Corporate Responsibility Research Conference

12-14 September 2012, Bordeaux

Media, legitimacy and climate change reporting by companies in the oil and gas industry

Breeda Comyns, PhD Candidate

Euromed Management School, Marseille, France

School of Earth & Environment, University of Leeds, UK

breeda.comyns@euromed-management.com

Abstract

The purpose of this paper is to explore whether a link exists between the amount of media attention focussed on oil and gas companies with regard to climate change issues and the quality and quantity of reporting on climate change within company sustainability reports. The study reviews sustainability reporting by 45 oil and gas companies listed on the 2011 Global Fortune 500 between 2001 and 2010.The effect of media attention on climate change reporting is considered from two different perspectives. In the first instance legitimacy and media agenda setting theory are drawn on to determine whether oil and gas companies, wishing to maintain legitimacy, will respond to media attention around climate change by increasing the quantity of climate change reporting in sustainability reports. In the second case legitimacy theory is considered with media visibility and in particular whether highly visible organisations, wishing to maintain legitimacy, have higher quality reporting to meet the needs of more informed stakeholders. Using these two perspectives two hypotheses are developed and tested. Results show that there is a relationship between media attention and both the quality and quantity of climate change reporting for the companies in the sample, showing how the media can play a dual role in influencing the sustainability reporting process.

1 Introduction

The purpose of this paper is to present the results of a study which investigates the relationship between print media attention to climate change issues in the oil and gas industry and the response by companies in the industry to such media pressure via their sustainability reports. Specifically the study considers a dual role played by the media in influencing both the quality and quantity of climate change reporting.

Central to arguments put forward in this paper is the notion of legitimacy. Legitimacy constitutes the acceptance of the activities or behaviours of an organisation by the broader public (Suchman 1995). Consistent with legitimacy theory, it is argued that companies use sustainability reporting as a communication tool to manage their environmental legitimacy status by demonstrating to society that they are behaving in a manner which is desirable (O'Donovan 2002; Milne and Patten 2002; Deegan et al. 2002; Deegan 2002). At the same time societal expectations may change and companies react to new external pressures by changing the content, extent and quality of sustainability reporting to ensure they retain their legitimacy status long term (Brown and Deegan 1998). The media can be a source of external pressure for companies and plays an important role in influencing issues which are important to society. Media agenda setting theory supports the view that the media influences the public agenda (McCombs and Reynolds 2002; McCombs and Shaw 1972) and so can determine issues of public concern by placing more importance on some issues over others. The greater the number of articles devoted to an issue then the more salient that topic becomes for the public. As public concern and the media agenda are related, companies will respond to issues highlighted in the media by increasing the quantity or extent of their sustainability disclosures to ensure that they can continue to gain legitimacy from the public (Islam and Deegan 2010; Deegan et al. 2002; Brown and Deegan 1998).Using legitimacy theory with media agenda setting theory this study investigates whether there is a relationship between external media pressure on climate change issues for companies in the oil and gas industry and the quantity of reporting on climate change within sustainability reports.

In addition to highlighting issues to the public, the media can also increase the visibility of particular organisations by highlighting their activities. This results in greater criticism and scrutiny of such companies by stakeholders. There is also a reduced the information asymmetry between stakeholders and visible companies with stakeholders being more informed about their behaviours and activities (Brammer and Millington 2006; Meznar and Nigh 1995). From this perspective the relationship between more visible companies and the quality of climate change reporting is investigated to determine whether companies which are the focus of media attention on the issue of climate change and having informed stakeholders produce higher quality reports to maintain legitimacy.

This paper seeks to contribute to the literature in the following ways. By drawing on legitimacy and media agenda setting theory, it adds to the existing literature in this area, taking the particular case of climate change reporting in the oil and gas sector. In the second instance by considering legitimacy theory with media visibility a dual role played by the media in influencing both the quantity and the quality of sustainability reporting is considered.

The remainder of the paper is organised as follows. Section 2 provides a review of the literature and development of hypotheses, the methodology is outlined in section 3, results are presented in section 4 and section 5 provides a summary, conclusions and discussion around some limitations of the study.

2 Literature review and development of hypotheses

2.1 Legitimacy Theory

As sustainability reporting is largely a voluntary process, researchers have sought to explain why companies are motivated to undertake such disclosures. Legitimacy theory has been a popular perspective used within the sustainability reporting literature (Wilmshurst and Frost 1999; Deegan et al. 2004; Deegan 2002; Castelo Branco et al. 2008). This perspective views sustainability reporting as part of the organisation's legitimising process to demonstrate to society that their activities are within expected societal norms. In this way organisations can gain legitimacy from society and continue to operate. In the context of reporting quality and quantity legitimacy theory is important and It has been used to explain the increasing quantity of sustainability reports as pointed out by O'Donovan (2002, p. 344)"Legitimacy theory is one of the most probable explanations for the increase in environmental disclosure since the early 1980's". This perspective is briefly discussed below.

Suchman (1995, p.574) defines legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". Legitimacy constitutes the acceptance of the activities or behaviours of an organisation by the broader public (Suchman 1995). Organisations recognise the importance of maintaining consistency between their actions and the expectations and values of society for their continued operation (Dowling and Pfeffer 1975; Kaplan and Ruland 1991).Where the actions or behaviours of the organisation deviate from societal values, then there exists a potential threat to organisational legitimacy (Dowling and Pfeffer 1975; Woodward et al. 1996).The consequences for organisations whose legitimacy status is threatened can include customers refusing to purchase products, shareholders selling stock as well as regulatory fines or penalties (Deegan 2002). Acquiring and maintaining legitimacy can be a major problem for many organisations (Elsbach and Sutton 1992). As society becomes more aware of environmental and social issues, organisations must demonstrate that their behaviours are congruent with societal expectations on such topics. For instance organisations which emit high levels of pollution and have a poor environmental performance endanger their legitimacy status (Castelo Branco et al. 2008; Bansal and Clelland 2004). Hamilton (1995) found that following the publication of the EPA Toxic Release Inventory in the US in

1989, companies with higher pollution figures were more likely to receive coverage in the media about their toxic releases as well as experience abnormally low returns. Such negative coverage around pollution issues will also impact and threaten company legitimacy. As legitimacy can directly impact business reputation and profitability organisations act proactively to maintain and protect their legitimate status (Dowling and Pfeffer 1975).

