Investigating the quality of Greenhouse Gas (GHG) reporting by companies in the oil and gas industry

Submitted by:

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Abstract

Since the early 1990's the number of companies voluntarily reporting on environmental and social issues has increased dramatically. Despite this increasing quantity, the overall quality of reports remains poor. In order to gain new insights into this problem, a model is proposed which predicts reporting quantity and quality, in the short and longer term, depending on the type of good a sustainability report is. This model has been developed by linking the social accountability and legitimacy perspectives from sustainability reporting literature using Akerlof's (1970)market for lemons theory. This permits a broader perspective on the market for sustainability reporting. Akerlof (1970) describes adverse selection of poor quality products in markets with specific characteristics namely information asymmetry, range of product quality, lack of regulation and motivation to cheat and uses the example of the used car market to demonstrate his theory. In the case of used cars, product quality becomes apparent with time. This is somewhat limiting in the case of sustainability reporting as it is unclear whether this is the case. Therefore, two further types of goods namely search goods (Nelson 1970) and credence goods (Darby and Karni 1973) are also considered in this context. This paper represents the first empirical stage to test this model by considering the quality of Greenhouse Gas reporting by companies in the oil and gas sector.

In order to measure such reporting quality, a scoring instrument has been developed based on 7 dimensions of quality namely relevance, completeness, consistency, timelines, credibility, transparency and accuracy. Considering the reporting requirements for GHG emissions as described by the GHG protocol (World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) 2004) , GRI (Global Reporting Initiative 2006, 2002, 2000) and FEE (Féderation des Experts Comptables Européens 2000)as well as industry specific guidelines for sustainability reporting (IPIECA/API/OGP 2011, 2010; IPICEA and API 2005, 2003), a number of criteria have been identified within each of these seven dimensions. Each criterion is then rated on a scale of 0-2 depending on whether it is not reported, partially reported or fully reported. Thus the instrument represents best practice GHG reporting specifically for the oil and gas industry. Some preliminary results on the reporting quality of three companies between 1998 and 2010 are presented.

1 Introduction

The purpose of this paper is to examine the quality of Greenhouse Gas (GHG) reporting by companies in the oil and gas industry and to present preliminary results on such reporting quality for OMV, Statoil and BP between 1998 and 2010.

This paper forms part of a PhD project which investigates the evolution of the quality and quantity of sustainability reporting and aims to explain why in spite of increasing reporting quantity (Corporate Register 2010; KPMG 2008; O'Donovan 2002), the quality (Gray 2007; Guenther et al. 2007) remains poor. The social accountability perspective and the legitimacy perspective from the sustainability reporting literature are linked using Akerlof's (1970) market for lemons theory and so a broader perspective on the sustainability reporting market is obtained. However, as Akerlof's theory considers goods where the quality becomes apparent with time and so experience goods (Nelson 1970), this is limiting in terms of sustainability reporting as is unclear whether this is the case. Therefore, two further types of goods, namely search goods as described by Nelson (1970), where the quality of the product is detectable upfront, and credence goods (Darby and Karni 1973), where the quality of the product may never be detected or if detected it will take a considerable period of time, are also considered in the case of sustainability reporting. Thus a model has been developed to predict the consequences for quality and quantity of reporting depending on the product type. This paper represents the first empirical stage to test this model.

While previous research into reporting quality has tended to consider the entire environmental or sustainability reports (Skouloudis et al. 2009; Davis-Walling and Batterman 1997; Guenther et al. 2007) often spanning multiple sectors (Wiseman 1982; Davis-Walling and Batterman 1997), this research concentrates specifically on the quality of reporting of one particular indicator, GHG emissions, by companies in the oil and gas industry. In line with the long-term predictions of the model, this study is longitudinal in nature, as of particular interest is observing how reporting quality is evolving.

The quality of Greenhouse Gas (GHG) reporting by companies in the oil and gas sector is interesting given that this sector exerts a significant impact in terms of global warming. Oil and gas companies initially opposed the regulation of carbon dioxide (CO_2) when issues of climate change came to the fore in the late 1980's (Pulver 2007).The industry obstructed such regulation as it threatened their primary products namely gasoline, diesel, kerosene etc. with the combustion of fossil fuels being identified as the largest source of CO_2 emissions globally (US EPA 2011).In addition to the GHG impact of the final products, the various processes used to extract, refine and transport these fuels

themselves generate significant quantities of carbon dioxide, methane, nitrous oxide and other GHG emissions. The Kyoto protocol which was signed in 1997, commits industrialised countries to reduce greenhouse gas emissions below 1990 levels and this brings with it pressures on industry sectors, such as the oil and gas industry, to implement reduction programmes. In some case companies are required to comply with legislation committed to reducing GHG emissions such as the EU Emissions Trading Scheme for Instance. As the public awareness of environmental issues such as climate change increases, so too does the pressure on companies to report (Tilt 1994). It has been found that a large number of companies within the oil and gas industry issue sustainability reports (KPMG 2008; Kolk 2003) with information on Greenhouse Gases included within these reports. Therefore, given the importance of the issue of climate change to this sector and also the impact that in turn is exerted on the environment by these companies, tracking of the evolution of the quality of GHG reporting by this sector is very pertinent.

