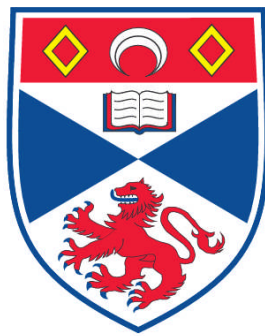


**CORPORATE DISCLOSURE OF GREENHOUSE GAS EMISSIONS
– A UK STUDY**

Thereza Raquel Sales de Aguiar

**A Thesis Submitted for the Degree of PhD
at the
University of St. Andrews**



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UNIVERSITY OF ST-ANDREWS

**Corporate Disclosure of Greenhouse Gas Emissions - A *UK*
*Study***

Thereza Raquel Sales de Aguiar

A thesis submitted in fulfillment of the requirements of the Degree of
Doctor of Philosophy in Accounting

**University of St-Andrews / School of Management
St-Andrews, UK**

July 2009

DECLARATIONS

I, Thereza Raquel Sales de Aguiar, hereby certify that this thesis, which is approximately 58,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

Date: 31 July 2009

Signature of candidate

I was admitted as a research student in September 2004 and as a candidate for the degree of PhD in May 2006; the higher study for which this is a record was carried out in the University of St Andrews between 2004 and 2009.

Date: 31 July 2009

Signature of candidate

I hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the degree of PhD in the University of St Andrews and that the candidate is qualified to submit this thesis in application for that degree.

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To Margarida Maria Sales, my dear grandmother.

ABSTRACT

Two beliefs drove this dissertation to be centered on the analysis of the UK corporate disclosure (CD) related to global climate change (GCC). Firstly, GCC is the most significant environmental concern of our current age (IPCC, 2001; Stern, 2006; IPCC, 2007). Secondly, CD could illustrate the values of organizations and possibilities for changing organizations' responsibility regarding to GCC (Gray *et al.*, 1996; Bebbington and Larrinaga-Gonzalez, 2008; Bebbington *et al.*, 2009).

This study utilizes content analysis as its principal method and seeks to achieve its goal by way of a two investigations. The first investigation focuses on disclosures made by direct participants' (DP) in the UK Emissions Trading Scheme (UK ETS). It captures GCC disclosures from both stand alone (SA) and annual reports (AR) during 2000 - 2004. This part of the study explores if joining the UK ETS changed GCC disclosures. This is tested on both a longitudinal and matched pair (MP) basis. An analysis using institutional theory suggests that instruments of environmental policy may influence GCC disclosures. Results showed that DP increased GCC disclosure, especially in the AR where mainstream business rationale is accepted. MP disclosures, in contrast, focus on the SA media and on different topics than DP disclosures. AR and SA both contain CD, but in this study they showed different patterns of disclosure and therefore may constitute different disclosure medias.

The second investigation suggests a method to compare GCC disclosure for a sample of DP and MP, using three different medias: carbon disclosure project (CDP), AR and SA. Analysis shows that GCC disclosure did not provide sufficient information to compare GCC initiatives and disclosures. Despite the fact that organizations have similar characteristics in terms of sector, size and origin country, they showed different views on GCC issues and this may partially explain differences on GCC initiatives and disclosure.

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Chapter 1:

GREENHOUSE GAS EMISSIONS –ENVIRONMENTAL CRISIS, AIR POLLUTION AND GLOBAL WARMING

CHAPTER 1: GREENHOUSE GAS EMISSIONS –ENVIRONMENTAL CRISIS, AIR POLLUTION AND GLOBAL WARMING

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Objective

1.1 Environmental crisis

1.2 Greenhouse gas: A scientific outline

1.3 Concluding comments

List of abbreviations

| | |
|---|---|
| CFCs | Chlorofluorocarbons |
| CH₄ | Methane |
| CO | Carbon Monoxide |
| CO₂ | Carbon Dioxide |
| DEFRA | Department for Environment, Food and Rural Affairs |
| GHG | Greenhouse Gas/Gases |
| GWP | Global Warming Potential |
| H₂ | Hydrogen |
| H₂O | Water Vapour |
| HFC | Hydrofluorocarbons |
| IPCC | Intergovernmental Panel on Climate Change |
| N₂O | Nitrous Oxide |
| NAEI | National Atmospheric Emissions Inventory |
| NMVOC | Non-Methane Volatile Organic Compounds |
| NO_x (NO₂ + NO) | Nitrogen Oxides |
| O₃ | Ozone |
| PFC | Perfluorocarbons |
| SF₆ | Sulphur Hexafluoride |
| SO₂ | Sulphur Dioxide |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UN | United Nations |
| UN FCCC | United Nations Framework Convention on Climate Change |
| UNEP | United Nations Environmental Programme |
| USA | United States of America |
| WMO | World Meteorological Organization |

Content

Objective

The objective of this chapter is to introduce the background to concerns about greenhouse gas (GHG)¹ concentration in the atmosphere. There are two different perspectives presented here. First, the chapter explores GHG and the socio-political debate around GHG. Second, GHG are explained from a scientific perspective in order to provide background as to why there is socio-political debate around them.

The first section introduces the socio-political context in which GHG emissions have become important. This arises, firstly because GHG contribute to what is seen as the environmental crisis. Secondly, there is a relationship between GHG and the average atmospheric temperature and this leads to the conclusion that the anthropogenic increases in GHG are leading to global warming. This phenomenon is often described as global climate change (GCC) and it is likely to impact on human and non-human species.

