Connecting the IPCC Greenhouse Gas Inventory Guidelines with the Corporate Standard

Discussion Draft

Zarina Moolla, Alex McNamara and Steve Nicholls

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Connecting the IPCC Guidelines with the Corporate Standard

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## List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AFOLU</td>
<td>Agriculture, Forestry and Land Use</td>
</tr>
<tr>
<td>CDSB</td>
<td>Climate Disclosure Standards Board</td>
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<tr>
<td>CO₂</td>
<td>Carbon Dioxide</td>
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<tr>
<td>CO₂e</td>
<td>Carbon Dioxide equivalent</td>
</tr>
<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<tr>
<td>DEROs</td>
<td>Desired Emission Reduction Outcomes</td>
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<tr>
<td>GCV</td>
<td>Gross Calorific Value</td>
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<tr>
<td>Gg</td>
<td>Gigagrams</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<tr>
<td>GICS</td>
<td>Global Industry Classification Standard</td>
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<tr>
<td>GWP</td>
<td>Global Warming Potential</td>
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<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>IPPU</td>
<td>Industrial Processes and Product Use</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardisation</td>
</tr>
<tr>
<td>JSE</td>
<td>Johannesburg Stock Exchange</td>
</tr>
<tr>
<td>Mt</td>
<td>Million Metric Tonnes</td>
</tr>
<tr>
<td>NCCRCP</td>
<td>National Climate Change Response Policy</td>
</tr>
<tr>
<td>NCV</td>
<td>Net Calorific Value</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-Governmental Organisations</td>
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<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>QC</td>
<td>Quality Control</td>
</tr>
<tr>
<td>WBCSD</td>
<td>World Business Council on Sustainable Development</td>
</tr>
<tr>
<td>WRI</td>
<td>World Resources Institute</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
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</table>
1 Introduction

1.1 Background

Reporting and calculating a corporate greenhouse gas (GHG) inventory is different to reporting a national GHG inventory. Many companies in South Africa have been reporting their GHG emissions voluntarily for a number of years, primarily through the CDP, corporate GHG inventories and integrated reporting, while at the same time national government has been reporting South Africa’s emissions as part of our national communications to the United Nations Framework Convention on Climate Change (UNFCCC), in order for the UNFCCC to have accurate data on GHG emissions trends for countries.

The South African government plans to introduce mandatory reporting for the national inventory, a carbon tax and Desired Emission Reduction Outcomes (DEROs) and carbon budgets to drive emission reductions in the future. These developments imply that some companies in South Africa will be required to report their GHG emissions to government on a compulsory basis. A further reporting channel creates certain challenges for companies who are already requested to report information in many different formats.

The IPCC Guidelines (Box 1) are designed for national GHG inventories, while the GHG Protocol Corporate Accounting and Reporting Standard (Corporate Standard) (Box 2) is designed for company level reporting therefore both reporting approaches have a different starting point. National reporting of emissions is aligned with the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). In contrast, most companies follow the GHG Protocol suite of standards for corporate reporting or the International Organisation for Standardisation (ISO) 14064-1 to report their GHG emissions.

The main purpose of corporate GHG reporting is to help companies build a fair account of their direct and indirect emissions, in order to effectively manage and reduce emissions and identify risks and opportunities. By comparison, national reporting focuses on improving the completeness and accuracy of the dataset reported to the UNFCCC and for national planning to achieve UNFCCC commitments. In the context of these differing objectives, what is required to be reported by companies to government under the IPCC Guidelines is different to what companies’ report in conformance with the Corporate Standard.

While corporate reporting and national reporting have developed independently of each other, they have the potential to complement each other and enable decision-makers to understand national and sector trends, as well as to inform mitigation activities (Singh et al., 2014). Furthermore, linking national and corporate inventories can help with sharing institutional capacities and expertise and assist with building relationships between government and business.

Following corporate inventory standards provides companies with a more complete, realistic picture of their emissions inventory and provides deeper insight to mitigating key risks and identifying opportunities (NBI, 2012).

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1 Companies report to the Global Reporting Initiative, the CDP, the JSE Socially Responsible Investment (SRI) Index and for their integrated reports.

2 The GHG Protocol Corporate Accounting and Reporting Standard and the Corporate Value Chain (Scope 3) Accounting and Reporting Standard...
Therefore it is important that companies who are required to report their emissions to government (either through mandatory reporting for the national inventory, DEROs or the carbon tax) continue to voluntarily report their emissions through the CDP or other platforms, whether based on the GHG Protocol Corporate Standard or other corporate GHG standards.

1.2 Purpose and structure of this report

This paper aims to support companies and governments to understand the differences between reporting at a national level and at a company level, to ensure that the varying approaches are aligned in a way that is beneficial to government and business alike. The next section outlines the national context for emissions reporting in South Africa, highlighting where this paper fits in. Section three provides a brief description of the methodology followed for the study. Section four specifically describes the key differences and similarities between the IPCC Guidelines and the GHG Protocol Corporate Standard. This section also includes a summary table that identifies some of the key implications for business and government. The last section concludes the report, summing up the main findings from the study.

1.3 Share your stories

Reporting GHG emissions using the IPCC guidelines is a relatively new process and companies need an avenue where they are able to share their experiences and to learn from others. We request companies to share their experiences with us so that we can incorporate it into the report, start a discussion and enable companies to learn from each other.

Box 1: The Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (2006)

The IPCC Guidelines (2006) provide guidance on how a country should report their national GHG inventory. The term IPCC Guidelines often comes up when government talks about reporting GHG emissions, but for many businesses it is not a familiar phrase. The guidelines were produced to assist Parties to the UNFCCC to meet their commitments under the UNFCCC on reporting GHG inventories, based on internationally agreed methodologies.