To improve the quality of sustainability reporting a number of reporting guidelines have been developed. These include general sustainability reporting guidelines issued by the Global Reporting Initiative (2006, 2002, 2000) as well as those issued by FEE (Féderation des Experts Comptables Européens 2000). Specific guidance on greenhouse gas reporting has been provided via the Greenhouse Gas protocol (World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) 2004). For the oil and gas industry a number of sector specific guidelines both on sustainability reporting(IPIECA/API/OGP 2010; IPICEA and API 2005) and also specifically on GHG reporting (IPIECA/API/OGP 2011; IPICEA and API 2003)have been issued.

To ascertain the quality of Greenhouse Gas reporting by companies in the oil and gas industry a content analysis methodology is used. A structured scoring instrument is developed based around the principles of relevance, completeness, consistency, credibility, timeline, accuracy and transparency as these are commonly recognised quality principles (Kolk 1999; Dixon et al. 2005; Guenther et al. 2007) many of which have also been incorporated into the above mentioned reporting guidelines. Each of these principles is then operationalised using the reporting requirements as defined in the above mentioned guidelines. The final instrument thus represents best practice GHG reporting, along seven dimensions of quality, taking into account general GHG reporting requirements as well as those specific to the oil and gas industry.

The paper is structured as follows; section 2 provides an overview of the model, section 3 is a review of literature and methodologies around reporting quality, section 4 describes the methodology, some preliminary results are presented in section 5 with discussion and research plans in section 6.

2 Description of the model for prediction of quality and quantity of sustainability reporting.

In order to make predictions about the quality and quantity of sustainability reporting, a model has been developed. This model links together two unrelated perspectives within sustainability reporting literature namely accountability and legitimacy using Akerlof's market for lemons theory.

2.1 Social Accountability

Accountability is about identifying what you are responsible for and providing information to those who have a right to that information (Gray 2001). Accountability places society "at the heart of the argument" (Gray 2001, p. 11) rather than the organisation with the accountability relationship and rights to information determined by society (Parker 2005). Furthermore while "full and frank accountability" (Gray 2007, p. 177) may not be in the best interests of the company it should be in the best interests of society.Taking this line of thought, the purpose of sustainability reporting should be the provision of accurate and credible accounts by companies to stakeholders on their environmental and social activities and so facilitate decision making.

However, this ideal of companies discharging accountability through their voluntary social and environmental disclosures, does not seem to be the case in practice. Within social accountability literature the current quality of sustainability reporting has been criticised with reports being described as selective and not discharging accountability (Gray 2007) being produced on a "fragmentary or ad hoc" basis (Adams et al. 1998, p. 2), and have even been described as little more than a "smokescreen diverting attention from core issues of ethical and moral accountability"(Owen 2005, p. 397).

Linked to these quality issues are the problems of asymmetric information and lack of regulation. The issue of regulation is one of the debates within this literature (Laufer 2003) as it is argued whether it is possible to have true accountability by companies if this remains a voluntary process (Gray 2007). Regulations surrounding sustainability reporting have been introduced in countries such as France, Netherlands, Australia and Denmark (Holgaard and Jorgensen 2005; Kolk 2003; Kolk et al. 2001; Frost 2007b), however, in the majority of cases reporting remains unregulated. Companies and governments have opposed the introduction of regulating social and environmental disclosures (Maltby 1997; Frost 2007) but by continuing this practice on a voluntary basis, it supports the justification for not introducing such regulation(Adams et al. 1998).In this context reporting may have little to do with actual accountability but is more a managerial strategy to avoid regulation on the issue.

While accountability seeks to reduce information asymmetries between the organisation and stakeholders such as investors (Brammer and Pavelin 2006; Cormier and Magnan 2003, 1999) through self reported information, such a trust based relationship may not be sufficient in this context. Swift (2001) points out that managerial opportunism will prevail and that companies cannot be trusted to act in the best interests of society, but rather given that they hold the power in terms of information availability, they will instead act in their own best interests.

From this perspective, poor quality social accounts have been linked to information asymmetry as well as lack of regulation whereby companies, having the upper hand with regard to information availability cannot be trusted in an unregulated environment to provide a good quality account.

2.2   Legitimacy & Media Agenda setting theory

Legitimacy theory is one of the most prominent theories used within the literature on sustainability reporting to explain why companies are motivated to voluntarily produce social and environmental reports (O'Donovan 2002; Deegan 2002; Wilmshurst and Frost 1999; Milne and Patten 2002) and perhaps is also one of the main theories which can explain the continuing increase in the quantity of such reports (O'Donovan 2002). Legitimacy theory considers the organization within society and as such it must behave in a manner which is consistent with societal expectations. The legitimacy perspective argues that voluntary sustainability disclosures are used by companies to justify their activities, positively influence public perceptions and legitimize their activities thus retaining their licence to operate. (Deegan et al. 2002; Wilmshurst and Frost 1999).

Societal expectations however are not static and can change and so too the reporting practices of organizations must change to meet expectations (Deegan and Rankin 1996). Legitimacy theory has been used with media agenda setting theory to explain how the extent or the quantity of reporting by companies can be influenced by the media. The media is an important source of information for the public and can have significant influence on community reaction to environmental issues, influencing the public agenda by assigning importance to some issues over others (Bansal 2005; Ader 1995).

