further calculation tools that will help your organisation to quantify your other indirect emissions.

CASE STUDY: Highways Agency – Calculating and understanding the GHG emissions (including scope 3) associated with the construction, maintenance, and operation of the strategic road network, including work carried out by their supply chain.

To attempt to quantify the GHG emissions associated with works carried out on their behalf the Highways Agency needed two things; 1: quantities of materials/ resources used delivering the work, 2: appropriate conversion factors to convert the raw data into GHG / CO₂. They also needed a consistent and transparent approach for their data collection that could be utilised both internally and by their supply chain.

They developed a structured approach to data collection, based on gathering resource use information in workable units (e.g. tonnes of materials, kWh of electricity), using a spreadsheet based system tailored to different delivery arms of their business (and supply chain) which can be seen at www.ha-partnernet.org.uk/sustainability.

These sheets then calculated the CO₂e associated with these resources using a range of conversion factors, including DEFRA's. The most readily available source of construction materials conversion factors they could find was from the University of Bath; Inventory of Carbon and Energy (<http://www.bath.ac.uk/mech-eng/sert/embodied/>) and these have also been adopted by the Environment Agency for their construction carbon calculator.

In order to get their major supply chain partners to complete the carbon calculation returns they made it a requirement within their standards, Interim Advice Note 114/08, making quarterly carbon reporting for all of their Managing Agent, Major Project, and Design Build Operate and Finance contractors, a mandatory requirement.

They made the format of their returns quite prescriptive, to try and assist them in understanding where the numbers have come from and what they represent.

Annex F: Which other indirect emissions should I measure and calculate?

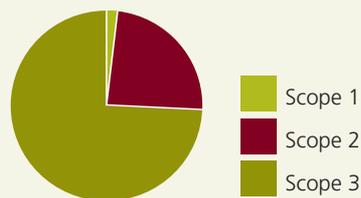
The Highways Agency published their first carbon footprint in their 2008/09 Annual report, circa 550,000 tCO₂e, which considers the emissions associated with their internal offices, network energy consumption, traffic office service, as well as the resources used by their supply chain delivering work on their behalf. Extracts of which are presented below, and more information can be seen on their website. This work is being used to develop their carbon reduction strategy, which would allow them to target the significant emissions sources associated with delivering their business.

Extracts from HA 2008/09 Annual Report

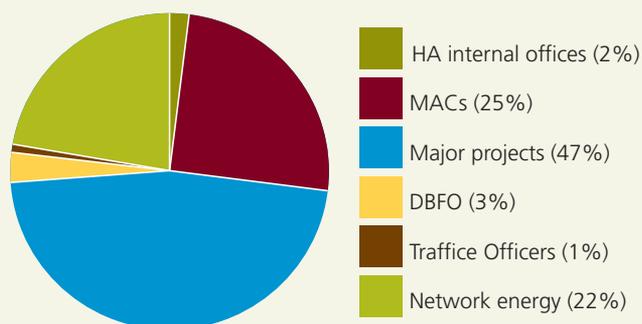
Table 1: Greenhouse gas (GHG) emissions (CO₂e, tonnes rounded to the nearest 10,000)

	This year 2008-09
Total Gross Emissions for Scope 1 (Direct GHG Emissions)	10,000
Total Gross Emissions for Scope 2 (Electricity Indirect Emissions)	130,000
Total Gross Emissions for measured Scope 3 items (Other indirect GHG Emissions)	410,000
Total Gross Emissions	550,000

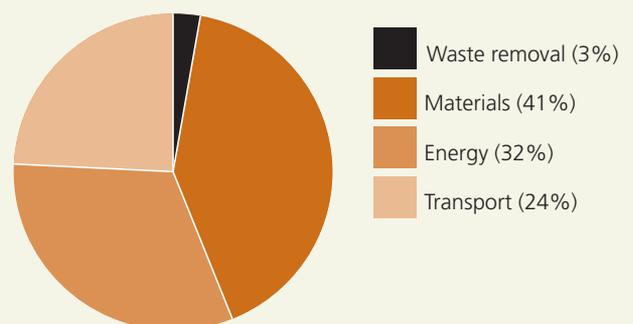
Figure I: Greenhouse gas (GHG) emissions by scope



Emissions by business area



Emissions by major source



Annex G: What can I count as an emission reduction?

When you report on your emissions reductions, it is important to be **transparent** about how you have done this. **Transparency** will help to promote greater credibility around your emission reduction claims.

Step 1: Reduce your own GHG emissions first

To reduce your GHG emissions, your organisation may carry out projects within your own operations or within your supply chain (e.g. energy efficiency measures, installation of on-site renewables, behaviour change programmes, supplier engagement initiatives).

We would recommend that organisations focus initially on these reductions as you can achieve cost savings by doing this. **Such internal GHG reductions will be accounted for in your reported gross CO₂e tonne figure as these internal projects will reduce emissions from within your own operations.** You may choose to provide supporting explanations on these internal GHG reduction activities.

Where your organisation generates electricity from 'owned or controlled' renewable sources backed by Renewable Energy Guarantees of Origin (REGOs)⁴⁴ within the UK:

- You should account for renewable electricity generated at zero emissions in Scope 1;
- You should account for all electricity purchased⁴⁵ for own consumption from the national grid or a third party at the 'Grid Rolling Average' factor (irrespective of the source of the electricity)
- You may report an emissions reduction in your **reported net CO₂e figure** for any renewable electricity that you have generated and exported to the national grid or a third party at the 'Grid Rolling Average' factor. The amount reported in this way should not exceed your actual electricity use⁴⁶. For a worked example of this, please refer to Box 1 (page 53).