Seeing that the IPCC Guidelines focus on producing a national GHG inventory, the boundary for the inventory is the boundary of the country. Therefore the IPCC Guidelines only focus on direct emissions and removals by sinks that occur within a country’s borders (apart from a few minor exceptions). This means that the IPCC Guidelines do not refer to scope 1, scope 2 and scope 3 emissions, which are specifically GHG Protocol terminology.

To assist countries with categorising their emissions, the IPCC Guidelines are divided into four sectors, which are:

- Energy,
- Industrial Processes and Product Use (IPPU),
- Agriculture, Forestry and Land Use (AFOLU) and
- Waste.
Box 2: The GHG Protocol – A Corporate Accounting and Reporting Standard

The GHG Protocol Corporate Accounting and Reporting Standard (Corporate Standard) simply provides guidance to companies on how to develop their corporate GHG Inventories. The Corporate Standard was developed by the World Resources Institute (WRI) and the World Business Council on Sustainable Development (WBCSD), through a multi-stakeholder process, including businesses, non-governmental organisations (NGOs) and government. As a result of this robust process the Corporate Standard is widely accepted. Currently the Corporate Standard is used by about 85% of companies reporting to the CDP in South Africa (NBI, 2014), often in combination with other reporting guidelines, including the UK Department for Environment, Food and Rural Affairs (DEFRA) Voluntary Reporting Guidelines and ISO 14064-1.

The objectives of the Corporate Standard focus on serving business goals, for example, managing GHG risks and identifying reduction opportunities, improving the company’s reputation with investors and other stakeholders and allowing companies to participate in voluntary emissions reporting programmes and GHG markets (WRI and WBCSD, 2004).

Companies have complex ownership structures – therefore, as a starting point the Corporate Standard prioritises that companies set their organisational boundaries, choosing the most suitable consolidation approach. A consolidation approach helps companies to identify which of their operations or facilities’ emissions need to be reported under direct emissions. The consolidation approach can either be based on equity share, financial control or operational control (WRI and...
WBCSD, 2004).

Because one of the main objectives of conducting a GHG inventory for business is to identify risks and opportunities, a company needs to report on all of its direct emissions (scope 1), but also is responsible for reporting its indirect emissions through purchased electricity, heat or steam (scope 2) and in many instances they are also at risk from and have many opportunities to reduce emissions in their supply chain (scope 3). In other words, in using the Corporate Standard companies account for GHG emissions that are emitted on-site, but also account for indirect emissions, which are a result or consequence of their activities.
2 Local Context

The South African government has been compiling national GHG inventories since 1998 to meet its reporting obligation under the UNFCCC. The first inventory was published in 1998 using 1990 data. To date, four inventories have been completed, with the most recent one covering the period from 2000 - 2010. According to the GHG Inventory for South Africa 2000 - 2010, the total emissions for the country in 2010 were 579.3 Mt CO$_2$e, which represents a 24.9% increase in emissions from 2000 (DEA, 2013a).

All national inventories acknowledge certain data gaps and to improve the accuracy and completeness of the national dataset, DEA has been requesting companies to submit GHG emissions voluntarily through Business Unity South Africa. Provision for mandatory reporting is made in the National Climate Change Response Policy (NCCRP, 2011), which states that the reporting of emissions data will be made mandatory for entities that emit more than 0.1 Mt CO$_2$e per annum or consumes electricity that results in emissions of over 0.1 Mt CO$_2$e in the electricity sector (this has been amended in further documents, which state that only direct emissions will be required). Companies will also be required to submit energy data to the Department of Energy (DOE), under the National Energy Act, 2008.

In addition to gaining a more accurate picture of the country’s emissions in line with international reporting obligations, the South African government is also seeking to meet our national emission reduction targets to reduce emissions by 34% by 2020 and 42% by 2025 below the Business As Usual (BAU) trajectory, in order to transition to a low carbon economy (NCCRP, 2011).

One measure that is planned to be introduced to meet the national reduction target is the carbon tax. In 2013, National Treasury released a Carbon Tax Policy Paper for public comment. It is envisaged within this Tax Policy that the tax will also protect the country’s economy from being exposed to border tax adjustments, which refers to taxes on imports introduced by countries that have a carbon price in place.

The carbon tax, as it currently stands, is structured to provide companies with an initial basic tax-free threshold for 60% of their emissions, with an additional allowance for process emissions and trade exposure, as well as the use of carbon offsets for up to 10% of emissions (National Treasury, 2013).

With initial plans to implement the carbon tax in 2015 postponed to January 2016, more attention is being given to the discussion paper released by DEA on Desired Emission Reduction Outcomes (DEROs) for the country and company-level carbon budgets. This policy development is an outcome from the NCCRP, which plans to introduce ‘desired mitigation sectoral contributions for sectors and sub-sectors and carbon budgets for companies to allow for least cost, flexible mitigation options’. In line with the NCCRP, the DEROs paper proposes aspirational goals for sectors and sub-sectors for the short (2016 - 2020), medium (2030) and long (2050) term, in a manner that aligns with the Peak, Plateau, Decline (PPD) trajectory for the country (DEA, 2014a).

Company-level carbon budgets provide companies with the GHG emission allowance for their direct operations over a period of time. DEA proposes to implement carbon budgets over five-year periods, with the first phase starting from January 2016 to December 2020. This phase will be a pilot
phase and there will be no legal requirement for companies to limit their emissions to their carbon budgets.

While mandatory reporting for the National GHG Inventory and the carbon budgets are to be implemented by DEA, they have different goals. The objective of DEROs and carbon budgets is to reduce national GHG emissions and is led by the Climate Change Mitigation Directorate, while mandatory reporting aims to improve the accuracy of the national inventory and is headed by the Climate Change Monitoring and Evaluation Directorate.

With the carbon budgets yet to be finalised, there is some speculation around how the various GHG reduction and reporting mechanisms are going to be aligned. It appears that the carbon budgets may be aligned with the carbon tax, although discussions are still underway in this regard. One approach under consideration is for companies that go over their allocated carbon budget to be subject to the carbon tax at the full marginal rate for their emissions exceeding the budget. National Treasury have stated that the tax is likely to proceed as it is currently designed until such time that the DEROs are fully established.