The distinction between legitimacy and legitimation is an important one and is explained by Brown and Deegan as follows: “Legitimacy itself can be considered to be a condition or status. Legitimation, on the other hand, is a process which organisations can undertake (perhaps through particular disclosure strategies) to take them to this state”. Therefore, it is clear that there is a distinction between the status of having legitimacy and the process by which it is obtained. An important part of the legitimation strategy is communication, a point which is enforced by Suchman (1995, p. 586) who states that “legitimacy management rests heavily on communication”. So organisations need to behave in a manner which is consistent with societal expectations but they also need to communicate to these activities. This point which is also raised by Buhr (1998),who identifies the dimensions of “action” and “presentation” in the organisational attainment of legitimacy. Thus, even if the activities of the organisation are consistent with societal expectations, legitimacy can be at risk if the company fails to communicate (Castelo Branco et al. 2008).Using the legitimacy theory perspective it is argued that sustainability reporting is used by companies as part of their legitimation strategy to communicate on their environmental and social activities and so gain legitimacy from society (Wilmshurst and Frost 1999; O'Donovan 2002; Deegan et al. 2004; Deegan 2002).

Legitimacy is also linked with the idea of perception and in particular the perceptions held by society (Aerts and Cormier 2009). It has been put forward that sustainability reporting is being used as an impression management technique mainly to positively influence public perception (Bansal and Clelland 2004; Hooghiemstra 2000) and that sustainability reports do not in fact reflect the actual performance of the organisation (Buhr 1998). There is quite a substantial body of research which supports this point of view. Deegan and Rankin (1996), found that Australian companies successfully prosecuted by the EPA did not include this bad news story within their environmental disclosures but rather included more positive disclosures in the years when the prosecutions occurred to offset any negative effects. The authors argued that this was consistent with a motivation by the companies involved to regain legitimacy. Patten (1992),used legitimacy to explain the increase in environmental reporting by oil and gas companies following the Exxon Valdez incident contending that companies responded to negative attention generated by the incident by increasing the quantity of disclosure to maintain legitimacy. In some more recent studies Castelo Branco et al (2008) found that in the case of two companies embroiled in a co-incineration controversy in Portugal, sustainability reporting was

used by one of the companies to manage its legitimacy. Tilling and Tilt (2009) also found some support that a tobacco company used social disclosures in its annual report to legitimise operations in the face of negative attention about the health impacts of the product.

2.2 Legitimacy and Media Agenda setting theory

Sustainability reporting has also been considered as a reaction by organisations to factors in its environment (Hooghiemstra 2000). As societal expectations change then the reporting practices of the organisation must also change to ensure its legitimacy status is maintained (Deegan and Rankin 1996). A legitimacy gap exists whenever there is a conflict between the expectations or values of the public and organisational behaviour (Brown and Deegan 1998). Organisations will need to ensure that any potential legitimacy gap does not persist. Legitimacy theory has been used in a theoretical framework with media agenda setting theory to determine whether and how companies respond to changing external media pressure via their sustainability reports to maintain legitimacy.

Media agenda setting theory supports the view that the media plays a significant role in influencing the salience of topics on the public agenda(McCombs and Reynolds 2002; McCombs and Shaw 1972).The more importance the media attaches to a topic in terms of the number of articles devoted to the issue then the more salient this topic becomes for the public. Media agenda setting theory supports the fact that "the media do not mirror public priorities as much as they influence them"(Ader 1995, p. 300).The role of the media in influencing the public agenda in relation to environmental pollution issues was researched by Ader (1995). She found that the media agenda and the public agenda for pollution issues were related whereas the public agenda and real world agenda were not. This study also proved earlier research which showed that environmental issues are unobtrusive and for such issues the media demonstrate a strong agenda setting effect. Unobtrusive issues are those issues "with which individuals have little personal contact and for which they rely on the media for the primary, and sometimes only source of information" (Ader 1995, p. 300). Therefore, media play a significant role in influencing the public agenda in relation to environmental issues.

Using a legitimacy theory /media agenda setting theory framework it has been found that companies increase the amount of disclosure in their sustainability reports in response to media attention in order to restore or protect legitimacy. It has been found that in the wake of environmental incidents or accidents (explosions, leaks, spills etc.) companies will increase the quantity of positive disclosure within their reports to offset any negative attention for the company or the industry sector resulting from the incident (Patten 1992; Deegan et al. 2000). Where a particular environmental or social issue receives negative attention in the media, companies will also increase the amount of positive

disclosure about such subjects within their sustainability reports. Islam and Deegan (2010) found that negative media attention around the issues of working conditions and child labour in developing countries corresponded with positive coverage of these issues in the sustainability disclosures of two major global sporting and clothing retail companies. The relationship between the media attention and sustainability disclosure in various industry sectors has also been explored (Brown and Deegan 1998). It was found that for six of the nine industries examined there was a significant positive relationship between the amount of media coverage and the mean quantity of disclosure, providing support for legitimacy theory although acknowledging that an industry effect may exist. Other studies have examined the disclosures of one particular company over time (Deegan et al. 2004) where again a relationship was found between issues disclosed by BHP in their annual reports and the main social and environmental themes in the media. This research shows that companies respond to external pressure by increasing the quantity of reporting to include issues of importance on the media and public agenda. Furthermore the quantity of positive disclosures increases in the aftermath of negative media attention.

2.2.1 Climate Change and the Oil and Gas Industry

Climate change has been emerging as an important environmental concern for several decades with the first World Climate Science Conference held in 1979 in Geneva. However it was only in the mid-1990's that companies involved in fossil fuel supply in North America really woke up to the threat posed by climate change(Kolk et al. 2008). Oil and gas companies, being directly affected by the threat of climate change, adopted different strategies to deal with the issue. Some such as the large American companies, Chevron and Exxon, aggressively challenged the climate science and lobbied against any mandatory measures to regulate GHG's, in fact Exxon has been one of the most outspoken companies in this regard (Kolk and Levy 2001; Levy and Kolk 2002). Other companies such as Total adopted a "wait and see strategy" (van den Hove et al. 2002) while yet others such as BP and Shell were deemed as being more proactive (Levy and Kolk 2002; van den Hove et al. 2002). However regardless of these earlier strategies, climate change has been and continues to be a major issue for the oil and gas sector. With increasing scientific evidence which links global average temperatures with increasing concentrations of anthropogenic greenhouse gases (IPCC 2007),even the most outspoken of the oil and gas companies have realised that they need to tackle this issue. Therefore, the emergence of the issue of climate change on the media and public agenda and in particular climate change associated with oil and gas companies is likely to have led companies in the sector to respond to this issue, to main organisational legitimacy.

