

An analysis of the sustainable disclosure of carbon tax in the ferroalloy industry

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Key words

King III, Carbon emission, Greenhouse gas, Carbon footprint, Integrated reporting, Ferroalloy industry, Global Reporting Initiative.

Abstract

Climate change is undoubtedly a serious challenge facing the world today, and as a result the preservation of the environment is at the top of the agenda for the international community and national governments.

Integrated reporting is a global phenomenon driven by the necessity for better information for shareholders and stakeholders. Sustainability reports in South Africa have gained momentum since King III was released in 2009. The purpose of this study is to determine if Ferroalloy manufacturers disclose their carbon emissions in their integrated reports.

A literature study was done and content analysis was used to analyse the integrated reports of Ferroalloy manufacturers.

On average the integrated reports of Ferroalloy manufacturers comply 41% according to GRI requirements. Governance related points measured complied on average 51%, while internal standards measured 71%. 86% of organisations make use of external standards to report their emissions on. Direct emissions obtained on average 42% as per GRI G4 requirements, while indirect emissions obtained a score of 50%. Emissions that may occur as a result of the usage of organisations products were reported on at only 11% according to the GRI G4 requirements.

Table of contents

Chapter 1 Introduction to study	1
1.1 Introduction	1
1.2 Problem statement	2
1.3 Objectives	5
1.3.1 Main objective	5
1.3.2 Secondary objectives	5
1.4 Research method	6
1.4.1 Literature study	6
1.4.2 Empirical study	6
1.5 Motivation of topic actuality	6
1.6 Conclusion	7
Chapter 2 Literature study	8
2.1 Introduction	8
2.2 The integrated report	9
2.3 Sustainability reporting	11
2.4 Environmental reporting	13
2.4.1 Governance	14
2.4.2 Internal standards	15
2.4.3 External standards	16
2.5 Global Reporting Initiative	17
2.5.1 Global Reporting Initiative and emissions	18

2.5.2	Classification of GHG emissions	18
2.6	The Ferroalloy industry.....	24
2.6.1	The Ferroalloy industry of South Africa.....	24
2.6.2	Emissions in the Ferroalloy industry	25
2.7	Conclusion	30
Chapter 3 Empirical study		31
3.1	Introduction	31
3.2	Research method.....	31
3.2.1	Quantitative research	31
3.2.2	Qualitative research	32
3.2.3	Mixed method.....	32
3.3	Content analysis.....	32
3.4	Measuring instrument.....	33
3.5	Population and sample	33
3.6	Results	33
3.6.1	Governance.....	33
3.6.2	Internal standards	34
3.6.3	External standards	35
3.6.4	Scope 1 reporting.....	36
3.6.5	Scope 2 reporting.....	37
3.6.6	Scope 3 reporting.....	38
3.7	Conclusion	39

Chapter 4 Conclusions	41
4.1 Introduction	41
4.2 Conclusions.....	41
4.3 Recommendations	42
Bibliography	43
Annexure A Checklist.....	49

List of tables

Table 2-1: What an integrated report is and what it is not	10
Table 2-2: Levels of GHG emissions, for South Africa between 2000 -2010.....	22
Table 2-3: South African energy demand.....	23
Table 2-4: Activity data from various metal industries	29
Table 2-5: Generic CO ₂ emissions factors for Ferroalloy production (ton CO ₂ / ton product)	30

List of figures

Figure 2-1: CO ₂ trend and emission levels of sectors, excluding Land sub sector, 2000-2010	23
Figure 2-2: CO ₂ trend and emission from fuel used in the industrial sector.....	26
Figure 2-3: Industrial trend and emission levels of source categories 2000-2010.....	26
Figure 2-4: GHG emissions from the Metal industry between 2000- 2010	27
Figure 2-5: The trend and emission levels of the Metal Industry	28
Figure 3-1: Governance compliance	34
Figure 3-2: Internal standards compliance	35
Figure 3-3: External standards compliance	36
Figure 3-4: Scope 1 compliance.....	37
Figure 3-5: Scope 2 compliance	38
Figure 3-6: Scope 3 compliance	39

Chapter 1 Introduction to study

1.1 Introduction

Environmental challenges, such as climate change and air and water pollution occur when the assimilative capacity of a particular resource is exceeded. Society is affected by the resulting pollution, and often the polluter is not held accountable for the costs of pollution. Climate change is undoubtedly a serious challenge facing the world today, and as a result the preservation of the environment finds its place on top of the agenda for the international community and national government (Mbadlanyana, 2013: 77).

During 2009 the Institute of Directors in Southern Africa (IOD) released the third version of the King Report on Corporate Governance (King III). South African organizations must align operations and governance guidelines with the principles set by the King III code. King III is non-legislative, but it represents the country's official code for governance best practices, and is in line with the Companies Act No71 of 2008 (Engelbrecht, 2010: 30). The King III report applies to all entities, regardless of the manner and form of incorporation or establishment (Esser, 2009: 191). King III recommends the use of the Global Reporting Initiative (GRI) guidelines as a generic sustainability framework. The GRI reporting framework is designed to be used by organisations of all sizes and in any sector with sector-specific supplements available (Ungerer, 2013: 33).

Traditionally, financial statements alone have dominated corporate reporting models. Currently however users and preparers of financial information have realised that financial statements provide only a limited perspective on business performance, with the information being inherently biased towards short term results (Ungerer, 2013: 28). Social and environmental reporting has evolved gradually since the 1970s, with accelerated growth in reporting since the turn of the century. Integrated report is the term for a holistic report and is a new concept not only in South Africa (SA), but all over the world. The ultimate aim of this type of reporting is to provide a single report telling stakeholders how the organisation being reported on impacts on the environment and community in which it operates, and how the environment and

community impact the business of the organisation (Muller, 2011: 24). Following the release of King III for SA, which became effective March 2010, South African companies are expected to embrace the concept of integrated reporting. Companies not primarily listed on the Johannesburg Stock Exchange (JSE) are not required to produce an integrated report; however South African listed companies are required in terms of the Johannesburg Stock Exchange listing requirements (JSE 2011) to comply with King III (Makiwane, 2013: 422).

The Ferroalloy industry form part of the industrial sector. The industrial sector is guided by the Mining and Metal Sector Supplement (MMSS) of the GRI in terms of requirements for their integrated reports. In South Africa KING III requires that all listed companies on the JSE submit an integrated report. The Ferroalloy industry is currently controlled by approximately 17 companies, with many of them being listed on the JSE.

Ferroalloy is an iron bearing alloy with one or more element other than carbon. The Ferroalloy industry is associated with the iron and steel industries as its largest customers. The principal Ferroalloys are those of chromium, manganese and silicon. Ferroalloys are produced mostly directly in submerged arc furnaces, where the submerged arc process is a reduction smelting operation. Reactants consist of metallic ores and a carbon-source reducing agent, usually coal and coke. An alternating current applied to electrodes causes a current to flow through the charge between the electrode tips. At high temperatures of up to 2000°C in the reaction zones, the carbon reacts with the metal oxides to form carbon monoxide and to reduce the ores to base metal. Ferroalloy production is an energy intensive industrial sector with significant CO₂ emissions (Holappa, 2010: 703).

This study will focus on the sustainability reporting of carbon disclosure in the Ferroalloy industry.

1.2 Problem statement

“The absence of reliable baseline data makes it difficult to grasp the nature and scope of compliance with environmental legislation in South Africa” says Melissa Fourie, director of the Centre for Environmental Rights (Planting, 2013).

South Africa (SA) emits more Greenhouse gasses (GHG) than all the other Sub Saharan African countries combined, owing it to its carbon intensive economic sectors (Mbadlanyana, 2013: 79). South Africa is ranked among the top 20 countries measured by absolute carbon dioxide emissions, and during the 2009 Copenhagen climate change negotiations, SA voluntarily announced that it would reduce domestic GHG by 34% by 2020 and 42% by 2025 from business as usual (subject to the availability of adequate financial and technical support). The Department of Environmental Affairs and Tourism (DEAT) showed that the major point of sources for CO₂ emissions are electricity generation, Synfuels, oil refineries and other energy intensive industries (Mbadlanyana, 2013: 79). The electricity sector is responsible for approximately 48% of South Africa's carbon emissions as a result of its dependence on coal, where over 80% of electricity supply is coal fired (Jeffrey, 2013: 18).

The Mail and Guardian reported that South Africa has been considering placing a price on carbon. Finance Minister Pravin Gordon announced in his National budget presentation to Parliament on 26 February 2014 that carbon tax will be introduced from January 2016 (Donnelly, 2014). Carbon tax is generally believed to be a cost effective way of reducing carbon output, with the idea that polluters pay per tonne of carbon that they release.

The introduction of the tax in South Africa will increase prices and place the country at a considerable competitive disadvantage. This is particularly important for the goods-producing industries, especially the mining and manufacturing industries. (Jeffrey, 2013: 19). Carbon tax is aimed to change behaviour of companies, but carbon tax will change production patterns, impact on production costs, and might influence international competitiveness of firms not subjected to a similar tax. Carbon tax will have a cost raising effect and will impact on domestic and international competitiveness. Introducing a carbon tax could erode investor confidence and take away some investment opportunities (Mbadlanyana, 2013: 87).

In the past, companies produced various reports, and integrated reporting provides a platform for reporting on financial and non-financial performance in a single report. Transparency, accountability and leadership are at the heart of integrated reporting and form the pillars of corporate governance. Transparency is the openness of an

organisation with regards to sharing information about how it operates. The transparency decision is guided by weighing the advantages and disadvantages that stem from disclosure of information (Ungerer, 2013: 29). King III addresses integrated reporting and disclosure, clearly emphasising the importance of appropriate systems and processes which in turn will produce a report to stakeholders that provides them with a holistic and reliable view of a company's financial and non-financial results and impact. Reporting should be integrated across all areas of performance, and should include economic, social and environmental factors. Sustainability reporting and disclosure should be integrated with the company's financial reporting (Engelbrecht, 2010: 30). Sustainability reporting is not a new concept, in the early 1980's social reporting lost momentum due to global recession, and this has led to the shift of focus from social reporting to economic issues. Today the Global Reporting Initiative (GRI) issued guidelines on sustainability. The GRI deals extensively with guidelines for reporting on sustainability issues based on three themes namely: economic, environmental and economic issues. Despite the significant and recent growth in sustainability reporting, the latest evidence suggests that only 21% of all listed companies worldwide report any sustainability information. In practice the materiality of sustainability related information is notoriously difficult to establish. Placing a financial value on materiality for financial risks is a complex process but establishing materiality and materiality thresholds for traditional non-financial risks which are hard to quantify is far more challenging if possible at all.

In South Africa King III extended the concept of sustainability reporting to incorporate integrated reporting which in essence requires companies to report on sustainability issues that is economic, social and environmental issues, and at the same time to show their link to the company's strategy, corporate governance, risks and financial performance (Makiwane, 2013: 421). Integrated reporting requires more than an add on of sustainability information to the traditional annual report. Sustainability should be embedded in the organisation so that when the integrated report must be drafted there is sufficient comprehensive information and the issues of sustainability are embedded in the organisation and become the way that the organisation operates on a daily basis (Muller, 2011: 25). An integrated report may be a substantial document

as each stakeholder might want to see a different aspect. Integrated reporting is new not only to South Africa but also internationally. It will still considerable time before the intended objectives are fully met.