It should be noted that companies that are not allocated company budgets would still be considered taxable entities, and would be subject to a direct carbon tax if they generate direct GHG emissions.

On a company level, the Johannesburg Stock Exchange (JSE) 100 companies are requested to voluntarily submit their GHG emissions to the CDP (formerly Carbon Disclosure Project) on behalf of investors representing over $90 trillion in assets. The NBI is the local partner to the CDP and have been compiling CDP reports in South Africa for eight years since 2007. The CDP aims to help companies understand and mitigate their carbon risks and to enable the investor community to be more aware of the risks in their portfolios and drive informed decision-making.

While many aspects of national government requirements for company GHG emissions reporting are yet to be finalised, one thing that is certain is the actual reporting guidelines that will be followed. Mandatory reporting, the Carbon Tax Policy Paper and DEROs discussion paper all refer to using the IPCC Guidelines (in some cases with amendments). This means that companies need to start thinking about reporting in line with the IPCC Guidelines, while government needs to think about the complexities of corporate GHG reporting when finalising their own reporting requirements. The purpose of this report is therefore to provide businesses with an approach to follow that will enable them to adopt their currently GHG Protocol driven reporting to meeting IPCC requirements.
3 Methodological Approach

This section describes the methodological approach used for the study and provides guidance on how to interpret the results. This overview also provides a backdrop to how the report outcomes outlined in section four emerged.

3.1 Research techniques used in the study

The study applied two main research techniques: a literature review and semi-structured interviews with key stakeholders.

An initial literature review was conducted to understand and summarise the main differences and similarities between the Corporate Standard and the IPCC Guidelines. The literature review also enabled a quick assessment of approaches for mandatory reporting followed by other countries, and provided the basis for the structuring of the interviews.

3.2 Semi-structured interviews

The criteria for identifying stakeholders for the study was informed by high emitting sectors identified in the IPCC Guidelines and the CDP. While the sample may not represent a complete set of companies that would be required to report their GHG emissions to government, an attempt was made to include a company from each key sector that emits more than 0.1 Mt CO₂e per annum, to enable the identification of sector-specific challenges that may emerge. The companies interviewed are illustrated in Table 1 below:

<table>
<thead>
<tr>
<th>Stakeholder interviewed</th>
<th>Key sector</th>
<th>CDP Sector</th>
<th>Sub-sector (as per DERO document categorisation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Environmental Affairs</td>
<td>Government</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>BHP Billiton</td>
<td>Industry</td>
<td>Metals and mining</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Afrisam</td>
<td>Industry</td>
<td>Construction materials</td>
<td>Cement (including lime)</td>
</tr>
<tr>
<td>AECI</td>
<td>Industry</td>
<td>Chemicals</td>
<td>Chemicals</td>
</tr>
<tr>
<td>Anglo American / Anglo Platinum</td>
<td>Industry</td>
<td>Metals and mining</td>
<td>Mining (including coal)</td>
</tr>
<tr>
<td>Sappi</td>
<td>Industry</td>
<td>Paper and forest products</td>
<td>Pulp and Paper</td>
</tr>
<tr>
<td>Sasol</td>
<td>Energy</td>
<td>Oil, gas and consumable fuels</td>
<td>Other Energy Industries</td>
</tr>
</tbody>
</table>

3.3 Interpretation of results

The desktop review highlighted some key differences between the IPCC Guidelines and the Corporate Standard, which were then tested with the consulted companies. The interview process revealed further insight to aligning the two approaches, as specifically outlined in section four of this report. Section four highlights the differences between the IPCC Guidelines and Corporate Standard in a systematic, step-wise way. This approach has been taken to allow companies to apply the steps provided in order to align their current reporting with the IPCC Guidelines. The study findings are an integration of the literature review and interview process and therefore no aspect of the report can be attributed to a particular company (unless directly stated). It is also important to note that the outcomes in section four may not highlight all the differences and similarities between the IPCC Guidelines and the Corporate Standard. We encourage companies who have experienced other challenges to share them with us for inclusion in future editions of this report (contact Zarina Moolla: ZarinaM@nbi.org.za).
4 Commonalities and Differences between the IPCC Guidelines and the Corporate Standard

An initial assessment of the Corporate Standard and IPCC Guidelines reveals that in most cases aligning the Corporate Standard with the IPCC Guidelines is relatively simple. Since the IPCC Guidelines requires reporting direct emissions only, companies would only need to report a portion of their complete emissions inventory (including scope 1, scope 2 and scope 3 emissions) to government.

However, the literature review and interview process with companies illustrated that there are areas that would require categorising and calculating emissions differently, in order to report according to the IPCC Guidelines. This section outlines a step-wise approach that highlights some of these challenges. Appendix 2 provides a diagram of how this step-wise approach can be applied by companies.

In addition, the notes placed in italics in this section allude to certain possibilities of reporting to national government that are yet to be finalised.

4.1 Step 1: Identify the IPCC reporting boundary for your company

An important difference between the IPCC Guidelines and the Corporate Standard is around setting boundaries. Boundaries are imaginary lines that help to identify what emissions need to be included in an inventory. The IPCC Guidelines sets the boundary for reporting emissions to the physical boundary of the country (with some exceptions). The Corporate Standard however, provides a framework for companies to set boundaries for reporting their emissions based on organisational and operational boundaries. Therefore companies reporting under the IPCC Guidelines may have to use different boundaries for reporting.

Companies reporting for national requirements must only report South African data.

The IPCC Guidelines aim to encourage national GHG reporting, while the Corporate Standard looks at a company’s total emissions, regardless of which country their operations are located in. Often you would find a company reporting emissions from all its operations in many countries in one inventory.