Using the legitimacy theory /media agenda setting theory framework it has been found that companies increase the amount of disclosure in response to negative media attention (Brown and Deegan 1998). Patten(1992), for instance looked in particular at the effect that the Exxon Valdez oil spill had on the amount of environmental disclosure in subsequent annual reports for the petroleum sector (other than Exxon) focusing also on the seven oil companies who owned the Alyeska pipeline service company and so had some responsibilities around responding to the spill. A significant increase in the mean disclosure was found between 1988 and 1989 in response to this

incident, showing that in the wake of such disasters companies will increase reporting in order to retain or regain legitimacy

Therefore, against a backdrop of company motivation for reporting, legitimacy theory as well as legitimacy theory / media agenda setting theory framework have been used to explain the continued increasing quantity of reports.

2.3   Market for Lemons & limitations in the context of sustainability reporting

In his 1970 seminal article, George Akerlof (1970) considers quality deterioration of products in markets which have certain characteristics namely asymmetric information, lack of regulation, range of product qualities and a motivation for one party to cheat. Akerlof uses his theory to describe how in the market for used cars, the seller, knowing the quality of the product will try to cheat the buyer by offering a low quality used car at the same price as a higher quality one. The buyer being unaware of product quality will only pay the average price, thus sellers will reduce the quality of the used cars even further to increase profits. Owners of good quality used cars will be reluctant to put their vehicles on the market as they will only achieve the average price and not the true value. In this case the good quality is driven out by bad quality and so the market adversely selects poorer quality products.

The characteristics described by Akerlof overlap with issues discussed within the sustainability reporting literature namely informational asymmetry, lack of regulation and poor report quality as discussed within accountability literature and the motivational aspects for reporting linked to legitimacy theory. Thus using Akerlof's theory these two very different perspectives within sustainability reporting can be linked.

However, one of the limitations of Akerlof's model in relation to sustainability reporting is that it considers experience goods (Nelson 1970), where the quality of the product can be ascertained with time. It is unclear whether the quality of a sustainability report can be determined with time. Two other types of goods have been identified which are worth considering in this case, namely search goods (Nelson 1970), where the quality of the product can be determined upfront if it is not cost prohibitive, and credence goods (Darby and Karni 1973) where it may be impossible to determine quality or quality may only become apparent after a very extended period of time. For each of these types of goods the market characteristics will be different. In the case of sustainability reporting, "buyers" are considered to be the stakeholders or readers of the reports while the "sellers" are the companies who produce the reports. The exchange between the companies and the stakeholders in the case of sustainability reporting is considered to be legitimacy. In the case of search goods there is

a low level of information asymmetry, as buyers or in this case stakeholders can determine report quality at a reasonable cost prior to granting legitimacy. In this case the market will function well and companies will aim to continually deliver good quality reports to maintain company reputation and legitimacy. In the case of experience goods, the market will operate as described by Akerlof, where there will be adverse selection of poor quality reports and overall quality deterioration. In the case of credence goods it may not possible either before or following granting of legitimacy by stakeholders to determine the quality of the report or if quality is determined it will only after a very considerable length of time. In this case adverse selection of poor quality reports and quality deterioration is expected.

Therefore, considering the types of goods, and thus expanding Akerlof's theory, the model presented in the next section has been proposed for predicting the quality and quantity of sustainability reporting.

2.4 Model for the prediction of quality and quantity of sustainability reporting

The model presented in figure 1 below shows three scenarios with quality / quantity predictions considering in each case the type of good a sustainability report may be.
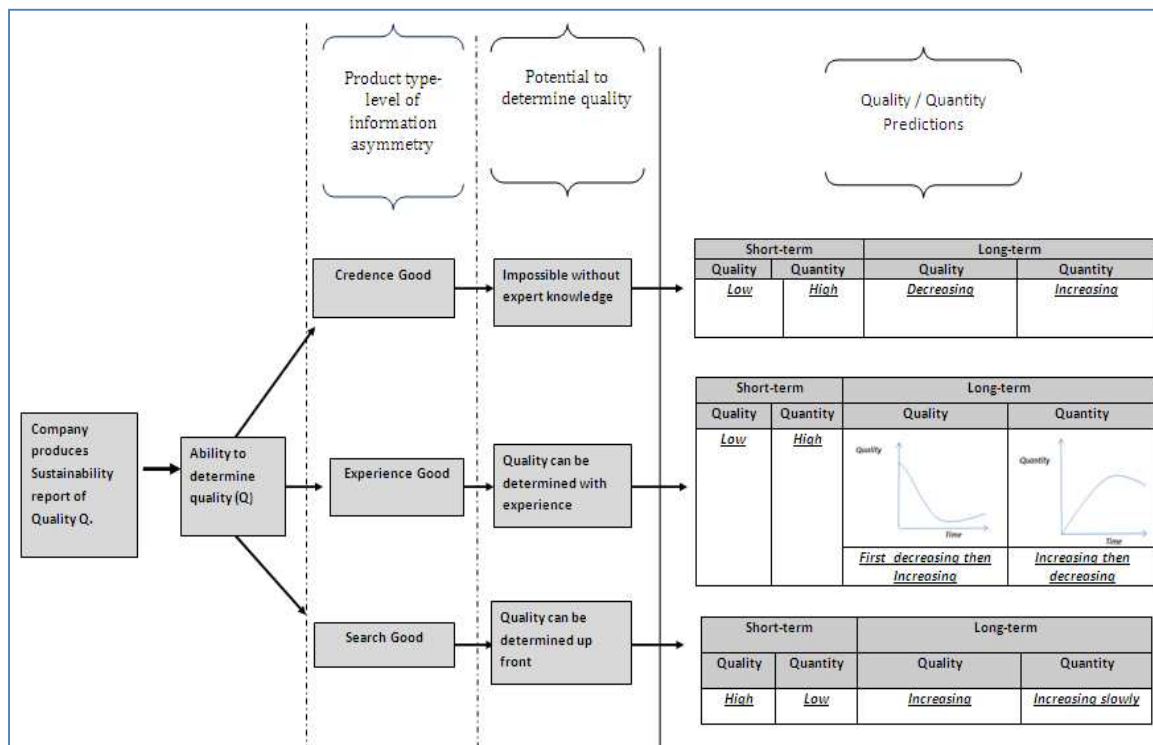