The second part of this chapter introduces the science behind GCC, including a description of what constitutes GHG. Firstly, they are classified as direct or indirect GHG. Secondly, GHG themselves are identified in the UK National Atmospheric Emissions Inventory –NAEI (AEA Energy & Environment, 2006) and this taxonomy is presented.

1.1 Environmental crisis

A desire for economic growth has had a two fold environmental impact (Goldsmith *et al.*, 1972; Clayton and Radcliffe, 1996; Meadows *et al.*, 2004; Porritt, 2005). First, the use of natural resources has accelerated. Second, the waste generated by economic activity has caused damage to natural ecosystems (Goldsmith *et al.*, 1972; Meadows *et*

¹ GHGs is label used to describe a number of gases that have a role in trapping energy in the atmosphere (oxygen, for example is a plentiful atmospheric gas but is not a greenhouse gas).

al., 2004; Porritt, 2005). As a result, many changes in the ecosphere are connected to human activities (Clayton and Radcliffe, 1996).

While environmental crisis involves many aspects, this thesis concentrates in one aspect that of GHG emissions. This has been selected because GHG are seen as quickly modifying physical, chemical and biological systems at larger scales (Meadows *et al.*, 2004) and hence pose significant threats to human societies. Concerns with GHG emissions also arise because it has been scientifically determined that increase GHG concentrations in the atmosphere leads the phenomena of ‘global warming’ which itself generates climate change.

Climate can be described as an average of the weather (temperature, precipitation, wind, etc) in period of time and area (Intergovernmental Panel on Climate Change- IPCC, 2001b). Variations in climate systems are likely to cause changes to the climate. According to the IPCC (2001b), the climate system is an interactive system composed by the atmosphere, the hydrosphere, the cryosphere, the land surface and the biosphere (IPCC, 2001b). The climate system receives energy from the sun in the form of radiation with about 49% of this being absorbed by the surface of the Earth. The rest of this energy is reflected back to the atmosphere in the form of infrared radiation. The existence of GHG delays the speed of which infrared radiation escapes from the Earth atmosphere.

The greenhouse effect maintains the temperature near to Earth’s surface around 14°C which is on average 33° C higher than the temperature in higher altitudes (which is around -19°C). This effect permits the existence of several species in the world, including human life. While the greenhouse effect is a naturally occurring process, there are concerns that human activities also impact upon this process.

The majority of scientists, including those working for the United Nations (UN)² and national scientists of the G8³, believe the global warming hypotheses (sometimes described as antropogenetic global warming). They stress that climate is changing

² Scientific opinion about climate change is published by the IPCC.

because of the increase of GHG emissions due to human actions (IPCC, 2001b). Economic activities, including energy production, industry, transport, agriculture and land use are those most closely related to climate change (Stern, 2006). The table 1.1 shows world GHG emissions in 2000 by sources.

Table 1.1: GHG emissions in 2000 by sources

| ACTIVITY SECTOR | GHG EMISSIONS | PRINCIPAL DRIVERS |
|---------------------------|---------------|---|
| ENERGY SOURCES | | |
| Power | 24% | Generation of power and heat |
| Transport | 14% | Road transport, aviation, rail and shipping |
| Industry | 14% | Cement and chemicals |
| Buildings | 8% | Heating and cooking at commercial and residential buildings |
| Other energy related | 5% | |
| NON-ENERGY SOURCES | | |
| Land use | 18% | Deforestation |
| Agriculture | 14% | Fertilizer use and livestock Rice and manure management |
| Waste | 3% | - |

Source: Adapted from Stern (2006). This data was prepared by Stern Review using information from World Resources Institute Climate.

Using the same dataset as reflected in table 1.1, 77% of all GHG are carbon dioxide (CO₂), 14% methane (CH₄), 8% nitrous oxide (N₂O) and 1% F-gases such as perfluorocarbon and sulphur hexafluoride (Stern, 2006). CO₂ is the most influential GHG as far as climate change is concerned because of the volume of the gas in the atmosphere as well as due to the long period that it remains in the atmosphere before it is broken down into its chemical component parts by light.

Table 1.2 provides data on CO₂ and it is clear that it will have the highest relative contribution to global warming over the next 100 year period. The contribution to global warming is estimated considering the global amount of emission of each GHG and its Global Warming Potential (GWP). The GWP is calculated using the lifetime, the amount of infrared radiation absorbed and the density of each GHG.

³ It is a group formed by large industrialised countries. Those countries are Canada, France, Italy, Japan, United Kingdom, United States of America, Germany and Russia. They met every year to discuss economic and political themes.

Table 1.2: Contribution to global warming

| GAS | LIFETIME IN ATMOSPHERE | GWP (100yr horizon) | RELATIVE CONTRIBUTION OVER 100YR |
|-----------------------------------|-------------------------------|----------------------------|---|
| Carbon Dioxide (CO ₂) | 50-200 years | 1 | 61% |
| Methane (CH ₄) | 10 years | 21 | 15% |
| Nitrous Oxide (N ₂ O) | 150 years | 290 | 4% |
| Chloroflurocarbons (CFCs) | 100 years | Various | 11% |
| HCFC-22 (I) | 13 years | 1500 | 0,5% |
| Others (II) | Various | Various | 8,5% |

Source: Adapted from Jäger and Ferguson (1991), IPCC (1996), Hadley Centre (1999), IPCC (2001b).

(I) Montzka, Myers, Butler, Cummings and Elkins (1993).

(II) The estimated effect of ozone is included under “others”. The gases included under “others” are given in the full report of the Second World Climate Conference (Jäger and Ferguson, 1991).