Reporting only South African company emissions is an easy step for companies, as companies usually distinguish between different country operations and facilities. The only time this may present an issue is if an operation occurs on the border of two countries for example, South Africa and Namibia. In this instance it may be useful to determine where the facility that runs the operation is based, to determine if the emissions need to be incorporated into South African reporting requirements.

Figure 1: Steps to align the Corporate Standard with the IPCC Guidelines
Connecting the IPCC Guidelines with the Corporate Standard

The IPCC Guidelines only require the reporting of direct emissions – but defining direct emissions for companies can be difficult with no boundary guidance.

The IPCC Guidelines are designed for national inventories, so there is no guidance around how companies reporting for the national inventory should set their boundaries. Terms like consolidation approach, equity share or control approach, which are key to assisting companies with setting their boundaries in the Corporate Standard, are not mentioned in the IPCC Guidelines.

The organisational boundary or consolidation approach that a company chooses helps determine what emissions to report as direct or indirect. The Corporate Standard helps companies to categorise emissions under scopes 1, 2 and 3 to enable them to account for and mitigate all direct and indirect emissions that occur as a consequence of their activities. The Corporate Standard also provides companies with guidelines on setting consolidation approaches (control or equity share) and is flexible around which approach to follow.

The Corporate Standard recommends that a company choose its approach based on the company’s business case for compiling a GHG inventory. Therefore companies can choose their consolidation approaches, which means that how companies report emissions under scope 1 (direct emissions), scope 2 (indirect emissions from purchase electricity, heat and steam) and scope 3 (other indirect emissions) may be different. For example, a company has equity share in four entities but only has operational control of three. If the company follows an equity share approach it will have to report its percentage share of emissions from all four entities under scope 1 and scope 2. However, if the company follows an operational control approach, it will have to report all emissions from only the three entities that it has operational control of under scope 1 and scope 2 (Figure 2). This flexibility does result in certain challenges, however, because if companies do not define their organisational boundaries in the same way, there will be some emission sources that will be skipped or some that will be double counted and can compromise the consistency and comparability in how emissions are reported across companies.

For the DEROs and carbon budget process, DEA has proposed that an operational control approach is applied to all facilities over which a company has operational control (DEA, 2014b). This implies that companies using an equity share or financial control approach are likely to have more to do for reporting under IPCC.

To allow for consistency across company reporting, countries implementing mandatory reporting schemes have prescribed a particular approach for companies. Box 3 provides examples of some countries that have set organisational boundaries for company reporting purposes.

The IPCC Guidelines make no references to consolidation approaches and scopes and only requires direct emissions to be reported. Therefore for national reporting, companies are only required to report their direct emissions. At this stage, companies do not have to report indirect emissions from purchased electricity to government; however DEA is exploring the possibility of including these emissions in carbon budgets (DEA, 2014b).

A likely requirement for reporting to national government is that only on-site direct emissions are reported. This means that if a company owns and operates vehicles that are used on public roads (off-site), these emissions would not need to be reported.
Box 3: Requirements for setting company boundaries in mandatory reporting programs in various countries

In order to align corporate GHG report with national reporting requirements countries that are implementing some form of national reporting are prescribing a consolidation approach for companies to use for more consistency. Below are some examples of countries that have set boundaries for company or facility reporting:

**Australia**’s ‘National Greenhouse and Energy Reporting (NGER)’ legislation is applied at a company level, unlike many mandatory reporting programmes which are applied at a facility level. The NGER provides companies with a guideline on how to define facilities for reporting. The NGER Guidelines state that a company has overall control of an activity or a series of activities if the company has operational control of the activity/activities. Operational control in the NGER is defined as the ability to introduce operating policies, health and safety policies and/or environmental policies. If more than one company has operational control at the same time then the company that has the greatest control to introduce and implement operating and environmental policies will have overall control (Australian Government, 2014).

Under the authority of **Canada**’s Canadian Environmental Protection Act, 1999, the year 2013 represented Canada’s tenth year of mandatory reporting of GHG emissions under their GHG Emissions Reporting Program (GHGRP). The current GHG reporting requirements are set at a facility level and stipulate that all persons who operate a facility that emits 50,000 tonnes of CO₂e or more of GHGs in the calendar year are subject to the reporting requirements (Environment Canada, 2013).

**Japan**’s Voluntary Emissions Trading Scheme requires the reporting of emissions from a factory or business unit by those who operate the factory or business unit. The site boundary is aligned with the existing legal system to reduce the reporting burden on business (Japan Ministry of Environment, 2007).

Under the **UK Companies Act 2006 (Strategic and Directors’ Reports) Regulations 2013**, around 1100 of UK’s largest listed companies are required to report their GHG emissions annually. The legislation came into place in October 2013 and requires companies to report their global emissions, not just those occurring in the UK. The UK mandatory reporting system also requires companies to report both their scope 1 and scope 2 emissions. There is no prescribed methodology for reporting and companies can choose how they set their boundary.
The IPCC Guidelines break down transport emissions into road and off-road transportation.

Off-road transportation includes vehicles and mobile machinery in industries, mines, airports, agriculture and forestry that are not used on roads for example agricultural tractors, heavy duty construction vehicles and forklifts. This means that if a company uses their vehicles on-site but on developed roads, these emissions would be classified as road transportation and would not be required to be reported. DEA intends to request companies to submit emissions only related to off-road transportation. There is a need to clarify if off-road transportation would also include emissions used on privately owned company roads. This is important because under the Corporate Standard all road and off-road transportation in vehicles that are owned by the reporting company is considered a direct emission and is reported under scope 1.

Some companies may find it challenging to distinguish between emissions from road and off-road transportation, especially if all vehicles are refuelled at on-site filling stations. Furthermore, in some instances contractors also use on-site filling stations to refuel their vehicles. Clear guidelines are needed to ensure that companies account for these emissions in the same way to avoid double counting.