Hypothesis 1 reads as follows:

H1 - The higher (lower) the number of print media articles associating climate change issues with the oil and gas sector, the higher (lower) the quantity of reporting on climate change by the companies in the sector in their sustainability reports.

Following previous studies (Brown and Deegan 1998; Islam and Deegan 2010),this hypothesis does not consider the content of the newspaper articles i.e. if it is positive or negative, it relates purely to the number of articles.

2.3 Media attention and organisational visibility

The print media plays an important role in dissemination of information. Newspapers have a very broad reach with a daily worldwide circulation of 519 million in 2010 (World Association of Newspapers and News Publishers 2011). Although printed newspaper circulation is somewhat in decline there is an increase in readership of digital newspaper media and as noted by the World Association of News Papers and News Publishers (WAN) " when measured in terms of readership, newspapers reach 2.3 billion people every day, 20 percent more than the 1.9 billion that the internet reaches world-wide"(World Association of Newspapers and News Publishers 2011).

The attention given to firms by the print media may also impact how they will react in terms of corporate responsibility and their sustainability disclosures. A high level of print media coverage increases the visibility of an organisation within society (Bansal and Clelland 2004; Brammer and Millington 2006). Media visibility has been associated with firm size as well as industry sector with larger firms and those involved in turbulent or controversial domains likely to have increased media visibility (Fombrun and Shanley 1990). As a consequence visible companies come under much greater levels of public pressure and scrutiny. As stated by Meznar and Nigh (1995, p. 980)"Actors in the general environment are likely to take a greater interest in organizations that directly affect them, or at least in organizations of which they are aware".

At the same time as increasing company visibility, increasing media pressure will also reduce the level of information asymmetry between a company and its stakeholders (Zyglidopoulos et al. 2010; Brammer and Millington 2006). Where the actions and activities of an organisation are widely reported in the media, then stakeholders will be better informed. This is especially important in terms of environmental issues as the media provides a source of information for stakeholders which have no direct contact with the firm (Ader 1995). The media in this way are "active agents shaping information through editorials and feature articles" (Fombrun and Shanley 1990, p. 240). As the media can shape the information presented to the public then this can also have an impact on the perception of the company within society (Fombrun and Shanley 1990).

As discussed earlier, perception is closely linked with the idea of legitimacy and so increased media attention, especially if it is negative, can also threaten the legitimacy of a company. Therefore companies which have a high visibility in the media may be under even more pressure with regard to maintaining legitimacy and so be motivated to take action. Previous studies have shown that more visible companies do take action regarding corporate social responsibility. For instance Brammer and Millington (2006) found that more visible corporations give more charitable donations while Zyglidopoulos et al (2010) found that increased media visibility increased company CSR strengths.

It is proposed that in the area of sustainability reporting, visible companies will be motivated to take action to ensure that environmental legitimacy is maintained. Since there is a reduced level of information asymmetry between visible companies and their stakeholders it will not be sufficient to use sustainability reporting merely as an impression management tool, as stakeholders will be more aware of the issues and activities of the company. Therefore visible companies will be obliged to report better quality information that more accurately reflects performance.

In the case of oil and gas companies, those organisations whose activities and behaviours are widely reported on in the media with regard to climate change will have more informed stakeholders. For instance there has been extensive media coverage around BP's investment in renewable energy as part of their "Beyond Petroleum" strategy.

Hypothesis 2 reads as follows:

H2 – The higher (lower) the level of media visibility that an organisation has with regard to climate change, the higher (lower) the quality of reporting on climate related emissions

3 Methodology

3.1 The Sample

The sample comprises 226 reports issued by 45 different oil and gas companies between 2001 and 2010.The reports are mainly standalone environmental or sustainability reports but some combined sustainability and annual reports were also included. The latter were included for companies which moved towards integrated reporting during the period of the study. The oil and gas companies were selected based on the 2011 Fortune Global 500 index, with all companies from this sector being initially identified. Of the 49 oil and gas companies identified only those which had at least one sustainability or environmental report available during the period 2001 – 2010 were selected. 2001 was selected as the starting point as prior to this year the availability of standalone environmental or sustainability reports was very limited. Since not all of the 45 companies had environmental or

sustainability reports available for each of the ten years of the study, the finial sample includes 226 observations over a ten year period.

3.2 Measurement of Variables

3.2.1 GHG Reporting Quality

Greenhouse Gas (GHG) reporting quality is measured using a coding tool which was developed in a way similar to coding instruments used in previous research such as by Wiseman (1982), Dong and Burritt (2010a), Guenther et al (2007). The general approach taken to develop such coding tools has been to identify a range of criteria by either conducting a literature review (Wiseman 1982; Holland and Boon Foo 2003)by reviewing what is typically disclosed in voluntary reports (Roberts 1991) or using criteria set in reporting guidelines such as GRI or sector specific guidance documents (Dong and Burritt 2010b; Morhardt et al. 2002; Daub 2007).The report is then analysed against each of these criteria and rated typically on a scale depending on the degree to which the coder determines that the content of the report adheres to the criteria laid out in the scoring instrument (Wiseman 1982; UNEP/ SustainAbility 1997, 2006, 2002; Davis-Walling and Batterman 1997; Morhardt et al. 2002) or in other cases simple "disclosed/ not disclosed " ratings are applied to the criteria (Roberts 1991). However, unlike these previous studies which score the entire environmental or sustainability disclosure, this instrument like that used by Rankin et al (2011) considers only the GHG reporting quality part of the disclosure. Rankin et al (2011) measured the quality of GHG reporting using the ISO14064 standard comparing the extent of GHG reporting against this standard.

The scoring instrument developed for the purposes of this study attempts to rate GHG reporting quality across various different dimensions of quality. Seven dimensions of quality were identified from a review of reporting guidelines including Oil and Gas Industry guidelines (IPICEA and API 2003, 2005; IPIECA/API/OGP 2010, 2011),GRI guidelines (Global Reporting Initiative 2000, 2002, 2006), GHG Protocol (WBCSD and WRI 2004) and FEE guidelines (Féderation des Experts Comptables Européens 2000). For each quality dimension a number of criteria were identified, such criteria were determined again from a review of GHG reporting requirements as per the reporting guidelines outlined above but focusing in particular on the reporting requirements under the GHG protocol (WBCSD and WRI 2004)as well as the oil and gas industry reporting guidelines specifically relating to GHG reporting (IPICEA and API 2003; IPIECA/API/OGP 2011). The scoring instrument showing the various dimensions of quality and criterion is included in Appendix 1. Each criterion is rated on a score of 0-2 based on whether it was not reported, partially reported or completely reported. A comprehensive set of rules were devised to aid with the scoring process and to reduce the subjectivity of the scoring process.