The IPCC (2007a) estimates the link between GHG levels in the atmosphere and the impact that this is likely to have on global temperature. One of their scenarios suggests that if there were a 50% reduction of GHG by 2015 (using 2000 as the baseline year), the Earth’s temperature could increase from 2° to 2.4° by 2050 (the time delay is due to the prolonged effects of GHG). The reduction of GHG emissions by half until 2015 is improbable and the earth temperature is hence expected to increase to a higher level. The expectation is that the temperature may rise by more than 5°-6°C. To put this amount of warming in context, such change in average temperature is equivalent to the difference in temperature that happened between the last ice age and today (Stern, 2006). Several ecological and economics consequences might arise from this increase in temperature. While the difficulty of predicting exactly what will happen, broad consequences is mentioned on table 1.3.

While noting that there is a very broad consensus about GCC hypothesis, there are ‘climate change sceptics’. The global warming stet emerged ten to fifteen years ago. It can be defined as a debate on GCC that argues against human responsibility for global warming, the accuracy of scenarios that predict the Earth’s temperature (Robinson *et al.*, 1998; Earth Science Education Forum - ESEF, 2001; Soon *et al.*, 2001) and the necessity of political action and international agreements to tackle GHG emission. Some sceptics refuse to acknowledge anthropogenic causes of global warming (Singer, 1998; ESEF, 2001), preferring to believe that increases in CO₂ and other GHG emissions are not correlated with the temperature.

Table 1.3: The effects of climate change on natural resources and sustainable development

| RESOURCE (I) | EXAMPLES OF POSSIBLE IMPACTS/EFFECTS (II) | EXAMPLES OF IMPLICATIONS ON SUSTAINABLE DEVELOPMENT |
|-------------------------|--|---|
| WATER | Changes in the climate will increase the intensity of floods and droughts, especially in humid and semi-arid areas. This could cause: <ul style="list-style-type: none"> • Increase demand for groundwater, • Consumption of poor quality of water, • Erosion and sediment transport. | <ul style="list-style-type: none"> • Increase of poverty and children mortality. • Decrease of groundwater recharge. • Decrease potential of hydropower. • Increase of pathogen load. |
| ECOSYSTEM | Climate change affects the ecosystem especially because its process (e.g. photosynthesis) is extremely related with CO ₂ concentration and climate factors. Examples of impacts on ecosystem are: <ul style="list-style-type: none"> • Displacement and extinction of some species, • Risk of wildfire, • Changing of ecosystems. | <ul style="list-style-type: none"> • Ecosystems degradation due to the growing demand for food, fish, freshwater, timber, fibre and fuel. • Reduction of carbon sequestration and loss of biodiversity due to land-redistribution plans. |
| COASTS | The rise in the temperature could cause the retreat of mountain glaciers and the global sea levels will presumably rise. Effects related to sea level variation are: <ul style="list-style-type: none"> • Thermal expansion, • Changes in the ocean circulation, • Surface air pressure variations. | As an illustration, adaptations actions required to face floods, storms and wetland lost requires big amount of monetary resources. Consequently, some countries could not afford to adapt themselves to such impacts. |
| FOOD | Changes in the climate could cause several impacts on food, fibre and florets products. Examples of those effects are: <ul style="list-style-type: none"> • Cereal productivity decrease in some regions, especially due to the change on temperature, • Negative impact for small holders and subsistence farmers and fishers, especially because high vulnerability to extreme events and species extinctions. | <ul style="list-style-type: none"> • Water resource tends to be more demanding to produce food. This will increase conflict to consume water, • Measures to substitute fuel fossil by biomass can cause severe implications on sustainable development. These measures tend to generate impacts on trade, economic development, environmental quality and land-use. |
| HEALTH | Changes in the climate will increase burden of health problems, such as: <ul style="list-style-type: none"> • Malnutrition, diarrhoea, cardio-respiratory and infections diseases, • Morbidity and mortality due to severe weather events such as heat waves. | <ul style="list-style-type: none"> • Burden of health systems due to malnutrition, diarrhoeal, cardio-respiratory and infections diseases • Health systems and individuals may not be able to face severe weather events, such as hurricanes and fires. |

Source: Adapted from IPCC (2007a).

(I) The impacts of GCC on these resources are co-related. For example, the impacts of climate change on water, ecosystem, and sea level variation affects food productivity, increase risks of disease and weather events. Additionally, the decrease of food productivity could affect health.

(II) The intensity of those impacts/effects may vary according to the levels of temperature.

They claim that GCC arises from natural variations (Robinson and Orient, 2004) or the scientific explanation for this phenomena is poor (Balling, 2003). In addition, sceptics commonly criticize political actions and international agreements to tackle global warming. For example, in the USA public petitions⁴ have been used to demonstrate objection to Kyoto Protocol specifically and GCC generally.

In the last five years climate denial has been viewed as not being credible. In particular, the IPCC (established in 1998 by World Meteorological Organization - WMO and United Nations Environmental Programme - UNEP) provides a comprehensive and transparent basis on for climate change science. IPCC assessments are discussed by intergovernmental represent of both WMO and UNEP members countries. Other relevant international, intergovernmental or non-governmental organizations also participate on IPCC discussions. Thus, despite sceptics criticism, the IPCC provides scientific, technical and socio-economic information that reflects an international common ground on GCC.

1.2 Greenhouse gas: A scientific outline

This section identifies the different types of GHG, drawing from the UK National Atmospheric Emissions Inventory (NAEI) from 1970 to 2004 (AEA Energy & Environment, 2006) and the UK Greenhouse Gas Inventory 1990-2005 (AEA Technology, 2007). The NAEI considers 44 pollutants (AEA Energy & Environment, 2006). Those substances are classified into the following six categories:

- (i) Greenhouse Gases
- (ii) Acidifying Pollutants & Ozone Precursors
- (iii) Air Quality Strategy Pollutants
- (iv) Persistent Organic Pollutants
- (v) Heavy Metals and
- (vi) Base Cations.