Where your organisation generates heat from 'owned or controlled' renewable sources, you should account for renewable heat in the following way:

- Account for heat from renewable heat technologies such as solar thermal and air / ground source heat pumps using the 'Renewables' factor in Scope 1. You should separately account for any purchased electricity consumption associated with the use of these technologies at 'Grid Rolling Average' in Scope 2.
- Account for the direct carbon dioxide emissions associated with the combustion of biomass separately from the 3 'scopes' where biomass is used as a feedstock in heat generating technologies such as CHP plants. Direct emissions of nitrous oxide (N₂O) and methane (CH₄) associated with the combustion of biomass should be included within scope 1.

Where your organisation reduces its emissions through internal projects that could not take place without the carbon finance from selling carbon credits, these emission reductions will be accounted for in your **reported gross CO₂e tonne figure**. To promote transparency, you should account for any sold carbon credits in **your reported net CO₂e tonne figure**. For a worked example of this, please refer to Box 2 (page 54).

⁴⁴ Renewable Energy Guarantees of Origin (REGOs) are certificates which demonstrate that electricity has been produced from a renewable source of energy. One REGO is issued for each kilowatt hour (kWh) of eligible renewable electricity generated. REGOs are evidence of who has generated the electricity, and as such "back" the claim of the generator.

⁴⁵ i.e. supplied from national grid or third party for a consideration

⁴⁶ This means that total emissions reductions from generated renewable electricity (and green tariffs if appropriate) would not be greater than reported scope 2 emissions.

Annex G: What can I count as an emission reduction?

Step 2: Decide whether or not to purchase external emission reductions

In some situations, your organisation may choose to reduce your emissions through external GHG reduction projects that reduce GHG emissions outside your operations or your supply chain. This may be because GHG reductions can be achieved more practically or cost effectively from these external sources. **We recommend organisations list separately external GHG reduction activities which are not accounted for in their reported gross CO₂e tonne figure and provide a net CO₂e tonne figure.** You may do this where these external reduction activities meet Defra's good quality criteria set out below. For a worked example of this, please refer to Box 3 (page 54).

Step 3: Assess the quality of these external emission reduction projects

Defra has listed the different types of external GHG reduction activities and the 'good quality' criteria these reductions must meet to report on them as purchased or sold emission reductions within your **net CO₂e tonne figure**. These are listed in the tables below:

Carbon Offsetting

'Good Quality' Criteria

Additionality – Projects must demonstrate that they have produced a saving in carbon that would not have happened otherwise i.e. the project could not take place without the carbon finance from selling credits. The project must not be required by legislation or to demonstrate compliance against legally binding targets. This should be demonstrated via a project methodology developed by a recognised body.

Avoiding leakage – The project must demonstrate that it has not caused an increase in carbon emissions elsewhere. Leakage is when the carbon saving made at a project/location/time increase emissions elsewhere. An assessment must be made of any effects from the project whether up stream or downstream. This must be taken into account in determining the total emissions that can be sold from that project.

Permanence – If the project could be impermanent, (e.g. forestry projects are at risk of disease or fire) then this must be addressed by the project developer or offset provider. To achieve this, impermanent projects must be periodically independently reviewed and, if necessary, credits must be replaced when they expire or cease to be valid.

Validation and verification – The project must receive **independent verification**. The verifier must be an accredited and recognised independent third party. Purchasers of credits should also ensure that robust, independent validation and verification procedures were in place to check projects were implemented according to the methodology and subsequently monitored to ensure that emission reductions were properly measured.

Timing – Carbon credits should be ex-poste, that is, they must only have been issued from the project **after** the emissions reduction has taken place.

Avoiding double counting – A registry must be used to register, track and permanently cancel credits to avoid **double counting** or double selling. The project must not be double counted against another policy or mandatory targets.

Transparency – Credits should be supported by publicly available project documentation on a registry to set out the underlying projects (when they were considered approved and implemented), the quantification methodology applied and independent validation and verification procedures and reports for project and credits.

Where your organisation purchases carbon credits directly, it is recommended that organisations purchase Kyoto-compliant carbon credits. These are credits that are covered by one of the market based flexibility mechanisms under the Kyoto Protocol. This includes Certified Emission Reductions (CERs) and other credits⁴⁷. The purchase of Kyoto-compliant credits will ensure that the 'Good Quality' criteria are met. The purchase of credits meeting any of the voluntary offset standards will not meet these criteria automatically.

⁴⁷ For more information on the Kyoto Protocol, the market based flexibility mechanisms and the different types of credits see http://unfccc.int/kyoto_protocol/items/2830.php

Annex G: What can I count as an emission reduction?

Where your organisation uses an offset provider (rather than purchasing credits direct from a broker), you should purchase offsets that meet the Government's Quality Assurance Scheme for Carbon Offsetting⁴⁸. Under the scheme, only Kyoto-compliant carbon credits are eligible for approval⁴⁹. Please note that some offset providers selling offsets approved by this scheme also sell offsets that are not approved/Kyoto compliant – you should therefore check whether the offsets you purchase carry the quality mark.

Domestic projects cannot normally meet the good quality criteria (most probably in terms of additionality and avoiding double-counting). The carbon value of carbon credits originating from domestic projects may therefore not be clear cut and should not be claimed as an offset. This does not mean that it is always inappropriate to finance domestic projects; indeed doing so would be of benefit in helping the UK to meet its targets efficiently. But unless all the 'good quality' offsetting tests are met, organisations funding such projects should communicate their contribution in another way; for example, they could say: *'Rather than offset our unavoidable emissions and claim the credit for these emission reductions, [organisation name] has contributed £[cost] to [project name] in [location] in the UK. This project is expected to help the UK to meet its national target by reducing emissions by [number] tonnes of CO₂e from [start date] to [end date]'*.

Where organisations seek to quantify, monitor and report on emission savings associated with domestic greenhouse gas reduction projects, you may choose to refer to BS ISO 14064 – Part 2⁵⁰. Where organisations seek validation and verification of these domestic greenhouse gas reduction projects, you may choose to refer to BS ISO 14064 – Part 3⁵¹.

Green Tariffs

Green tariffs are electricity tariffs marketed as having environmental credentials.