The sustainability or environmental reports issued by the firms in the sample were reviewed and the GHG disclosure was rated using the scoring tool. The scores assigned for each of the criteria were totaled to achieve a total aggregate quality score for each report.

3.2.2 GHG Reporting Quantity

Reporting quantity was measured in terms of the number of words or terms related to climate change terms included in each sustainability report. The approach employed for measuring the quantity of disclosure is at the term or word level and such an approach has been used previously in the literature on sustainability reporting (Deegan and Gordon 1996; Neu et al. 1998; Ratanajongkol et al. 2006).Measuring disclosure at the term level is less problematic than measuring disclosure in terms of the number of sentences or portions of pages (Gray et al. 1995).Hackston and Milne (1996, p. 84) point out the difficulties associated with using portions of pages as a measure as "print sizes, column sizes and page sizes may differ from one annual report to the other". Furthermore, while counting the number of sentences can overcome some of these difficulties "a difference does exist between two sentences which are identical but for different font sizes" (Hackston and Milne 1996, p. 84). A further advantage of measuring disclosure at the term level is that it lends itself to the use of automatic text mining tools which can scan reports for pre-defined terms and thus is a pragmatic solution for measuring the level of disclosure.

For the purposes of this study, in the first instance it was necessary to generate a list of terms and phrases to be used as a basis for counting the quantity of reporting on climate change. An overall review of several climate glossaries was carried out to determine a set of common terms associated with the issue of climate change. Glossaries consulted included those from the IPCC Third Assessment Report – Appendix 1- Glossary (IPCC 2001), IPCC Fourth Assessment Report –Annex 1- Glossary (IPCC 2007), the USEPA glossary of climate change terms (USEPA 2012), the UNFCCC glossary of climate change acronyms (United Nations Framework Convention on Climate Change (UNFCCC) 2012) as well as the glossary of the GHG protocol (WBCSD and WRI 2004).The initial review of glossaries allowed compilation of a master list containing 100 terms associated with climate change. However, many of these terms such as "Framework Convention on Climate Change" or "Climate Feedback" although important in terms of global climate issues may not be typically used by oil and gas companies within their sustainability reporting. Therefore, following this initial review, further analysis was necessary. Using Rapid Miner, a text mining software tool, a word vector of all 1 and 2 gram[1] terms used within a sub-sample of 20 sustainability reports was generated for

[1] Note 2 gram terms simply means that the software looks for terms containing two tokens in a row. This is useful in this context as the frequency of occurrence of terms such as carbon_dioxide, climate_change, global_warming can be detected by selecting this operator.

comparison against the master list of climate terms. This process facilitated identification of the most frequently occurring climate terms within oil and gas sustainability reports with rarely occurring or non occurring climate terms eliminated. This method, described as term filtering by Feldman et al (1998), allowed selection of only the most relevant and frequently used climate terms in oil and gas industry sustainability reports.

The data collection process involved the use of an automated text mining process in Rapid Miner whereby a word vector calculating the frequency of occurrence of each of the climate change terms was generated for each of the reports in the sample. The number of occurrences of each term was added to give an overall quantity of climate change terms for each report.

3.2.3 Media Visibility

Following a similar methodology to that used by Meznar and Nigh(1995) and Brammer and Millington (2006), media visibility on climate change was measured by totalling the number of times the firm was mentioned in the same article as a climate change term for each year between 2001 and 2010.The Dow Jones Factiva database which contains over 20,000 news sources in 22 languages was used for the purpose of the study. The database includes all of the major national and regional newspapers from around the world as well as news wires from the major providers. A total of 121 newspapers and 24 news agencies were included in the study covering 35 countries and 5 languages.

3.2.3.1 Newspaper selection

There were a number of criteria considered for the inclusion of newspapers within the sample. Newspapers which have a high circulation rate were included as it was deemed that these will reach the largest audience. Newspapers which focus on national rather than regional or local news were preferred as these are more likely to reflect the national agenda (Barkemeyer et al. 2009). Since the oil and gas companies in the sample have operations worldwide, the newspapers chosen were geographically diverse to include as many countries as possible. Newspapers were limited to broadsheets and the quality press (i.e. The New York Times, Los Angeles Times, Washington Post in the USA or the Guardian, Financial Times, Telegraph in the UK) as they have a reputation for overall higher quality reporting. In the UK the quality press have been described as having well educated influential readerships and so has important "agenda setting" power for politicians, decision makers and the public (Carvalho and Burgess 2005).Although it has to be acknowledged that the tabloid press particularly in the UK has a very high readership and higher circulation rates than the broadsheets, these were excluded as sources used for the study. The sample was also limited to newspapers which were available within the Factiva database. The aim was to include newspapers which were available for the entire period of analysis 2001 – 2010.The challenge of availability of news media on the Factiva database was more pronounced in the case of the availability of press in

languages other than English. In such cases the most important national newspapers were included in the sources from the time they became available on the database.

In addition to newspapers, articles from international news agencies including Reuters, Associated Press, Agence France Presse and Dow Jones were also included. News agencies have an important role as their provision of international news stories to other news organisations means that they have an agenda setting influence on other media (Paterson 2006). Inclusion of the international news agencies was a further measure to broaden the reach of the news sources included. The inclusion of many newspapers and news agencies with the sources means that there is a likelihood that duplicates of articles will be returned in the results screen. Duplicate articles were identified by Factiva and were counted only once in the results file thus avoiding any issues of double counting.

3.2.3.2 Data Collection Process

The methodology employed for this study is a text mining one whereby documents are retrieved from a large database using key word search (Miner et al. 2012).A key word search was carried out to retrieve articles on the subject of climate change relating specifically to the oil and gas companies in the sample. The search terms “climate change” or “greenhouse” or “global warming” were used along with the specific company name. To enhance the quality of the articles retrieved using this search sequence the Intelligent indexing feature of the Dow Jones Factiva database was used whereby as well as including the name of the company in the initial search sequence in the “free text search” the company name was also selected from the “company” dropdown menu. The operator between the “free text search” and the Dow Jones intelligent indexed “company” menu is the Boolean AND operator. Using the intelligent indexing feature within the database reduces the number of articles retrieved for each search sequence as only articles which contain one of the search terms and the name of the company and which have also been specifically coded as applying to that company will be returned. However, although the number of the articles returned will be reduced, it will increase the relevancy of the articles returned.