⁴ Examples of those petitions are: Statement by Atmospheric Scientists on Greenhouse Warming, Heidelberg Appeal, Leipzig Declaration on Global Climate Change and Oregon Petition.

The NAEI categorization distinguish between direct and indirect GHG (see table 1.4), while indirect GHG are classified in more than one pollutant category.

Table 1.4: Pollutants in the UK NAEI, Kyoto Protocol and UK Climate Change Agreements

| POLLUTANTS CONSIDERED IN THE UK NAEI | | TYPE OF POLLUTANT (I) | KYOTO PROTOCOL ANNEX A | UK CLIMATE CHANGE AGREEMENT |
|---|---|--------------------------------------|---------------------------------------|--|
| 1. Carbon Dioxide | CO ₂ | G | X | X |
| 2. Methane | CH ₄ | G | X | X |
| 3. Nitrous Oxide | N ₂ O | G | X | X |
| 4. Hydrofluorocarbons | HFC | G | X | X |
| 5. Perfluorocarbons | PFC | G | X | X |
| 6. Sulphur Hexafluoride | SF ₆ | G | X | X |
| 7. Nitrogen Oxides | NO _x (NO ₂ + NO) | NAQS, AC, IG, O | | |
| 8. Sulphur Dioxide | SO ₂ | NAQS, AC, IG | | |
| 9. Carbon Monoxide | CO | NAQS, O, IG (II) | | |
| 10. Non-Methane Volatile Organic Compounds | NMVOC | NAQS, O, IG | | |

Source: Adapted from AEA Technology (2005), AEA Energy & Environment (2006), DEFRA (2001b; 2002) and UNFCCC (1997).

(I) Codes meaning:

- G Greenhouse gas
- IG Indirect greenhouse gas
- O Ozone precursor
- AC Acid gas
- NAQS National Air Quality Standard

(II) The UK NAEI does not classify Carbon Monoxide as indirect greenhouse gas. However, according to IPCC (2001b) and AEA Technology (2007) Carbon Monoxide is an indirect greenhouse gas.

There are two main sources of GHG, these can be found naturally in the atmosphere or they could arise from human activities (anthropogenic source). The GHG which are naturally in the Earth's atmosphere are: Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Ozone (O₃)⁵ and Water Vapour (H₂O). Solid and liquid particles (aerosols) and clouds also naturally occur in the atmosphere. They are not GHG, but radiation effects in the atmosphere by absorbing and emitting infrared radiation. Their impact in the radiation is complex and varies spatially. Hydrofluorocarbons (HFC), Perfluorocarbons (PFC) and Sulphur Hexafluoride (SF₆), are also considered as potential GHG. These gases do not exist naturally in the atmosphere. Rather, they have

⁵ The Ozone in the troposphere and lower stratosphere, acts as a greenhouse gas. However in the higher stratosphere, Ozone filters ultra-violet radiation.

been introduced by human activities and hence are also direct GHG (IPCC, 2001b).

Table 1.5 summarises the main sources of direct GHG.

Table 1.5: Direct GHG: Main sources

| DIRECT GHG | | GLOBAL SOURCES |
|----------------------|-----------------------------|--|
| Carbon Dioxide | CO ₂ | Anthropogenic and natural sources. |
| Methane | CH ₄ | Anthropogenic and natural sources. |
| Nitrous Oxide | N ₂ O | Anthropogenic and natural sources. |
| Hydrofluorocarbons | HFCs | Anthropogenic industrial production. |
| Perfluorocarbons | PFCs | Anthropogenic industrial production. |
| Sulphur Hexafluoride | SF ₆ | Anthropogenic industrial production. |
| Water Vapour | H ₂ O | Anthropogenic and natural sources (e.g.: Stratospheric H ₂ O - Oxidation of CH ₄ and exhaust from aviation, or by a changing climate). |
| Ozone | Tropospheric O ₃ | Anthropogenic sources: <ul style="list-style-type: none"> • Industrial emissions of its precursors: CH₄, NO_x, CO and VOC, • Transport of ozone from the stratosphere to the troposphere (Ozone depletion). |

Source: Adapted from IPCC (2001b).

There are other gases, which contribute to the effects of the direct GHG and aerosols through atmospheric chemistry. These gases are called indirect GHG (IPCC, 2001b). Indirect GHG are: Nitrogen Oxides (NO and NO₂), Sulphur Dioxide (SO₂), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC) (IPCC, 2001b; AEA Technology, 2007). Table 1.6 shows the effects of indirect GHG on direct GHG and aerosols concentrations in the atmosphere.

Table 1.6: Effect of the indirect GHG to increase direct GHG concentration in the atmosphere

| INDIRECT GHG | | EFFECT |
|----------------------------|--|--|
| Carbon monoxide | CO | <ul style="list-style-type: none"> • Affects the atmospheric burden of CH₄, • Lead to the formation of O₃. |
| Volatile organic compounds | VOC | <ul style="list-style-type: none"> • Produce organic aerosols, • Photochemistry (e.g. Leads to the production of O₃ in the presence of NO_x and light). |
| Sulphur dioxide | SO ₂ | It causes formation of acid aerosols that contributes to climate change. |
| Nitrogen oxides | NO _x = NO + NO ₂ | Catalyse Tropospheric O ₃ . |

Source: Adapted from IPCC (2001b) and (AEA Technology, 2007).