The Ferroalloy industry was responsible for 5% of the total world CO₂ emissions in 2007. This figure concerns however only the primary energy use and not indirect emissions. Ferroalloy production is regarded as an energy intensive industry with high consumption of electricity and coke and minor fuels and reductants, which mean high CO₂ emissions (Holappa, 2010: 704).

Currently there is a significant lack of information with regards to CO₂ emission reporting. Ferroalloy production is regarded as an energy intensive industry with high consumption of electricity and coke and minor fuels and reductants, which result in high CO₂ emissions.

Out of this problem, the following objectives will be addressed.

1.3 Objectives

1.3.1 Main objective

To analyse the disclosure of CO₂ emissions in the Ferroalloy industry. Sustainability reports will be analysed according to GRI guidelines in order to evaluate on how organisations reports adhere to the requirements with specific reference to CO₂ disclosure.

1.3.2 Secondary objectives

- To conceptualise integrated reporting;
- To conceptualise environmental reporting requirements and sustainability disclosure;
- Investigate how Greenhouse gas (GHG) emissions are being classified according to the Global reporting initiative;
- The role of the Ferroalloy industry in CO₂ emissions;

To reach the above mentioned objectives, a literature study as well as an empirical study will be performed.

1.4 Research method

1.4.1 Literature study

In the literature study integrated reporting, as well as sustainability reporting will be conceptualised. The literature will be used to conceptualise environmental reporting, as well as what governance there is and the different standards that environmental reporting must adhere to. The Global reporting initiative will be reviewed, as well as emission reporting, and how they are classified. The Ferroalloy industry of South Africa will be reviewed as well as their emissions.

The following resources will be used as part of the literature review:

- Internet;
- NWU Library where Books, scientific journals, and previous studies will be accessed;
- Academic journals.

1.4.2 Empirical study

A content analysis method will be applied in this study to determine the level of sustainability disclosure of carbon tax in the South African Ferroalloy industry. Content analysis is a mixed method research technique.

1.5 Motivation of topic actuality

The primary energy sources in South Africa are fossil fuel based, and is among the world's most carbon intensive economies. Energy derived from fossil fuel has a harmful impact on the environment. Carbon Dioxide (CO₂) is a greenhouse gas which is released when fossil fuels are burnt.

Currently there is a significant lack of information resulting in companies being unsure of how carbon tax will influence their normal operations, as well as the financial implications regarding their profitability. Ferroalloy production is regarded as an energy intensive industry with high consumption of electricity and coke and minor fuels and reductants, which result in high CO₂ emissions.

1.6 Conclusion

In this chapter, the problem statement was discussed and the problem that needs to be addressed was identified as well. The primary objective as well as secondary objectives of this study was identified, as well as the research method that will be used. The next chapter will focus on the literature study that serves as the background of the study.

Chapter 2 Literature study

2.1 Introduction

Integrated reporting is a global phenomenon driven by the necessity for improved information for shareholders and stakeholders. While integrated reporting is a new concept globally, South Africa has taken the lead in terms of urging companies to embrace the concept in their reporting (Makiwane, Padia and Witwatersrand, 2013: 422). Effective corporate governance principles form the foundation of any successful managed company. The King Code of Governance Principles for South Africa (2009) states that current incremental changes towards sustainability are not sufficient, we need a fundamental shift in the ways companies and directors act and organise themselves (Integrated Reporting Committee, 2011: 1).

As early as 1992 when the Rio Declaration on Environment and Development and Agenda 21 were adopted during the United Nations Conference on Environmental and Development, people recognised the need for sound environmental information (Department of Environmental Affairs and Tourism, 2005: 4). Environmental reports have become highly effective tools for communicating the environmental performance of an organisation to stakeholders (Brown, 2005: 87).

South Africa is a significant industrial and economic power in Africa and has the largest economy in Southern Africa. Furthermore, South Africa's Ferroalloys industry has burgeoned over the last five decades to become the world leader in ferrochromium production, a major exporter of manganese ore and alloys and a significant producer of vanadium products. In addition, ferrosilicon of different grades as well as silicon metal is produced (Basson, 2007: 7).

There are various factors that can influence a nation's Greenhouse gas emissions, including government structure, population growth, geography, economic growth, energy consumption, technology development, climate and soils, agriculture and land use management (Department of Environmental Affairs, 2013: 22).

2.2 The integrated report

Current reports on annual financial performance, sustainability and governance disclosure often fail to make the connection between the organisations strategy, financial performance and its performance on environmental, social and governance issues. The primary purpose of an integrated report is to explain to providers of financial capital how an organisation creates value over time (IIRC, 2013: 5). Decision making within organisations and by stakeholders often rely strongly on financial information, yet this information may not provide a complete picture of the organisation's situation. The integrated report will enable stakeholders to assess the ability of an organisation to create value over time (IIRC, 2013: 4).

Integrated reporting requires more than an inclusion of sustainability information to the traditional annual report. Sustainability should be embedded in the organisation so that when the integrated report are drafted there will be sufficient comprehensive information and the issues of sustainability are stable in the organisation and become the way that the organisation operates on a daily basis (Muller, 2011: 25).

An integrated report can be described as a summarised communication on how an organisation's strategy, governance, performance and future forecast lead to value creation over the short, medium and long term. An integrated report should become the organisation's primary report, as it tells the overall story of the organisation and could be linked to more detailed reports and information such as financial statements, sustainability report, and governance disclosure. An integrated report is not simply an extract from the traditional annual report or a combination of the annual financial statements and the sustainability reports, but need to include the sensitive issues so that the crisp and holistic picture is given (IRC, 2011: 6). The users of the integrated report should be able to determine whether the organisation's governing structures has applied its collective mind in identifying the environmental, social, economic and financial issues that impact on the organisation, and to assess the extent to which these issues have been incorporated in the strategy of the organisation (IRC, 2011: 3).

Integrated reporting is currently only compulsory for listed entities in South Africa but every business (regardless of its size) can benefit from an integrated report. It is vital for companies to do business responsibly and ethically, as well as respecting the right of the company's stakeholders. Integrated reporting builds on the practice of financial reporting, while simultaneously incorporating environmental, social and governance matters into one report.

Table 2-1: What an integrated report is and what it is not

What an integrated report is	What an integrated report is not
Integrated reporting is the process of combining environmental, social and governance thinking into core business processes in order to communicate strategic business issues and performance to a wider range of stakeholders.	Integrated reporting is not simply combining the annual report with health and safety and environmental or corporate social responsibility information as this does not do justice to a company's business approach from strategy to performance management.
Stakeholder inclusiveness is central to the notion of integrated reporting. The organisation should establish processes to identify and engage with key stakeholder groups to understand their concerns and needs. The integrated report should be a comprehensive response to key stakeholders concerns.	Responding to a multitude of stakeholders concerns should not result in a brush over of issues or information overload. The organisation must establish processes to identify and prioritise key business issues and respond to these accordingly and comprehensively.
An effective integrated reporting process is one that fulfils the ever increasing reporting requirements of an organisation efficiently, as well as providing interested and relevant stakeholders information in relation to their own perspective and specific	A credible report cannot be produced without a reporting process in place. With directors' liabilities becoming stricter and external scrutiny on sustainability information increases, organisations should be mindful that the information which is being put to the public domain is

What an integrated report is	What an integrated report is not
interests.	factual and credible.
CEO's are indicating that having financial and non-financial information side by side in an integrated report means that all information is now subject to the same level of scrutiny.	Non-financial information can no longer be exempt from external assurance.
The integrated report should be prepared every year and required equal treatment of the various elements throughout the report, leading to a discussion of economic information alongside environmental, social and governance issues.	An integrated report is not necessarily a single report. Emphasis should be on substance over form. While a truly integrated report should be presented in one document, it can be presented in more than one document. If more than one document is presented, the documents should all be made available at the same time and disclosed as an integrated report.

Source: (KPMG, 2011)

2.3 Sustainability reporting

Sustainability reporting is synonymous with other terms for non-financial reporting. A sustainability report is a report published by an organisation about the economic, environmental and social impacts caused by its everyday activities. Sustainability reporting is not a new concept but has its background in the 1970's. In those days reporting was limited as companies tended to focus on the social issues instead of also addressing economic and environmental issues (Makiwane, 2013: 426). The sustainability report presents the organisations values and governance model, and demonstrates the link between strategy and commitment to a sustainability global economy (GRI, 2011: 1).

Stakeholders are interested in both financial and non-financial information regarding the company and its operation (Marx, 2010: 60). Sustainability reports help stakeholders to reflect on past performance and provide a view to the future, in respect of environmental, social and governance initiatives. The sustainability report must provide a balanced and reasonable representation of the sustainability performance both negative and positive of the reporting organisation (GRI, 2010: 9). Although not all stakeholders will use this report, the reasonable expectations and interests of stakeholders are a key reference point for many decisions in the preparation of a report, such as the scope, boundary, application of indicators and assurance approach (GRI, 2010: 15).

Sustainability reporting should address all material sustainability topics that are relevant in understanding how a company can create, preserve or erode value over time. The key to sustainability reporting is that it must be relevant and strategic (Technical Protocol, 2011: 3). Materiality for sustainability reporting is not limited to those sustainability topics that have a significant financial impact on the organisation, but determining materiality for a sustainability report also includes considering economic, environmental and social impacts that cross a threshold in affecting the ability to meet the needs of the present without compromising the needs of the future operations (GRI, 2011: 3).

The purpose of sustainability reporting is to create transparency and accountability in order to allow better informed robust decision making. Sustainability reporting must answer the question of whether the present practice can persist by knowing your non-financial risks and opportunities and showing how it is managed.

Reports should present performance in relation to broader concepts of sustainability, and will involve discussing the performance of the organisation in the context of the limits and demands placed on environmental or social resources at sectorial, local, regional or global level (GRI, 2010: 16).

Integrated sustainability reporting is more about managing than reporting (Mammatt, 2010: 56). Sustainability should be integrated into day-to-day management activities; otherwise the sustainability report will become a meaningless report. In order to

achieve this, stakeholder engagement, both internal and external, are required, as well as long term monitoring (Mammatt, 2010: 56).

Sustainability reporting in South Africa has gained momentum following the release of the corporate governance guidelines by King III (Makiwane, 2013: 427). Companies have begun to produce environmental or sustainability reports which detail the company's impact upon the environment and the ways that these impacts are measured and monitored. Sustainability reporting has evolved from the extraordinary to the exceptional to the expected (White, 2012: 5). Sustainability disclosure used to be the domain of only a few companies, but today it is best practice employed by organisations worldwide.