'Good Quality' Criteria

SMEs as defined under OFGEM's Final Green Supply Guidelines

To be considered a purchased emission reduction, green tariffs should be certified under the independent certification scheme based on OFGEM's green supply guidelines⁵².

All other organisations not defined as SMEs under OFGEM's Final Green Supply Guidelines

Green tariffs should meet the following criteria for an organisation to consider them an emissions reduction. Organisations should check with their renewable electricity tariff supplier to see how they meet these criteria:

Evidence of supply – You should check with your electricity supplier to ensure that they are able to provide evidence of supply, equivalent to that required in OFGEM's Final Green Supply Guidelines (paras 1.16 to 1.18).

Additionality – There must be an additional carbon saving (CO₂e) achieved through the purchase of a green tariff that would not have happened otherwise. The measure of additionality that qualifies is **carbon offsetting**. The conditions are:

- The tariff supplier can only offset using Kyoto-compliant carbon credits.
- The tariff supplier must offset at least 50% of the carbon emissions from the tariff⁵³.

48 www.decc.gov.uk/offsetting

49 The Scheme also requires offset providers to calculate emissions accurately, to offer transparent information about the projects involved, the role of offsetting in tackling climate change and about pricing.

50 <http://www.bsi-global.com/en/Standards-and-Publications/Industry-Sectors/Environment/more-products/BS-ISO-14064-22006/>

51 <http://www.bsi-global.com/en/Standards-and-Publications/Industry-Sectors/Environment/more-products/BS-ISO-14064-32006/>

52 For OFGEM's Final Green Supply Guidelines please refer to <http://www.ofgem.gov.uk/Sustainability/Environment/Policy/Documents/1/Green%20supply%20guidelines%20final%20proposals%20open%20letter.pdf>

53 The tariff supplier should apply a 'Grid Rolling Average' factor to the electricity supplied under the tariff to determine the GHG emissions associated with the tariff. Tariff suppliers should not account for GHG emissions based on the fuel supply mix.

Annex G: What can I count as an emission reduction?

'Good Quality' Criteria (cont'd...)

- Where the tariff supplier purchases Kyoto-compliant credits through an offset provider, the offsets used must be compliant with the Government's quality assurance scheme for carbon offsetting.

You should check with your electricity supplier to ensure that they are able to provide evidence of the percentage and quality of carbon offsetting undertaken.

It is recommended that organisations should only claim an emission reduction in their **net CO₂e tonne figure** where electricity purchased meets the 'Good Quality' criteria and, in this case, the emission reduction reported should be based on the additional carbon saving associated with the tariff. Your electricity supplier will be able to provide you with the level of additional carbon savings achieved through their tariff.

For example, the electricity supplier offsets 50% of the emissions from the tariff using carbon credits. As a result, your organisation would report a 50% reduction of emissions within their **net CO₂e tonne figure** based on their corresponding scope 2 figure. This is illustrated in Box 3.

Step 4: Report on these external emission reductions to promote greater transparency

Where GHG reduction activities meet the 'good quality' criteria listed in step 3, it is recommended you provide supporting explanations on purchased or sold emission reductions.

Where your organisation is carbon offsetting, you should provide the following information as a minimum:

- The reduction in tonnes of CO₂e per year
- Type of carbon credit (Kyoto-compliant or non-Kyoto compliant credit)
 - If carbon credits are Kyoto-compliant, organisations should specify which external GHG programme has approved them (e.g. the Clean Development Mechanism, Joint Implementation), provide the name of the supplier and a hyperlink to the project documentation where possible.
 - If carbon credits are non-Kyoto compliant, organisations should provide the name of the supplier, a hyperlink to the project documentation where possible, details of who developed the quantification methodology, how the project was validated and verified, and how other 'good quality' criteria were met.

Where your organisation is purchasing a green tariff, you should provide the following information as a minimum:

- The reduction in tonnes of CO₂e per year
- The supplier
- The name of the tariff
- The additional carbon saving. This should be a percentage (%) of the tariff based on the additional carbon saving delivered by the tariff.

Annex G: What can I count as an emission reduction?

Worked examples

BOX 1

A hotel in Scotland generates electricity from its own wind turbine and uses this electricity to meet the energy needs of the hotel. Any surplus is sold to the grid. However, occasionally they need to purchase electricity from the grid when they experience a high demand and this electricity is reported at grid average. Their corporate greenhouse gas emissions would be reported as follows:

Scope 1 emissions

Electricity generation from wind turbine (3MW surplus generated is sold to the grid)	0
---	---

Scope 2 emissions

Purchased electricity (grid average)	1.5
--------------------------------------	-----

Scope 3 emissions

Transport etc	3.5
---------------	-----

Total annual gross emissions (tCO₂e/year)	5
---	----------

Netted off renewable electricity exported to grid up to total amount of electricity purchased and consumed by organisation	(1.5)
--	-------

Total annual net emissions (tCO₂e/year)	3.5
---	------------

The supporting narrative to the company's accounts explains that they previously had a gross emissions of 9 tonnes per annum but installation of the wind turbine has allowed them to show a significant reduction.

Electricity Generation Note

10 MW of electricity has been generated during the reporting period from our wind turbine (backed by REGOs)

2.75 MW of electricity has been exported to the grid

10 ROCs have been sold.

Annex G: What can I count as an emission reduction?

BOX 2

In this example, a project developer buys land in China and builds a wind farm. As a result, the project developer emits 15,000 tonnes of CO₂e in the reporting period associated with the development and construction of their wind farm. This is reported in their scope 1 and 2 figures. The generation of renewable electricity from their wind farm does not create any emissions. To finance the wind farm project, the project developer sells 10,000 carbon credits to other organisations. These other organisations use these carbon credits to offset some of their emissions. To promote greater transparency, the project developer shows the sale of these 10,000 carbon credits in **their reported net CO₂e tonne figure**.

