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HM Government

Environmental Reporting Guidelines:

Including streamlined energy and carbon reporting guidance

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Contents

Introduction

Who is this document for?

This document is designed to help:

- companies and limited liability partnerships in complying with the Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013 ('the 2013 Regulations') and the Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018 ('the 2018 Regulations'); and

- all organisations with voluntary reporting on a range of environmental matters, including voluntary energy and GHG emissions reporting, and through the use of key performance indicators (KPIs).

Updates to 2019 guidelines

Chapter 1: Steps in reporting your environmental impacts covers the steps to take when considering your environmental impacts and which KPIs to report.

Chapter 2: Guidance on Streamlined Energy and Carbon Reporting (SECR) helps businesses across the UK in scope of the 2018 Regulations comply with their legal obligations that come into force on 1 April 2019. It also outlines additional voluntary information that is likely to be useful to qualifying organisations and a wide range of stakeholders.

Benefits of reporting

There are direct benefits to your organisation in the measuring and reporting of environmental performance as it will benefit from lower energy and resource costs,[1] gain a better understanding of exposure to the risks of climate change and demonstrate leadership, which will help strengthen your green credentials in the marketplace. You should find it helpful to use environmental KPIs to capture the link between environmental and financial performance.

Investors, shareholders and other stakeholders are increasingly requesting better environmental disclosures in annual reports and accounts. The number

[1] 2011 report for Defra by Oakdene Hollins. The study estimated that the UK savings opportunities associated with no cost / low cost from resource efficiency activities were estimated at a total of around £23billion in 2009 Resource Efficiency Study.

of organisations that are seeking information from their suppliers on environmental performance is increasing too. Organisations of all sizes are increasingly expected to measure and report on their environmental performance or risk losing out to competitors who do record their environmental performance. A Defra sponsored study[2] provided robust evidence that environmental management systems generally delivered cost savings and new business sales for the majority of the study's small and medium sized enterprises.

Many businesses are finding that their environmental risks are material to their operations and supply chains or are likely to become so. This may take the form of physical risks from climate change, or business risk from volatile energy and commodity prices. Equally some are finding that early action to address such risks can generate new business opportunities.

This guidance has links with the work of the Natural Capital Committee (NCC). Natural capital refers to the elements of nature that produce value (directly and indirectly) to people, such as the stock of forests, rivers, land, minerals and oceans. It includes both living and non-living aspects of nature. The NCC is working with businesses (including land owners and managers) to explore the development of corporate natural capital accounting. As part of that work, the NCC is considering the scope for corporate natural capital accounting guidance which would relate to the guidance contained here.

Legal framework for reporting

The Companies Act 2006 (Strategic Report and Directors' Reports) Regulations 2013 amended the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 to require quoted companies to report information on greenhouse gas (GHG) emissions in their Directors' Reports. Quoted companies, as defined by the Companies Act 2006,[3] are also required to report on environmental matters (including the impact of its activities on the environment) to the extent it is necessary for an understanding of the company's business within their Annual Report,[4] including where appropriate the use of KPIs.[5] If the Annual Report does not contain this information,

[2] An evidence-based study (EV0440) into the benefit of EMSs for SMEs.

[3] A quoted company is defined in section 385(2) of the Companies Act 2006 as a company that is UK incorporated and whose equity share capital is listed on the Main Market of the London Stock Exchange UK or in an EEA State, or admitted to trading on the New York Stock Exchange or Nasdaq.

[4] The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013 created a new structure for annual reports, which required companies to report on the impact of the company on the environment within a new section - the Strategic Report.

[5] Environmental Key Performance Indicators (KPIs) are quantifiable measures that reflect the environmental performance of an organisation in the context of achieving its wider goals and objectives. The focus is on 'key' measures i.e. those most important to an understanding of an organisation. You probably already collect a lot of data required to report on environmental KPIs, either because it is calculated from standard organisational data, such as utility bills, or

then it must point out the omissions.

The Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018 come into force on 1 April 2019 and apply to financial years starting on or after 1 April 2019. The 2018 Regulations impose new obligations for what must be included in the Directors' Report[6] for quoted and large unquoted companies as well as imposing an obligation on large LLPs to prepare a new kind of report ('the Energy and Carbon Report'). The requirements are outlined in Chapter 2.

Some public bodies are required or may need to consider reporting GHG or environmental issues under other legislation or commitments, for example:

- Government departments, non-ministerial departments, agencies and Non-Departmental Public Bodies must report as a minimum certain GHG emissions in their Annual Reports as part of their statements on sustainability performance and be subject to the Greening Government Commitments.

- Local authorities in England have been requested by Government to measure and report their GHG emissions from their own estate and operations.[7]

- Reporting Commitments in the Devolved Administrations.

The Environment Agency and the Institute of Chartered Accountants in England & Wales have previously published guidance for company directors and those preparing and auditing annual financial statements to help them in understanding what is required to be reported and how this relates to the latest statutory financial accounting and reporting standards.[8]

You can use this guidance to report your environmental impacts alongside social impacts and community involvement in an integrated report. Integrated reporting communicates material information about how your organisation's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value over the short, medium and long term. Further detail on integrated reporting can be found at www.theiirc.org/.

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because of existing regulatory requirements.

[6] Under s.416(4) of the Companies Act 2006.

[7] Via a letter to local authorities, see: www.gov.uk/guidance/sharing-information-on-greenhouse-gas-emissions-from-local-authority-own-estate-and-operations-previously-ni-185

[8] Environmental reporting and annual financial reports – www.icaew.com/-/media/corporate/files/technical/sustainability/tecpln12453-eiafr-annual-report-2nd-edition-final.ashx?la=en

Principles for accounting & reporting environmental impacts

The following principles should be applied when collecting and reporting on environmental impacts:[9]

Relevant: Ensure the data collected and reported appropriately reflects the environmental impacts of your organisation and serves the decision-making needs of users — both internal and external to your organisation.

Quantitative: KPIs need to be measurable. Targets can be set to reduce a particular impact. In this way the effectiveness of environmental policies and management systems can be evaluated and validated. Each chapter provides the details for that subject area. Quantitative information should be accompanied by a narrative, explaining its purpose, impacts, and giving comparators where appropriate.

Accuracy: Seek to reduce uncertainties in your reported figures where practical. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.[10]

Completeness: Quantify and report on all sources of environmental impact within the reporting boundary that you have defined. Disclose and justify any specific exclusions.

Consistent: Use consistent methodologies to allow for meaningful comparisons of environmental impact data over time. Document any changes to the data, changes in your organisational boundary, methods, or any other relevant factors.

Comparable: Companies should report data using accepted KPIs rather than organisations inventing their own versions of potentially standard indicators. The narrative part of a report provides the opportunity for a company to discuss any tensions which exist between providing comparable data and reporting company-specific KPIs. Use of accepted KPIs will aid you in benchmarking your organization and will aid users of your report to judge your performance against that of your peers.

Transparent: This is essential to producing a credible report. Address all

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[9] Drawn from accounting principles and the internationally-recognised Greenhouse Gas Protocol Corporate Accounting and Reporting Standard from the World Resources Institute and World Business Council for Sustainable Development, known as the "GHG Protocol Corporate Standard".

[10] The National Physical Laboratory has produced an introductory guide to uncertainty.

relevant issues in a factual and coherent manner, keeping a record of all assumptions, calculations, and methodologies used. Internal processes, systems and procedures are important, and the quantitative data will be greatly enhanced if accompanied by a description of how and why the data are collected. Report on any relevant assumptions and make appropriate references to methodologies and data sources used. There is more on transparency in Step 5 on reporting.

Chapter 1: Steps in reporting your environmental impacts

This section covers the steps to take when considering your environmental impacts and which KPIs to report on. For simplicity we have laid this out into 5 key steps and 7 supporting actions.

As a starting point you should work through steps 1 – 5 in order to report on your key environmental impacts.

Step 1 Determine the boundaries of your organisation

Step 2 Determine the period for which you should collect data

Step 3 Determine the key environmental impacts for your organisation

Step 4 Measure

Step 5 Report

We recommend you develop and report at least 3 KPIs associated with your key environmental impacts.