Figure 1 Model for the prediction of reporting quality and quantity

2.4.1 Case of sustainability report as a search good

In this case, the information on reporting quality can be determined by stakeholders, including the media, prior to granting legitimacy to the company. Poor quality reports will lead to negative media coverage for a company, thereby jeopardising their legitimacy. Companies will react to counteract this effect by improving the quality of subsequent reports. In the short term the quality is expected to be high and longer term this quality will continue to improve driven by stakeholder pressure. Reporting quantity on the other hand will remain low in the short-term as companies realise that as quality can be detected, sustainability reporting cannot be used merely as a legitimising exercise and will need to invest appropriately to produce a good quality report. In the longer term a gradual increase in this quantity is expected as companies are pressurised to report on their environmental and social activities by stakeholders including the media.

2.4.2 Case of sustainability report as an experience good

In this case, it is considered that the quality of the report is not observable upfront but quality becomes apparent with time (Nelson 1970). In this case it is predicted that the market for sustainability reporting will operate in the same way as Akerlof's used car market. In the short term, reporting quality cannot be determined, and companies will be able to gain and maintain legitimacy even with poor quality reporting. As stakeholders or the media cannot detect report quality there will be no impetus for companies to improve. Therefore, it is expected that reporting quality will be low in the initial stages. Longer term, it is expected that reporting quality will deteriorate initially but as stakeholders become more experienced it will be possible for them to distinguish between a high quality and a poor quality report. Therefore with time quality will slowly improve driven by stakeholder pressure. In this case it is expected that the quantity of reporting will be high in the short term as companies use the process to manage perception and gain legitimacy. However, in the longer term, once quality can be detected, the number of reports is likely to be fewer, as companies realise that they need to produce a good quality report as a poor quality one itself can jeopardise legitimacy. Therefore, companies may choose to cease reporting and the number of first time reporters would also be expected to slow down.

2.4.3 Case of sustainability report as a credence good

In this case it is assumed that it is impossible for the stakeholder, either due to the requirement for expert knowledge or due to excessive cost, to determine the quality of a report either prior to granting legitimacy or after. As in the previous case as quality is unobservable, stakeholders may adversely grant legitimacy to companies producing poor quality reports and the overall quality of reporting on the market will be poor in the short term. In the longer term it is expected that report quality will continue to deteriorate as companies can gain legitimacy even with a poor quality

product. Stakeholders in this case may determine reporting quality over time, but the timeline will be much longer than in the case of experience goods (Darby and Karni 1973). Therefore, in the longer term it is expected that reporting quality will continue to deteriorate with a slight chance of improvement over a very long period of time. It is expected that in this case, the quantity of reporting will increase and will continue to do so as the majority of companies are producing sustainability reports to manage perception and gain or retain legitimacy. If the quality of reporting does become apparent after a significant period of time, then it is expected that in the very long term the quantity of reporting will slowly start to decrease as in the case of experience goods.

3 The quality of sustainability reporting – background literature and methodologies

Research in the realm of sustainability reporting has involved efforts in determining the quality of such reports. It has been established that more polluting sectors such as the oil and gas industry tend to report more(KPMG 2008; Kolk 2003) however, determining the actual quality of these disclosures has proven to be challenging. Several benchmarking exercises carried out by UNEP/ Sustainability (1997, 2002, 2006)have charted the development of reporting quality and show that there is a wide range of reports from "green glossies" to sustainability. Likewise academic researchers have broached this subject using various methodologies with content analysis being the a frequently used one used for the collection of empirical data in social and environmental reporting literature (Parker 2005; Gutherie and Abeysekera 2006) .

Content analysis has been defined by Krippendorff (2004,pg. 18) as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use".

Within this literature body, research typically involves the generation of a scoring or rating instrument to determine the extent or comprehensiveness of voluntary environmental or sustainability (triple bottom line) disclosures (Wiseman 1982; Roberts 1991; Davis-Walling and Batterman 1997; Daub 2007; Skouloudis et al. 2009).In addition some systems also incorporate performance elements into their scoring such as the Pacific Sustainability Index used by the Roberts Environmental Centre of Claremont McKenna College. Research has focused on environmental and social disclosures in annual reports (Wiseman 1982; Roberts 1991; Dong and Burritt 2010), while more recently environmental or sustainability reports have received much attention (triple bottom line reports) (Skouloudis et al. 2009; Davis-Walling and Batterman 1997) while yet others analyse sustainability information posted on company websites (Dickinson et al. 2008).