Scope 1 emissions	5,000
Scope 2 emissions	10,000
Total annual gross emissions (tCO₂e/year)	15,000
<hr/>	
Sold carbon credits	10,000
Total annual net emissions (tCO₂e/year)	25,000

BOX 3

In this example, a clothing manufacturer decides to reduce their emissions through purchasing carbon offsets and a green tariff that meet the good quality criteria set out by Defra. This does not impact on their reported Scope 2 figure where they apply a 'Grid Rolling Average' emission factor to their purchased green tariff electricity.

Scope 1	15,000
Scope 2	10,000
Total annual gross emissions (tCO₂e/year)	25,000
<hr/>	
Purchased Carbon Offsets ¹	(5,000)
Purchased Green Tariff ²	(5,000)
Total annual net emissions (tCO₂e/year)	15,000

1 We purchased 5,000 carbon credits from Carbon Offsetting Ltd. The credits are from Project 0939: Yutan Hydroelectric Project. The credits are Kyoto-compliant Certified Emission Reductions (CERs) covered by the Clean Development Mechanism (CDM). Project documentation can be found here: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1171524749.54/view>

2 We purchased all our electricity from Green Electricity Ltd. We use their Eco + green tariff. This tariff is certified under the independent certification scheme based on OFGEM's Final Green Supply Guidelines. The Eco + tariff offsets 50% of the carbon emissions from the tariff using Kyoto-compliant Certified Emission Reductions (CERs). Therefore we have reduced our emissions from the consumption of purchased electricity by 50%. This equates to a carbon saving of 5,000 tonnes of CO₂e per year.

Annex H: How to make emissions data more useful?

Emissions data can be normalised by dividing your emissions by an appropriate activity metric (e.g. floor space, Full Time Equivalents) or financial metric (£ million sales). The resulting normalised data is called an intensity ratio.

Normalising your emissions data is useful because it facilitates:

- Comparison over time
- Comparison across different business sectors and products

It is recommended that an organisation reports an intensity ratio (for its scope 1 & 2 emissions). This can be either an activity ratio or a financial ratio.

Intensity ratios express GHG impact per unit of physical activity (an activity ratio) or unit of economic output (financial ratio). An activity ratio is suitable when aggregating or comparing across businesses that have similar products. A financial ratio is suitable when aggregating or comparing across businesses that produce different products.

We recommend you use the intensity ratio which is most relevant to your organisation and will provide the most context to users of this information. If your organisation has many varied business operations e.g. a travel company which owns its own planes and also owns its hotels you may wish to calculate separate activity ratios for each activity i.e. one for the planes and one for the hotels.

This guidance sets out below some examples, by sector, of activity and financial intensity ratios⁵⁴.

Sector	Intensity measurement	Example
All	Tonnes of CO ₂ e per total £m sales revenue	$\frac{\text{CO}_2\text{e tonnes}}{\text{Total £million sales}}$ $\frac{7,500 \text{ CO}_2\text{e tonnes}}{\text{£100 million sales}}$ <p>= 75 intensity ratio</p>
	Tonnes of CO ₂ e per £m Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA)	$\frac{\text{CO}_2\text{e tonnes}}{\text{£million EBITDA}}$ $\frac{20000 \text{ CO}_2\text{e tonnes}}{\text{£100 million EBITDA}}$ <p>= 200 intensity ratio</p>
	Tonnes of CO ₂ e per full time equivalents	$\frac{\text{CO}_2\text{e tonnes}}{\text{full time equivalent}}$ $\frac{800 \text{ CO}_2\text{e tonnes}}{800 \text{ full time equivalents}}$ <p>= 1 intensity ratio</p>

⁵⁴ A number of these intensity ratios have been sourced from the Carbon Disclosure Project (CDP)

Annex H: How to make emissions data more useful?

Sector	Intensity measurement	Example
Integrated oil and gas	<p>Tonnes of CO₂e per tonne of output, broken down for:</p> <ul style="list-style-type: none"> • Exploration and production • Refining • Petrochemicals 	$\frac{\text{CO}_2\text{e tonnes}}{\text{Tonnes output}}$ <p>For refining only:</p> $\frac{8,000 \text{ tonnes CO}_2\text{e}}{10,000 \text{ tonnes of output}}$ <p>= 0.8 intensity ratio</p>
Transport sectors	<p>Tonnes of CO₂e per revenue tonne kilometre (RTK – revenue from transporting one tonne over a distance of one kilometre)</p>	$\frac{\text{CO}_2\text{e tonnes}}{\text{Revenue tonne kilometres}}$ $\frac{55,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ tonne kilometres}}$ <p>= 5.5 intensity ratio</p>
	<p>Tonnes of CO₂e per pallet cases</p>	$\frac{\text{CO}_2\text{e tonnes}}{\text{Total number of pallet cases}}$ $\frac{40,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ pallet cases}}$ <p>= 4 intensity ratio</p>
Passenger carrying sector	<p>Grammes of CO₂e per passenger kilometre</p>	$\frac{\text{CO}_2\text{e grammes}}{\text{passenger kilometres}}$ $\frac{9,000 \text{ CO}_2\text{e grammes}}{450 \text{ passenger kilometres}}$ <p>= 20 intensity ratio</p>
Beverages	<p>Grammes of CO₂e per total litres of beverage eg beer, spirit</p>	$\frac{\text{CO}_2\text{e grammes}}{\text{Litres of beer}}$ $\frac{10,000 \text{ CO}_2\text{e grammes}}{1,000 \text{ Litres of beer}}$ <p>= 10 intensity ratio</p>
Retail	<p>Tonnes of CO₂e per square metre of gross store area</p>	$\frac{\text{CO}_2\text{e tonnes}}{\text{Square metres of gross store area}}$ $\frac{16,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ square metres of gross store area}}$ <p>= 1.6 intensity ratio</p>

Annex H: How to make emissions data more useful?