You should then consider actions i – vii (below) which provide you with information to help you develop your environmental strategy.

Action i Intensity ratios

Action ii Setting a base year

Action iii Setting a target

Action iv Verification & assurance

Action v Your upstream supply chain

Action vi Downstream impacts

Action vii Business continuity and environmental risks

Working through these steps will enable you to present a summary of your environmental findings in relation to your organisation's activities and what

you did to improve your performance. You should be clear how any targets reflect regulations or international standards. Provision of a narrative description of your actions, highlighting any key developments for the year and giving specific case studies relevant to your organisation will help provide a more comprehensive view of your organisation's environmental performance and strategy.

Step 1: Determine the boundaries of your organisation. Do you need to report on all parts of your organisation?

Define the operations on which you are going to report, i.e. set your organisational boundary. If you have a simple organisational structure and own 100% of the assets that you operate, it is straightforward: you would report on the impacts from everything that you own and operate. However, for organisations with more complex structures in which some entities may be part-owned, or owned but not operated and vice versa, a different approach is needed that should be applied consistently throughout the organisation. Boundaries are described below with more detail given in Annex A.

Financial control boundary

Your organisation reports on all sources of environmental impact over which it has financial control. Your organisation has financial control over an operation if your organisation has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities.

Operational control boundary

Your organisation reports on all sources of environmental impact over which it has operational control. Your organisation has operational control over an operation if your organisation or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation.

Equity share boundary

Your organisation accounts for GHG emissions from operations according to its share of equity in the operation.

Climate Change Reporting Framework

The Climate Disclosure Standards Board's Climate Change Reporting Framework (CCRF) sets out an approach to boundary setting that seeks to align with the boundaries used for financial reporting. Although it has been written for reporting climate impacts, it can be used for reporting other impacts. GHG emissions from entities that you operate but are not included

in the consolidated financial statement are reported separately according to the CCRF. This approach has the advantages of providing a comprehensive set of data that aligns with other reporting practices.

The next step is to identify all the reporting units that are within the boundary. A reporting unit can be all or part of a subsidiary company, joint venture, investment, facility, etc. Reporting units should be selected to represent the smallest practical building blocks to allow data to be reported.

Other impacts associated with your organisation's activities lie outside of the boundary e.g. your supply chain. Further information regarding this can be found under actions v and vi in this chapter.

Step 2: Determine the period you should collect data

Your reporting period should be for 12 months and should ideally correspond with your financial year because this allows for easier comparison of your financial performance with other aspects of your performance. Where they are different though, the majority of your environmental reporting year should fall within your financial year.

Step 3: What are the key environmental impacts for your organisation

The next step is to understand which environmental issues are key and to do this you need to understand the extent of the impacts of your organisation. The "polluter pays principle" assigns responsibility to those parties that directly cause the pollution or use a natural resource. Using this model, emissions caused or resources used directly by your organisation fall under your direct responsibility; all other impacts are indirect (see actions v and vi).

Your Key Performance Indicators

Through understanding your own organisation's operations you should have a clear understanding of where your main environmental impacts occur. These are likely to fall into one or more of six categories:

- Greenhouse gases
- Water
- Waste
- Materials and resource efficiency

- Biodiversity/ecosystem services
- Emissions to air, land and water

Not all six will be relevant (material) to your organisation. You should identify which are and explain why they are relevant and how they are defined. There are UK and EU regulations covering these issues and, in general, for any KPI of interest to your organisation you need to ensure that you are also complying with any relevant legislation.

Step 4: Measuring

There are a number of ways to collect and manage data at a corporate level. This could include direct entry of 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. Using a standardised reporting format is recommended to ensure that data received from different business units and operations is comparable. Ideally, environmental reporting should be integrated into your existing reporting processes.

Your efforts to collect the best quality data should be focused on the most important sources. This assessment might be based on:

- Magnitude or size
- Financial significance
- Potential ability to influence impacts
- Importance to your business
- Importance to stakeholders

Where possible, it is better to use primary data to calculate your KPIs. However, in some cases data may not be available or of sufficient quality in which case secondary data, such as industry-average figures, proxy data and extrapolation, may need to be used. This is 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.

You should establish a quality management system to provide a systematic process for preventing and correcting errors in your organisation's

environmental data.[11]

If you do estimate data, 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.

The six environmental impact categories (above) form the subject chapters of this guidance and provide specific guidance on measuring and reporting.

Environmental Management Systems

The most widely used form of ensuring good data management is by the use of an Environmental Management System (EMS). EMSs help all types and sizes of organisations to meet their own environmental and sustainability targets. If you have an accredited EMS, you should state the type and whether it covers your entire organisation or just part in your reporting.

Three types of formal environmental management systems are recognised in the UK:

- ISO 14001
- EMAS (EU Eco-Management and Audit Scheme)
- BS 8555

Some of the other step-by-step systems that exist are the Green Dragon Environmental Standard, Steps to EMS (STEM), IEMA's Acorn Scheme and Eco Campus.

EMS objectives and targets can be used to show a company's progress against stated plans and goals, including:

- quantitative targets based on outcomes, such as reduction of emissions or incidents;
- quantitative or qualitative objectives in terms of inputs, such as completion of management system initiatives by a planned date;
- annual progress measured against a commitment to continuous improvement; or
- case studies providing evidence of programmes planned across a specified period.

[11] 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

Alternative approaches to undertaking a structured assessment of an organisation's environmental performance are available from the Global Reporting Initiative / UNEP or from the World Business Council for Sustainable Development Corporate Ecosystem Valuations.

Step 5: Reporting

Transparency is essential to producing a credible report. You should present your information in a balanced and transparent fashion. Celebrate success but also avoid glossing over negative environmental impacts or poor performance against targets.

1. Your report should summarise how you have carried out each of the steps listed above and the outcome from each.

   Be clear about:

   - why you have collected the data;
   - how you have gone about it, such as the assumptions, methodologies, and reference data used;
   - to which parts of your organisation the data relates.

   You should explain if you are not reporting data for some sources of environmental impacts within your chosen reporting boundary, whether they are from a geographical area, type of equipment or activity.

   Trends in impacts should be clear to the reader. Use units consistently. Give:

   - progress against targets, whether improvements or set-backs have occurred and how these are being tackled;
   - information relating environmental performance to financial performance. This should include environmental expenditures, e.g. more efficient production processes, recycling facilities, the reclamation/ rehabilitation of land to a more natural state, or investment in projects in the local community.

2. Explain how you are managing your impacts i.e. EMAS, ISO 14001 and who has responsibility for this (including Board Members).

3. Identify the risks and opportunities that arise from your impact on the environment and from the environment's impact on you through, for example, climate change. Be clear whether your organisation has been subject to any environmental fines. The date, location, reason and amount of fine should be stated.

4. Explain internal processes to manage and report risk. Develop a plan or strategy that addresses these risks and opportunities and fits with your business strategy or is integrated with it and report on this plan. Explain how the information you have gathered is used to support corporate decision making. Use case histories to illustrate your actions and approach.

Action i: Intensity ratios/normalisation factors

When presenting the detail of your KPIs, they should be expressed in absolute terms but it is also helpful if you use a normalising factor in reporting your data where it is not an obligation. Environmental impacts data can be normalised by dividing the impact you are reporting on (whether tonnes of waste or emissions) by an appropriate activity metric (e.g. units produced, Full Time Equivalent staff) or financial metric (£ million turnover). The resulting normalised data is called an intensity ratio (see Annex F for more information). Two commonly used normalising factors are turnover and production output; but there are others which may be relevant, for example companies with offices or retail operations may normalise to floor space.

Normalising your data is useful because it facilitates:

- Comparison over time.
- Comparison across different organisation sectors and products.

This allows stakeholders to know how much environmental impact companies have relative to a given amount of goods and/or services produced. Normalised data can be particularly helpful in demonstrating environmental improvements in a growing organisation.