Molecular Hydrogen (H₂)⁶ and other ozone-depleting substances⁷ regulated by the Montreal Protocol, international agreement which regulates substances that deplete the ozone layer, also have climate change potential (UNEP, 2000). The classification of those substances under direct or indirect GHG is not clear. This uncertainty lies mostly in the fact that the UK GHG Inventory (AEA Technology, 2007) does not include these chemicals and the UK NAEI (AEA Technology, 2005) does not provide individual estimation of them.

The figure 1.1 summarizes the discussion to date and identifies several GHG. The United Nations Framework Convention on Climate Change (UNFCCC) requires the UK to publish regularly national emission inventories of GHG, using reporting guidelines from IPCC (AEA Energy & Environment, 2006; AEA Technology, 2007). Table 1.7 shows direct GHG and their main sources in the UK. Details of indirect GHG sources are not presented at the UK GHG inventory. This information is available at UK NAEI, since the major effects of indirect GHG are identified as contributing to other aspects of air pollution (see table 1.4).

⁶ IPCC (2001b) does not consider the Molecular Hydrogen (H₂) as direct GHG. The H₂ is treated as a reactive gas like the other indirect GHG, because it increases CH₄ and HFC through chemical reactions.

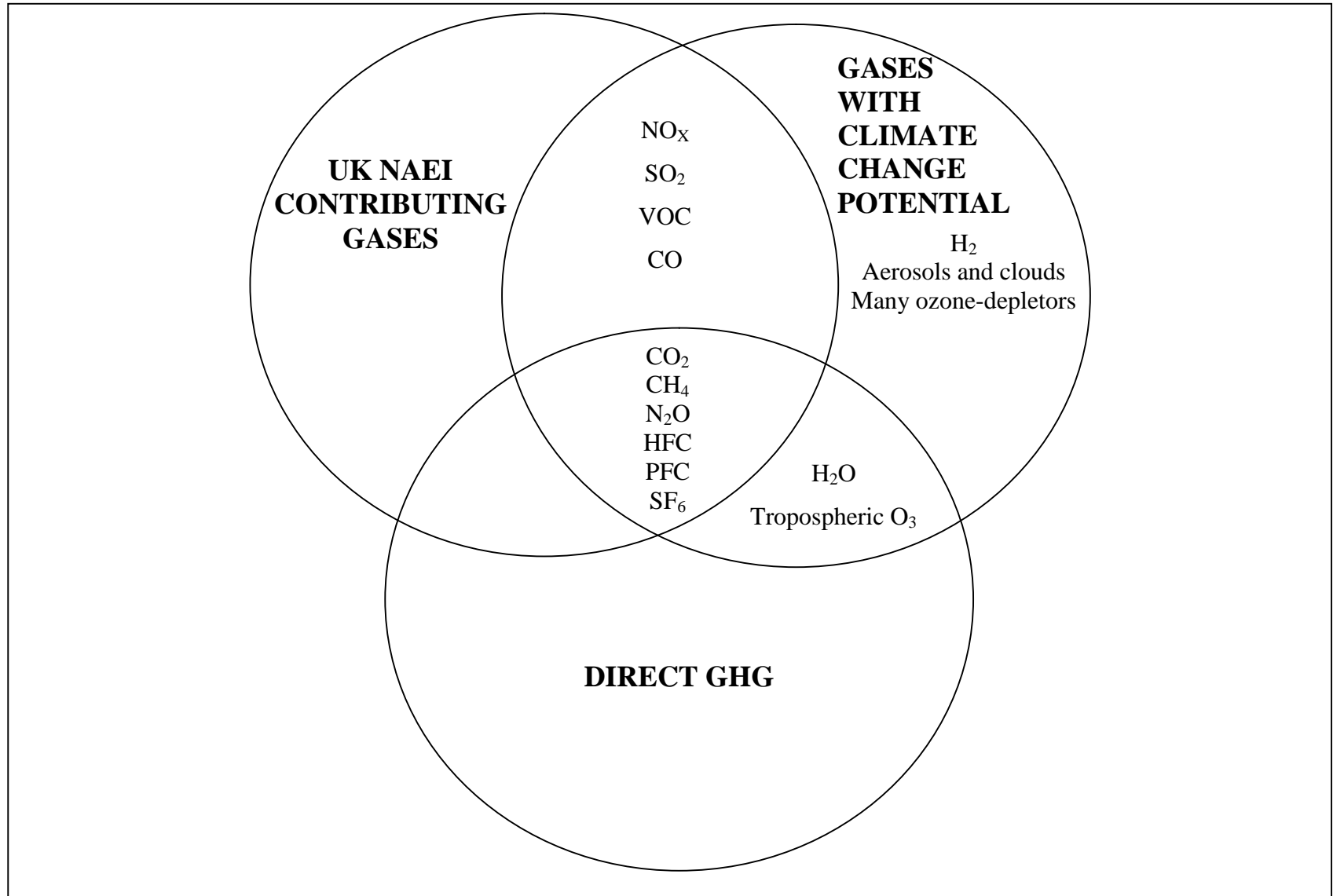
⁷ According to IPCC (2001b) many ozone-depleting substances are also GHG. Examples of those substances are (IPCC, 2001b): CFC-11 (CFCl₃), CFC-12 (CF₂Cl₂), and CFC-113 (CF₂ClCFCl₂). For more details consult IPCC, chapters 4.2.2 and 6.3.3.