Where an article may be relevant for more than one company, for instance if an articles talks about Shell and BP, it is counted once for each of the companies it is attributed to. This may mean that the same article is counted several times but for different companies. This is deemed acceptable as the same article may prompt a response in terms of its sustainability disclosure from each of the companies identified.

4 Results

4.1 Descriptive Statistics

In terms of the oil and gas companies Listed on the 2011 Fortune 500, 45 companies out of a total of 49 have produced at least one standalone sustainability or environmental report between 2001 and 2010.This percentage of almost 92% of the largest oil and gas companies producing sustainability reports is in line with previous research which shows that larger and more polluting companies are more likely to produce sustainability reports (Kolk 2004; Kolk et al. 2001; KPMG 2011). However there were just 5 Companies for which reports were available each year between 2001 and 2010, with the majority of companies in the sample only starting to produce sustainability reports around the years 2004 and 2005.

An analysis of the sustainability reports available shows that 73% of the total number of reports included quantitative data on GHG emissions. In 2007 for instance 75% of companies in the sample reported quantitative data for GHG emissions. This is a higher average rate of GHG disclosure than for Australian companies in 2007, where it was found that 59% of companies in the energy and mining sector disclosed on GHG emissions (Rankin et al. 2011). Guenther et al (2007), also analysed reporting by mining and oil and gas companies in 2005 found that while the majority of companies (93%)reported on GHG emissions, the quality of such reporting was found to be low and deviated from the requirements as laid out by GRI. All reports, even those which contained no quantitative data were scored using the scoring tool.

Descriptive statistics for the mean quantity of climate change reporting are presented in Table 1.The mean quantity of reporting on climate change has shown an overall increase over the 10 year period of the study with the most significant increase occurring between 2001 and 2005. Reporting quantity seems to have stabilised since 2005. It must be noted that the number of sustainability reports in the sample is also fewer in the earlier years of the study, 2001-2004, however this is due to the fact that fewer companies were actually producing s reports at this point. However, should companies have been reporting on climate change through other communication channels, such as the annual report for instance, this will not have been picked up by this study. The overall trend still suggests that more oil and gas companies are reporting on climate change compared with 2001and that the quantity in

terms of the number of words reported has also increased.

Year	Mean	Median	St. Dev	Range	Min	Max	N
2001	44.5	46	27.7	79	6	85	7
2002	50.17	48	34.97	98	0	98	12
2003	71.5	53	53.07	160	15	175	12
2004	68.05	50	56.03	201	3	204	21
2005	82.57	73	65.13	237	6	243	23
2006	82.59	75	53.79	190	4	194	27
2007	83.75	74.5	58.14	241	9	250	28
2008	93.38	76.5	64.84	264	7	271	32
2009	87.75	90.5	61.76	234	0	234	32
2010	73.91	69.5	47.57	187	2	189	32

TABLE 1 – Descriptive Statistics – Reporting Quantity

Descriptive statistics for mean GHG emissions reporting quality are presented in Table 2. The lowest score assigned to a report was 0 points and the highest score was 30 points. The data shows that mean reporting quality has increased only very slightly since 2001 and has more or less remained very steady with the average score remaining between 41% and 47% of the total points available.

This result is quite surprising as the criteria used to score the reports are based on reporting guidelines issued between 2004 and 2011. Therefore it would be expected that as more guidelines become available, then companies following these guidelines, would have higher quality reporting on their GHG emissions over time. However, in general it would appear that companies do not change their reporting format in line with guidelines and that the majority report to the same standard year after year.

Year	Mean	Mean as % of total points available	Median	St. Dev	Range	Min	Max	N
2001	13.17	36.57%	14.50	6.79	18.00	2.00	20.00	7.00
2002	12.67	35.19%	13.50	4.92	16.00	4.00	20.00	12.00
2003	15.92	44.21%	16.50	5.57	17.00	4.00	21.00	12.00
2004	15.71	43.65%	15.00	6.21	23.00	4.00	27.00	21.00
2005	17.17	47.71%	18.00	6.29	26.00	3.00	29.00	23.00
2006	16.48	45.78%	18.00	6.86	24.00	4.00	28.00	27.00
2007	14.97	41.57%	16.00	7.12	25.00	3.00	28.00	28.00
2008	15.44	42.90%	17.00	6.66	26.00	3.00	29.00	32.00
2009	16.29	45.25%	17.00	6.36	27.00	3.00	30.00	32.00
2010	15.47	42.98%	16.00	7.24	27.00	1.00	28.00	32.00

TABLE 2 – Descriptive Statistics – GHG reporting Quality

Descriptive Statistics for media visibility are presented in Table 3. This shows that the mean number of articles has increased over the period of the study. However, consideration must be given to the fact that the number of articles would also increase as the number of companies in the sample increased between years. When considering the total number of articles, there appears to have been heightened interest in the oil and gas industry and climate change in 2007 and again in 2010. It is difficult to determine what factors could have caused this interest and identification of such factors is beyond the scope of this paper. However climate change in the media has been the subject of several studies (Boykoff 2007a, 2007b, 2010) who also found a peak in coverage on the general issue of climate change in 2007. This peak has been attributed to the release of the IPCC Fourth Assessment report as well as discussion around Al Gore's documentary "An Inconvenient Truth" which was released in 2006 (Boykoff 2010).However, it is not clear whether these events would have at the same time caused the oil and gas sector to be highlighted on the issue. The Deepwater Horizon incident in 2010, which although did not have a direct impact on climate change, brought the oil and gas industry under the media spotlight with regard to environmental issues and can perhaps explain the increased coverage in 2010.

Year	*Mean*	*St. Dev*	*Total number of Articles*	*N*
2001	21.5	21.06	86	7
2002	23.16	24.83	139	12
2003	16	16.61	96	12
2004	13.38	15.55	174	21
2005	24.4	34.03	366	23
2006	27.15	43.03	516	27
2007	42	70.01	927	28
2008	25	44.08	664	32
2009	17	25.95	431	32
2010	40	114.15	922	32

TABLE 3 – Descriptive Statistics – Media Coverage

4.2 Results of hypothesis testing

The results of hypothesis testing are presented in Tables 5 & 6. Hypothesis 1 predicts that higher media coverage around climate change issues for companies in the sample will lead to a higher quantity of reporting on climate change in sustainability reports. In this case a significant and positive correlation was found between the quantity of climate change disclosure and the number of media articles. This is consistent with previous studies which have investigated the issues of media attention and the quantity of reporting (Islam and Deegan 2010; Deegan et al. 2002), however this also shows that companies react to topics that have emerged as a concern within the media over a period of time in addition to reacting to particular accidents or incidents as has been shown in

previous studies.