An activity ratio is suitable when aggregating or comparing across organisations that have similar products. A financial ratio is suitable when aggregating or comparing across organisations that produce different products. We recommend you use the intensity ratio that is most relevant to your organisation and will provide the most context to users of this information. If your organisation has many varied organisational operations e.g. a travel company which owns its own planes and also owns its hotels you should consider calculating separate activity ratios for each activity i.e. one for the planes and one for the hotels.

When reporting, the simplest method is to present data on a clear and transparent like-for-like basis. So if the product lines are much the same and output has increased, then a normalised approach, with the factor in number of units or weight, as appropriate, will be sufficient especially if backed up with absolute figures in order to understand the scale of the impact as well as the

direction of change. If a 'value of output' measure has to be used, then it should be a volume measure (i.e. adjusted for relevant price changes).

Action ii: Setting a base year

To maintain meaningful and consistent comparison of your data and KPIs over time, you will need to set targets and choose and report on a base year. A base year gives you a point against which you can compare your current data and you should choose the earliest year for which you have data. Your base year may be:[12]

- a fixed or single base year;
- an average of a range of years in order to smooth out year-on-year fluctuations; or
- a rolling base year.

A base year is an important benchmark and you should explain the reasons behind your choice. It is recommended that if you set a fixed base year, you also determine your base year recalculation policy. The following are instances when you might need to recalculate a single base year:

Structural changes that have a significant impact on the organisation's base year figures, such as the transfer of ownership or control of relevant activities or operations from your organisation to another. While a single structural change might not have a significant impact on the base year figure, 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 relevant activities;
- Changes in calculation methods or improvements in the accuracy of factors, such as emission factors, or activity data that result in a significant impact on the base year figures; and
- Discovery of significant errors, or a number of cumulative errors that are collectively significant.

[12] The implications of these different options are discussed in chapters 5 and 11 of the GHG Protocol Corporate Standard and are applicable to other environmental impacts other than GHG emissions.

Develop a base year recalculation policy

You will probably not want to recalculate your fixed base year to take account of every change in circumstances. So you will need to determine your policy and set a threshold over which a recalculation is triggered under different scenarios. In determining your threshold for the different scenarios, you should take into account the cumulative effect on your base year figure of different changes. You may wish to recalculate 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.

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

Determine whether the base year needs to be recalculated

Update your base year in line with the criteria below and when the changes meet your significance threshold.

If you acquire a facility which existed in your base year, recalculate your base year if the emissions were not included in your base year figures and will be included in your current year's figures. For outsourcing, recalculate your base if the figures from the outsourced activity were included in your base year figures and will not be included anywhere in your current year's figures. If you acquire/dispose of a facility from another company, you recalculate your base year to include/exclude respectively the figures from the new facility at the level they were in your base year.

You should not recalculate your base year where you acquire (or insource) and divest (or outsource) operations that did not exist in your base year.

Transfer of ownership/ control of relevant activities, including changes in leased status, should be treated in the same way as acquisitions and disposals.

You do not need to recalculate base year to take account of economic growth or decline, changes in production output or product mix, and closures and openings of operating units owned or controlled by your organisation.

Changes in methodologies, improvements in the accuracy, or discovery of previous errors would trigger a recalculation.

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

figures 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.

Action iii: Setting a target

Once you have your data, set a target. There are a number of good business reasons to do this such as improving cost and resource efficiency. It is important to obtain senior management commitment to the target as this will establish internal accountability for your targets; create an incentive system, and provide resources to meet your target. You should set a target date that will drive strategic change within your business.

There are two types of target:

- an absolute reduction target which compares absolute figures in the target year to the base year;
- an intensity target based on an appropriate normalising factor (e.g. water consumption per tonne of product, CO_2e emissions per Full Time Equivalent staff member).

An absolute target is designed to achieve actual reductions in environmental impact. Organisational growth has to be decoupled from the environmental impact in order to achieve an absolute target. In contrast, an intensity target can drive resource efficiency and relative environmental impact, but the total resource use/impact may actually increase even if an intensity target has been reached due to increases in organisational activity e.g. production.

Action iv: Assurance and verification

Assurance and verification of reported sustainability and environmental data is a component of a responsible reporting approach. There is a reputational risk in disclosing misleading data and assurance provides a check on the value and authenticity of the data in the public domain. While there are many methodological approaches to sustainability/ environmental assurance, the key components of a robust assurance statement, are that it should:

- Clearly reflect the scope of matter material to both your company and your stakeholders.
- Transparently review the quality of your disclosures.
- Provide clear conclusions on data quality and processes.
- Be conducted by a qualified, independent third-party reviewer.

- Meet the requirements of a recognised standard.
- Be easily understood and jargon free.

There are two internationally-recognised standards for the verification of sustainability reports that are ideally used together as they complement one another.

- International Audit and Assurance Standards Board's ISAE3000 "Assurance engagements other than audits or reviews of historical financial information".
- AA1000AS[13] from AccountAbility (the Institute of Social and Ethical AccountAbility). AA1000AS is a free, open source set of principles which addresses sustainability and CSR aspects of reports.

ISO 14064-3 and ISAE 3410 are widely-used standards for the verification of GHG emissions reports.

There is no statutory requirement to have your environmental information audited. The statutory auditor of the financial statements is not required to audit environmental information in the Strategic or Directors' Reports within the annual report, but an auditor will be required to:[14]

- consider whether the information is materially inconsistent with the financial statements, or the auditor's knowledge obtained in the audit;
- consider whether the information has been prepared in accordance with applicable legal requirements; and
- report on these matters in the auditor's Report.

Where your company publishes a separate environmental or sustainability report, your auditor is not required to read it although they may consider it as contributing to a knowledge of the business.[15]

Action v: Your upstream supply chain

The indirect environmental impact of your supply chain may be greater than your own impact. Engaging with your supply chain can provide you with

[13] ISA (UK) 720 (Revised June 2016) The Auditor's Responsibilities Relating to Other Information

[14] ISA (UK and Ireland) 250 Section A.

[15] ICAEW (2015) Turning questions into answers: Environmental Issues and Annual Financial Reporting

valuable information to inform a strategic assessment of where, in your supply chain, the most significant environmental impacts are occurring.

There is no single, quantifiable measure that you can use as a KPI for the effect of your upstream supply chain on the environment, but you can use the environmental information that your suppliers' report in order to make better procurement decisions. The following is an example of a process that can be used to determine the impacts upstream in the supply chain:

- Identify companies from which goods and services are purchased.
- Categorise your expenditure into sector groupings.
- Assess the typical environmental impacts and risks for each sector.
- Determine where to focus your efforts. Clearly some suppliers, even suppliers in the same sector, have more significant environmental impacts than others. It is important to prioritise your suppliers in a way that takes into account both the amount of money you spend with them and relative environmental impact.
- Engage with your suppliers. Encourage your suppliers to report on the key impacts.
- Influence purchasing decisions with the information gathered. Improvements In your suppliers' environmental performance will be more likely if they know that their environmental performance is a factor in your organisation's buying decisions.
- Consider post-contract supplier development to focus on engaging suppliers in continuous improvement in environmental management.

Action vi: Your downstream impacts

Whilst identifying key performance indicators for downstream environmental impacts is beyond the direct scope of this guidance, there are some issues that you should consider, for example, water use in washing machines, electricity use of TVs and computers, etc. In some cases there are specific legal requirements associated with managing the end-of-life phase of products e.g. batteries, electrical equipment and cars. You should consider disclosing information on both the financial risks represented by any liabilities associated with managing end-of-life disposal, and narrative disclosures on level of engagement with those organisations involved in the recycling or reuse of the particular products.

Action vii: Business continuity & environmental risks

The clear evidence of climate change points to the need for drastic and urgent action to reduce emissions of greenhouse gases. But this alone will not suffice: substantial changes to our climate are already unavoidable. Even with urgent greenhouse gas emissions reductions, scientists expect that the world will face rising temperatures and, in many places, increasingly frequent and severe weather impacts due to climate change (such as floods, droughts, heatwaves and other extreme events).