The common feature of all of the above mentioned methodologies is that they tend to consider the entire report for instance if it is a triple bottom line report (Skouloudis et al. 2009; Morhardt et al. 2002) or an environmental report (Davis-Walling and Batterman 1997)or the environment and /or social disclosure in the annual report (Wiseman 1982).

There is no standard format for how these scoring systems have been devised and the majority are standalone and developed for the specific purposes of the particular research. The general approach taken 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 2010; 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).

Research in this area tends to focus on multiple sectors however there is a growing realisation that more industry specific research is required (Guthrie et al. 2008). This is mainly to avoid the problems of comparing different sectors where the issues of importance may vary. For instance Davis-Walling and Batterman (1997) point out some problems encountered in their research whereby companies may not present information on some topics as it does not feel that it is relevant i.e. emergency response for the food industry. There was also the added problem that for some sectors issues covered in the reports may not be included in the scoring system which resulted in lower scores.

Another problem within current research is trying to determine the quality of reports rather than the extent or comprehensiveness. This occurs for instance when researchers assess sustainability reports against the GRI (Global Reporting Initiative) guidelines and count the number of indicators the company actually reports on versus the number recommended by GRI (Guenther et al. 2007). In these instances Mordhardt et al (2002) point out that in order for companies to increase their scores they can do this by reporting more widely on topics which may or may not be relevant without adding a significant amount of depth to the topics covered.

Bearing in mind the current problems and issues encountered in the examination of sustainability reporting the methodology developed for the purposes of this research aims to examine a particular and important indictor namely Greenhouse Gas reporting within one sector, that being the oil and gas industry. The instrument developed considers general sustainability reporting requirements

(Global Reporting Initiative 2000, 2002, 2006; Féderation des Experts Comptables Européens 2000), general GHG emission reporting requirements (World Business Council for Sustainable Development (WBCSD) and World Resources Institute (WRI) 2004)as well as industry specific guidelines for both sustainability reporting (IPIECA/API/OGP 2010; IPICEA and API 2005)and GHG emission reporting(IPICEA and API 2003; IPIECA/API/OGP 2010, 2011).

4 Methodology

The methodology developed to determine the quality of GHG reporting involves the construction of a scoring instrument consisting of 20 criteria across 7 dimensions of quality, where criteria can be scored on a scale of 0-2 depending on level of adherence.

The first step in the construction of this instrument was to identify the predominant principles or dimensions of sustainability reporting quality by consulting relevant international as well as industry specific guidelines both on sustainability reporting as well as greenhouse gas reporting.

The following were considered to be the most pertinent guidelines in the context of this research:

- Global Reporting Initiative (GRI) – Sustainability Reporting Guidelines 2000-2006 (2006, 2002, 2000)
- GHG (Greenhouse Gas) Protocol – A corporate accounting and reporting standard (WBCSD and WRI 2004)
- FEE– Towards a generally accepted framework for Environmental reporting (Féderation des Experts Comptables Européens 2000)
- Oil and gas industry guidance on voluntary sustainability reporting (IPIECA/API/OGP 2010)

Reporting Principle	GRI – Guidelines 2000-2006	GHG Protocol (WBCSD/WRI) 2004	FEE reporting 2000	Oil and gas industry guidance on voluntary sustainability (2005 & 2010)	Petroleum Industry Guidelines for Reporting GHG Emissions (2003 & 2011)
Relevance		X	X	X	X
Completeness	X	X	X	X	X
Consistency		X		X	X
Comparability	X		X		
Balance/ Neutrality	X		X		

Reporting Principle	GRI – Guidelines 2000-2006	GHG Protocol (WBCSD/WRI) 2004	FEE reporting 2000	Oil and gas industry guidance on voluntary sustainability (2005 & 2010)	Petroleum Industry Guidelines for Reporting GHG Emissions (2003 & 2011)
Credibility			X		
Timeline	X		X		
Reliability	X		X		
Transparency		X		X	X
Clarity	X		X		
Accuracy	X	X		X	X

Table 1 Summary of quality dimensions and reporting standards where they are used

In order to fully consider all of the dimensions of quality, as identified in the table above, in the context of GHG emission reporting, the definitions and descriptions of each dimension within each of the reporting guidelines were compared to determine the common themes. From this review a working definition for each quality dimension in the context of this research was derived.

Quality Dimension	Definition
Relevance	Information provided on GHG emissions should cover > 95 %* of company operations, with a well defined reporting boundary.
Completeness	Information provided on GHG emissions should include both direct and indirect CO_2 emissions from all of the operations within the defined reporting boundary.
Consistency	Information provided on GHG emissions should be prepared and presented in a consistent manner to allow analysis of company performance over time as comparison of performance between companies. Information should reflect both positive and negative aspects of performance.
Credibility	Information provided on GHG emission reporting should be presented in a manner where the data can be trusted by the report reader.
Timeline	Information on GHG emissions should occur on a regular schedule with a well defined reporting period.
Transparency	Information on GHG emissions should be presented in a clear, factual and understandable manner with clear reference to the methodologies and calculation tools used.
Accuracy	Information provided on GHG emission reporting should be precise and not over or underestimated.