Correlations

			Reporting_ Quantity	Media_ Articles
Spearman's rho	Reporting_Quantity	Correlation Coefficient	1,000	,534**
		Sig. (1-tailed)	.	,000
		N	226	226
	Media_Articles	Correlation Coefficient	,534**	1,000
		Sig. (1-tailed)	,000	.
		N	226	226

**. Correlation is significant at the 0.01 level (1-tailed).

TABLE 5 – Test results for Hypothesis 1 – Spearman rank order correlation between mean total "climate" disclosure and total media articles relating oil and gas companies with climate change

Hypothesis 2 meanwhile predicts that companies which have a high media visibility, so which have the most number of articles and get the most media attention will also produce the highest quality reports. This hypothesis is also supported. As evident in table 6 below, there is a significant positive correlation between the number of media articles linking a company to climate change and the quality of reporting on the issue. Therefore, it would appear that in the case of the issue of climate change in the oil and gas industry; those companies which appear in the media spotlight, with regard to the issue also have the highest quality reporting.

Correlations

			Media_ Articles	Report_ Quality
Spearman's rho	Media_Articles	Correlation Coefficient	1,000	,333**
		Sig. (1-tailed)	.	,000
		N	226	226
	Report_Quality	Correlation Coefficient	,333**	1,000
		Sig. (1-tailed)	,000	.
		N	226	226

**. Correlation is significant at the 0.01 level (1-tailed).

TABLE 6 – Test results for Hypothesis 2 – Spearman rank order correlation GHG disclosure quality and total media articles relating oil and gas companies with climate change

5 Summary and Discussion

The purpose of this paper is to investigate the relationship between the quantity and quality of climate change reporting in sustainability reports by companies in the oil and gas industry and media attention. It was found that the majority of the largest oil and gas companies do produce a

sustainability report and that over 70% of companies report quantitative data on greenhouse gas emissions. It is also apparent that between 2001 and 2010 the number of companies producing sustainability reports as well as the quantity of reporting on climate change issues has increased. However, there is little if any increase in the quality of GHG emissions reporting over the same period with quality remaining stable. There appears to have been increased media pressure regarding climate change in the oil and gas industry over the time period with elevated numbers of articles noted especially in 2007 and 2010.

The results of this study are consistent with legitimacy theory. In the first instance and consistent with previous research which has used a legitimacy theory/ media agenda setting theoretical framework, it has been found that oil and gas companies increase the quantity of climate change disclosure in response to an increasing number of media articles on the issue. This further reinforces the idea that companies use sustainability reporting as part of the legitimation process and that they change reporting practices in response to external pressures. In the second instance it has been found that companies with a high visibility in the media, coming under more pressure to maintain legitimacy, produce higher quality reports to meet the needs of more informed stakeholders.

The results therefore show that the media may have an important role to play in driving improvement in reporting quality and quantity. However, it is perhaps only when companies feel that their legitimacy is being threatened do they act to increase reporting quantity or improve reporting quality. Since sustainability reporting is largely a voluntary process, external pressure such as pressure from the media, although important for highlighting issues, cannot be relied upon to drive improvement in this process. Stronger and more rigorous measures are required to ensure that GHG reporting quality improves and evolves and that all companies, not only those highlighted by the media, account for their activities and impacts to stakeholders with high quality reporting.

5.1 Limitations

There are some limitations associated with this study. The study considers only one issue in one sector, in order to get a broader view of this dual role of the media in influencing reporting quality and quantity, further analysis would be necessary to analyse the effect within various industry sectors. In addition the size effect of companies has not been taken into account. For instance in general it has been found that bigger companies are more likely to produce higher quality sustainability reports and also that bigger companies are likely to be more visible in the media - therefore company size effect should be accounted for to determine whether this contributes to the result observed.

6 References

Ader, C. R. 1995. A longitudinal study of agenda setting for the issue of environmental pollution. *Journalism and Mass Communication Quarterly* 72 (2):300.

Aerts, W., and D. Cormier. 2009. Media legitimacy and corporate environmental communication. *Accounting, Organizations and Society* 34 (1):1-27.

Bansal, P., and I. Clelland. 2004. Talking Trash: Legitimacy, Impression Management, and Unsystematic Risk in the Context of the Natural Environment. *Academy of Management Journal* 47 (1):93-103.

Barkemeyer, R., F. Figge, D. Holt, and T. Hahn. 2009. What the Papers Say: Trends in Sustainability. *Journal of Corporate Citizenship* Spring 2009:69-86.

Boykoff, M. T. 2007a. Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006. *Area* 39 (4):470-481.

———. 2007b. From convergence to contention: United States mass media representations of anthropogenic climate change science. *Transactions of the Institute of British Geographers* 32 (4):477-489.

———. 2010. Indian media representation of climate change in a threatened journalistic ecosystem *Climatic Change* 99 (1-2):17-25.

Brammer, S., and A. Millington. 2006. Firm size, organizational visibility and corporate philanthropy: an empirical analysis. *Business Ethics: A European Review* 15 (1):6-18.

Brown, N., and C. Deegan. 1998. The public disclosure of environmental performance information - a dual test of media agenda setting theory and legitimacy theory. *Accounting and Business Research* 29 (1):21-41.

Buhr, N. 1998. Environmental performance, legislation and annual report disclosure: the case of acid rain and Falconbridge. *Accounting, Auditing & Accountability Journal* 11 (2):163-190.

Carvalho, A., and J. Burgess. 2005. Cultural Circuits of Climate Change in U.K. Broadsheet Newspapers, 1985 - 2003. *Risk Analysis* 25 (6):1457-1469.

Castelo Branco, M., T. Eugenio, and J. Ribeiro. 2008. Environmental disclosure in response to public perception of environmental threats: The case of co-incineration in Portugal. *Journal of Communication Management* 12 (2):136-151.

Daub, C.-H. 2007. Assessing the quality of sustainability reporting: an alternative methodological approach. *Journal of Cleaner Production* 15 (1):75-85.