Table 1.7: Direct GHG: The main UK drivers

| DIRECT GHG | | MAIN DRIVERS |
|----------------------|------------------|--|
| Carbon Dioxide | CO ₂ | <ul style="list-style-type: none"> • Public Power, • Industrial combustion, • Transport, • Commerce/Residential Combustion, • Waste and Agriculture & Land Use. |
| Methane | CH ₄ | <ul style="list-style-type: none"> • Stationary fuel combustion, • Coal mining, • Gas Mains Leakage, • Landfill and other types of waste, • Agriculture, • Off-road vehicles/machinery. |
| Nitrous Oxide | N ₂ O | <ul style="list-style-type: none"> • Industry, • Transport, • Agriculture and Waste. |
| Hydrofluorocarbons | HFCs | <ul style="list-style-type: none"> • Plastic foams blowing, • Fire fighting fluids, • Refrigeration, • Aerosols. |
| Perfluorocarbons | PFCs | <ul style="list-style-type: none"> • Etching processes, • Chemical vapour deposition, • Soldering processes, • Leak testing of electrical components, • Cooling electrical components, • Refrigerant and fire fighting, • Cushioning in the soles of training shoes, • Cosmetic and tracer gas, • Largest emissions: aluminium production and electronics sector. |
| Sulphur Hexafluoride | SF ₆ | <ul style="list-style-type: none"> • SF₆ Cover gas, • Electrical insulation, • Trainers production. |

Source: Adapted from AEA Energy & Environment (2006).

Figure 1.1: GHG



1.3 Concluding comments

The environmental crisis generated by the impacts of economic activity involves many aspects. However, the aspect related to GHG concentration in the Earth's atmosphere is quickly changing the effects of balance and modifying physical, chemical and biological systems at larger scales. Urgent actions to tackle GHG emissions are therefore needed and are supported by a raft of policy interventions (see chapter 2).

In the UK, GHG are considered as part of UK National Atmospheric Emissions Inventory - NAEI (AEA Energy & Environment, 2006). According to NAEI (AEA Energy & Environment, 2006; AEA Technology, 2007) and IPCC (2001b), the GHG divide into two categories: *Direct GHG* (comprising: Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Ozone (O₃), Water Vapour (H₂O), Hydrofluorocarbons (HFC), Perfluorocarbons (PFC) and Sulphur Hexafluoride (SF₆)) and *indirect GHG* (comprising: Nitrogen Oxides (NO and NO₂), Sulphur Dioxide (SO₂), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)).

The next chapter outlines actions taken, at national and international levels, to mitigate GHG emissions. A special emphasis is given to the Kyoto Protocol, European and UK climate change policies.

Chapter 2:

POLICY RESPONSES TO MITIGATE GREENHOUSE GAS EMISSIONS

CHAPTER 2: POLICY RESPONSES TO MITIGATE GREENHOUSE GAS EMISSIONS

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List of abbreviations

| | |
|-----------------------|--|
| AP | Agreements Participants |
| C0₂ | Carbon Dioxide |
| CCA | Climate Change Agreements |
| CCL | Climate Change Levy |
| CCPM | Common and Coordinated Policy Measures |
| CDM | Clean Development Mechanisms |
| CER | Certificated Emissions Reductions |
| CH₄ | Methane |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DP | Direct Participants |
| EC | European Commission |
| ECA | Enhanced Capital Allowances |
| EECs | Energy Efficiency Commitments |
| EPA | Environment Protection Agency |
| ET | Emissions Trading |
| EU | European Union |
| EU CCP | European Union Climate Change Program |
| EU ETS | European Emissions Trading |
| EUP | Eco-design of energy using products |
| GHG | Greenhouse Gas/Gases |
| GCC | Global Climate Change |
| HFCs | Hydrofluorocarbons |
| HMG | Her Majesty's Government |
| IPCC | Intergovernmental Panel on Climate Change |
| JI | Joint Implementation |
| N₂O | Nitrous Oxide |
| NAO | National Audit Office |
| NGOs | Non-governmental Organizations |
| OECD | Organization for Economic Co-operation and Development |
| PCA | Partnership for Climate Actions |
| PFCs | Perfluorocarbons |
| PP | Projects Participants |
| R&D | Research & Development |
| ROCs | Renewable Obligations |
| RTD | Road Tax Differentials |
| RTFO | Renewable Transport Fuels Obligations |
| SEPN | Sustainable Energy Policy Network |
| SF₆ | Sulphur Hexafluoride |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK CCP | UK Climate Change Programme |
| UK ETS | UK Emissions Trading Scheme |
| UN | United Nations |
| UN FCCC | United Nations Framework Convention on Climate Change |
| UNEP | United Nations Environment Programme |
| USA | United States of America |
| VAT | Value Add Tax |
| WMO | World Meteorological Organisation |

Content

Objective

This chapter outlines policies and measures that have been undertaken worldwide in order to respond to the challenge to adapt and mitigate⁸ global climate change (GCC)⁹. Initially, this chapter describes the most widely used greenhouse gas (GHG) abatement initiatives and gives some examples of these instruments implementation within the ten largest economies in the world are also presented. In addition, this chapter introduces the Kyoto Protocol, since this Protocol could be considered to be the most relevant international action on GCC. This Protocol also influences policies and measure at European and UK levels. The discussion of the Kyoto Protocol involves its historical antecedents, objectives and Kyoto's various mechanisms. Finally, European and UK climate change policies are presented. This discussion is centred on the measures and instruments adopted to achieve Kyoto's targets and other domestic commitments on GCC. Special emphasis is given to the UK Emissions Trading Scheme, given the focus of the thesis.