Sustainability reporting is one of the core aspects of good corporate governance. King III requires that sustainability reporting and disclosure be integrated with the company's financial reporting. Reporting equips companies to strategically manage their operations, brand and reputation to stakeholders and be better prepared to manage any risk that may compromise the long term sustainability of the business." (KPMG, 2011).

The GRI deals extensively with guidelines for reporting on sustainability issues based on three themes, namely economic, environmental and social issues. The focus of this study is in the field of environmental reporting.

2.4 Environmental reporting

Environmental reporting is the disclosure by an entity of environmentally related data regarding environmental risks, environmental impacts, policies, strategies, targets, costs, liabilities or environmental performance to those who have interest in such information (Brown, 2005: 87) An environmental report acknowledge and explain the environmental impacts of an organisations operations and products, and publicly demonstrates the organisations commitment to reduce them accordingly (Brown, 2005: 87).

Environmental dimensions include a company's impact on living and non-living natural ecosystems, land, air and water. Environmental indicators cover performance

related inputs which include energy input, water usage, and material used, and output related information such as emissions, effluent, and waste. In addition to this, it covers biodiversity, environmental compliance and other relevant information such as environment expenditure and the impacts of products and services (SAB&T, 2009: 3).

Benefits of environmental reporting according to the Association of Chartered Certified Accountants (ACCA) are:

- Serving the need for both internal and external stakeholders;
- Help to reduce the agency gap between directors and shareholders;
- It demonstrates coherence of overall management strategy to important stakeholders;
- It increases competitive advantage;
- Public recognition for corporate accountability and responsibility;
- Target setting and external reporting drives continual environmental improvement;
- It reduces corporate risk, which may reduce financing costs and broaden the range of investors;
- It enhances employee morale;
- Improved profitability (ACCA, 2014).

2.4.1 Governance

Environmental governance is critical for the achievement of environmental sustainability and ultimately sustainability development. The maintenance of healthy ecosystems and natural resources are pre-conditions for human wellbeing. Environmental governance is a complicated arena in South Africa, partly due to a fragmented and evolving legislative framework and a lack of clarity in the division of roles and responsibilities across the three spheres of government (Middleton, 2011: 2).

Effective environmental governance at all levels is critical for finding solutions to these challenges. Environmental governance comprises includes the rules,

practices, policies and institutions that shape how humans interact with the environment (Huong, 2009: 2). Environmental governance points out concerns on how legal and policy decisions are made, and will affect the outcome of such decisions, therefore companies should include environmental management issues into their policies and strategies.

It is important to develop a strategy that improves the performance of the environment. King III suggests that sustainability should be considered as part of the strategy of the organisation and should be considered as a business opportunity. Every board in South Africa need to revisits their strategy and ensure that sustainability objectives have been incorporated in their future plans (Engelbrecht, 2010: 30).

Risk management is also an essential component of governance, and is aimed at assisting companies to identify threats to their business for taking appropriate action before any damage is caused. Risk management entails the identification, analysis, mitigation, monitoring and reporting of risk. A risk management policy should set the tone for risk management and should also indicate how risk management support the company's strategy (Makiwane, 2013: 426). It is therefore also emphasised that companies should be aware of environmental risks.

2.4.2 Internal standards

"What gets measured gets managed" is a mantra often associated with the business world (Dickinson, 2012: 11). Organisations must be able to understand and manage their GHG risks if they are to ensure long-term success in a competitive business environment, and to be prepared for future national or regional climate policies.

In order to effectively reduce CO₂ emissions, organisations need to know what their emissions are, and what the sources of the emission are. Internal standards help organisations to analyse marginal costs or benefits to reduce emissions, and determine optimal allocation mechanisms.

By measuring and reporting their CO₂ emissions organisations can have a baseline and from this, with the aid of accredited standards, they can establish aggressive but

achievable internal standards for them. Setting internal standards will help organisations to prioritise and focus their reduction efforts on those sources with the largest impact, as well as help to plan the reduction strategy. Aggressive internal standards help to engage employees in identifying carbon benefits and show stakeholders that the organisation view CO₂ emission reduction as a priority (Dickinson, 2012: 3)

According to Dickson of the CDP, they have found that annual reporting drives standardization and those internal standards can become a key pillar for the organisation. Internal measuring and having standards may provide third party verification organisations with useful information to audit the reported data (Dickinson, 2012: 3).

2.4.3 External standards

Regulations require that sustainability reports enable readers of emission data to have a clear understanding of the operations for which the emissions data has been reported. External standards help organisations to quantify, monitor, report and verify emissions, and are aimed at improving GHG management.

External verification provides readers and managers increased confidence in the data, and ensure that the data can be used for decision making (GRI, 2013: 5).

Making use of external standards, have the following benefits:

- It provides an organization's stakeholders with a greater sense of confidence in disclosures.
- Increase the robustness, accuracy and trustworthiness of disclosed information.
- External standards help confirm that internal systems and controls are robust, and can recommend any necessary improvements.
- Prove your commitment to reducing your carbon emissions.
- Develop robust internal mechanisms for quantifying and reporting GHG emissions.
- Prepare legitimate GHG assertions, claims and reports.

- Quantify and report emission reductions from projects (GRI, 2013: 6).

The Greenhouse Gas Protocol is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. The Greenhouse Gas Protocol was designed with the following objectives in mind:

- To help companies prepare a GHG inventory that represents a true and fair account of their emissions, through the use of standardized approaches and principles.
- To simplify and reduce the costs of compiling a GHG inventory.
- To provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions.
- To increase consistency and transparency in GHG accounting and reporting among various companies and GHG programs (Greenhouse Gas Protocol, 2004).

2.5 Global Reporting Initiative

Professor Mervyn King: “To make our economy sustainability we have to relearn everything we have learnt from the past”. That means making more from less and ensuring that governance, strategy and sustainability are inseparable. Communication and dissemination of corporate environmental information has become a vital requirement in the on-going management and monitoring of human activity and its impact upon the earth (Department of Environmental Affairs and Tourism, 2005: 11).

The Global Reporting Initiative (GRI) is a leading organisation in the sustainability arena. The GRI promotes the use of sustainability reporting as a way for organisations to become more sustainability and contribute to sustainability development.

The GRI was founded in 1997 in Boston, and its roots lies in the US non-profit organisations the Coalition for Environmentally Responsible Economies (CERES) and the Tellus Institute (GRI, 2013: 1).

CERES established a GRI project department with the aim of creating an accountability mechanism to ensure companies were following CERES Principles for responsible environmental conduct. A Multi Stakeholder Steering Committee was established to develop GRI's guidance. This guidance became a Sustainability Reporting Framework, with the reporting principles at its heart. In May 2013, the GRI released its fourth generation of its guidelines, the G4 (GRI, 2013: 1).

There are four Reporting Principals for Defining Content featured in the GRI Sustainability Reporting Guidelines that should be used in the process for defining report content: Materiality, Stakeholder Inclusiveness, Sustainability Context, and Completeness (GRI, 2011: 4). The next paragraph will look in more detail about the GRI and emissions.

2.5.1 Global Reporting Initiative and emissions

Greenhouse gas emissions (GHG) are a major contributor to climate change. The United Nations recognises CO₂, Methane, and Water Vapour Nitrous Oxide, Hydro fluorocarbons, Per fluorocarbons, and Sulphur hexafluoride as greenhouse gasses under the Kyoto Protocol according to the United Nations Framework Convention on Climate Change (UNFCCC, 2008). South Africa emits more Greenhouse gasses (GHG) than all the other Sub Saharan African countries combined; owing it to its carbon intensive economic sectors (Mbadlanyana, 2013: 79).

The GRI has aligned itself with the Greenhouse Gas Protocol. The Greenhouse Gas Protocol (GHG Protocol) is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. In 2006, the International Organization for Standardization (ISO) adopted the Corporate Standard as the basis for its ISO 14064. GHG Emissions Indicators of the GRI are fully aligned with the GHG Protocol's grouping of emissions, as well as the ISO 14064 grouping.

2.5.2 Classification of GHG emissions

GHG emissions are classified into three scopes, namely Scope 1, Scope 2, and Scope 3.

- Scope 1 emissions are all GHG emissions that come from sources that are owned or controlled directly by an organisation (GRI, 2013: 107).
- Scope 2 emissions are indirect GHG emissions that result from the generation of purchased electricity, heating, cooling and steam which is purchased from other organisations for its own consumption (GRI, 2013: 110).
- Scope 3 emissions occur from sources not owned or controlled by the organisation, and are classified as upstream and downstream emissions. Upstream emissions are linked to the supply chain and the activities surrounding the manufacturing process, while downstream emissions are linked to the life of the products manufactured (GRI, 2013: 112).

EN denoted in this section is for Environmental category. According to the G4/EN15, organisations need to identify direct emissions of GHGs from sources owned or controlled by the organisation including the following: Generation of electricity, heating, cooling and steam; physical or chemical processing; transportation of materials, waste, employees and passengers, as well as fugitive emissions (GRI, 2013: 107).) The sources identified must be used for calculating the organisations gross direct GHG emissions and using relevant Gross World Product (GWP) rates, calculate CO₂ equivalents for the reporting period.

Methodologies used to calculate emissions may include:

- Direct measurement of energy sources consumed.
- Mass balance calculations.
- Calculation based on site - specific data.
- Calculation based on published criteria.
- Direct measurement of GHG.
- Estimations, only due to a lack of default figures, but assumptions need to be indicated (GRI, 2013: 108).

According to G4/EN16, organisations need to identify indirect emissions of GHG's that result from the generation of electricity, heating, cooling and steam which is

purchased or acquired for own consumption by the organisation. Indirect GHG emissions are often much greater for organisations than their direct GHG emissions.

The gross indirect energy GHG emissions need to be calculated from the above factors. A consistent consolidation approach needs to be selected to calculate the gross energy indirect emissions. Organisations are expected to report standards, methodologies and assumptions used to calculate and measure emissions (GRI, 2013: 110).

According to G4/EN17 GHG emissions may occur from outside of the organisation, or result from the use of their products, and are often much greater than the direct GHG emissions or energy indirect emissions. These emissions are a consequence of activities of the organisation, but occur from sources not owned or controlled by the organisation. These include both upstream and downstream emissions. Organisations are expected to report standards, methodologies and assumptions used to calculate and measure emissions (GRI, 2013: 112)

Organisations may disaggregate data by the following categories and activities:

Upstream:

1. Purchased goods and services.
2. Capital goods.
3. Fuel and energy related activities that are not included in Scope1 and Scope 2 emissions.
4. Upstream transportation and distribution.
5. Waste generated in operations.
6. Business travel.
7. Employee commuting.
8. Upstream leased assets.
9. Other upstream.

Downstream:

10. Downstream transportation and distribution.

11. Processing of sold products.
12. Use of sold products.
13. End of life treatment of sold products.
14. Downstream leased assets.
15. Franchises.
16. Investments.
17. Other downstream.