Davis-Walling, P., and S. A. Batterman. 1997. Environmental Reporting by the Fortune 50 Firms. *Environmental Management* 21 (6):865-875.

Deegan, C. 2002. Introduction: The legitimising effect of social and environmental disclosures a theoretical foundation. *Accounting, Auditing & Accountability Journal* 15 (3):282 - 311.

Deegan, C., and B. Gordon. 1996. A Study of the Environmental Disclosure Practices of Australian Corporations. *Accounting & Business Research* 26 (3):187-199.

Deegan, C., and M. Rankin. 1996. Do Australian companies report environmental news objectively?: An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority. *Accounting, Auditing & Accountability Journal* 9 (2):50 - 67.

Deegan, C., M. Rankin, and J. Tobin. 2002. An Examination of the corporate social and environmental disclosures of BHP from 1983 - 1997 A test of legitimacy theory. *Accounting, Auditing & Accountability Journal* 15 (3):312-343.

Deegan, C., M. Rankin, J. Tobin, and C. B. Roberts. 2004. An Examination of the Corporate Social and Environmental Disclosures of BHP from 1983-1997: A Test of Legitimacy Theory. In *Developments in financial reporting by multinationals*: Elgar Reference Collection. New Library of International Accounting, vol. 5.

Cheltenham, U.K. and Northampton, Mass.:

Elgar, 491-522.

Deegan, C., M. Rankin, and P. Voght. 2000. Firms' Disclosure Reactions to Major Social Incidents: Australian Evidence. *Accounting Forum* 24 (1):101-130.
Dong, S., and R. Burritt. 2010a. Cross-Sectional Benchmarking of Social and Environmental Reporting Practice in the Australian Oil and Gas Industry. *Sustainable Development* 18:108-118.
———. 2010b. Cross-sectional benchmarking of social and environmental reporting practice in the australian oil and gas industry. *Sustainable Development* 18 (2):108.
Dowling, J., and J. Pfeffer. 1975. Organizational Legitimacy: Social Values and Organizational Behavior. *The Pacific Sociological Review* 18 (1):122-136.
Elsbach, K. D., and R. I. Sutton. 1992. Acquiring Organizational Legitimacy through Illegitimate Actions: A Marriage of Institutional and Impression Management Theories. *The Academy of Management Journal* 35 (4):699-738.
Féderation des Experts Comptables Européens. 2000. Towards a Generally Accepted Framework for Environmental Reporting - A paper issued by the Environmental Working Party of the European Federation of Accountants

Feldman, R., M. Fresko, Y. Kinar, Y. Lindell, O. Liphstat, M. Rajman, Y. Schler, O. Zamir, J. Zytkow, and M. Quafafou. 1998. Text mining at the term level
Principles of Data Mining and Knowledge Discovery: Springer Berlin / Heidelberg, 65-73.
Fombrun, C., and M. Shanley. 1990. What's in a Name? Reputation Building and Corporate Strategy. *The Academy of Management Journal* 33 (2):233-258.
Global Reporting Initiative. 2000. Sustainability Reporting Guidelines. Boston,MA: Global Reporting Initiative.
———. 2002. Sustainability Reporting Guidelines 2002. Boston, MA.
———. 2006. G3 Guidelines. Amsterdam: GRI.
Gray, R., R. Kouhy, and S. Lavers. 1995. Constructing a research database of social and environmental reporting by UK companies. *Accounting, Auditing & Accountability Journal* 8 (2):78-101.
Guenther, E., H. Hoppe, and C. Poser. 2007. Environmental Corporate Social Responsibility of Firms in the Mining and Oil and Gas Industries: Current Status Quo of Reporting Following GRI Guidelines. *Greener Management International* (53):7-25.
Hackston, D., and M. J. Milne. 1996. Some determinants of social and environmental disclsoures in New Zealand companies. *Accounting, Auditing & Accountability Journal* 9 (1):77-108.
Hamilton, J. T. 1995. Pollution as News: Media and Stock Market Reactions to the Toxics Release Inventory Data. *Journal of Environmental Economics and Management* 28 (1):98-113.
Holland, L., and Y. Boon Foo. 2003. Differences in environmental reporting practices in the UK and the US: the legal and regulatory context. *The British Accounting Review* 35 (1):1-18.
Hooghiemstra, R. 2000. Corporate Communication and Impression Management -- New Perspectives Why Companies Engage in Corporate Social Reporting. *Journal of Business Ethics* 27 (1/2):55-68.
IPCC. 2001. *Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the*
Intergovernmental Panel on Climate Change Edited by J. T. Houghton, Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. and a. C. A. J. Maskell. United Kingdom and New York: Cambridge University Press.
———. 2007. *Climate Change 2007 - The Physical Science Basis*
Contribution of Working Group I to the Fourth Assessment Report of the IPCC Edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and and H. L. Miller. United Kingdom and New York: Cambridge University Press.
IPICEA, and API. 2003. Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions. London.
———. 2005. Oil and Gas Industry Guidance on Voluntary Sustainability Reporting : Using Environmental, Health & Safety, Social and Economic Performance Indicators. London.

IPIECA/API/OGP. 2010. Oil and gas industry guidance on voluntary sustainability reporting 2nd Edition. London.

———. 2011. Petroleum industry guidelines for reporting greenhouse gas emissions 2nd edition. London.

Islam, M. A., and C. Deegan. 2010. Media pressures and corporate disclosure of social responsibility performance information: A study of two global clothing and sports retail companies. *Accounting and Business Research* 40 (2):131-148.

Kaplan, S. E., and R. G. Ruland. 1991. Positive theory, rationality and accounting regulation. *Critical Perspectives on Accounting* 2 (4):361-374.

Kolk, A. 2004. A decade of sustainability reporting:developments and significance. *International Journal Environment and Sustainable Development* 3 (1):51-64.

Kolk, A., and D. Levy. 2001. Winds of Change:: Corporate Strategy, Climate change and Oil Multinationals. *European Management Journal* 19 (5):501-509.

Kolk, A., D. Levy, and J. Pinkse. 2008. Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. *European Accounting Review* 17 (4):719-745.

Kolk, A., S. Walhain, and S. van de Wateringen. 2001. Environmental reporting by the Fortune Global 250: exploring the influence of nationality and sector. *Business Strategy and the Environment,* 10 (1):15-28.

KPMG. 2011. KPMG International Survey of Corporate Responsibility Reporting 2011.

Levy, D. L., and A. Kolk. 2002. Strategic Responses to Global Climate Change: Conflicting Pressures on Multinationals in the Oil Industry. *Business and Politics* 4 (3):275-300.