These changes will have profound effects on many aspects of our lives in the UK. Sea levels are rising and, in the future, the rate of rise will accelerate; some familiar species will disappear and new alien species will arrive—for better or worse. The international impacts are likely to affect food security, migration patterns, natural ecosystems, production and supply. The Government's Climate Change Risk Assessment sets out the key climate change risks to the UK and is published every five years, with the most recent one being in 2017[16]. Additional information is available through the UK Climate Projections 2018[17], which illustrate a range of future climate scenarios until 2100.

These changes to our world will become better defined over the coming years and decades, as science advances, but they require action now. For the business sector, this means managing those risks and discovering new opportunities, to maintain a competitive edge. Forward planning rather than reacting to extreme weather events as they occur is essential. This process of adjusting to the changes in our climate is called adaptation and should be part of any long-term business strategy.

There are three elements of adaptation:

- to reduce exposure to the risk of damage;
- to develop the capacity to cope with unavoidable damages;
- to take advantage of new opportunities.

Effective adaptation to climate change requires sound risk management and strengthening business resilience.

[16] https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017

[17] https://www.metoffice.gov.uk/research/collaboration/ukcp

Recommendations

1. Include an evaluation of climate change risks in your company's overall assessment of business risks.

2. Cover the following areas in your climate risk evaluation:

- supply chains;
- assets;
- operations;
- markets;
- regulatory compliance.

3. Focus your climate adaptation strategies on actions that fit within broader sustainability strategies and that deliver savings (in resource use, key asset risks and running costs) in their own right.

4. Include actions you have taken on climate change adaptation in your annual report.

The level and type of response will depend largely on the exposure of your business: whether responding to direct risks to core operations, or indirect risks via supply chain or other dependencies. You will need to utilise expertise across your organisation - among sustainability, procurement, business continuity and environment managers - to develop your adaptation strategy.

The impacts of climate change will be widespread and affect networks on which you rely. Explore how you can work with external partners to contribute to increased climate resilience. Partners with a mutual interest in ensuring climate security could include suppliers, customers, other local businesses, local authorities, and others in your sector.

Being ready for climate change is also about making sure you identify new ways and better ways to do business. There will be demands for new products and services; the demand for some existing products will grow. Customers will want to be confident that you will be able to deliver whatever the weather. Taking a lead in the development of new climate adaptation technologies and expertise could also open up new markets for UK firms internationally. Financial institutions, for example, are at the centre of efforts to evaluate climate vulnerability and act on the risks it may pose to investments. Some major banks have undertaken research to support

investment managers to incorporate climate-related risks in assessments of investment portfolios.

Further information is available in the Government's National Adaptation Programme and the report "Insights into Climate Change Adaptation by UK Companies" provides further details and case studies of how FTSE 100 companies have adapted to climate risks. Further information is available in the Government's National Adaptation Programme[18], and dedicated programmes in Scotland, Northern Ireland and Wales[19].

[18] https://www.gov.uk/government/publications/climate-change-second-national-adaptation-programme-2018-to-2023. The second National Adaptation Programme (NAP) was published in 2018 along with the Third Strategy for Climate Adaptation Reporting, under which the Government has invited key organisations, including a number of public bodies and infrastructure providers, to report on actions they are taking to address current and future climate risks. These reports provide vital intelligence on the resilience of core sections of society. Reports from the second reporting round can be accessed on: https://www.gov.uk/government/collections/climate-change-adaptation-reporting-second-round-reports

[19] Information on climate adaptation programmes in the Devolved Administrations is available as follows:
Scotland (http://www.scotland.gov.uk/Publications/2014/05/4669),
Wales (https://gov.wales/topics/environmentcountryside/climatechange/preparing/?lang=en),
Northern Ireland (https://www.daera-ni.gov.uk/publications/northern-ireland-climate-change-adaptation-programme), subject to scheduled updates in 2019 or beyond.

Chapter 2: Guidance on Streamlined Energy and Carbon Reporting

The Companies (Directors' Report) and Limited Liability Partnerships (Energy and Carbon Report) Regulations 2018 ("the 2018 Regulations") implement the government's policy on Streamlined Energy and Carbon Reporting (SECR) and this chapter will help businesses across the UK in scope of the new regulations comply with their legal obligations that come into force on 1 April 2019.

Introduction

The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013[20] introduced changes to require quoted companies to report their annual emissions and an intensity ratio in their Directors' Report.

The 2018 Regulations[21] bring in additional disclosure requirements for quoted companies. The 2018 Regulations also introduce requirements for large unquoted companies and limited liability partnerships to disclose their annual energy use and greenhouse gas emissions, and related information.

This chapter sets out the mandatory requirements of the legislation and outlines additional voluntary information that is likely to be useful to qualifying organisations and a wide range of stakeholders.

This guidance includes changes, which take effect from 1 April 2019, and cover financial reporting years starting on or after this date, replacing the guidance on Mandatory Greenhouse Gas Reporting (MGHG) that was contained in the previous version of this guidance.

[20] The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013 amended the Large and Medium-Sized Companies and Groups (Accounts and Reports) Regulations 2008, including adding Part 7 of Schedule 7 dealing with GHG emissions by quoted companies.

[21] The 2018 Regulations amend the Large and Medium-Sized Companies and Groups (Accounts and Reports) Regulations 2008, in particular adding a Part 7A to Schedule 7 dealing with energy and carbon disclosures by large unquoted companies. The 2018 Regulations also amend the Limited Liability Partnerships (Accounts and Audit) (Application of Companies Act 2006) Regulations 2008, which apply certain provisions of the Companies Act 2006 to Limited Liability Partnerships, to provide for large LLPs to prepare an equivalent report to the Directors' Report to disclose energy and carbon information.

The legislation affects:

- quoted companies;
- large unquoted companies (including charitable companies);
- large Limited Liability Partnerships (LLPs).

Remember, you, or part of your organisation, may fall within the scope of SECR even if undertaking public, or not for profit activities as registered companies or companies/LLPs owned by universities, academies or NHS Trusts. You are however not however required to report under the SECR framework at an organisational level if your organisation is defined as a public body, although you may still have other reporting requirements such as under the Greening Government Commitments.

Companies incorporated outside of the United Kingdom are not required to include energy and carbon information in their Directors' Report under this legislation, including foreign parent companies of UK subsidiaries. The government encourages all private sector organisations which are not in scope of the legislation to report similarly, although this remains voluntary.

Businesses are responsible for ensuring they meet the requirements of the 2018 Regulations. This guidance is not a substitute for the 2018 Regulations but is intended to help businesses understand how they must comply with it. You may wish to refer directly to the provisions of the regulations or seek independent legal advice to confirm that you are complying in full.

1. Complying with SECR

Under changes introduced by the 2018 Regulations, large unquoted companies and large LLPs are obliged to report their UK energy use and associated greenhouse gas emissions as a minimum relating to gas, electricity and transport fuel, as well as an intensity ratio and information relating to energy efficiency action, through their annual reports.

Quoted companies of all sizes continue to be required to report their global greenhouse gas (GHG) emissions and an intensity ratio through their annual reports. Additionally, they are now required to report their total global energy use and information relating to energy efficiency action alongside the methodology used to calculate the new and existing disclosure requirements.

This guide sets out the key obligations, including which organisations are in scope and the information they will need to report and disclose annually. Some SECR requirements differ for quoted and unquoted organisations (see table below). Section 6 is relevant for quoted companies, section 7 for unquoted large companies and LLPs, and section 8 contains requirements that

all organisations in scope of SECR need to comply with. The rest of the Environmental Reporting Guidance sets out best practice and opportunities to go beyond what is legally required and may prove useful to stakeholders.