*This figure is taken from the Environmental Investment Organisation methodology (2011)

Table 2 : Summary of quality dimensions and their definitions

The overall number of dimensions used for the construction of the scoring instrument does not include all of the dimensions as presented in Table 1 as it was found that there was some overlap

between certain dimensions and therefore potential for amalgamation. For instance "consistency", "comparability" and "balance" is a case in point. The Global Reporting Initiative(2006) and FEE (2000)use the term "comparability" while the term "consistency" is used in the Greenhouse Gas Protocol (WBCSD and WRI 2004), the Oil and Gas Industry Guidance on Voluntary Sustainability Reporting (2010)and the Petroleum Industry Guidelines for reporting Greenhouse Gas Emissions (2003; 2011). Following analysis of the definitions and the descriptions of these two principles within the reporting guidelines, it is clear that the intent of "consistency" and "comparability" is the same, namely to allow comparison of GHG emissions over time at a company level as well as comparison of performance between companies.

In line with the GRI definition of balance and the Fee definition of neutrality, this principle demands that the reader be presented with a balanced view of company performance with both positive and negative performance being disclosed. Given that this research is considering *only* GHG reporting quality, and not any other qualitative aspects of the report, thus reporting of GHG performance over time can also be considered an element of the consistency principle where the performance trend reported should allow the reader to see both positive and negative results. Therefore, the three principles, consistency, comparability and balance can be amalgamated into the definition of consistency for the purposes of this research.

In the same way the dimensions of reliability, clarity and transparency have been used in the various guidelines and there are two main themes which overlap within these three dimensions. Within the GRI guidelines (Global Reporting Initiative 2006), both reliability and clarity are defined separately with reliability pertaining to disclosure of processes used in the preparation of the report while clarity relates to the fact that information should be understandable and accessible. The Fee(Féderation des Experts Comptables Européens 2000) definitions of clarity and reliability are in line with those of GRI. Within the GHG protocol (WBCSD and WRI 2004), the Voluntary Sustainability Reporting Guidelines for the Oil and Gas industry and the Petroleum Industry Guidelines for reporting Greenhouse Gas Emissions, the reporting principle of transparency is used rather than reliability and/or clarity. In the context of the latter guidelines, transparency includes the presentation of information in a clear, factual and understandable manner and is thus in line with the GRI clarity principle. In addition under the transparency principle within the Petroleum Industry Guidelines for reporting Greenhouse Gas emissions it is advised that "assumptions and reference to calculation methodologies"(IPICEA and API 2003, p. 2-1) should be disclosed. This is in line with the "reliability" principle as described by GRI. Therefore these three dimensions "transparency", "reliability" and "clarity" have been amalgamated into one dimension of transparency for the

purposes of this research. The following table summarises the final quality dimensions to be used in the scoring instrument along with their definitions:

The dimensions of quality as identified above are operationalised into specific criteria by considering guidance given in the GHG protocol (WBCSD and WRI 2004),the Petroleum Industry Guidelines for reporting Greenhouse Gas emissions guidelines (2003; 2011) as well as the reporting requirements of the Global Reporting Initiative (2006, 2002, 2000).Each criterion will be rated on a scale of 0-2 depending on whether it is not reported, partially reported or fully reported

- 0- Not reported
- 1- Partially reported
- 2- Fully reported

In the case of several of the criteria a score of either 0 or 2 can be applied as it is deemed that there is no possibility of partial reporting of these items. While each of the criteria is allocated the same number of points, the dimensions have different numbers of criteria associated with them as per figure 2 below, with completeness having the greatest number of points allocated. The table outlining each of the dimensions and criteria are located at the end of the document.
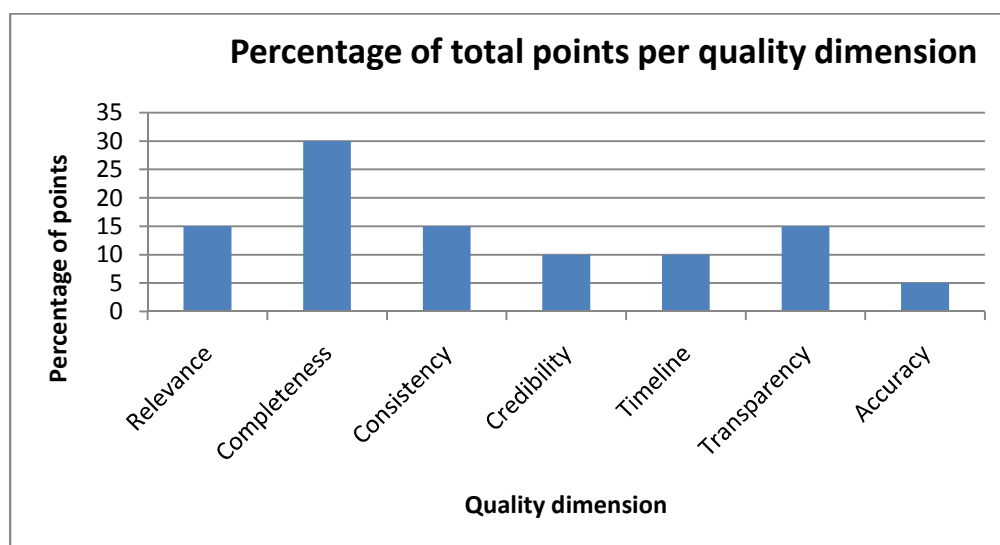

Figure 2 Percentage of points per quality dimension

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5 Results

The sustainability reports from Statoil, BP and OMV were analysed, using the instrument over the period 1998 to 2010, where reports were available. Reports were downloaded directly from the company websites and analysed. Since 2008, Statoil has commenced producing web-based sustainability reports, which are also downloadable. In the late 1990's BP issued most of their sustainability information on the web page (now unavailable) with a downloadable review document, which contains summarised information. The 1999 BP review document contained very little information and it was deemed unsuitable to assess this. OMV produce bi-annual sustainability reports with this frequency increasing to annual in 2009.The overall GHG reporting quality for each of these companies was analysed against the instrument and some preliminary findings are presented.