For example, the Japanese monitoring and reporting guidelines state that if on-site vehicles are refuelled at off-site service stations, these emissions should not be reported. Emissions from vehicles used off-site but refuelled at the on-site service station should be included in the calculation, unless companies are able to distinguish between on-site and off-site use. Emissions from vehicles that are refuelled on-site, but are not owned and operated by the reporting company, can be excluded if it is possible to exclude it (Japan Ministry of Environment, 2007).

It is most likely that only off-road transport emissions will be required for companies reporting to government.

4.2 Step 2: Identify the relevant IPCC sources of emissions

The IPCC Guidelines are categorised according to activities, while the Corporate Standard focuses more on sectors. This means that the categories that companies use to report emissions might be different.

The IPCC Guidelines divide emissions into four main categories, termed sectors, which are further divided into a number of sub-sectors. The sectors refer to activities that emit GHGs. The four main sectors are (see Appendix 1 for the break-down of these sectors):

- Energy
- Industrial Processes and Product Use (IPPU)
- Waste
- Agriculture, Forestry and Land-use (AFOLU)

Therefore a company’s emissions will not fall into one IPCC sector, but would be activities in various sectors.
Using the term sectors can be confusing for businesses that define sectors according to the Johannesburg Stock Exchange (JSE) sectoral classification, based on the Industry Classification Benchmark or the Global Industry Classification Standards (GICS). The CDP uses the GICS system for companies reporting GHG emissions in their CDP response.

The GICS and JSE sectors are used to describe different industries (for example, Industrials, Health Care and Financials) while the IPCC sectors are specifically linked to activities that emit GHGs. The CDP, where companies report emissions voluntarily, allows some flexibility around how companies breakdown their emissions, which they can do by business division, facility, activity or legal structure. Therefore in some instances companies may not allocate their emissions in the same sectors (activities) that are required by the IPCC Guidelines.

Under the IPCC Guidelines companies might have to start reporting emissions from sources that they previously have not reported on.

Companies reporting their emissions voluntarily in some instances left out certain emissions, not because the Corporate Standard does not require them to be reported but because there is a lack of data, or the emissions were classified as immaterial, and in some instances these emission sources were unknown. For example, in certain cases companies that are new to reporting GHG emissions, who own landfill sites, wastewater treatment facilities or mine dumps were not including these emissions in their inventories due to the complexities of reporting these emissions. The IPCC Guidelines require that these emissions are reported, so companies will need to begin calculating and reporting them, as over time these categories will be phased in and become a national requirement.

Both the IPCC Guidelines and the Corporate Standard require that GHGs need to be reported separately.

Both the IPCC Guidelines and the GHG Protocol Corporate Standard require that emissions are reported separately. However companies responding voluntarily, for example, to the CDP are not required to separate their GHG emissions.

Many companies use an emissions factor that converts data into carbon dioxide equivalent (CO₂e) that include the non-CO₂ greenhouse gases for example the UK Department of Environment, Food and Rural Affairs (Defra) provides emissions factors in CO₂e. While some companies use supplier specific emission factors that do not include separate emission factors for all GHGs.

In some instances non-CO₂ GHGs are immaterial, but where they are relevant companies need to add an extra step to calculate and report these emissions separately.

The common GHGs that are required by both the IPCC Guidelines and the GHG Protocol Corporate Standard, as per the Kyoto Protocol are:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF₆)
- Nitrogen trifluoride (NF₃)

Companies that only report CO₂ or CO₂e emissions would need to calculate and report their emissions from the other GHGs.
**Distinguish between different source category definitions.**

Companies reporting according to the Corporate Standard do not always break down their emissions by activity type. In cases where companies do break down their emissions by activity type, the activities listed may not be in the same source categories that are used in the IPCC Guidelines. IPCC categories and sub-categories are used to distinguish between different sources of emissions in the different sectors.

In some operations, energy emissions and IPPU emissions are combined, especially when it is challenging to distinguish between the two emissions sources. The IPCC Guidelines recommends that if companies cannot distinguish between their process and combustion emissions they should not separate these emissions but include them under either energy or IPPU depending on the actual activity. If the combustion of fuels is obtained directly or indirectly from the feedstock of an industrial process, then the emissions will be categorised as an IPPU activity as part of the relevant process emission category. Common IPPU categories where this occurs are process emissions in the chemical industry and the metals industry. However, if the fuels are transferred for heat generation or electricity production, then the emissions will be reported under an energy category (IPCC Guidelines, 2006).

**Distinguish between fuel use for energy and for non-energy related purposes.**

In some instances fuels are used for non-energy related purposes. The IPCC Guidelines categorises emissions from non-energy fossil fuel products and solvents in Industrial Processes and Product Use (IPPU). Non-energy uses of fossil fuels include: feedstocks for the manufacture of certain products such as plastics and rubber, reductants for the production of some metals and inorganic compounds, and for products such as lubricants, waxes and solvents.

Emissions from the use of fuels for non-energy purposes are small, as part of the carbon remains embodied in the product manufactured. It is estimated that about 62% of carbon consumed for non-energy fuel products is stored in the product and only 38% is emitted (US EPA, 2013).

**4.3 Step 3: Collect data and calculate emissions**

The IPCC Guidelines uses a tiered approach to describe different methods of calculating GHG emissions. This is new terminology for companies using the GHG Protocol standards.

For various categories of emission activities, the IPCC Guidelines provide several options for calculating the emissions, described as tiers. There are three levels of tiers: tier 1, tier 2, and tier 3. Each tier has an associated increasing level of detail and accuracy, with the tier 3 method requiring the most accurate approach. While the tiered approach is mentioned in some of the GHG Protocol’s sector-specific guideline documents, it is not explained in the Corporate Standard.

The methodology described for energy emission sources for example are:

- **tier 1** method to calculate emissions from energy sources is based on quantifying the amount of fuel combusted (activity data) and multiplying it by a default IPCC emissions factor
- **tier 2** method uses similar data on the amount of fuel combusted but this is
Connecting the IPCC Guidelines with the Corporate Standard

- **tier 3** method requires detailed emissions models, measurements and data at individual plant level such as Continuous Emissions Monitoring Systems (CEMS)

Similarly, the tiered method for Industrial Process and Product Use (IPPU) uses default emission factors and national level production data for the tier 1 approach. The tier 2 approach in most instances uses plant level production data and default or national emission factors. The tier 3 approach is based on real data measurement at a plant level.