Quoted companies	Large unquoted companies and LLPs
Annual GHG emissions from activities for which the company is responsible including combustion of fuel and operation of any facility; and the annual emissions from the purchase of electricity, heat, steam or cooling by the company for its own use	UK energy use (as a minimum gas, electricity and transport, including UK offshore area)
Underlying global energy use	Associated greenhouse gas emissions
Previous year's figures for energy use and GHG	Previous year's figures for energy use and GHG emissions
At least one intensity ratio	At least one intensity ratio
Energy efficiency action taken	Energy efficiency action taken
Methodology used	Methodology used

The new mandatory reporting requirements imposed by the 2018 Regulations are designed to:

- Increase awareness of energy costs within large and quoted organisations, including enhanced visibility to key decision makers;
- Create more of a level playing field among large organisations, in terms of energy and emissions reporting;
- Ensure administrative burdens associated with energy and emissions reporting are proportionate and broadly aligned to the existing energy reporting requirements and the business reporting framework;
- Provide organisations in scope with the right data to inform adoption of energy efficiency measures and opportunities to reduce their impact on climate change; and
- Provide greater transparency for investors, and other stakeholders, on business energy efficiency and low carbon readiness.

Business will already have much of the information required to comply with the

new disclosure requirements. Participation in other schemes, such as the CRC Energy Efficiency Scheme (CRC),[22] Energy Savings Opportunity Scheme (ESOS), Climate Change Agreements (CCA) Scheme, EU Emissions Trading System (ETS) or MGHG reporting and voluntary environmental reporting frameworks, will further help companies and LLPs meet their new obligations. Wherever possible, businesses should make use of their normal accounting and environmental management systems to regularise the collection of energy use information throughout the year. Additions or changes to existing systems or processes may be required to take account of the new disclosure requirements. This guide will help you identify if these are needed. Early identification will enable the necessary changes to be made in time for you to meet your SECR obligations.

While SECR reporting requirements cover emissions and energy information for the current and previous financial year, organisations may also wish to voluntarily set forward-looking science-based emissions reduction targets.

Organisations seeking to report on forward-looking financial risks and opportunities arising from climate change should consider reporting in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). The TCFD has developed a globally recognised framework for making climate-related financial disclosures which the UK Government formally endorsed in September 2017.

2. Who needs to report under SECR?

Quoted companies

Under changes introduced by the 2013 and 2018 Regulations, quoted companies of any size that are required to prepare a Directors' Report under Part 15 of the Companies Act 2006, are required to disclose information relating to their energy use and GHG emissions.

Quoted companies in this respect are those whose equity share capital is officially listed on the main market of the London Stock Exchange; or is officially listed in an European Economic Area State; or is admitted to dealing on either the New York Stock Exchange or NASDAQ.

Large unquoted companies and large limited liability partnerships

Under changes made by the 2018 Regulations, unquoted companies incorporated in the UK which are required to prepare a Directors' Report under

[22] The CRC Energy Efficiency Scheme (CRC) will be closed following the 2018-19 compliance year, with no purchase of allowances required to cover emissions for energy supplied from April 2019. Organisations will be required to report under CRC for the last time in July 2019 and submit allowances in October 2019 and may want to use CRC systems to help collect some of the SECR information.

Part 15 of the Companies Act 2006, and which are "large" (see below) are required to prepare and file energy and carbon information in their Directors' Reports. This applies to both registered companies and to unregistered companies[23] which are required to prepare company accounts and reports.

Under the 2018 Regulations, LLPs which are "large" are also required to prepare and file energy and carbon information in their accounts and reports (in a new 'Energy and Carbon Report').

The definition of "large" is the same as applies in the existing framework for annual accounts and reports, based on sections 465 and 466 of the Companies Act 2006. The qualifying conditions are met by a company or LLP in a year in which it satisfies two or more of the following requirements:

- Turnover £36 million or more[24]
- Balance sheet total £18 million or more
- Number of employees 250 or more

Group Reporting

If you are reporting at group level, for a financial year for which you are required to prepare a group Directors' Report,[25] when making your energy and carbon disclosures, you must take into account not only your own information, but also the information of any subsidiaries included in the consolidation which are quoted companies, unquoted companies or LLPs. However, you have the option to exclude from your report any energy and carbon information relating to a subsidiary which the subsidiary would not itself be obliged to include if reporting on its own account. The same applies to LLPs required to prepare a group Energy and Carbon Report.[26]

If you are reporting at subsidiary level, for a financial year for which your parent company (or parent LLP) is preparing a group relevant Report (i.e. a group Directors' Report or a group Energy and Carbon Report), you might not be obliged to include your energy and carbon information in your own accounts and reports. A subsidiary is not obliged to report their energy and carbon information if:

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[23] Unregistered companies are incorporated companies not formed or registered under the Companies Acts or under any other public general Act of Parliament (for example, companies formed under private Acts of Parliament, Royal Charters and letters patent).

[24] In the case of charitable companies, the reference to turnover shall be taken as a reference to the charitable company's gross income, as defined for its jurisdiction of registration, or operation.

[25] Under section 415(2) of the Companies Act 2006.

[26] Under section 415(2) of the Companies Act 2006 as applied to LLPs by regulation 12A of the Limited Liability Partnerships (Account and Audit) (Application of Companies Act 2006) Regulations 2008 as amended by the 2018 Regulations.

- They are a "subsidiary undertaking" at the end of the relevant financial year;
- They are included in the group Report (whether a group Directors' Report or a group Energy and Carbon Report) of a "parent undertaking";
- That group Report is prepared for a financial year of the parent that ends at the same time as, or before the end of, the subsidiary's financial year; and
- The group Report complies with the relevant obligations on the parent to report energy and carbon information for themselves and their subsidiaries; but this provision does not apply where the group Report relies on the seriously prejudicial option.

Note this is different to the approach taken under ESOS, where a smaller subsidiary of a parent company is not exempt, even where on its own, it would not meet ESOS eligibility criteria. Similarly, this is also different from the approach under the CRC Energy Efficiency Scheme.

A corporate group is defined in the Companies Act 2006, and sections 1158 to 1162 of that Act explain how to identify if an undertaking is a parent to, or subsidiary of, another undertaking. You may wish to speak to your Finance Director in order to establish your organisation's existing obligations relating to group reporting. The legislation requires organisations to take the same approach, with the option to apply subsidiary exemptions as outlined above.

3. What needs to be reported under SECR?

Quoted companies

Quoted companies within the scope of the legislation must continue as a minimum to disclose in their Directors' Report their:

- Annual global emissions from activities for which that company is responsible including the combustion of fuel and the operation of any facility; together with the annual emissions from the purchase of electricity, heat, steam or cooling by the company for its own use. [Also referred to as Global GHG Protocol Scope 1 and Scope 2 emissions (outlined in more detail in section 6)].
- At least one intensity ratio (outlined in section 8).
- Previous year's figures for energy use and GHG emissions (except in the first year).
- Methodologies used in calculation of disclosures.

Additionally for financial years that start on, or after, 1 April 2019, quoted companies must also report:

- Underlying global energy use that is used to calculate GHG emissions, including previous year's figure (in the first year, previous figures are not required).
- Information about energy efficiency action taken in the organisation's financial year.

For financial years starting on or after 1 April 2019, quoted companies also need to state what proportion of their energy consumption and their emissions related to emissions and energy consumption in the UK (including offshore area).

Unquoted companies and LLPs

Unquoted companies and Limited Liability Partnerships in scope of the legislation will be required to disclose energy and carbon information in their accounts and reports, including:

- UK energy use (to include as a minimum purchased electricity, gas and transport, outlined in more detail in Section 7).
- Associated greenhouse gas emissions.
- At least one intensity ratio (outlined in section 8).
- Previous year's figures for energy use and GHG emissions (except in the first year).
- Information about energy efficiency action taken in the organisation's financial year.
- Methodologies used in calculation of disclosures.

Additionally, if you are an offshore undertaking (i.e. if your activities consist wholly or mainly of offshore activities as defined in the 2018 Regulations) you must disclose your emissions and energy use for the UK and the offshore area.