The industrial sector form part of the Mining and Metal Sector Supplement (MMSS) of the GRI. The MMSS provides organizations in the sector with a tailored version of GRI's Sustainability Reporting Guidelines. The Supplement's additional commentaries and Performance Indicators, developed especially for the sector, capture the issues that matter most for companies in the mining and metals sector. The MMSS has potentially complex relationships with the environment, sometimes extending over large areas, requiring a careful assessment of the potential for direct environmental impact (GRI, 2013: 11).

According to the International Council on Mining and Metals (ICMM) climate change report of November 2011, the global mining and metal emissions is close to 1Giga ton carbon dioxide equivalent, which is approximately 2% of the global total emissions (ICMM, 2011).

The industrial sector can be divided into sub sectors of mining, iron and steel, chemicals, non-ferrous metals, non-metallic minerals, construction, textiles, wood products etc. The largest subsector is iron and steel which consume 27.4% of the total energy utilised by the industrial sector (Department of Environmental Affairs, 2013: 60). The Ferroalloy industry forms part of the industrial sector.

South Africa has an abundant supply of minerals and is a world leader in mining and minerals. The mining and metal sector is a diverse sector that includes exploration, mining and primary metal processing, and covers the complete life cycle from development through operational lifetime to closure and post closure.

The energy sector is the main contributor of GHG emissions in South Africa with more than 80% of emissions (Department of Environmental Affairs, 2013: 21) as can

be seen in table 2-2. The primary users of electricity in South Africa are the mining and manufacturing industries. The electricity sector is responsible for approximately 48% of South Africa's carbon emissions, as 80% of electricity is coal fired. The mining and manufacturing industry, are both electricity intensive, and contribute 9% and 14% respectively to South Africa's GDP, and account for 75% of exports by value (Jeffrey, 2013).

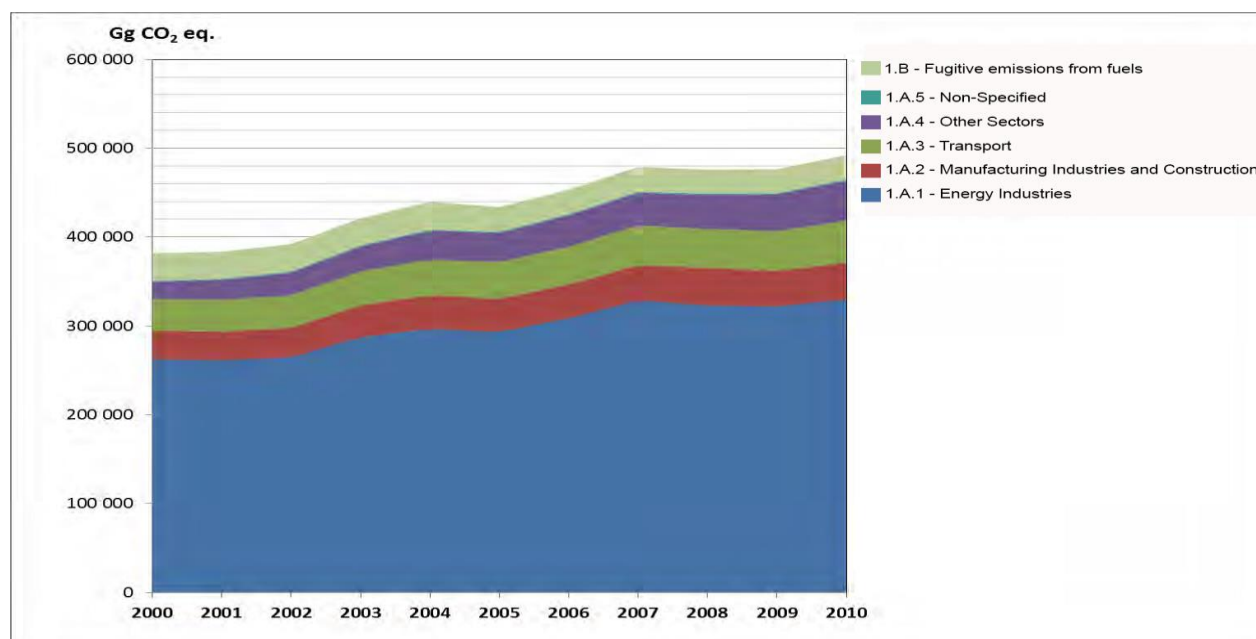
Table 2-2: Levels of GHG emissions, for South Africa between 2000 -2010

Year	Energy	IPPU	AFOLO (excl. land)	AFOLO (incl. land)	Waste	Total (excl. land)	Total (incl. land)
2000	381790	29961	39565	9037	12434	463750	433221
2001	383620	28652	39725	12772	13122	465118	438166
2002	392107	30368	38916	16060	13789	475180	452324
2003	421121	30987	36995	10310	14477	503581	476895
2004	439835	32548	37049	19545	15179	524611	507107
2005	433719	33400	37235	29667	15907	520262	512693
2006	453536	34190	37148	23869	16649	541523	528244
2007	479058	33871	36522	23435	17409	566860	553773
2008	475817	30229	37580	25280	18170	561797	549497
2009	476346	27456	36658	21688	18989	559450	544480
2010	495432	29634	37577	18248	19806	582449	563120

Source: GHG Inventory for South Africa 2000-2010.

Figure 2-1 present the contribution of the main sectors to the national CO₂ emissions excluding land. CO₂ emissions occur mainly from two sources, namely energy and fuel. The energy sector was by far the largest contributor to CO₂ emissions contributing on average 88.9% between 2000 and 2010. In terms of energy demand South Africa is divided into six sectors namely industry, agriculture, commerce, residential, transport and other sectors (Department of Environmental Affairs, 2013: 40).

Figure 2-1: CO₂ trend and emission levels of sectors, excluding Land sub sector, 2000-2010



Source: GHG Inventory for South Africa 2000-2010

Table 2-3 demonstrates the South African energy demand and it reveals that the industry sector utilise 38% of the energy demand with only 33000 of the 7.9 Million consumers, second is the mining industry.

Table 2-3: South African energy demand

Consumer group	Electricity consumption	Number of consumers
Residential	17%	7.5 Million
Agriculture	3%	103 000
Commercial	13%	255 000
Mining	15%	1100
Industry/Manufacturing	38%	33000
Transport	3%	1800
Exports	6%	7
Own use of distributors	5%	N/A
Total	100%	7.9 Million

Source: GHG Inventory for South Africa 2000-2010

2.6 The Ferroalloy industry

2.6.1 The Ferroalloy industry of South Africa

Ferroalloys are master alloys containing iron and one or more non-ferrous metals as alloying elements (Kuenen, 2013: 3). The Ferroalloy industry is associated with the iron and steel industries as its largest customers. Ferroalloy plants manufacture concentrated compounds that are delivered to steel production plants to be incorporated in alloy steels (Department of Environmental Affairs, 2013: 112). Ferroalloys are defined as iron bearing alloy with a high proportion of one or more other elements (Holappa, 2010: 703).

South Africa is a leading player in the international Ferroalloys industry. Historical factors that have contributed to this dominant position include an abundance of natural resources and relatively low cost electricity. The Ferroalloy industry is controlled by approximately 17 companies, with many of them listed on the JSE, some even with JSE's Social Responsibility Index and ISO 14001 accreditation. (Gauteng Provincial Government, 2006: 3)

South Africa is the world's largest producer of chromium and vanadium ores, as well as the leading supplier of their alloys. South Africa is also the largest producer of iron and manganese ores and an important supplier of ferromanganese, ferrosilicon, and silicon metal (Department of Environmental Affairs, 2013: 112).

The South African economy is directly related to the global economy mainly through exports and imports. South Africa's GDP is the 26th highest in the world, but in primary energy consumption South Africa is ranked 16th mainly due to the economy being dominated by large scale energy intensive primary minerals beneficiation industries and mining (Department of Environmental Affairs, 2013: 40).

Ferroalloys are most commonly produced by submerged arc furnaces with graphite electrodes or consumable Söderberg electrodes, during which raw ore, carbon materials and slag forming materials are mixed, and heated to release carbon sources. In addition to emissions originating from reducing agents and electrodes, the calcination of carbonates in ores and fluxes contribute to the CO₂ emissions

(Lindstad, 2006: 458). The production of Ferroalloys result in emission of greenhouse gasses as a result of the manufacturing process.

Sustainability reporting in the Ferroalloy industry is guided by the Mining and Metal Sector supplement of the GRI. This supplement identifies aspects of mining and metals companies' operations that are significant to a discussion of sustainability development by companies in this sector. The mining and metals sector includes exploration, feasibility, construction, mining and metal processing. Mining and metals form an integral part of modern society and industrial chains, and their activities and products interact with a wide range of groups (ICMM, 2005: 8).

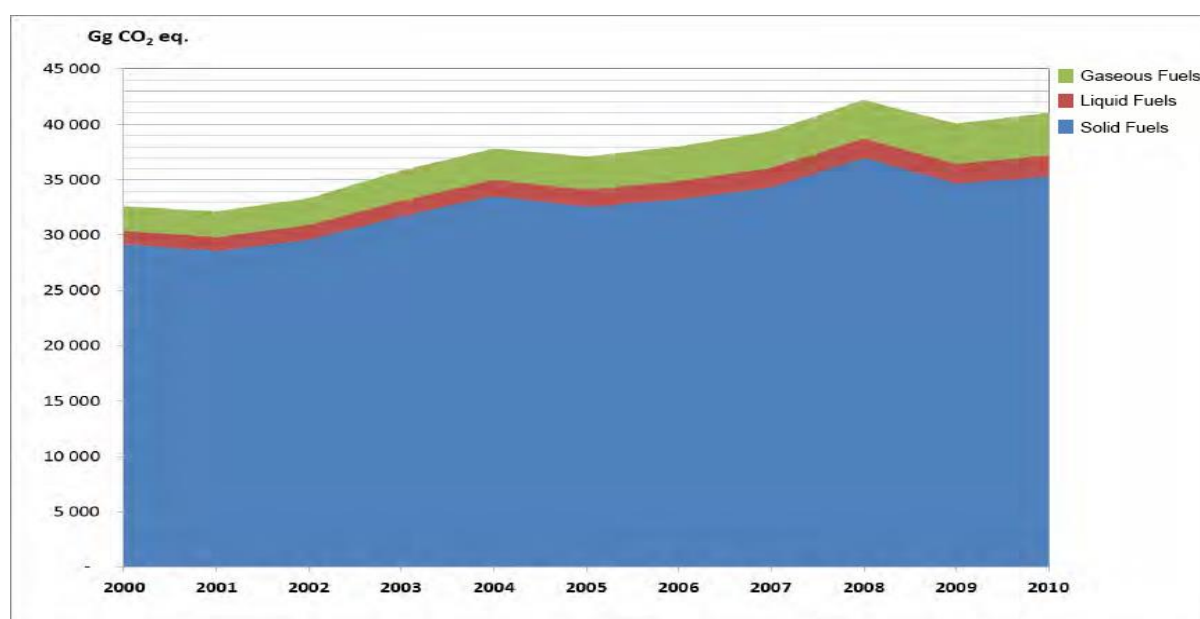
2.6.2 Emissions in the Ferroalloy industry

Ferroalloy production is regarded as an energy intensive industry with high consumption of electricity and coke and minor fuels and reductants, which result in high CO₂ emissions.