The IPCC Guidelines recommend that the type of method applied should depend on whether the category is considered a key category in the national inventory. The IPCC Guidelines identifies key categories as emission sources that have a significant influence on a country’s total GHG inventory. These are the highest emission categories, which when summed together add up to 95% of the total inventory (IPCC, 2006).

The National GHG Inventory 2000 – 2010 (DEA, 2013) showed the key categories for 2010 (excluding the land sub-sector) to be energy industries (solid fuels), road transportation, manufacturing and construction (solid fuels) and enteric fermentation.

*Companies that have emission sources which are considered key categories might be requested to submit emissions using a tier 2 or tier 3 approach.*

*Companies will have to use emission factors and Global Warming Potentials (GWP) in line with IPCC requirements.*

An emission factor is a value that quantifies emissions associated with an activity (e.g. fuel consumption). The IPCC provides ‘default emission factors’ for different fuels and activities. These default emission factors are considered to be less accurate than country-specific factors and even less accurate than company-specific factors. In the case of reporting under the IPCC Guidelines, it is recommended to use country or plant specific emissions factors for key categories. In instances where country or plant specific emission factors are not available, then it is recommended that IPCC default factors are used.

In some cases, companies use emission factors that are not country, plant-specific or default IPCC factors, for example the UK Department for Environment, Food and Rural Affairs (DEFRA) or the US Environmental Protection Agency (EPA) emission factors. In these instances, to ensure consistency across reporting companies, companies would need to align their emission factors with the default IPCC emission factors. For key categories the IPCC Guidelines recommends that country- or plant-specific emission factors are determined, to improve the accuracy of reporting (Box 4).

The IPCC Guidelines recommends that when calculating non-CO₂ GHG emissions, the most recent Global Warming Potentials (GWP) are used. However under our national reporting requirements to the UNFCCC, non-annex 1 countries are required to use GWP provided by the IPCC 2nd Assessment Report (1995 IPCC GWP values) (UNFCCC, 2003). A GWP is a measure of how much a GHG contributes to global warming relative to CO₂. The GHG Protocol however states that the IPCC 2nd, 3rd or 4th Assessment Report GWPs can be used, as long as they are referenced correctly and used consistently. Because GWPs vary in the
Connecting the IPCC Guidelines with the Corporate Standard

IPCC Assessment Reports, final CO$_2$e emissions may change depending on which GWP a company used previously. The GWPs identified in the different IPCC Assessment Reports are summarised in Table 2 and illustrate the variation in GWPs over time. To ensure consistency with company reporting, GWPs would be prescribed. The

GHG Inventory for South Africa 2000 - 2010 uses the GWP specified in the IPCC 3rd Assessment Report, while the IPCC 4th Assessment Report is recommended for carbon budgets.

Table 2: Changes in GWP between the IPCC 2nd, 3rd, 4th and 5th Assessment Reports

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide</td>
<td>CO$_2$</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Methane</td>
<td>CH$_4$</td>
<td>21</td>
<td>23</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>N$_2$O</td>
<td>310</td>
<td>296</td>
<td>298</td>
<td>265</td>
</tr>
<tr>
<td>Sulphur hexafluoride</td>
<td>SF$_6$</td>
<td>23,900</td>
<td>23,900</td>
<td>22,800</td>
<td>23,500</td>
</tr>
<tr>
<td>Nitrogen trifluoride</td>
<td>NF$_3$</td>
<td>-</td>
<td>-</td>
<td>17,200</td>
<td>16,100</td>
</tr>
<tr>
<td>Hydrofluorocarbons</td>
<td>HFCs</td>
<td>140 – 11,700</td>
<td>120 – 12,000</td>
<td>12 – 14,800</td>
<td>4 – 12,400</td>
</tr>
<tr>
<td>Perfluorocarbons</td>
<td>PFCs</td>
<td>6,500 - 9,200</td>
<td>5,700 – 11,900</td>
<td>7,390 – 12,200</td>
<td>6,290 – 11,100</td>
</tr>
</tbody>
</table>
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**Box 4: Calculating South Africa specific emission factors for coal mining**

In 2005 a study was conducted to calculate methane emissions from South African coal mines. Coal mining results in methane emissions from underground coal seams in the case of underground coal mining, as well as from exposed coal seams in the case of surface mining. Prior to the study, mining companies were using the default IPCC emission factors to calculate methane emissions from mines (Cook, 2005). The IPCC default emission factors were based on Australian and American coal mines that have much higher levels of methane trapped in their coal seams.

The coal mining industry in South Africa planned to develop country-specific methane emission factors following the IPCC tier 2 approach. The study revealed that methane emissions from South African mines are significantly lower than the IPCC default emission factors, particularly for underground mining (Table 3). These country-specific emission factors have now been verified and approved by the IPCC and adopted by South African coal mining industries and DEA in its 2000 - 2010 national greenhouse gas inventory.

This initiative illustrates the importance of developing country-specific emission factors, which greatly improves the accuracy of reporting.

<table>
<thead>
<tr>
<th>Mining method</th>
<th>Activity</th>
<th>Methane (CH₄) emission factors (m³/tonne of coal mined)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underground Mining</strong></td>
<td>Coal Mining</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Post-mining (handling and transport)</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Surface Mining</strong></td>
<td>Coal mining</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Post-mining (storage and transport)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

This initiative illustrates the importance of developing country-specific emission factors, which greatly improves the accuracy of reporting.