Low energy users

Where an organisation is a low energy user (see below) it is not required to make the detailed disclosures of energy and carbon information referred to

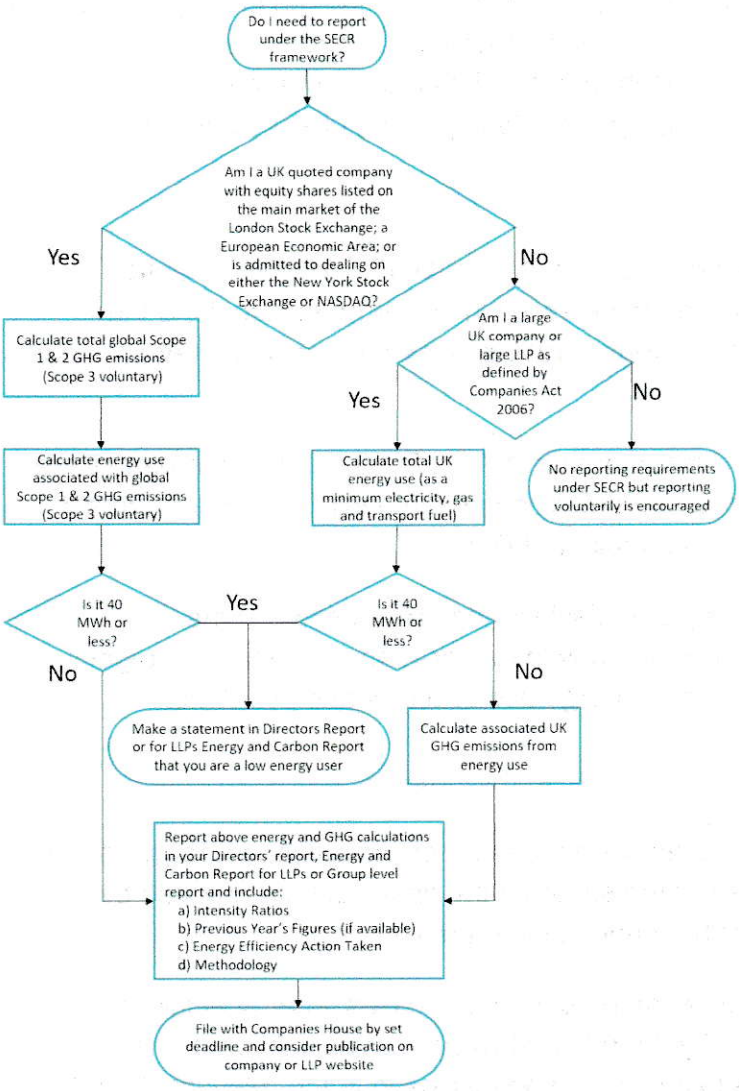
above. Instead, such an organisation is required to state, in its relevant report, that its energy and carbon information is not disclosed for that reason.

The following qualify as low energy users:

- A quoted company preparing a Directors' Report which has consumed 40MWh or less during the period in respect of which the report is prepared. If the quoted company is preparing a group Directors' Report, the assessment is of the energy consumption of the parent and its subsidiaries which are included in the consolidation and are quoted companies, unquoted companies or LLPs. In assessing whether or not the 40MWh threshold is met, companies in scope must consider all the energy usage as defined in section 6.

- Unquoted companies or LLPs preparing a Directors' Report or Energy and Carbon Report which have consumed 40MWh or less in the UK, including offshore area, during the period in respect of which the report is prepared. If the company or LLP is preparing a group Report, the assessment is of the energy consumption of that parent and its subsidiaries. In assessing whether or not the 40MWh threshold is met, companies in scope must consider all the energy from gas, electricity and transport fuel usage as defined in section 7.

Does my organisation need to disclose energy and carbon information (for reporting years starting on or after 1 April 2019)?



Comply or explain

The legislation permits that certain information may be excluded:

- When the directors or members consider the disclosure of the energy and carbon information would be **seriously prejudicial** to the interests of the organisation. The relevant report must state that the energy and carbon information is not disclosed for that reason. Businesses are encouraged to rely on this only in exceptional circumstances, such as specific sensitivities arising from restructuring or acquisitions by an organisation in the run up to producing the relevant report, or when there are exceptional commercial sensitivity considerations. We expect such situations to be very rare and may be questioned by the Financial Reporting Council (FRC).

- Where the energy and carbon information is **not practical to obtain**. The relevant Report must still state what energy and carbon information is not included and why. That means, should you be in the situation

where it is not practical for you to obtain all required energy and carbon information, you must state what is omitted and explain why in the relevant report. It is recommended that you set out the level of materiality and the steps you are taking to acquire the information.

Data from previous years

For financial years that start on or after 1 April 2019, with the exception of the first mandatory reporting year, businesses in scope must also state the emissions, energy use, and intensity ratio disclosures made in their previous year's relevant Report.

For financial years that start earlier than 1 April 2019, quoted companies are already required to disclose the emissions and intensity ratio disclosures if disclosed in the previous year's relevant Report.

Organisations are encouraged to disclose the previous five years' performance, where possible, to show a longer-term trajectory and trigger discussions around changes in energy use or emissions over time.

What period should my disclosures cover?

The obligation is to disclose annual figures for emissions and energy use. If the annual period used is not the same as the financial year covered by the relevant Report, this must be made clear in the Report.

If actions have been taken to improve the businesses' energy efficiency during the financial year covered by the relevant Report, a description of the principal energy efficiency actions taken should be disclosed in the relevant Report. The actions should not relate to periods outside the organisations' financial year.

Organisations are encouraged that all information is aligned to financial years, to aid comparability and consistency of information across reports and organisations.

4. Where do organisations need to report

Companies in scope of the legislation will need to include their energy and

carbon information in their Directors' Report as part of their annual filing obligations.

The 2018 Regulations impose requirements on large LLPs to prepare an equivalent report to the Directors' Report (the "Energy and Carbon Report") for each financial year including their energy and carbon information. The Energy and Carbon Report must be approved by the LLP's members and signed on behalf of the LLP by a designated member. The Energy and Carbon Report also needs to identify each of its members during the financial year. LLPs may wish to consider whether they can comply with the latter requirement by referring to the online list published by Companies House, if one is available.

In the case of charitable companies, the reporting should be in the combined Directors' and Trustees' Annual Report.

Where energy usage and carbon emissions are of strategic importance to the company, disclosure of the relevant information may be included in the Strategic Report instead of the Directors' Report. Information relating to energy usage and carbon emissions should be included in the Strategic Report if it is considered necessary for an understanding of the development, position or performance of the company or the impact of its activities. Where information is promoted to the Strategic Report as it is of strategic importance, then a statement explaining this has been done must be included in the Directors' Report.

5. When do businesses in scope need to report?

Quoted companies have been required to make carbon disclosures in their Directors' Reports since 30 September 2013.

The new requirements, imposed by the 2018 Regulations on quoted companies and on large unquoted companies and large LLPs apply to reports for financial years starting on or after 1 April 2019. The table below gives an example of the first financial year for which the relevant Report must comply with SECR for organisations with different reporting year start dates. The first publication of reports which must comply with the 2018 Regulations is therefore expected to be filed with Companies House in 2020 (e.g. those which cover financial years to 31 March 2020).

You will need to check what financial year your organisation uses. Check with your finance director or company secretary if you are unsure.

Annex L: Emissions to air, land and water

This Annex explores in greater detail the background behind the reporting recommendations and provides further detail about the relevant legislation.

Background

1.1 Emissions to Air

Whereas greenhouse gases are most active high in the atmosphere, the most important factor for air quality is the concentration of emissions closer to the ground. Nevertheless, air emissions can travel long distances, chemically reacting in the atmosphere to produce other pollutants, leading to air pollution problems locally as well as a long way from the source.

There is an important distinction between emissions of air pollutants and the concentrations of such pollutants in the air we breathe. Emissions contribute to the concentration of pollutants in ambient air, so it is essential to monitor the amount emitted. It is the concentration in the air we breathe that affects human health and the environment.