CO₂ is the main greenhouse gas from Ferroalloy production, although research has shown that CH₄ and N₂O account for an equivalent greenhouse gas emission of up to 5% of the CO₂ emissions from Ferro-Silicon and Silicon metal production (Lindstad, 2006: 458). The Ferroalloy industry was responsible for 5% of the total world CO₂ emissions in 2007. This figure however only refers to the primary energy use and not indirect emissions.

The Industrial sector includes GHG emissions sourced from industrial processes, the use of GHG emissions in products and the use of fossil fuels. The main emissions sources are releases from industrial processes that chemically or physically transform raw materials (Department of Environmental Affairs, 2013: 49).

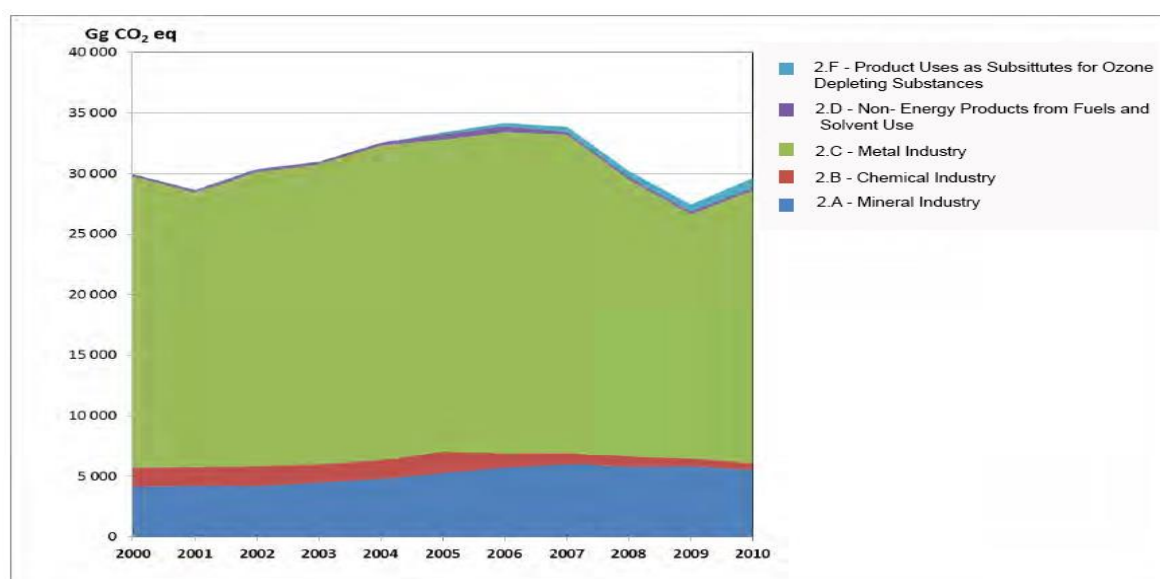
Figure 2-2: CO₂ trend and emission from fuel used in the industrial sector



Source: GHG Inventory for South Africa 2000-2010

Figure 2-2 clearly indicates that the main emissions from fuel used in the industrial sector are emissions from solid fuels. Solid fuels consist mainly of carbon sources such as coal and coke

Figure 2-3: Industrial trend and emission levels of source categories 2000-2010



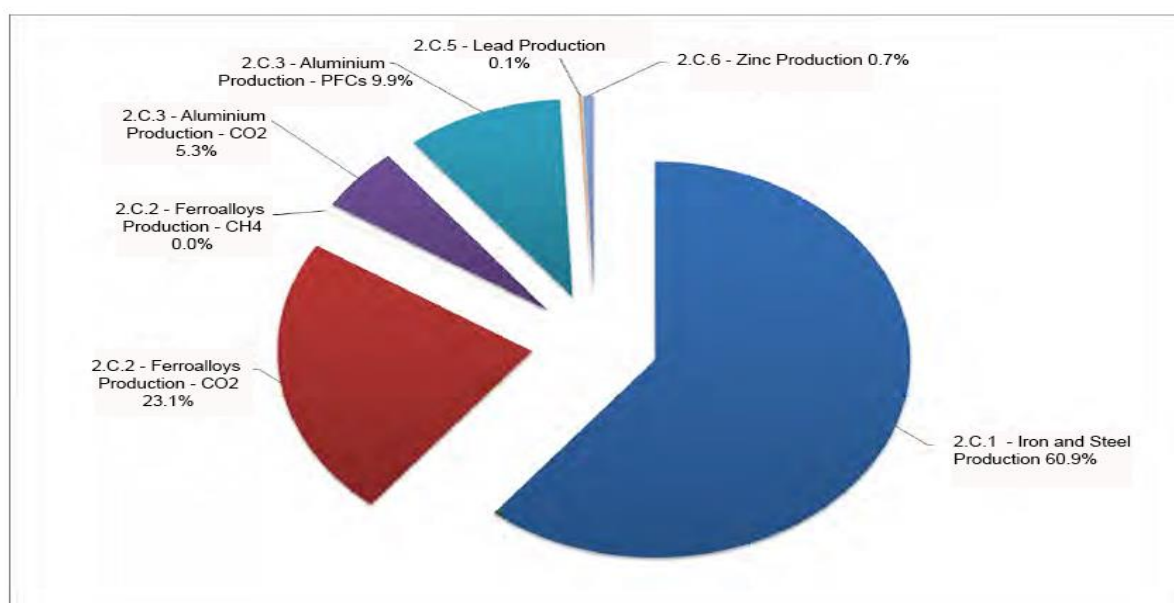
Source: GHG Inventory for South Africa 2000-2010

The main source of emissions in the Industrial sector from 2000 to 2010 was the Metal Industries, which contributed between 73.5% and 80.3% over this period, with the Iron and Steel Industry contributing 60.9% (Department of Environmental Affairs, 2013: 50).

The GHG emissions in the Industrial sector fluctuated during the ten year reporting period as can be seen in figure 2-3. Total emissions declined between 2000 and 2001, and slowly increased until 2006. A sharp decline occurred between 2007 and 2009 in the three major contributing industries, namely Iron and steel production, Ferroalloys production, and Aluminium production.

The Ferroalloys emission showed a reduction of up to 38.5 % in this period. These declines can be attributed to reduced production, caused by electrical supply challenges and decrease demand following the economic crisis that occurred during this period (Department of Environmental Affairs, 2013: 70).

Figure 2-4: GHG emissions from the Metal industry between 2000- 2010

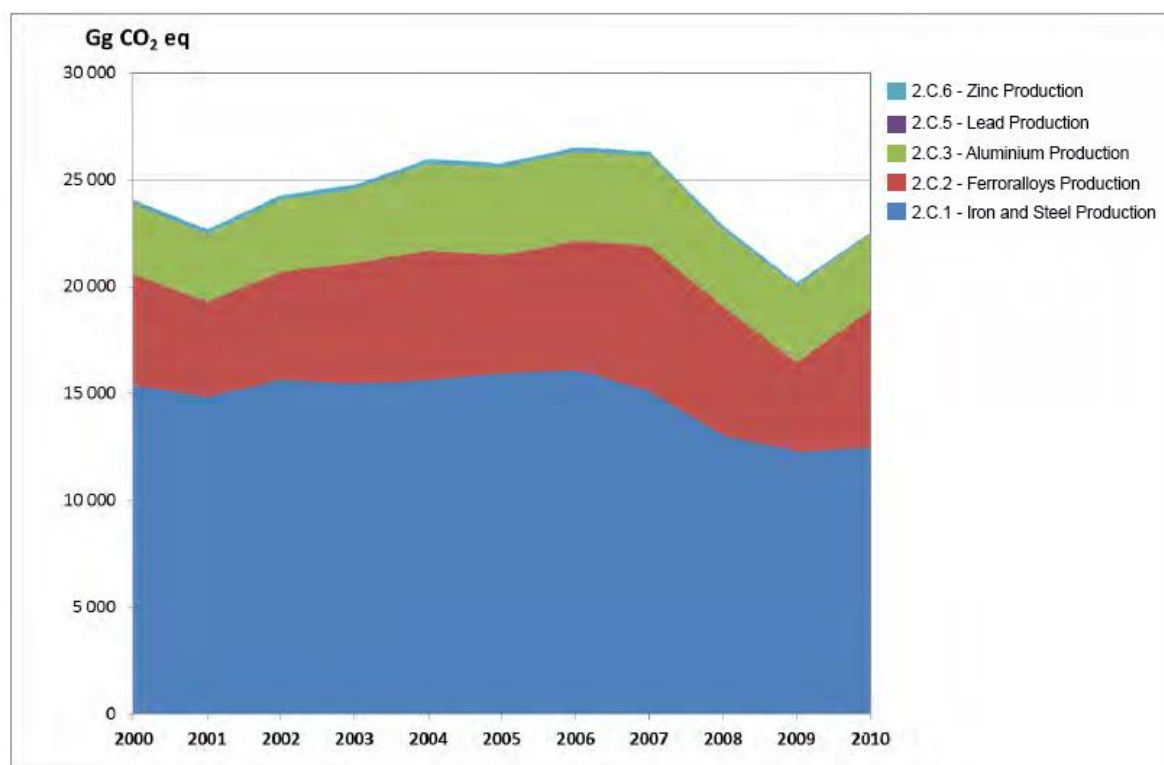


Source: GHG Inventory for South Africa 2000-2010

Figure 2-4 shows the contribution from the various industries and gases to the total accumulated GHG emissions from the Metal industry between 2000 and 2010. The largest source of emissions in the Metal industry sector emissions in South Africa is

from the production of iron and steel, while Ferroalloys emissions contribution of CO₂ was 23.1% of the total emissions from this sector.

Figure 2-5: The trend and emission levels of the Metal Industry



Source: GHG Inventory for South Africa 2000-2010

The Ferroalloy industry has the second largest emission levels of the Metal industry, after Iron and Steel. A sharp decline in emission levels occurred from 2007 to 2009 mainly due to the economic downturn at that time, but during 2010 emissions in the Ferroalloy industry increased by 54, 7% (Department of Environmental Affairs, 2013: 114) as can be seen in figure 2-5.

Table 2-4: Activity data from various metal industries

Activity (tons)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Chromium alloys	2574 000	2141 000	2351 000	2819 000	3032 000	2802 000	3030 000	3561 000	3269 000	2346 000	3607 000
Manganese alloys, (7%C)	596873	523844	618954	607632	611914	570574	656235	698654	502631	274923	529300
Manganese alloys, (1%C)	310400	259276	315802	373152	373928	275324	277703	327794	259014	117683	260700
Silicon alloys	108500	107600	141700	135500	140600	127000	148900	139600	154500	110400	128760
Silicon metals	40600	39400	42500	48500	50500	53500	53300	50300	51800	38600	45240

Source: GHG Inventory for South Africa 2000-2010

Table 2-4 shows the activity data from the various metal industries from year 2000 through to 2010. From table 2-4 above it is clear that Chromium alloy production has grown significantly between 2000 and 2010, while both Manganese alloys production has declined. Silicon alloys and Silicon metals production increased in this period as well.