**Table 2: Difference between IPCC default and South Africa specific emission factors for coal mining (adapted from DEA, 2013b)**

**CO₂ emissions from biomass combustion for energy purposes are reported separately for the IPCC Guidelines and the GHG Protocol Corporate Standard.**

Biomass is commonly used as a fuel, often in combination with fossil fuels. Like the GHG Protocol, the IPCC Guidelines states that CO₂ emissions from biomass fuels are reported separately and are not included in sector or national totals to avoid double counting (IPCC Guidelines, Volume 2 Energy, page 1.19). Also similar to the Corporate Standard, the IPCC Guidelines require that methane (CH₄) and nitrous oxide (N₂O) emissions from biomass burning are included in sector and national totals because these gases are not sequestered during growth and are in addition to stock changes.

When biomass is used in combination with fossil fuels, companies would need to ensure that CO₂ emissions from biomass are separated from fossil fuel emissions.
4.4 Step 4: Report emissions

Energy and emission units for the IPCC Guidelines are specific.

The IPCC Guidelines uses SI units (International System of Units) for its calculations and for reporting emissions.

Emissions are reported in Gigagrams (Gg) which is equivalent to 1,000 tonnes. Companies reporting to the CDP report are requested to report their emissions in tonnes, while the GHG Protocol does not require emissions to be reported in specific units. Care needs to be taken to ensure that conversions are done correctly.

Energy data for liquid, solid and gaseous fuels are usually expressed in physical units, e.g. tonnes or litres. To determine the emissions related to these energy units, the data needs to be expressed in common energy units, such as joules. Converting from physical units to joules requires calorific values. The calorific value (heating value) is the amount of heat produced by the combustion of a fuel. The IPCC recommends that the net calorific value (NCV) is used. The NCV (or lower heating value(LHV)) assumes that the products of combustion contain water vapour and the heat is not completely recovered, while the gross calorific value (GCV) (or high heating value (HHV)) assumes the water vapour is entirely condensed and the heat contained in the water vapour is completely recovered (IPCC, 2006; Iowa State University, 2008).

Some companies use GCVs when converting physical units to joules, which is between 5% (coal) and 10% (natural gas) greater than the NCV. If these companies start following the IPCC Guidelines, their energy related GHG emissions could decrease between 5 - 10%.

The IPCC Guidelines require that emissions should be reported for a calendar year, while the Corporate Standard also requires emissions to be reported for a year, which could also be a financial year.

Some companies report emissions for their financial year and would need to realign their reporting according to the calendar year, to report in line with the IPCC Guidelines. Although companies feel that this would not be a problem to do, in terms of verification companies might need to verify additional information for a calendar year. This could result in an additional cost burden for companies, who normally align their GHG verification with their financial audits and will continue to do so.

The Corporate Standard does not require verification.

While the Corporate Standard does not require verification, many companies responding to the CDP verify their emissions. However, not all companies do so. The IPCC Guidelines are also not clear on verification requirements for company-level reporting, but do provide guidelines to ensure quality assurance and quality control. For national reporting to ensure consistency and accuracy in emissions, government will require some form of verification. Companies that have not previously verified their emissions will now need to begin the process of getting their emissions verified. The NBI paper titled ‘A Primer on Selecting an Assurance Provider’ provides companies with some useful guidance on how to go about choosing a verification provider.

http://www.nbi.org.za/Lists/Publications/Attachments/389/A_Primer_for_Assurance_in_South_Africa.pdf
4.5 Summary table

Table 4 below provides a summary of the key IPCC reporting requirements, as described above, highlighting what these requirements would mean for companies and government.

Table 3: Summary of key IPCC reporting requirements and implications for companies and government

<table>
<thead>
<tr>
<th>Good practice IPCC Guidance</th>
<th>Implications for business</th>
<th>Considerations for government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify relevant IPCC Boundary</td>
<td>Companies need to exclude emissions from facilities in other countries in their calculations, by allowing for their data collection methods to separate emissions from other countries</td>
<td>Government should consider clearly stipulating this requirement to companies and give them sufficient time to make these changes to data their collection procedures</td>
</tr>
<tr>
<td>Companies need to only report direct emissions, which will most likely only be on-site emissions.</td>
<td>Companies may need to change the consolidation approach they apply to ensure that direct emissions are consistent across all companies</td>
<td>Government should consider that direct emissions differ based on the organisational boundary that a company sets</td>
</tr>
<tr>
<td>Transport emissions are broken down into off-site and on-site transportation</td>
<td>Companies that report all transport emissions together would need to separate on-site and off-site emissions</td>
<td>To avoid double-counting, there is a need to clarify what kind of transport emissions companies would be responsible for reporting</td>
</tr>
<tr>
<td>Identify relevant IPCC sources of emissions</td>
<td>Business will have to understand that IPCC sectors are GHG activity based and not economic sector based and align their emissions sources with the IPCC sectors</td>
<td>Government will have to understand that businesses classify sectors differently and be clear around what sectors they are referring to in their reporting requirements</td>
</tr>
<tr>
<td>Emissions need to be categorised into IPCC sectors</td>
<td>Companies need to start calculating individual GHG emissions (where relevant)</td>
<td>To avoid an additional reporting burden, government should consider requiring companies to report only significant GHGs separately</td>
</tr>
<tr>
<td>The seven GHGs need to be reported separately</td>
<td>Depending on what is required by government, business may need to calculated emissions differently</td>
<td>Government needs to inform companies around which methodological approach (tier 1, tier 2 and tier 3) they should be following</td>
</tr>
<tr>
<td>Collecting data and calculating emissions</td>
<td>In some instances companies may be required to use different emission factors and GWPs, so emissions reported may be different to what is reported</td>
<td>To ensure consistency in reporting, government needs to provide companies with preferred emissions factors and GWPs</td>
</tr>
</tbody>
</table>
### Connecting the IPCC Guidelines with the Corporate Standard