2.1 Adaptation & mitigation

According to the Intergovernmental Panel on Climate Change (IPCC, 2001a), adaptation and mitigation are the two ways in which GCC damage can be avoided. Adaptation aims to moderate the harmful effects of GCC, reducing its adverse consequences and enhancing positive impacts (IPCC, 2001a, 2007a). In contrast, mitigation aims to reduce concentrations of GHG, aerosol or GHG/aerosol precursors on the atmosphere in order to prevent dangerous anthropogenic GCC (IPCC, 2001a, 2007a). Both strategies are used by countries as they are responding to GCC.

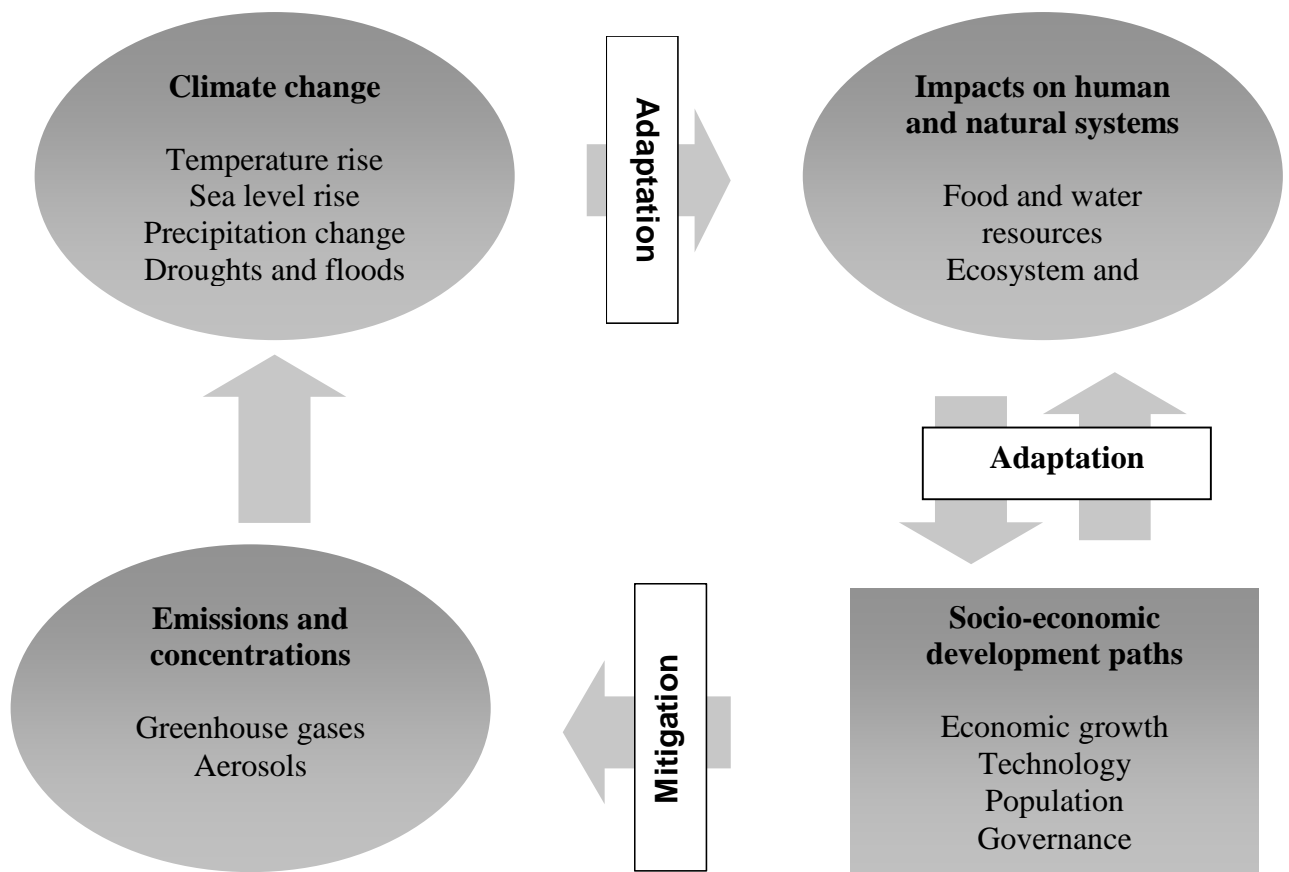
Figure 2.1 illustrates the difference between adaptation and mitigation (Houghton, 1994). The figure starts on the bottom right side and moves in clockwise direction. It

⁸ This chapter is mostly focused on mitigation actions, but it also addresses conceptual differences between adaptation and mitigation.

⁹ This is a fast changing area. Thus, this chapter relates to initiatives late up to the start of 2009.

highlight that GCC is mainly caused by human economic activities, leading increased GHG, aerosol or GHG/aerosol precursor in the atmosphere. These emissions change the concentration of GHG/aerosol precursor in the atmosphere and subsequently changes the climate system, causing various impacts on human and natural systems. Finally, the figure suggests that mitigation and adaptation link to the causes and effects of GCC respectively (Houghton, 1994).

Figure 2.1: Climate Change- an integrated framework



Source: Houghton (1994:3)

Natural and human systems will adapt to GCC events (IPCC, 2001a). The natural systems can only react to effects of GCC. On the other hand, human system may both react and prevent some of these events in order to moderate harm or exploit beneficial opportunities (IPCC, 2001a). According to Stern (2006), human adaptation arises at two levels (see table 2.1). The first level, called building adaptive capacity, refers to creating information and conditions to support adaptation activities (e.g. studies which identify vulnerabilities). The second level, called delivering adaptation actions, refers to taking

actions to reduce GCC impacts (e.g. building flood defence systems). Governments can decide to implement adaptations policy, using public investments (Stern, 2006). However, most human adaptations will be carried autonomously by individuals themselves (Stern, 2006). Examples of adaptation practices are given on table 2.2.