McCombs, M. E., and A. Reynolds. 2002. News Influence on Our Pictures of the World. In *Media Effects : Advances in Theory and Research*, edited by J. Bryant. Mahwah: Laurence Erlbaum Associates inc.

McCombs, M. E., and D. L. Shaw. 1972. The Agenda-Setting Function of the Mass Media. *The Public Opinion Quarterly* 36 (2):176-187.

Meznar, M. B., and D. Nigh. 1995. Buffer or bridge? Environmental and organizational determinants of public affairs activities in American firms. *Academy of Management Journal* 38 (4):975-996.

Milne, M. J., and D. M. Patten. 2002. Securing organizational legitimacy: An experimental decision case examining the impact of environmental disclosures. *Accounting, Auditing & Accountability Journal* 15 (3):372 - 405.

Miner, G., D. Delen, J. Elder, A. Fast, T. Hill, and R. A. Nesbit. 2012. *Practical text mining and statistical analysis for non-structured text data applications*. 1 ed: Elsevier.

Morhardt, J. E., S. Baird, and K. Freeman. 2002. Scoring corporate environmental and sustainability reports using GRI 2000, ISO 14031 and other criteria. *Corporate Social Responsibility & Environmental Management* 9 (4):215-233.

Neu, D., H. Warsame, and K. Pedwell. 1998. Managing Public Impressions: Environmental Disclosures in Annual Reports. *Accounting, Organizations and Society* 23 (3):265-282.

O'Donovan, G. 2002. Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory. *Auditing, Accounting & Accountability* 15 (3):344 - 371.

Paterson, C. 2006. News Agency Dominance in international News on the Internet. *Papers in International and Global Communication* 01 (06).

Patten, D. M. 1992. Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. *Accounting, Organizations and Society* 17 (5):471-475.

Rankin, M., C. Windsor, and D. Wahyuni. 2011. An investigation of voluntary corporate greenhouse gas emissions reporting in a market governance system: Australian evidence. *Accounting, Auditing & Accountability Journal* 24 (8):1037-1070.

Ratanajongkol, S., H. Davey, and M. Low. 2006. Corporate social reporting in Thailand: The news is all good and increasing. *Qualitative Research in Accounting & Management* 3 (1):67-83.

Roberts, C. 1991. Environmental Disclosures: A Note on Reporting Practices in Mainland Europe. *Accounting, Auditing & Accountability Journal* 4 (3):62-71.
Suchman, M. C. 1995. Managing Legitimacy: Strategic and Institutional Approaches. *Academy of Management Review* 20 (3):571-610.
Tilling, M. V., and C. A. Tilt. 2009. The edge of legitimacy: Voluntary social and environmental reporting in Rothmans' 1956-1999 annual reports. *Accounting, Auditing & Accountability Journal* 23 (1):55-81.
UNEP/ SustainAbility. 1997. Engaging Stakeholders - the 1997 Benchmark Survey - The third international progress report on company environmental reporting.
———. 2002. Trust Us - The Global Reporters 2002 Survey of Corporate Sustainability Reporting.
———. 2006. Tomorrow's Value: The Global Reporters 2006 Survey of Corporate Sustainability Reporting
United Nations Framework Convention on Climate Change (UNFCCC). 2012. *Glossary of climate change acronyms* 2012 [cited 4/04 2012]. Available from http://unfccc.int/essential_background/glossary/items/3666.php.
USEPA. 2012. *Glossary of Climate Change Terms* 2012 [cited 04/04 2012]. Available from http://www.epa.gov/climatechange/glossary.html.
van den Hove, S., M. Le Menestrel, and H.-C. de Bettignies. 2002. The oil industry and climate change: strategies and ethical dilemmas. *Climate Policy* 2 (1):3-18.
WBCSD, and WRI. 2004. The Greenhouse Gas Protocol.
Wilmshurst, T. D., and G. R. Frost. 1999. Corporate Environmental reporting A test of legitimacy theory. *Accounting, Auditing & Accountability Journal* 13 (1):10-26.
Wiseman, J. 1982. An Evaluation of Environmental Disclosures Made in Corporate Annual Reports. *Accounting, Organisations and Society* 7 (1):53-63.
Woodward, D. G., P. Edwards, and F. Birkin. 1996. Organizational Legitimacy and Stakeholder Information Provision1. *British Journal of Management* 7 (4):329-347.
World Association of Newspapers and News Publishers. 2012. *World Press Trends: Newspapers Still Reach More Than Internet* 2011 [cited 2/08/2012 2012]. Available from http://www.wan-ifra.org/press-releases/2011/10/12/world-press-trends-newspapers-still-reach-more-than-internet.
Zyglidopoulos, S. C., C. E. Carroll, A. Georgiadis, and D. S. Siegel. 2012. *Does Media Attention Drive Corporate Social Responsibility?* 2010 [cited 08/08 2012]. Available from http://ssrn.com/abstract=1737707 or http://dx.doi.org/10.2139/ssrn.1737707.

Appendix 1 – GHG reporting quality Scoring tool

Category	No.	Criteria
Relevance	1	The Company reports absolute levels of quantitative GHG emission data
	2	The boundary for CO2/GHG data is described and is complete
Completeness	3	Scope 1 CO2 emissions are reported
	4	Scope 2 CO2 emissions are reported
	5	Scope 3 CO2 emissions are reported
	6	Global Warming Potential - Emissions data for all direct GHG emissions are reported in tonnes of CO2 equivalent
Consistency	7	Consistent Boundary
	8	Normalised data is reported (for example tonnes of CO2 per barrel of oil produced) (Normalisation factor will depend on the specific activity
	9	Standards – The report refers to whether GHG or CO2 data is reported in accordance with internal or external reporting guidelines
	10	Performance
Credibility	11	There is an assurance statement which includes the assurance of GHG or CO2 data
	12	Contact information
Timeline	13	The reporting period which the data covers is outlined in the report
	14	There is a consistent reporting schedule
Transparency	15	The methodologies which have been used to calculate or measure emissions are outlined
	16	All terms and jargon are clearly explained
	17	Not clear whether the company is reporting on Scope 1 or Scope 2 CO2 data or whether "GHG" data is just CO2 or includes other pollutants – cannot be deciphered
Accuracy	18	Apart from the assurance statement, the report includes measures taken to ensure the accuracy of the emission estimation process i.e. details of internal processes or auditing procedures for verifying data