A tool for calculating emissions is available at National Atmospheric Emissions Inventory http://naei.defra.gov.uk/data_warehouse.php

The most common emissions are:

1.2 Oxides of Nitrogen (NO_X)

All combustion processes in air produce oxides of nitrogen (NO_X). Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen and together are referred to as NO_X. Road transport is the main source of NO_X and NO_2, followed by the electricity supply industry and other industrial and commercial sectors. Although large combustion plants are polluting, they tend to be located away from major centres of population, and for this reason road transport contributes far more to the public's exposure to air pollutants. Deposition of pollutants derived from NO_X emissions contribute to acidification and eutrophication of sensitive habitats leading to loss of biodiversity. NO_X also contributes to the formation of secondary particles and ground level ozone, both of which are associated with ill health effects.

1.3 Sulphur Oxides

Sulphur oxides (SOx) are compounds of sulphur and oxygen molecules. Sulphur dioxide (SO_2) is the predominant form found in the lower atmosphere. Sulphur oxides in the atmosphere can influence the habitat suitability for plant communities as well as animal life. Sulphur oxide emissions are a precursor to acid rain and atmospheric particulates.

The main sources of sulphur oxides are emitted following the combustion of fossil fuels such as coal used in power generation, domestic and industrial purposes and certain types of vehicle ships, trains and those cars without catalytic convertors.

1.4 Particulate matter (PM)

Particulate Matter (PM) is made up of a wide range of materials and arise from a variety of sources. PM is generally categorised on the basis of the size of the particles (for example PM2.5 are particles with a diameter of less than 2.5µm which is very fine material that can penetrate deep into the lung). PM derives from both human-made and natural sources (such as sea spray and soil dust). In the UK the biggest human-made sources of PM are stationary fuel combustion and transport. Road transport gives rise to primary particles from engine emissions, tyre and brake wear and other non-exhaust emissions. Other primary sources include quarrying, construction. Secondary PM is formed from emissions of ammonia, sulphur dioxide and oxides of nitrogen as well as from emissions of organic compounds from both combustion sources and vegetation.

1.5 Volatile Organic Compounds (VOCs)

VOCs are either emitted to air as gases from certain substances or as a by-product of fossil fuel combustion.

Volatile organic compounds (VOC) are a group of commonly used chemicals that evaporate when exposed to air. VOCs are able to act as a solvent, or carrier, for many substances and as such are widely used as cleaning and liquefying agents in fuels, degreasers, solvents, polishes, cosmetics, drugs, and dry cleaning solutions. Some common VOCs are trichloroethylene (TCE), tetrachloroethylene (a dry cleaning fluid), trichloroethane, benzene, toluene, and xylenes. Industrial processes that emit VOCs include manufacturing, mining, textiles and paper production. VOCs also arise from fuel consumption. However, given the broad range of VOCs and their multitude of uses, it is not practical to give an exhaustive list of the processes that produce them.

1.6 Metal Emissions to Air

Metals that can have significant environmental impacts include lead, mercury, cadmium, arsenic and nickel. Certain metals that are in common usage are often emitted to air as particulates or dust. Metals emitted to air are eventually deposited on land or water and accumulate in soil, water, sediments and sludge, depending on the atmospheric conditions and type of metal. From here they can then accumulate in flora and fauna and, as they are often toxic, this can have a negative effect on the environment. The relative mobility of metals differs, and consequently their environmental effects can also be varied. For example, once lead has fixed into soil it takes a very long time to migrate out and can have long-term effects on soil quality. Mercury (and to a lesser extent cadmium) quickly leaches out of soil and into watercourses; once there it is rapidly taken up by fish and subsequently accumulates in the food chain.

Heavy metals can be emitted from the burning of coal or oil and are also emitted from a variety of industrial processes. Metal ore mining causes metal based dust formation, as do manufacturing processes that involve working with large amounts of metal (in particular foundries, auto-manufacturers and heavy manufacturing). Smaller amounts of metal will be emitted from light manufacturing (for example, electronics) and power generation will have high emission rates if the combustion of coal or oil is involved.

1.7 Metal Emissions to Land

Emissions of metals to land by industrial processes can have a serious impact on the local environment. All metals can have adverse effects on natural habitats depending on the amount emitted and the acceptable biological limit. In particular, metals such as mercury, cadmium, arsenic, chromium, copper, zinc and lead, can be highly toxic.

Metals are emitted directly to land by a number of industrial processes or by heavy metal leaching from mineral wastes at mining facilities. Metals can also be found in sewage sludge used as fertiliser.

1.8 Metal Emissions to Water

Metals and metal compounds can be found in effluent, drinking water, cooling water and run-off water. Metal emissions to water include: arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), mercury (Hg), nickel (Ni), lead (Pb) and zinc (Zn). Other metals that are regularly detected in waters comprise antimony (Sb), barium (Ba), beryllium (Be), boron (B), cobalt (Co), manganese (Mn), selenium (Se), silver (Ag) and vanadium (V).

Metal can affect the aquatic environment in a number of different ways, and for some metals their concentration can increase in the food chain at each trophic level, a process called biological magnification.

Many sectors can cause metal emissions, by a variety of different processes.

1.9 Acid and Organic Chemicals

There is the potential for a wide range of organic chemicals to be emitted into the environment – for example, long chain hydrocarbons (from oil, etc) and organic chemicals from industrial processes (e.g. solvents such as formaldehyde and alcohols). Organic and inorganic acids are also used in many industrial processes. These emissions are usually caused by accidental spillage. Any process using either oil based fuels or lubricants can give rise to these emissions, as can accidental spillages. Similarly any process using large amounts of industrial acids or organic chemicals may also give rise to this impact.

2. Nutrients and Organic Pollutants

Many sectors are responsible for emitting organic pollutants to water including farming, water treatment, textile production, the paper industry and chemical industry. Pollutants

also reach water from the run-off from roads and highways. Sources of nutrients commonly include human sewage, crops and animal production, food processing, pulp and paper manufacturing, detergent manufacturing and fertiliser manufacturing. Organic pollutants can be found in wastewater treatment, drinking water, and boiler feed water, cooling water, and storm water.

Organic matter is commonly found in groundwater and inland waters, and can cause pollution and disruption to aquatic habitats. Discharges of organic waste (nutrients) into bodies of water can cause eutrophication in rivers, lakes, estuaries, coastal and marine waters. Sources of nutrients commonly include human sewage, crops and animal production, food processing, pulp and paper manufacturing, detergents manufacturing and fertiliser manufacturing. Organic contaminants can lead to the death of animals and fish as well as changes in appearance, reproductive patterns or behaviour in fish. Organic pollutants can be found in influent and effluent of wastewater treatment, boiler feed water, cooling water, and storm water.

While nutrients have an indirect effect on oxygen levels, oxygen-demanding pollutants have a direct effect. They are contained in organic effluents such as sewage discharges and discharges from the industrial sectors (food and drink). Organic effluent includes contaminants such as polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), hexachlorocyclohexanes (HCH), benzene, toluene, xylenes, ethylbenzene, dioxins and phenols, as well as general brewing waste and sewage. Oil spills can also contribute to organic pollutants.

3. Issues to consider and Legislation

The **European Pollutant Release and Transfer Register (E-PRTR) Regulation** applies directly to operators within 9 industrial sectors – covering approximately 65 economic activities:

- Energy
- Production and processing of metals
- Mineral industry
- Chemical industry
- Waste and waste water management
- Paper and wood production and processing
- Intensive livestock production and aquaculture
- Animal and vegetable products from the food and beverage sector
- Other activities

The Regulation requires operators to report annually emissions of any of the 91 substances listed in the Regulation which is emitted in quantities above the threshold for that substance. The objective of the E-PRTR is "to enhance public access to information through the establishment of coherent, nationwide pollutant release and transfer registers (PRTRs)".

4. Industrial Emissions Directive

The Industrial Emissions Directive recast seven existing Directives, related to industrial emissions, including the Large Combustion Plant Directive and the Integrated Pollution Prevention and Control (IPPC) Directive, into a single Directive. Much of the component Directives remains substantively unchanged or has been clarified, but a few new activities are subjected to IPPC, notably wood preservation and some waste recovery activities, and minimum requirements in respect of emissions from existing large combustion plants are significantly tightened from 2016.