Table 2-5: Generic CO₂ emissions factors for Ferroalloy production (ton CO₂/ ton product)

Type of ferroalloy	Emission factor CO ₂	Emission factor CH ₄
	(tonnes per Ferroalloys tonne production)	
Ferrosilicon 45% Si	2.5	n/a
Ferrosilicon 65% Si	3.6	1
Ferrosilicon 75%Si	4.0	1
Ferrosilicon 90% Si	4.8	1.1
Ferromanganese (7%C)	1.3	n/a
Ferromanganese (1%C)	1.5	n/a
Silicon manganese	1.4	n/a
Silicon metal	5.0	1.2

Source: GHG Inventory for South Africa 2000-2010

Table 2-5 indicates the typical emission factor of CO₂ and CH₄ for every one ton of different alloy produced. Ferromanganese with 7% carbon content is the lowest contributor of CO₂ emission with 1,3 ton of CO₂ emission for every 1 ton alloy produced, while Silicon metal emissions are the highest with 5,0 ton of CO₂ emission for every 1 ton alloy produced.

2.7 Conclusion

This chapter focussed on the literature of sustainability reporting. The characteristics as well as the importance of an integrated report and reporting were discussed. In addition, the purpose and the relevance for stakeholders to receive a non-financial report or a sustainability report were also studied. The benefits of environmental reporting were acknowledged. Furthermore, it was substantiated that the energy sector was the main GHG emission contributor in South Africa for the period between 2000 and 2010.

The Global Reporting Initiative (GRI) was discussed to convey who they are, their history, the principles they adhere to, and how to report GHG emissions. The GRI has different sector supplements, and the Ferroalloy industry forms part of the Mining and Metal Sector Supplement.

The next chapter will focus on the compliance of the Ferroalloy industry with regards to the GRI requirement for sustainability reporting. Content analyses will be used to evaluate the different JSE listed Ferroalloy manufacturers' integrated reports.

Chapter 3 Empirical study

3.1 Introduction

This chapter will focus on analysing integrated reports and sustainability disclosure from various South African Ferroalloy producers. The different research methods will be discussed, as well as the results obtained from this study.

3.2 Research method

3.2.1 Quantitative research

Quantitative research is a formal, objective, systematic process in which numerical data are used to obtain information about the world (Burns, 2005: 23). Quantitative methods emphasise objective measurements and numerical analysis of data. Quantitative research is conclusive in its purpose as it tries to quantify the problem and understand how prevalent it is by looking for projectable results to a larger population (Amora, 2010: 1).

The overarching aim of a quantitative research study is to classify features, count them, and construct statistical models in an attempt to explain what is observed. (Labare, 2013). In quantitative research, the goal is to determine the relationship between one variable and another in a population.

Quantitative research uses observations such as the data collection method. Quantitative research largely uses methods such as questionnaires and surveys with set questions and answers that respondents tick from a predefined selection (Willis, 2014: 1). Quantitative research deals in numbers, sensibleness and the objective, focusing on logic, numbers, and unchanging static data and detailed, convergent reasoning rather than divergent reasoning.

Quantitative research can gather a large amount of data that can be easily organized and manipulated into reports for analysis (Labare, 2013).

3.2.2 Qualitative research

Qualitative research is by definition exploratory, and it is used when we don't know what to expect, to define the problem or develop an approach to the problem. It's also used to go deeper into issues of interest and explore nuances related to the problem at hand (Amora, 2010: 1).

There are a wide variety of methods that are common in qualitative measurement. In fact, the methods are largely limited by the imagination of the researcher (Trochim, 2006).

Unlike quantitative research which relies on numbers and data, qualitative research is more focused on how people feel, what they think and why they make certain choices. Qualitative research is characterised by its aims, which relate to understanding some aspect of social life, and its methods which generate words, rather than numbers, as data for analysis (Bricki, 2007).

3.2.3 Mixed method

A mixed methods research design is a procedure for collecting, analysing, and using both quantitative and qualitative research and methods in a single study to understand a research problem (Driscoll, 2007: 19).

Mixing quantitative and qualitative research methods can take on many forms. One of these methods is Content analyses.

3.3 Content analysis

Content analysis can be defined as a systemic, replicable technique for compressing many words of text into fewer content categories (Stemler, 2001: 1). Content analysis is a research tool used to determine the presence of certain words or concepts within texts or sets of texts with relative ease in a systematic fashion and can be used in an array of fields (Flores, 2013: 200).

According to Prasad, content analyses can do the following:

- It goes beyond the impressionistic observations about phenomena and can help you make a quantitative expression about the phenomenon;
- It is an unobtrusive research technique useful to study sensitive research topics;
- It is context sensitive and therefore can process symbolic meanings of data;
- It is a safe method if the researcher found that a portion of the necessary information was missing or incorrectly coded;
- It can deal with large volumes of data (Prasad, 2008: 8).

Content analysis will be used to analyze published integrated reports of Ferroalloy organizations. The reason for using content analyses is because it enables us to sift through large volumes of data in a systematic manner. Content analysis is useful to examine trends and patterns in documents and is also a powerful data reduction technique (Raftery and Valiulis, 2013: 49).

3.4 Measuring instrument

A checklist was developed to measure the content of annual integrated and sustainability reports. The checklist has 5 different categories namely Governance, Standards internal and external, Scope 1 emissions, Scope 2 emissions and Scope 3 emissions. The checklist is attached in Annexure A.

3.5 Population and sample

The population for this research is the entire Ferroalloy manufacturing organisation in South Africa. A convenient sample of 14 organisations listed on the JSE was selected. The selected organisations annual integrated and sustainability reports for 2013 were measured against the checklist.

3.6 Results

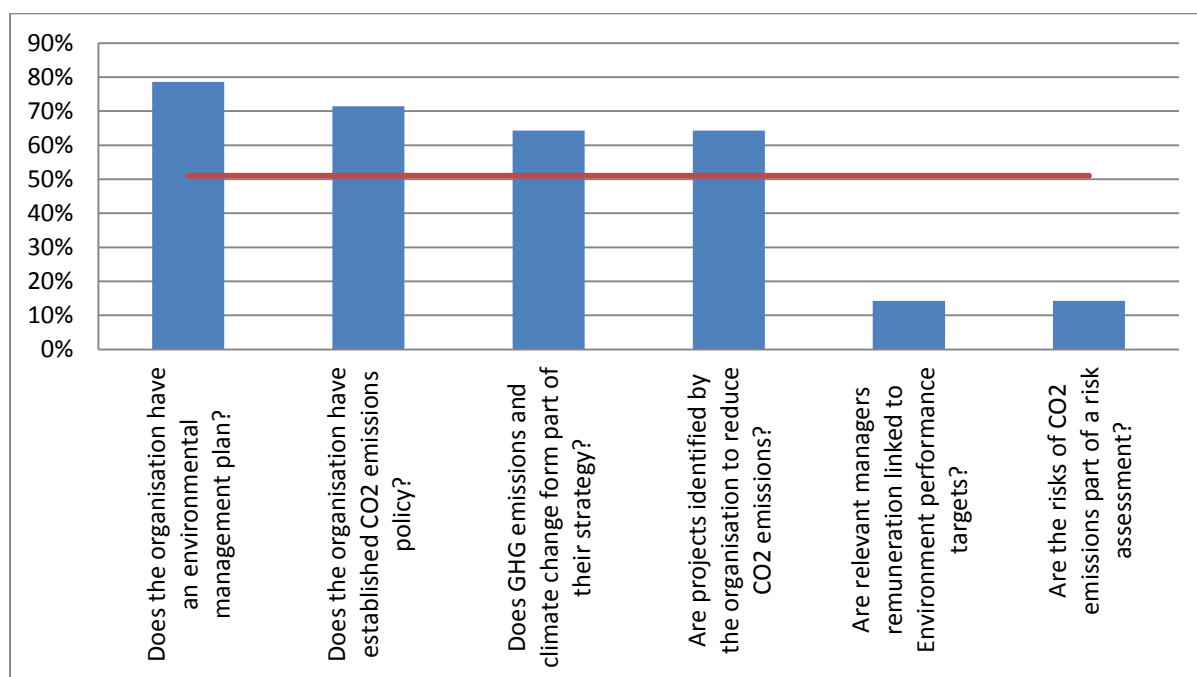
3.6.1 Governance

The purpose of this section is to determine if organisations adhere to environmental governance with reference to environmental management plans, CO₂ emission

policies, and whether climate change is addressed in the strategy of the organisation. It also addresses whether CO₂ emissions is part of risk assessments.

The results for Governance compliance are presented in figure 3.1 below.

Figure 3-1: Governance compliance



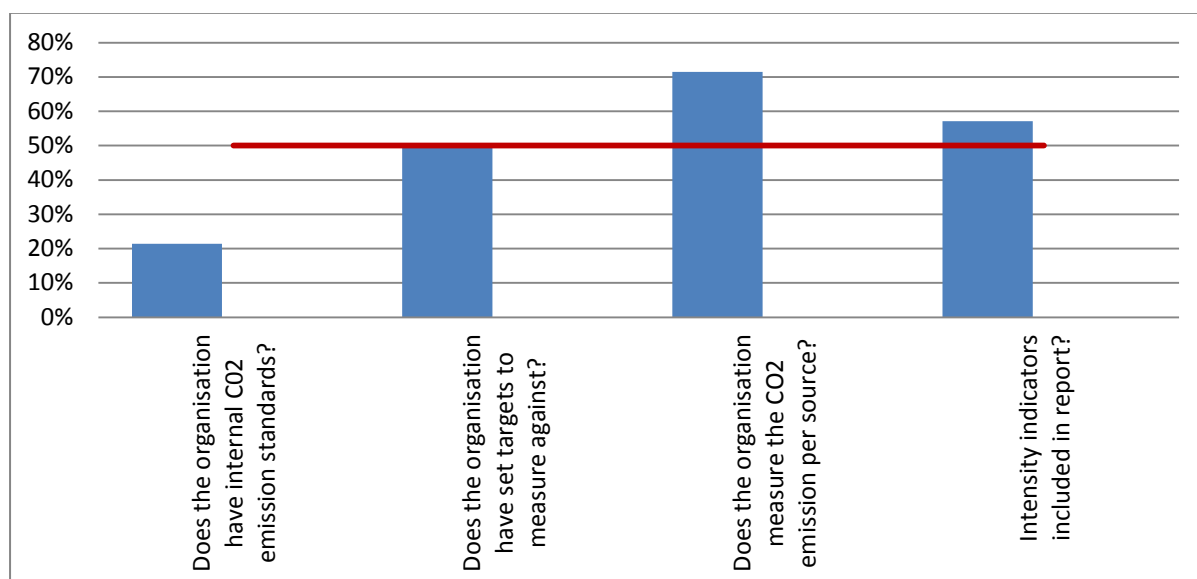
The average score of all the organisations on governance related aspects is 51% as indicated by the red line. Environmental management plans were reported on in 79% of the organisations, 71% of the organisations have environmental policies, but none of the 14 organisation assessed have an established CO₂ emission policy. The impact of climate change and GHG emissions are addressed as part of the organisations strategy in 64% of the organisations. 64% of the organisations have identified and reported on projects to reduce their CO₂ emissions. Only 14% of the organisation have managers remuneration linked to environmental targets, either as part of their normal package or as a key performance indicator (KPI) incentive. 14% of the organisation address CO₂ emissions in their risk assessments.