Sector	Intensity measurement	Example
Banking	Tonnes of CO ₂ e per £ million of income	$\frac{\text{CO}_2\text{e tonnes}}{\text{£ million of income}}$ $\frac{500 \text{ CO}_2\text{e tonnes}}{\text{£600 million of income}}$ <p>= 0.833 intensity ratio</p>
Manufacturing	Tonnes of CO ₂ e per total tonnes of production	$\frac{\text{CO}_2\text{e tonnes}}{\text{Total tonnes of production}}$ $\frac{6,700 \text{ CO}_2\text{e tonnes}}{800 \text{ tonnes of production}}$ <p>= 8.375 intensity ratio</p>
Postal services	Grammes of CO ₂ e per 1000 items	$\frac{\text{CO}_2\text{e grammes}}{1000 \text{ items}}$ $\frac{5,500 \text{ CO}_2\text{e grammes}}{1,000 \text{ items}}$ <p>= 5.5 intensity ratio</p>
Water utilities	Tonnes of CO ₂ e per megalitre broken down by clean and wastewater.	<p>Clean water</p> $\frac{\text{CO}_2\text{e tonnes}}{\text{Megalitres}}$ $\frac{40,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ Megalitres}}$ <p>= 4 intensity ratio</p> <p>Wastewater</p> $\frac{\text{CO}_2\text{e tonnes}}{\text{Megalitres}}$ $\frac{350,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ Megalitres}}$ <p>= 35 intensity ratio</p>
Electricity utilities	Tonnes of CO ₂ e per megawatt hour	$\frac{\text{CO}_2\text{e tonnes}}{\text{Megawatt hours}}$ $\frac{9,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ Megawatt hours}}$ <p>= 0.9 intensity ratio</p>

Annex H: How to make emissions data more useful?

Sector	Intensity measurement	Example
Telecommunications, internet software and services	Tonnes of CO ₂ e per gigabyte transmitted	$\frac{\text{CO}_2\text{e tonnes}}{\text{Gigabytes}}$ $\frac{1,200 \text{ CO}_2\text{e tonnes}}{10,000 \text{ Gigabytes}}$ <p>= 0.12 intensity ratio</p>
Property sector	Tonnes of CO ₂ e per total square metres	$\frac{\text{CO}_2\text{e tonnes}}{\text{Total square metres}}$ $\frac{1,000 \text{ CO}_2\text{e tonnes}}{10,000 \text{ total square metres}}$ <p>= 0.1 intensity ratio</p>

Directors Report

You will wish to outline your climate change strategy to provide context to your emissions balance sheet (an example of reported emissions is given below). It is suggested that you should also identify the risks and opportunities that climate change poses to your business; and demonstrate how you address, or plan to address them.

GHG emissions data for period 1 January 2010 to 31 December 2010			
	Global tonnes of CO ₂ e		
	2010	2009	Base Year 2006
Scope 1	17,100	17,500	13,120
Scope 2	14,500	15,100	10,000
Scope 3	9,410	10,415	12,990
Total gross emissions	41,010	43,015	36,110
Carbon offsets	(5,000)		
Green tariff	(7,250)	(9,800)	
Total annual net emissions	28,760	33,215	36,110
Intensity measurement 'Tonnes of CO₂e per tonne of output'	0.49	0.54	0.52

Example supporting explanations for a large company

1. Company Information

XX is a public limited company, incorporated in the UK. Registered address is 1 New Street, London, SW1 1AA.

2. Reporting period

1 January 2010 – 31 December 2010

3. Change in Emissions

Our reported emissions have fallen this year because we have invested in more energy efficient process equipment in our operations.

4. Approach

We have followed the Government's Guidance on how to measure and report greenhouse gas emissions

5. Organisational boundary

We have used the financial control approach

6. Operational scopes

We have measured our scope 1, 2 and significant scope 3 emissions.

Annex I: Example Report template

	GHG emissions 2010 in tonnes of CO ₂ e ⁵⁵	State specific exclusions and % this represents for relevant scope (excluding geographic exclusions)
Scope 1		
Gas consumption	3,600	
Owned transport	1,500	
Process emissions	12,000	
Fugitive emissions		Emissions from air conditioning and refrigeration units in office buildings excluded due to cost of data collection. These account for less than 0.5% of total scope 1 emissions
Total scope 1	17,100	
Scope 2		
Purchased electricity	14,500	
Total scope 2	14,500	
Significant Scope 3		
Business travel	6,190	
Employee commuting	690	
Waste Disposal	2,530	
Product in use	Not calculated	
Total significant scope 3	9,410	

7. Geographic break down

Geographical breakdown			
2010	Tonnes of CO ₂ e		
	Scope 1	Scope 2	Scope 3
Total global	17,100	14,500	9,410
UK	3,000	14,500	1,760
US	11,100	0	5,000
South Africa	3,000	0	2,650
Mongolia	N/A	N/A	N/A

Emissions from facilities in Mongolia excluded as these are newly acquired operations which did not exist in our base year. We estimate that this is less than 2% of total scope 1 and 2 emissions.

⁵⁵ If you have used EU ETS and /or CRC data please state

8. Base Year

Our base year is 2006 which we set using a fixed base year approach.

Our base year recalculation policy is to recalculate our base year and the prior year emissions for relevant significant changes which meet our significance threshold of 5% of total base year emissions.

We have recalculated our base year to account for:

- a. The sale of our facilities and operations in Kazakhstan which accounted for 2,000 tonnes of CO₂e emissions in the base year.

9. Targets

Our emissions reduction target is to reduce our global GHG emissions, scopes 1, 2, and 3 (for scope 3 only those emissions which relate to business travel) per million tonnes of product output by 10% from 2006 to 2011.

Our progress towards reaching this target is good and we expect to meet this target in 2011.

Allan Woods, Managing Director and Paul Smith, Chief Operating Officer are responsible for the achievement of the target.