Details of the industries and activities that will be subject to the provisions of the IED can be found here: http://www.defra.gov.uk/environment/quality/industrial/eu-international/industrial-emissions-directive/

Further detail on E-PRTR can be found here: http://prtr.defra.gov.uk/

And here:

http://www.environment-agency.gov.uk/static/documents/Business/eprtr_guidance_doc_1426519.pdf

5. Off Shore Chemical Notification Scheme

The use and discharge of hazardous substances in the offshore oil and gas industry have been identified as a cause for concern. To reduce the overall impact of offshore chemicals on the marine environment, OSPAR has adopted a harmonised mandatory control system[99] for use and reduction of discharges of offshore chemicals. This system promotes the shift towards the use of less hazardous or preferably non-hazardous substances. There is a common OSPAR interpretation of which chemicals are covered and not covered[100] by the control system. The Offshore Chemical Notification Scheme (OCNS)[101] manages chemical use and discharge by the UK offshore petroleum industries. The scheme is regulated in the UK by the Department of Energy and Climate Change using scientific and environmental advice from Cefas and Marine Scotland. If you operate in this sector and use chemicals that are covered by OSPAR you should report using your

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[99] http://www.ospar.org/documents/DBASE/DECRECS/Decisions/od00-02e.doc

[100] http://www.ospar.org/documents/DBASE/DECRECS/Agreements/02-06e_Common%20interpretation.doc

[101] http://www.cefas.defra.gov.uk/industry-information/offshore-chemical-notification-scheme.aspx

OCNS data/returns and discuss within your organisation plans for substitution where feasible to move to safer alternatives.

The EP Regulations 2010 covering England and Wales provide industry, regulators and others with a single extended permitting and compliance system and includes those systems for discharge consenting, groundwater authorisations and radioactive substances regulation. Environmental Permitting also provides a tool for delivering the permitting and compliance requirements of EU directives such as those relating to the Batteries Directive and Mining Waste Directive.

More information on emissions to air is available at Defra website at:

https://www.gov.uk/government/policies/protecting-and-enhancing-our-urban-and-natural- environment-to-improve-public-health-and-wellbeing/supporting-pages/international- european-and-national-standards-for-air-quality

Information about air quality laws and regulations for industry are available at Environment Agency

http://www.environment-agency.gov.uk/business/topics/permitting/32320.aspx

Information about air quality monitoring is available at UK Air: http://uk-air.defra.gov.uk/

The National Atmospheric Emissions Inventory is also a source of detailed information on air emissions in the UK. http://naei.defra.gov.uk/index.php

6. Other Information

The following table is a list of metals and some of their main industrial uses.

Pollutant[102]	**Processes & Activities**
Antimony	Petroleum refineries Fire retardants Electronic production Ceramic production Steel production (solder)
Arsenic	Glass production Electronic production Fruit production

[102] Main source: United States Environmental Protection Agency. Note that not all these will be applicable in the UK, but the table is left complete to assist multinational UK registered companies that wish to refer to these guidelines

Barium	Metal refineries Mining
Beryllium	Metal refineries Electronic and electrical production Aerospace and defence industries
Boron	Pyrotechnic flares Insulation fibreglass Sodium bleach and disinfectants Manufacture of borosilicate glasses Boron filaments in aerospace structures
Cadmium	Corrosion of pipes Stabilisers for PVC Alloys and electronic compounds Landfill Metal refineries Refined petroleum products Batteries Paint Coatings (marine - aerospace applications)
Chromium	Steel production (metal alloys) Landfill Pigments for paper, paints, cement and rubber
Cobalt	Cobalt-bearing portables Rechargeable batteries
Copper	Corrosion of pipes Landfill Additives to control algal growth
Lead	Corrosion of pipes Batteries Petrol additives (forbidden in the EU) Pigments Landfill Cable sheathing Ammunition
Manganese	Used in quantitative analysis and medicine Paints Landfill Glass colorant Alloys
Mercury	Refineries Crop production Landfill Batteries Lamps Thermometers Fillings (dentistry)
Nickel	Stainless steel and related alloys Coins

	Landfill Electronic devices' batteries
Selenium	Petroleum refineries Mining
Silver	Photographic material and processes Mirrors Electric conductors Batteries Table cutlery Dental and medical
Vanadium	Aerospace titanium alloys Chemical catalyst for glass and ceramics Dyes Target material for X-rays

Annex M: Biodiversity and ecosystem services

What are Biodiversity and Ecosystem Services?

Biodiversity. The UN defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

Ecosystems. An ecosystem is a dynamic complex of flora, fauna, microbes and their non-living environment (soil, air, water) interacting with one another as a functional unit. Examples of ecosystems are forests, grass-lands, mangroves and urban areas.

Ecosystem Services. Ecosystem services are the benefits that humans obtain from ecosystems, and they are produced by interactions within the ecosystem. Different types of ecosystems and services can be distinguished.[103]

The Millennium Ecosystem Assessment (MA), grouped ecosystem services into four broad categories:

- Provisioning services: Goods or products obtained from ecosystems such as food, freshwater, timber and fibre;
- Regulating services: Benefits obtained from natural processes such as climate, disease, erosion, water flows and pollination, as well as protection from natural hazards;
- Cultural services: Non-material benefits obtained from ecosystems, such as recreation, spiritual values and aesthetic enjoyment (elements of biodiversity are included within this e.g. charismatic species);
- Supporting services: Functions that maintain all other services, such as photosynthesis, water and nutrient cycling.

The report on The Economics of Ecosystems and Biodiversity (TEEB) further refined this list by identifying 22 service types that ecosystems provide. You might find these

[103] This definition has been derived from 'Ecosystems and human well-being; Opportunities and Challenges for Business and Industry' of the Millennium Ecosystem Assessment.

helpful in understanding the linkages to natural capital[104] by making a distinction between the natural capital assets that give rise to a flow of benefits, and a particular aspect of human well-being.

Biodiversity Offsets

Biodiversity offsets are conservation activities designed to deliver biodiversity benefits in compensation for losses, in a measurable way. They can be used to compensate for residual impacts on biodiversity from development activities, as a final step after avoiding losses wherever possible, and mitigating for impacts on site.

Biodiversity offsets are distinguished from other forms of ecological compensation by the requirement to measure losses (due to impact) and gains (achievable through the offset) in the same way.

The Business and Biodiversity Offsets Program (BBOP) is an international partnership between companies, financial institutions, governments and civil society organizations to explore biodiversity offsets: http://bbop.forest-trends.org/ . In January 2012, BBOP published the latest version of its standard for offsetting, which aims to help auditors, developers, conservation groups, communities, governments and financial institutions that wish to assess biodiversity offsets against the BBOP principles, criteria and indicators.

Indicators

Indicators are measures that summarise complex data into simple, standardised and communicable figures. Many indicators that relate to the aspects of biodiversity exist, however none capture biodiversity in its entirety.

You might find it easier to understand, communicate and act upon your biodiversity indicators if you consider the linkages that connect your activities to outcomes as follows:

- Responses —actions to prevent or reduce biodiversity loss
- Pressures — the threats to biodiversity that your responses aim to address
- State — the condition of biodiversity and how it is changing
- Benefits — amount and change in benefits and services that humans derive from biodiversity

[104] The term 'capital' is used to describe a stock or resource from which revenue or yield can be extracted. Four basic categories of natural capital are generally recognised: air, water (fresh, groundwater and marine), land (including soil, space and landscape) and habitats (including the ecosystems, flora and fauna which they both comprise and support).

There is cyclical nature to these four indicators where the state of, or action in one impacts on the next. Linking these 4 indicator types together makes it clear that there is a cyclical nature to your decisions and the corresponding impact on biodiversity i.e. your decisions can lead to pressures on biodiversity which in turn impact on the state of biodiversity which can then alter the benefits from biodiversity. You can start from any point in this cycle i.e. a change in the benefits from biodiversity could lead to a response by your organisation. etc. This approach can be applied to any organisation, sector or system and is a simple way of understanding the Response-Pressure-State-Benefit approach.