3.6.2 Internal standards

The purpose of this question is to establish whether organisations have set internal targets that they utilise to measure their CO₂ emissions per source and to establish if they measure it against an intensity factor.

The results for internal standards are presented in figure 3.2 below.

Figure 3-2: Internal standards compliance



The average score that organisations obtained for internal standards is 50% as is indicated by the red line. Internal CO₂ emission standards could only be found in 21% of organisations analysed, while 50% of the organisations have internal targets of CO₂ emissions that they measure themselves against. CO₂ emissions per source were measured and reported by 71% of organisations, while 57% of organisations make use of intensity indicators when reporting CO₂ emissions.

3.6.3 External standards

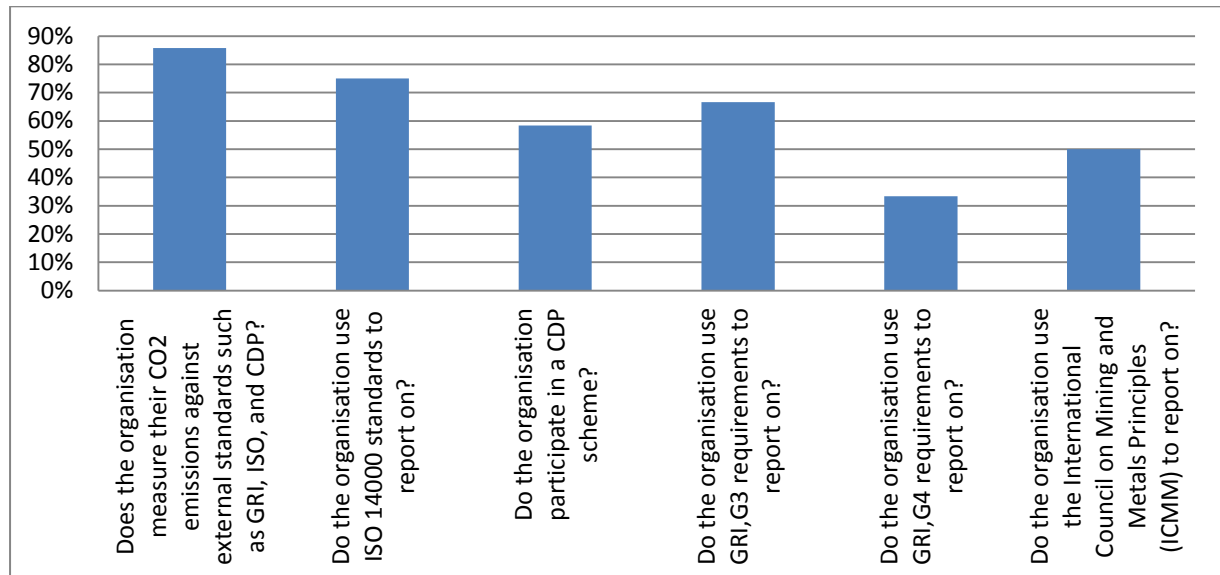
The purpose of this question is to see whether organisations make use of external standards to measure their emissions, and to audit the results by third parties. External standards provide stakeholders with confidence in the data, and it ensures that the reported data can be used in decision making.

The different external standards that can be used to report CO₂ emissions include the following, but are not limited to this: International Standards Organisation (ISO) 14000, Carbon Disclosed Projects (CDP), GRI G3 requirements, GRI G4 requirements. When integrated reports were studied, it was noted that organisations make use of the International Council on Mining and Metals Principles (ICMM). GRI

G4 requirements are preferred above the GRI G3 as they are the most up to date version of the requirements.

The results for external standards are presented in figure 3.3 below.

Figure 3-3: External standards compliance



Organisations make use of one or more external standards when reporting CO₂ emissions in 86% of the organisations studied. The organisations that make use of the above external standards use the different standards as follow:

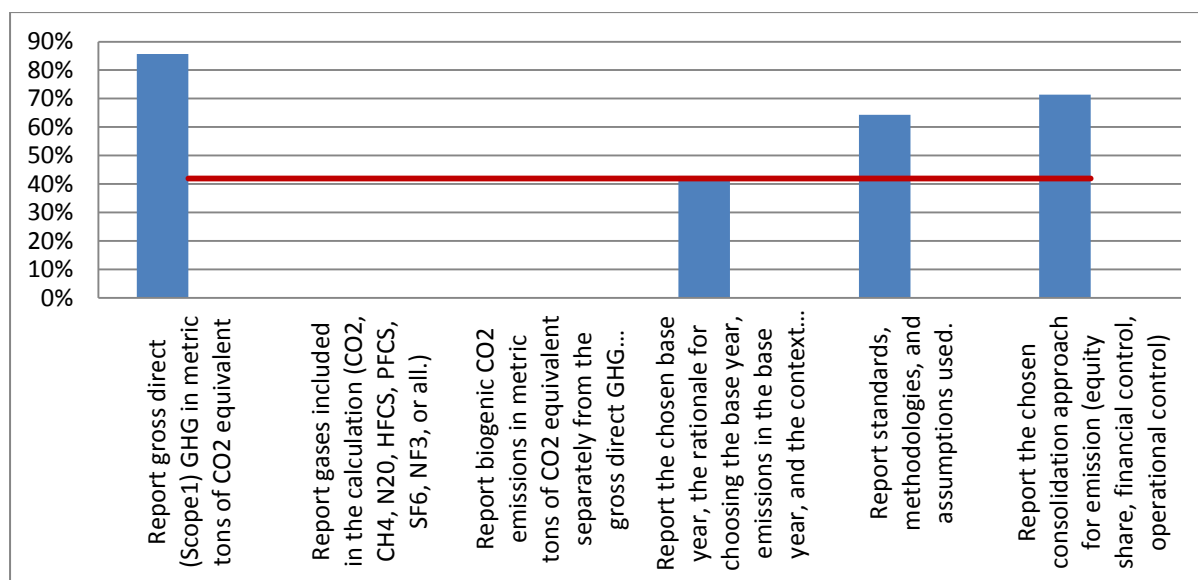
- 75% of the organisations make use of ISO
- 58% participate in the CDP scheme
- 67% of the organisations report from GRI G3 requirements,
- 33% make use of the GRI G4 requirements
- 50% of the organisations use the ICMM principles on top of the measurements.

3.6.4 Scope 1 reporting

The purpose this question is to investigate if organisations have identified their direct emissions (Scope1) of GHGs from sources owned or controlled by the organisation. The sources identified must be used for calculating the organisations gross direct GHG emissions CO₂ equivalents for the reporting period.

The results for Scope 1 reporting are presented in figure 3.4 below.

Figure 3-4: Scope 1 compliance



On average 42% of the criteria was met by organisations for their gross direct emission (Scope 1) reporting as is indicated by the red line. Scope1 are reported by 86% of the organisations in metric tons of CO₂ equivalent. None of the organisations reported on the gasses included in their CO₂ emissions calculations, as well as the biogenic CO₂ emissions. A base year was reported by 43% of the organisations against which they measure their CO₂ emissions. The standards, assumptions, and the methodology used for their Scope 1 reporting were reported by 64% of the organisations. The consolidation approach that the organisation will use to control their emissions, 71% of organisations reported on their approach. All of the organisations studied that use a consolidated approach, use both financial control, and operational control as consolidated approaches.

3.6.5 Scope 2 reporting

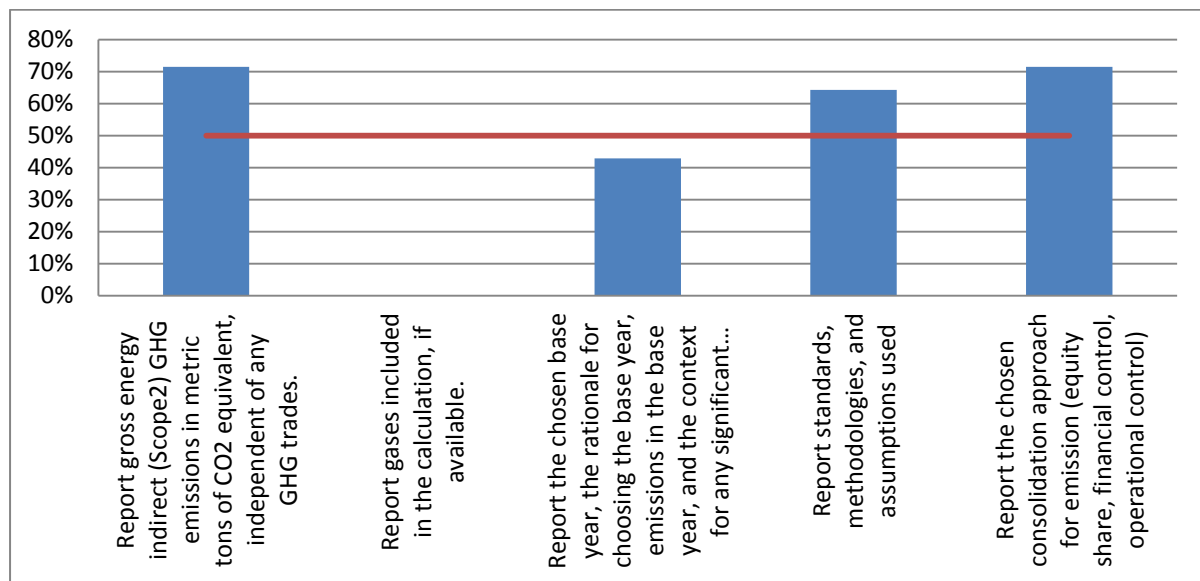
The purpose this question is to investigate if organisations have identified their indirect emissions (Scope 2) of GHGs reporting. It is important for organisations to identify indirect emissions that occur as a result of the generation of purchased

electricity, heating, cooling and steam which is purchased from other organisations for its own consumption.

Organisations need to identify their indirect emissions as it is often greater than their direct emissions.

The results for Scope 2 reporting are presented in figure 3.5 below.

Figure 3-5: Scope 2 compliance



On average 50% of the criteria was met by organisations for their gross indirect emission (Scope2) reporting as is indicated by the red line. Scope 2 is reported by 71% of the organisations in metric tons of CO₂ equivalent. None of the organisations reporting on the gasses included in their CO₂ emissions calculations. A base year was reported by 43% of the organisations against which they measure their CO₂ emissions. The standards, assumptions, and the methodology used for their Scope 2 reporting were reported by 64% of the organisations. 71% of organisations reported on their consolidation approach that they will follow to control their emissions. All of the organisations that were studied that use a consolidated approach, use both financial control, and operational control as consolidated approaches.