In the cases of Statoil and BP it was found that report quality remained steady over the timeframe in question, with both demonstrating only a slight increase in quality. In 2001 Statoil scored 25% of the total of 40 points (maximum possible using the instrument), increasing to 37.5% in 2010. In this case the main improvement was that the company increased its completeness score by reporting on methane as well as carbon dioxide emission.

With regard to BP, the GHG reporting quality although higher also demonstrated only a slight improvement, increasing from 40% of the total potential 40 points in 1998 to 57.5% in 2009 and dropping slightly to 52% in 2010. During this period BP increased reporting on accuracy and transparency issues, including sections on the internal processes in place for ensuring accuracy. In 2010, there was a slight decrease in the quality of GHG reporting within the sustainability report; much of this report was focussed on the Deepwater Horizon incident and the aftermath although the GHG impact of this incident was not reported.
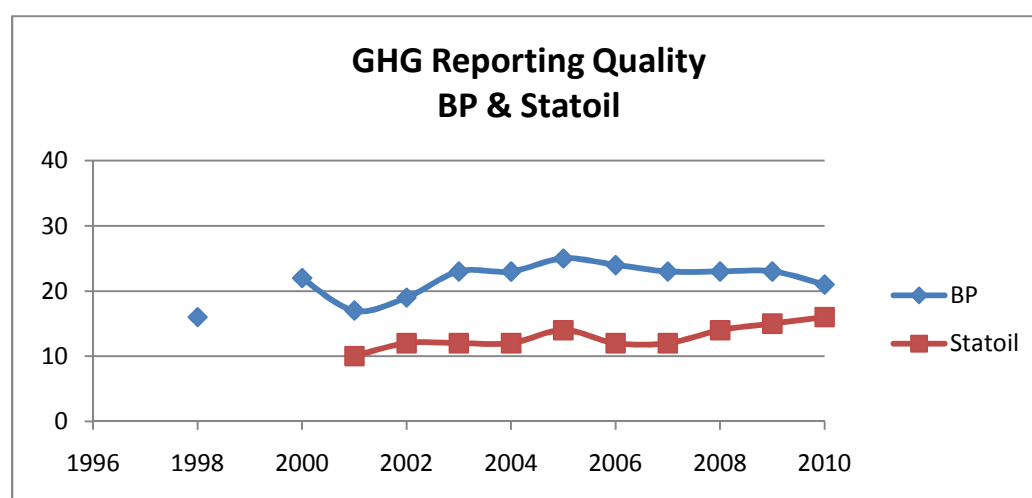

Figure 3 Overall GHG reporting quality BP & Statoil

In the case of OMV it was found that reporting quality increased from 30% of the potential total score in 1998 to 62% in 2010. OMV improved reporting across most of the dimensions from completeness, credibility, transparency and accuracy. In addition to direct CO_2, OMV also report on methane and nitrous oxide. This company was the only one of the three to report on scope 3 emissions, reporting data relating to the GHG impact of products sold.
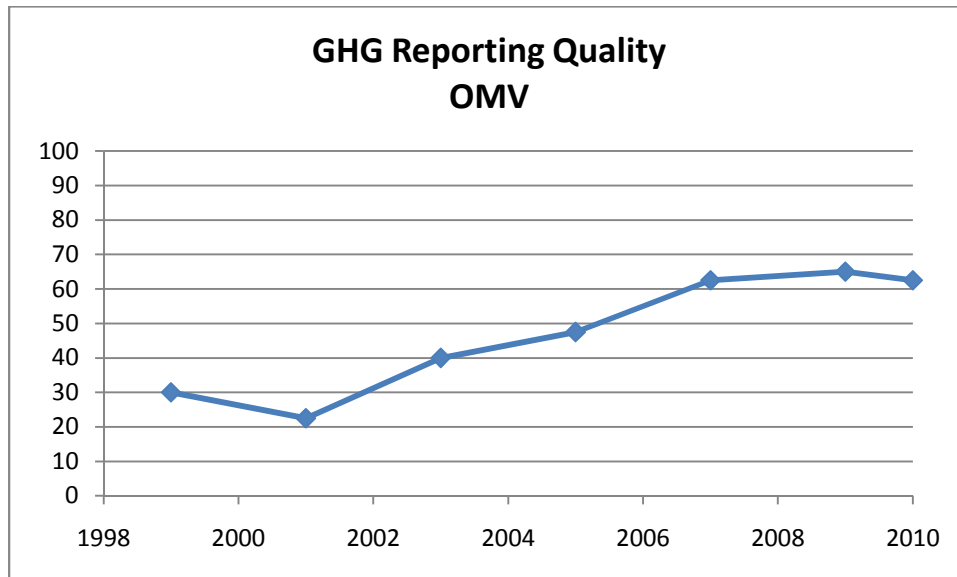
6   Discussion/future research

In this paper the methodology to be used to determine the quality of GHG reporting by companies in the oil and gas industry has been presented along with some preliminary results for three companies. However, this is just a pilot sample of a total of 45 companies which will be assessed overall and is just the first step in empirically analysing the model as proposed in section 2.