<table>
<thead>
<tr>
<th>Good practice IPCC Guidance</th>
<th>Implications for business</th>
<th>Considerations for government</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voluntarily</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CO₂ emissions from biomass combustion for energy purposes are reported separately but report CH₄ and N₂O emissions from biomass</strong></td>
<td>● Companies need to report CH₄ and N₂O emissions from biomass burning</td>
<td>● Government should ensure that CO₂ emissions are not double counted</td>
</tr>
</tbody>
</table>

**Reporting emissions**

<table>
<thead>
<tr>
<th>Reporting emissions</th>
<th>Implications for business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that energy and emission units are in line with the IPCC Guidelines</td>
<td>● Companies need to ensure that NCVs are used and emissions are reported in Gigagrams (Gg)</td>
</tr>
</tbody>
</table>
| Emissions should be reported for a calendar year | ● Emission totals will need to be reworked to suit the required reporting year  
● Monthly recording of data would enable and simplify this process |
| The IPCC Guidelines requires some form of QA, QC and verification, which is not a requirement under the GHG Protocol | ● Companies that do not currently verify their emissions should consider doing so |
|  | ● Verification requirements need to be clear and not pose an additional cost burden on companies that are already verifying their emissions |
5 Concluding Remarks

With government moving towards requiring companies to report their emissions for the national inventory, carbon tax and DEROs process, it is becoming increasingly important for companies to understand the requirements for GHG reporting to government. It is also equally important for government to set clear guidelines and requirements for reporting.

The aim of this research paper has been to identify and understand the main differences between the IPCC Guidelines for National Inventories and the GHG Protocol Corporate Standard. The paper outlines key differences in a step-wise approach that companies need to consider when reporting under the IPCC Guidelines.

Overall, the study has found that while there are differences between the two approaches, in most instances companies that are already reporting using corporate standards have the information needed to report using the IPCC Guidelines. Companies will need to report a portion of their corporate GHG inventory to government. Furthermore to align the Corporate Standard with the IPCC approach, companies may have to report some of their emissions differently.

A key issue pertains to the requirement for companies to report their direct emissions within the IPCC methodology, in contrast to reporting their scope 1 emissions within the Corporate Standard. Since scope 1 emissions are defined by different organisational boundaries, these emissions can vary from company to company. The IPCC Guidelines do not provide guidance on company boundaries, hence defining direct emissions for companies can be difficult. As a result, direct emissions in terms of the IPCC Guidelines may not necessarily only refer to scope 1 emissions.

Some other key differences that have emerged from the study are as follows:

- The IPCC sectors are GHG activity based, which can create confusion for companies who normally refer to specific industry or economic sectors
- Transport emissions are separated between road transportation and off-road transportation within the IPCC Guidelines. It seems likely that companies would only be required to report emissions from off-road transportation
- The IPCC follows a tiered methodological approach, which in some instances may require companies to report using a higher tier (a higher level of accuracy)
- The IPCC Guidelines require that emissions should be reported for a calendar year, while the Corporate Standard allows companies flexibility to report on either a calendar or financial year basis
- Emission factors, GWPs and reporting units may be stipulated under the IPCC Guidelines, whereas this is more flexible within the Corporate Standard

Although there are differences in corporate reporting and national reporting, it must be noted that aligning the two approaches is important to enable decision-makers to understand national and sector trends, as well as to inform mitigation activities at a collective, national level.

Companies have the potential to mitigate GHG emissions outside of their direct operations, so it is important for organisations to continue reporting using corporate inventory standards, as these standards provide companies with a better understanding of where their emission reduction opportunities lie, as well as highlights areas that are exposed to risks.
To ensure consistency and comparability in company reporting, government and business should work collaboratively so that there is a common understanding of the potential challenges for companies reporting under the IPCC Guidelines, to ensure that these are clearly explained and addressed. A collective, collaborative approach can help to drive large-scale emission reduction across the country.
6 References


DEA, 2014a. Development of Desired Emission Reduction Outcomes (DEROs) and Mix of Measures for Sectors and Subsectors of the Economy, Department of Environmental Affairs.


DEA, 2013b. The Status of Mandatory Reporting in South Africa, powerpoint presentation, Brian Mantlana and Jongikhaya Witi.


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Appendix 1: IPCC Emission Activities and Sources for Sectors

Energy sector activities and sources

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Industrial Processes and Product Use Categories

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3: Industrial Processes and Product Use, Chapter 1 In
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Agriculture, Forestry and Land-Use Categories

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Land-Use, Chapter 1

Introduction
Waste Sector Categories

Appendix 2: A step-by-step approach to reporting corporate emissions under the IPCC Guidelines

Step 1: Exclude all your non-South African emission sources

Step 2: Exclude emissions from purchased electricity, heat or steam (scope 2 sources)

Step 3: Identify all emission sources from facilities/operations that your company has operational control of

Step 4: Exclude road transportation emission sources

Step 5: Ensure that your data is for the most recent calendar year

Step 6: Align remaining emissions into IPCC categories

Step 7: Convert energy data from physical units into energy units using Net Calorific Values

Step 8: Convert data into GHG emissions using IPCC or IPCC accepted emission factors

Step 9: Convert GHG emissions into CO2e using the IPCC 3rd Assessment Report Global Warming Potentials (GWP)

Step 10: Report GHG emissions in Gigagrams (kilo-tonnes) CO2e for each GHG separately

Ensure that all 7 GHGs are reported separately

See Appendix 1 for the different IPCC categories

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<table>
<thead>
<tr>
<th>Greenhouse Gas</th>
<th>GWP (IPCC 3rd AR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon dioxide (CO₂)</td>
<td>1</td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td>23</td>
</tr>
<tr>
<td>Nitrous oxide (N₂O)</td>
<td>296</td>
</tr>
<tr>
<td>Sulphur hexafluoride (SF₆)</td>
<td>23,900</td>
</tr>
<tr>
<td>Hydrofluorocarbons (HFCs)</td>
<td>120 – 12,000</td>
</tr>
<tr>
<td>Perfluorocarbons (PFCs)</td>
<td>5,700 – 11,900</td>
</tr>
</tbody>
</table>