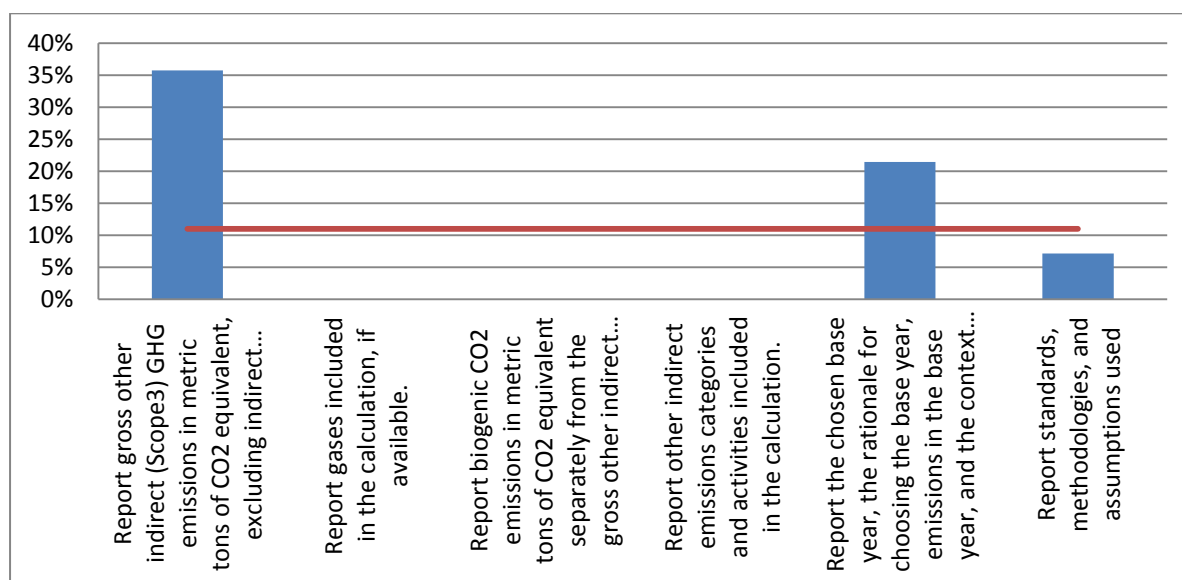
3.6.6 Scope 3 reporting

The purpose this question is to investigate if organisations have identified their emissions that occur from outside the organisation, or emissions that result from the

use of their product. This emissions (Scope 3) are often much greater than the direct GHG emissions or energy indirect emissions.

The results for Scope 3 reporting are presented in figure 3.6 below.

Figure 3-6: Scope 3 compliance



On average 11% of the criteria was reported on by organisations for their Scope3 emissions as is indicated by the red line. Gross other indirect emissions Scope 3 are reported by 36% of the organisations in metric tons of CO₂ equivalent. None of the organisations reported on the gasses included in their CO₂ emissions calculations, as well as the biogenic CO₂ emissions, and none of the organisations reported other indirect emissions categories and activities included in the calculation. A base year was reported by 21% of the organisations against which they measure their CO₂ emissions and only 7% reported on the consolidation approach that they follow. The red line indicates the average score of all the organisations on Scope 3 aspects.

3.7 Conclusion

Content analyses were used to evaluate 14 JSE listed organisations annual sustainability reports for 2013. From all the aspects measured in this study, the sustainability reports of the 14 organisations in the Ferroalloy industry only comply on average with 41% of the GRI requirements.

Governance achieved only 51% mainly due to managers remuneration not being linked to environmental performance targets, and CO₂ emissions not being addressed in risk assessments. Organisations in general use various external standards to measure and report on, but fail to have internal standards to measure themselves against.

Scope 1 and Scope 2 overall compliance is low mainly due to the fact that gasses included in calculation for Scope 1 and Scope 2 emissions are not reported on at all, as well as the biogenic CO₂ emissions for Scope 1 not being reported. Scope 3 received only 11% compliance for the GRI requirements with only 36% of the organisations reporting on the CO₂ gross direct equivalent emissions.

In the next chapter, the conclusion and recommendations will be discussed.

Chapter 4 Conclusions

4.1 Introduction

This chapter deals with the conclusion from the study conducted, and recommendations will be made.

4.2 Conclusions

Integrated reporting in the Ferroalloy industry is guided by the Mining and Metal Sector supplement of the GRI. The integrated reports that were analysed during this study contained all information of the organisations, both financial and non-financial, for past and future operations.

On average, organisations in the Ferroalloy industry comply with 41% of the total aspects that were measured in this study.

From the criteria used in the checklist, the reporting organisations comply on average 51% with Governance related issues. Environmental issues and Greenhouse gas emissions are addressed in the sustainability reports, but specific reporting on CO₂ emissions from Ferroalloy organisations is lacking currently.

Organisations in general make use of external standards to guide them in reporting on their GHG emissions. The GRI G4 guidelines launched in May 2013 and reporting organizations using the G3.1 guidelines need to decide for themselves when transition to the G4 guidelines will happen. Although the GRI had published the G4 guidelines, 67% of the organisations analysed during this research still report on the GRI, G3.1 guidelines.

Greenhouse gas emissions are reported in three categories, Scope 1, Scope 2 and Scope3. Although 86% of the organisations make use of either the GRI 3.1 or GRI G4 guidelines to report on, Scope 1 are only 42% reported on , Scope 2 only 50% and Scope 3 only 11%.

4.3 Recommendations

It is recommended that organisations link more of the remuneration for their directors and managers to Environmental performance. Linking remuneration to a specific objective will ensure that more intense focus is given to a specific subject. By linking remuneration to environmental performance, managers will ensure that CO₂ emissions are addressed in their risk assessment as well. This is not the case at present.

Organisations need to identify internal CO₂ emissions standards. Internal standards will ensure that focus and resources are applied to the correct areas in order to manage emissions as well as reduce them.

Organisations need to report on their gasses used in their calculation of their emissions, as the Kyoto protocol has identified 6 gasses that contribute to GHG emissions, and organisations should report on all of the applicable, and not only on CO₂ gas.

Biogenic carbon emissions and sequestration should be subject to the same type of scrutiny as fossil fuel emissions because any emission of CO₂ to the atmosphere contributes to climate change.

It is suggested that further studies is conducted in the uniformity of reporting as there are currently no industry standard, as well as how CO₂ tax emissions will be calculated.

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Annexure A Checklist

Annexure A

Checklist

		RBM	Panafrican resources	Mittal	Merafe	Kumba	IFM	Exxaro	Highveld steel	BHP	Assmang	ARM	Acerinox	Insimbi	HULAMIN
1	Governance														
1.1	Does the organisation have an environmental management plan?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
1.2	Does the organisation have established CO ₂ emissions policy?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	x
1.3	Does GHG emissions and climate change form part of their strategy?	✓	✓	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x
1.4	Are projects identified by the organisation to reduce CO ₂ emissions?	✓	✓	x	✓	✓	x	✓	✓	✓	✓	✓	✓	x	✓
1.5	Are relevant managers remuneration linked to Environment performance targets?	x	x	x	x	✓	x	✓	x	✓	x	✓	x	x	x
1.6	Are the risks of CO ₂ emissions part of a risk assessment?	x	x	x	✓	x	x	x	✓	✓	x	✓	x	x	x
2	Targets														
2.1	Internal standards														
2.1.1	Does the organisation have internal CO ₂ emission standards?	x	x	x	✓	✓	x	x	x	x	x	✓	x	x	x
2.1.2	Does the organisation have set targets to measure against?	✓	✓	x	x	✓	x	✓	✓	✓	x	x	x	x	✓
2.1.3	Does the organisation measure the CO ₂ emission per source?	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	x	x	x
2.1.4	Intensity indicators included in report?	✓	x	✓	✓	✓	x	✓	x	x	x	✓	✓	x	✓
2.2	External standards														
2.2.1	Does the organisation measure their CO ₂ emissions against external standards such as GRI, ISO, and CDP?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	x
2.2.2	Do the organisation use ISO 14000 standards to report on?	✓	x	✓	x	✓	✓	x	✓	✓	✓	✓	✓	x	x
2.2.3	Do the organisation participate in a CDP scheme?	x	x	x	x	✓	x	✓	✓	✓	✓	✓	✓	x	x
2.2.4	Do the organisation use GRI,G3 requirements to report on?	x	✓	✓	✓	x	x	✓	x	✓	✓	✓	✓	x	x
2.2.5	Do the organisation use GRI,G4 requirements to report on?	✓	x	x	x	✓	✓	x	✓	x	x	x	x	x	x
2.2.6	Do the organisation use the International Council on Mining and Metals Principles (ICMM) to report on?	✓	✓	x	x	✓	x	x	x	✓	x	✓	✓	x	x
3	Scope 1														
3.1	Report gross direct (Scope1) GHG in metric tons of CO ₂ equivalent	✓	✓	✓	✓	✓	x	✓	x	✓	✓	✓	x	x	✓
3.2	Report gases included in the calculation (CO ₂ , CH ₄ , N ₂ O, HFC _s , PFC _s , SF ₆ , NF ₃ , or all.)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3.3	Report biogenic CO ₂ emissions in metric tons of CO ₂ equivalent separately from the gross direct GHG emissions.	x	x	x	x	x	x	x	x	x	x	x	x	x	x
3.4	Report the chosen base year, the rationale for choosing the base year, emissions in the base year, and the context for any significant changes in emissions that triggered the recalculation of base year emissions.	x	x	x	x	✓	x	✓	✓	✓	✓	x	x	x	✓
3.5	Report standards, methodologies, and assumptions used.	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	x	x	x	x
3.6	Report the chosen consolidation approach for emission (equity share, financial control, operational control)	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	x	x	x
4	Scope 2														
4.1	Report gross energy indirect (Scope2) GHG emissions in metric tons of CO ₂ equivalent, independent of any GHG trades.	✓	✓	✓	✓	✓	x	✓	x	✓	✓	✓	x	x	✓
4.2	Report gases included in the calculation, if available.	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4.3	Report the chosen base year, the rationale for choosing the base year, emissions in the base year, and the context for any significant changes in emissions that triggered the recalculation of base year emissions.	x	x	x	x	✓	x	✓	✓	✓	✓	x	x	x	✓
4.4	Report standards, methodologies, and assumptions used	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	x	x	x	x
4.5	Report the chosen consolidation approach for emission (equity share, financial control, operational control)	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓	x	x	x
5	Scope 3														
5.1	Report gross other indirect (Scope3) GHG emissions in metric tons of CO ₂ equivalent, excluding indirect emissions from the generation of purchased or acquired electricity, heating, cooling and steam consumed by the organisation, exclude any GHG trades.	x	x	x	x	✓	x	✓	x	✓	x	✓	x	x	✓
5.2	Report gases included in the calculation, if available.	x	x	x	x	x	x	x	x	x	x	x	x	x	x