10. Intensity measurement

We have chosen 'Tonnes of CO₂e per tonne of output' as this is the common business metric for our industry sector.

Our intensity measurement has fallen this year as we have invested £5 million in more energy efficient process equipment in our operations in the USA.

11. External Assurance Statement

We have received an independent external assurance statement from xxx.

To see the external assurance statement please go to www.xx.co.uk.

12. Carbon offsets

We have purchased carbon credits which reduce our GHG emissions by 5,000 tonnes.

The credits are Kyoto-compliant Certified Emission Reductions (CERs) covered by the Clean Development Mechanism (CDM). These carbon credits were supplied by Carbon Offsetting Ltd. The credits are from Project 0939: Yutan Hydroelectric Project. Project documentation can be found here: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1171524749.54/view>

13. Green tariffs

We have purchased a green tariff which reduces our GHG emissions by 7,250 tonnes.

We purchased all our electricity from Green Electricity Ltd. We use their Eco + green tariff.

This tariff is certified under the independent certification scheme based on OFGEM's Final Green Supply Guidelines. The Eco + tariff offsets 50% of the carbon emissions from the tariff using Kyoto-compliant Certified Emission Reductions (CERs reducing our emissions from the consumption of purchased electricity by 50%).

Annex J: Recalculating your base year⁵⁶

It may be difficult to compare your organisation's current GHG emissions with your base year emissions as a result of changes in your organisational structure or in the approach used to measure your emissions. Therefore, to be able to compare "like with like", over a period of time you may need to recalculate your base year emissions data. The guidance set out below is applicable where your organisation is using a **"fixed base year"** approach, which is essentially a fixed point in the past against which to compare your current emissions.

1. Develop a base year recalculation policy

It is recommended that your organisation develops a base year recalculation policy which clearly articulates the basis for any recalculation to your base year. We recommend that you only recalculate your base year if the changes meet your **significance threshold**.

In determining your significance threshold you may want to take into account the cumulative effect on your base year emissions of different scenarios.

You may wish to recalculate GHG emissions data for all years between the base year and the reporting year or just the prior year and the reporting year following a base year recalculation.

In some circumstances, it may be simpler to roll your base year forward to your current reporting year following very large structural changes or mergers. However, where possible you should recalculate your base year as this will help you to keep tracking your performance over time.

2. Determine whether the base year needs to be recalculated

To determine whether you need to recalculate your base year, you will need to follow the following process:

- Identify any changes that have occurred in the reporting period which may require you to recalculate your base year
- Apply the rules in the table below to help to determine which changes may require a base year recalculation

Change Scenario	Base Year Recalculation
Mergers, Acquisitions, Divestitures	
1. Acquisition of (or insourcing) a facility from another company. This facility existed in your base year	Recalculate your base year to include the emissions from the new facility (at the level the emissions were in your base year). In respect of insourcing recalculate your base year if the acquired emissions were not included in your base year emissions total and will be included in your current year's total.
2. Acquisition of (or insourcing) a facility that did not exist in your base year	No base year recalculation required.

⁵⁶ For further guidance on how to recalculate your base year refer to Chapter 5 of the GHG Protocol <http://www.ghgprotocol.org/standards/corporate-standard>

Annex J: Recalculating your base year

Change Scenario	Base Year Recalculation
Mergers, Acquisitions, Divestitures	
3. Disposal of (or outsourcing) a facility to another company. This facility existed in your base year	Recalculate your base year to subtract the emissions from the disposed facility (at the level the emissions were in your base year). In respect of outsourcing recalculate your base if the outsourced emissions were included in your base year emissions total and will not be included in your current year's emissions total.
4. Disposal of (or outsourcing) a facility to another company. This facility did not exist in your base year	No base year recalculation required
5. Transfer of ownership/ control of emissions sources. This includes changes in lease status	Increased ownership should be treated in the same way as a new acquisition (follow rules for scenarios 1 and 2 above). Decreased ownership should be treated in the same way as a disposal (follow conditions for scenarios 3 and 4 above).
Organic Growth and Decline	
6. Organic growth <ul style="list-style-type: none"> • Increase in production output • Change in product mix • Opening of new plants or operating units owned or controlled by the company 	No base year recalculation required
7. Organic decline <ul style="list-style-type: none"> • Decrease in production output • Changes in product mix • Closing of plants or operating units owned or controlled by the company 	No base year recalculation required
Changes in Quantification Methodologies / Errors	
8. Changes in emission factors or methodologies (eg change in activity data) that reflect real changes in emissions (i.e. changes in fuel type or technology)	No base year recalculation required
9. Changes in measurement methodologies, improvements in the accuracy of emission factors/ activity data, or discovery of previous errors/ number of cumulative errors	Recalculate base year emissions to be consistent with new approach or to correct errors

- Where there have been changes for which it is recommended you recalculate your base year establish if these meet the **significance threshold** in your base year recalculation policy.

If a recalculation of the base year is required for a structural change which occurred in the middle of the reporting year, it is recommended that base year emissions are recalculated for the entire year not just the period from the structural change onwards. If it is not possible to recalculate in that reporting year due to lack of data, recalculation can be carried out in the following year.

Do I need to recalculate my base year if Government's emission factors change?

Only in certain cases will you need to recalculate your previous year's emissions for changes in Government's emission factors. Please refer to the Introduction in the 2009 Defra / DECC GHG conversion factors for further explanation on what to do following updates to emissions factors.

Annex K: How do I set my emissions target?