There are a number of important next steps:

-   Based on the pilot sample as well as on feedback from academics and practitioners, the tool will be refined
-   The quantity of GHG reporting also needs to be determined and this will be done by counting the occurrences of GHG and climate related terms in the reports. The relative quantity will be calculated.
-   In order to gauge the stakeholder reaction, it is proposed that media articles will be analysed to assess whether reporting quality can be ascertained i.e. whether media articles around sustainability reporting quality are positive, negative or neutral.

Another important aspect of this work is also to assess the effect of countervailing mechanisms on reporting quality. Akerlof (1970) discusses how factors such as the provision of product guarantees or professional licensing for instance can counteract the lemons effect.

As discussed previously there have been a number of reporting guidelines such as GRI (Global Reporting Initiative 2006, 2002, 2000) FEE (Féderation des Experts Comptables Européens 2000)as well as country and sector specific guidelines developed which are aimed at improving reporting quality. In addition to the reporting guidelines, there has also been an extensive amount of work with regard to developing a quality assurance process for sustainability reporting, which has seen the development of the AA1000 Assurance Standard (2008). In addition to the above, companies may also operate Environmental Management Systems such as ISO 14001, EMAS or have operations where GHG emissions are regulated, any which may serve to increase reporting quality. Therefore, these factors must also be considered as perhaps influencing the reporting quality of companies who use them.

Overall this work will contribute to a better understanding of how quality and quantity is evolving particularly in relation to GHG reporting in the oil and gas sector. The model developed allows new insights into sustainability reporting, linking the social accountability perspective and the legitimacy perspective, two currently unrelated literature bodies, using Akerlof's market for lemons theory. There are also potential policy implications as the research will offer insights into the current state of GHG reporting quality, how it has evolved and whether the current mechanisms aimed at improving such quality are adequate or whether further measures are required.

Category	No.	Criteria	Score		
			0	1	2
Relevance	1	The Company reports quantitative GHG emission data	Not reported	Partially reported – e.g. only reports CO_2 emissions (direct, indirect or both) or direct GHG emissions	Fully reported – Total GHG emissions (direct and indirect) are reported in tons of CO_2 eq.
	2	The report boundary covers 95 %* or greater of worldwide operations	Covers less than 50% of operations or boundary not indicated	Covers 50% - 95% of operations	Covers 95% -100% of operations
	3	The report specifies whether emissions are reported using the equity share (economic interest) approach or financial/operational control approach	No approach reported	Emission reporting approach disclosed however not precisely as per the approaches described.	Emissions reported as per approach described in the criterion
Completeness	4	Scope 1 CO_2 emissions are reported separately	Not reported		Reported
	5	Scope 2 CO_2 emissions are reported separately	Not reported		Reported
	6	Scope 3 CO_2 emissions are reported	Not reported	Scope 3 emissions are mentioned / no quantitative data	Quantitative data reported
	7	The types of activities covered by Scope 3 emissions are specified	A		Activities covered by scope 3 data are specified
	8	Emissions data for all direct GHG emissions are reported separately in metric tons. These should include CO_2 & CH_4 at a minimum	Not reported	Partially reported i.e. CO_2 is reported	CO_2 and CH_4 (minimum) are reported
	9	Emissions data for all direct GHG emissions (as above) are also reported in tons of CO_2 equivalent	Not reported		Reported

Category	No.	Criteria	Score		
			0	1	2
Consistency	10	Emissions performance overtime (at least two previous years**) is reported	Not reported	Partially reported – 1 previous year	More than 2 years of performance trend reported
	11	Emissions performance is related to a base year	Not related to a base year		Related to a base year
	12	Normalised data is reported (Normalisation factor will depend on the specific activity)	Normalised data not reported		Normalised data reported
Credibility	13	There is an assurance statement	No assurance statement	Assurance statement mentioned but not included	Verified assurance statement included
	14	The assurance statement specifically covers GHG emissions data	Not mentioned in assurance statement	Assurance statement mentions the inclusion of HSE (Health, Safety, Environment) data but not GHG data	Assurance statement specifically mentions inclusion of GHG data
Timeline	15	The reporting period which the data covers is outlined in the report	Not outlined	The year the report refers to is outlined but not the specific months	Reporting period, outlined in months and year
	16	There is a consistent reporting schedule	Consistent schedule not observed	First sustainability report – schedule not apparent	Consistent reporting schedule observed
Transparency	17	The methodologies which have been used to calculate or measure emissions are outlined	Not reported		Methodologies reported refer to API compendium/ measurement methods
	18	References to any calculation tools used are provided	Not reported		Reference to calculation tools provided
	19	All terms and jargon are clearly explained -there is a glossary of terms	No glossary of terms		Glossary of terms provided
Accuracy	20	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	Not reported	General statements around HSE data accuracy reported.	Specific statements around accuracy of GHG/ CO_2 data reported

Table 4 GHG report quality scoring instrument

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