In order to set a robust and achievable reduction target, organisations should follow Defra's recommended approach below:

Step	Guidance
Obtain senior management commitment to the setting of a reduction target	Engaging senior management will be necessary in order to: <ul style="list-style-type: none"> Establish internal accountability for your targets, Create an incentive system, and Provide resources to meet your target.
Decide on the target type	There are two types of emissions reduction targets that you can set – absolute or intensity based. See Part 11 of the Guidance for advantages and disadvantages of each.
Decide on the target boundary	The target boundary defines which GHGs, geographic operations, sources and activities are covered by the target. The target and your corporate carbon footprint boundary may be identical or the target may only cover a specific subset of your corporate carbon footprint. For example, you may decide to focus only on regulated emissions under emissions trading schemes.
Choose the target base year	There are two approaches to setting your base year: <ul style="list-style-type: none"> Using a fixed target base year. Most targets are defined against a fixed target base year. Using a rolling target base year. Organisations roll forward their base year at regular intervals, usually one year, so that emissions are always compared to the previous year. It is important to ensure that the emissions data for your target base year is reliable and verifiable.
Define the target completion date	This determines whether the target is short or long term. A five year target period may be the most practical for organisations with shorter planning cycles whereas a ten year target may help future planning for large capital investments.
Decide on the use of GHG offsets or credits	You can meet your GHG target either through reducing emissions within your own operations and your supply chain or through purchasing credits from emission reduction projects (e.g. carbon offsets). Organisations should prioritise reducing emissions within your own operations and your supply chain. For further information on carbon offsetting, you should refer to What can I count as an emission reduction? (Annex G, page 49)
Decide on target level	In determining what target levels to set, you should consider the key drivers affecting GHG emissions in your organisation by looking at: <ul style="list-style-type: none"> The relationship between GHG emissions and your other business metrics (e.g. number of employees, sales, revenue) Emissions projections based on different reduction strategies Existing initiatives or business targets that will affect your GHG emissions (e.g. capital investments, product / service changes, environmental or energy plans) The future of the organisation as it relates to GHG emissions (e.g. factoring in growth factors such as new production plans) Benchmarking your organisation with similar organisations. You should set more challenging targets if you have not previously invested in energy or other GHG reductions.
Track and report progress	You should carry out regular performance checks to track performance against your target. An interim target may help you to keep a closer track on your performance. A rolling target base year will automatically include interim targets every year. For further guidance on what you should report, please refer to Part 8: What do I need to report?

Summary of recommendations

1	Apply your chosen approach consistently and for most organisations this will be the financial control approach.
2	Measure or calculate your total emissions on a global basis.
3	Measure or calculate emissions that fall into your scopes 1 and 2. Discretionary: Measure or calculate your significant scope 3 emissions in addition to your scopes 1 and 2.
4	Measure or calculate emissions from all six GHGs covered by the Kyoto Protocol.
5	Where your organisation is using standard emission factors, you should use the Defra / DECC emission factors for UK emissions. If you require other emission factors, you should refer to the emission factors in the GHG Protocol calculation tools.
6	Report total GHG emissions as a gross figure in tonnes of CO ₂ e.
7	Report on purchased or sold emissions reductions that meet Defra's emission reduction criteria. Then report a net figure in tonnes of CO ₂ e, in addition to the gross figure.
8	Report on total scopes 1 and 2 emissions using an intensity ratio.
9	Provide supporting explanations.
10	Choose and report on a base year. Your base year should be: The earliest year that verifiable emissions data is available for either a single year, or a multi-year average (e.g. 2006-2008).
11	Develop a base year recalculation policy. Update your base year following significant changes that meet your significance threshold.
12	Set a reduction target and choose the approach to use.

Absolute target. A target defined by reduction in absolute emissions over time, e.g. reduce CO₂ emissions by 25 percent below 1994 levels by 2015.

Activity data. Information on material flow, volume and rates of fuel consumption, input materials, or production output that is used to calculate GHG emissions.

Additionality. A criterion for assessing whether a project has resulted in GHG emission reductions or removals compared to what would have occurred in its absence. This is an important criterion when the goal of the project is to offset emissions elsewhere.

Associate. The parent company has significant influence over the operating and financial policies of the associate, but not financial control.

Base year. A historical specific year against which a company's emissions are tracked over time.

Base year emissions. GHG emissions in the base year.

Biofuels. "biofuels" means liquid or gaseous fuel for transport produced from biomass; biomass is organic material of recent plant or animal origin.

Biomass. Non-fossilized and biodegradable organic material originating from plants, animals, and micro-organisms, including products, byproducts, residues and waste from agriculture, forestry and related industries as well as the non-fossilized and biodegradeable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradeable organic material.

Boundaries. GHG accounting and reporting boundaries can have several dimensions, i.e., organisational, operational, geographic, business unit, and target boundaries. The boundary determines which emissions are measured or calculated and reported by the organisation.

Calculation tools. Tools that automate the calculation of GHG emissions.

Cap and trade system. A system that sets an overall emissions limit, allocates emissions allowances to participants, and allows them to trade emissions credits with each other.

Carbon dioxide equivalent (CO₂e). A universal unit of measurement used to indicate the global warming potential of a greenhouse gas, expressed in terms of the global warming potential of one unit of carbon dioxide. It is used to evaluate the releasing (or avoiding releasing) of different greenhouse gases against a common basis.

CRC. A statutory UK scheme aimed at driving improvements in energy efficiency.

Climate Change Act 2008. The world's first long term legally binding framework to tackle the dangers of climate change. The Climate Change Bill was introduced into Parliament on 14 November 2007 and became law on 26th November 2008.

Co-generation unit/combined heat and power (CHP). A facility producing both electricity and steam/heat using the same fuel supply.

Consolidation. Combination of GHG emissions data from separate operations that form part of one company or group of companies.

Control. The ability of a company to direct the operating policies of another operation. More specifically, it is defined as either operational control (the organisation or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation) or financial control (the organization has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities).

Corporate carbon footprint. The total direct and indirect GHG emissions that an organisation is responsible for as a result of its business activities.

Direct GHG emissions. Emissions from sources that are owned or controlled by the reporting company.

Direct monitoring. Direct monitoring of exhaust stream contents in the form of continuous emissions monitoring (CEM) or periodic sampling.

Double counting Two or more reporting companies take ownership of the same emissions or reductions.

Energy indirect. Emissions released into the atmosphere associated with the consumption of purchased electricity, heat, steam or cooling. These are indirect emissions that are a consequence of an organisation's activities but which occur at sources not owned or controlled by the organisation.

Emission factor. A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g. litres of fuel consumed).

Emissions. The release of GHGs into the atmosphere.

Equity share. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Typically, the share of economic risks and rewards in an operation is aligned with the company's percentage ownership of that operation, and equity share will normally be the same as the ownership percentage.

EU ETS. European Union Emissions Trading System. This is a Europe wide scheme which puts a price on carbon that businesses use and creates a market for carbon. It has been in place since 2005.

Finance lease. A lease which transfers substantially all the risks and rewards of ownership to the lessee and is accounted for as an asset on the balance sheet of the lessee. Also known as a Capital or Financial Lease. Leases other than Capital/Financial/Finance leases are Operating leases.

Other equity investments. Equipment, land, stocks, property, incorporated and non-incorporated joint ventures, and partnerships over which the parent company has neither significant influence or control.

Fugitive emissions. Emissions that are not physically controlled but result from the release of GHGs. They commonly arise from the production, processing, transmission, storage and use of fuels and other chemicals, often through joints, seals, packing, and gaskets.

Global warming potential. A factor describing the radiative force impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO₂.

Greenhouse gases (GHGs). In this guidance reference to GHGs are to the Kyoto gases.

GHG Protocol. The accounting and reporting standard for GHG emissions. Comprising the GHG Protocol Corporate Accounting and Reporting Standard and the GHG Protocol Project Quantification Standard. Developed by a multi-stakeholder collaboration convened by the World Resources Institute and the World Business Council for Sustainable Development .

Indirect emissions. Emissions that are a consequence of the operations of the reporting company, but occur from sources owned or controlled by another company. These will be either scope 2 emissions or scope 3 emissions.

Intensity ratios. Ratios that express GHG impact per unit of physical activity or unit of economic value (e.g. tonnes of CO₂ emissions per passenger kilometre).

Intensity target. A target defined by reduction in the ratio of emissions and a business metric over time, e.g. reduce CO₂ per tonne of cement by 12 percent between 2000 and 2015.

Intergovernmental Panel on Climate Change (IPCC). International body of climate change scientists. The role of the IPCC is to assess the scientific, technical and socio-economic information relevant to the understanding of the risk of human-induced climate change.

Kyoto gases. These are the gases covered by the Kyoto Protocol: Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Kyoto Protocol. A protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC). The Kyoto Protocol establishes legally binding commitments for the reduction of the Kyoto gases which came into force in 2005 and committed signatories to a reduction in greenhouse gas (GHG) emissions to between 20-24 billion tonnes by 2050 (about 50-60% below 1990 global levels).

Materiality. Information is material if its omission or misstatement could influence the economic decisions of users.

Mobile combustion. Burning of fuels by different types of transportation such as cars, trucks, trains, airplanes, ships.

Offset. Offsets are discrete GHG reductions, in the form of carbon credits, used to compensate for (i.e. offset) specific and accurately measured GHG emissions elsewhere, for example to meet a voluntary GHG target or cap. Carbon credits must represent a genuine, additional carbon saving, and are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the credits. To avoid double counting, the reduction giving rise to the credit must occur at sources or sinks not included in the target or cap for which it is used.

Operation. A generic term used to denote any kind of business, irrespective of its organisational, governance, or legal structures. An operation can be a facility, subsidiary, affiliated company or other form of joint venture.

Operational boundaries. The boundaries that determine the core direct and indirect emissions associated with operations owned or controlled by the reporting company. This assessment allows a company to establish which operations and sources cause direct and indirect emissions, and to decide which other indirect emissions to include that are a consequence of its operations.

Operating lease. A lease which does not transfer the risks and rewards of ownership to the lessee and is not recorded as an asset in the balance sheet of the lessee. Leases other than Operating leases are Capital/Finance leases.

Organisational boundaries. The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).

Other indirect. All other activities that release emissions into the atmosphere as a consequence of your actions, which occur at sources that you do not own or control and which are not classed as scope 2 emissions.

Outsourcing. The contracting out of activities to other businesses.

Process emissions. Emissions generated from manufacturing processes, such as cement or ammonia production.

Renewable energy. Energy taken from sources that are replenished by natural processes, e.g. wind, water, solar, geothermal energy and biofuels.

Reporting. Presenting data to internal management and external users such as regulators, shareholders, the general public or specific interested groups.

Scope. GHG Protocol definition which defines the operational boundaries in relation to indirect and direct GHG emissions.

Scope 1. Emissions from sources that are owned or controlled by the reporting company. Also known as direct emissions.

Scope 2. Emissions that are a consequence of the operations of the reporting company, but occur from sources owned or controlled by another company, e.g., as a consequence of the import of electricity, heat, cooling or steam. Also known as indirect emissions or energy indirect emissions.

Scope 3. Emissions that are a consequence of all other activities which release emissions into the atmosphere as a consequence of your actions, which occur at sources which you do not own or control and which are not classed as scope 2 emissions. Also known as other indirect emissions.

Stationary combustion. Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces.

Stern Review. "Stern Review on the Economics of Climate Change" released on 30 October 2006. Sir Nick Stern was asked to lead a major review of the economics of climate change, to understand more comprehensively the nature of the economic challenges and how they can be met, in the UK and globally.

Subsidiary. The parent company has the ability to direct the financial and operating policies of the subsidiary with a view to gaining economic benefits from its activities.

Target base year. The base year used for defining a GHG target, e.g., reduce CO₂ emissions 25 percent below the target base year levels specified by the target base year 2015.

Target boundary. The boundary that defines which GHGs, geographic operations, sources and activities are covered by the target.

Target completion date. The date that defines the end of the target period.

PB13309 September 2009

Nobel House
17 Smith Square
London SW1P 3JR

www.defra.gov.uk