Several countries have set targets for reductions in GHG emissions. The Stern Report described some of the goals that are being pursued for the 10 largest economies in the world (see table 2.3). In order to mitigate the cause of GCC, countries are advised to implement multiple policies, measures and instruments (Organization for Economic Co-operation and Development -OECD, 1989; Jäger and Ferguson, 1991; Gibson, 2000; IPCC, 2001a; Krarup, 2001; Mortensen, 2001; Harrington *et al.*, 2004). The next section will explore policies instruments used by countries to achieve the GHG emissions targets reductions that they have been set.

Table 2.1: Natural and human system adaptation

| | CHARACTETISTICS | |
|----------------|--|-------------------------------|
| NATURAL | Reaction of natural system to climate events | |
| HUMAN | Forms of Operation | Building adaptive capacity |
| | | Delivering adaptation actions |
| | Drivers | Policy-driven |
| | | Autonomous |

Source: IPCC (2001a) and Stern (2006).

Table 2.2: Examples adaptation initiatives

| NATURAL RESOURCE | EXAMPLES OF ADAPTATION PRACTICES |
|-----------------------------|--|
| WATER | <p>GCC could increase the risks of floods and droughts. Some examples of adaptation practices to face droughts are:</p> <ul style="list-style-type: none"> • Extraction of groundwater, • Water desalination, • Improvement in water use efficiency. |
| ECOSYSTEM | <ul style="list-style-type: none"> • Controlling burning of ecosystem, • Restoration of habitats, • Reduce and manage stress on species and ecosystem. |
| COASTS | <p>Adaptation actions could be taken to protect, accommodate and retreat the coast. Examples of these actions are:</p> <ul style="list-style-type: none"> • Statutory closure of specific coasts, • Flood proof buildings, • Wetland restoration. |
| FOOD | <p>Adaptation actions to tackle the impacts of GCC on food could be planned by government or could be done autonomously by individuals themselves. Examples of these actions are:</p> <ul style="list-style-type: none"> • Planed: Development of infrastructure and capacity to adapt community and institutions to the effects of climate change. • Autonomous: Water management and use of technologies to conserve the soil. |
| HEALTH | <p>Adaptation actions regard on health could be taken at international, regional and individual spheres. Examples of these actions are:</p> <ul style="list-style-type: none"> • Malaria outbreak, • Educational health campaign to reduce risks of diarrhoea, • International help to reduce epidemic diseases. |

Source: IPCC (2007a)

Table2.3: Examples of goals to tackle GCC adopted by 10 largest economies

| COUNTRY | GOAL (I) |
|---------------------------------|---|
| BRAZIL | <ul style="list-style-type: none"> • National objective to increase the share of alternative renewable energy sources (biomass, wind and small hydro) to 10% by 2030. |
| CHINA | <p>The 11th Five Year Plan contains stringent national objectives including:</p> <ul style="list-style-type: none"> • 20% reduction in energy intensity of GDP from 2005 to 2010, • 10% reduction in emission of air pollutants, • 15% of energy from renewable. |
| FRANCE | <ul style="list-style-type: none"> • Kyoto Protocol commitment to cap GHG emissions at 1990 levels by the period 2008-2012. • National objective for 25% reduction from 1990 levels of GHGs by 2020 and fourfold reduction (75-80%) by 2050. |
| GERMANY | <ul style="list-style-type: none"> • Kyoto Protocol commitment to reduce GHG emissions by 21% on 1990 levels by the period 2008-2012. • Offered to set a target of 40% reduction below 1990 levels by 2020 if EU accepts a 30% reduction target. • National objective to supply 20% of electricity from renewable sources by 2020. |
| INDIA | <ul style="list-style-type: none"> • The 11th Five Year Plan contains mandatory and voluntary measures to increase efficiency in power generation and distribution, increase the use of nuclear power and renewable energy, and encourage mass transit programs. • The Integrated Energy Policy¹⁵ estimates that these initiatives could reduce the GHG intensity of the economy by as much as one third. |
| ITALY | <ul style="list-style-type: none"> • Kyoto Protocol commitment to reduce GHG emissions by 6.5% on 1990 levels by the period 2008-2012. • National objective to increase share of electricity from renewable resources to 20% by 2010. |
| JAPAN | <ul style="list-style-type: none"> • Kyoto Protocol commitment to reduce GHG emissions by 6% on 1990 levels by the period 2008-2012. • National objective for 30% reduction in energy intensity of GDP from 2003 to 2030. |
| RUSSIAN FEDERATION | <ul style="list-style-type: none"> • Kyoto Protocol commitment to cap GHG emissions at 1990 levels by the period 2008-2012. |
| UNITED KINGDOM (II) | <ul style="list-style-type: none"> • Kyoto Protocol commitment to reduce GHG emissions by 12.5% on 1990 levels by the period 2008-2012. • National objectives to reduce CO₂ emissions by 20% on 1990 levels by 2010 and by 60% on 2000 levels by 2050. |
| UNITED STATES OF AMERICA | <ul style="list-style-type: none"> • Voluntary federal objective to reduce GHG intensity level by 18% on 2002 levels by 2012. • California, the largest state, in the USA, has an objective to reduce CO₂ emissions by 80% on 1990 levels by 2050. • States in the North-East and mid-Atlantic have set up the Regional GHG Initiative to cut emissions to 2005 levels between 2009 and 2015, and by a further 10% between 2015 and 2018. |

Source: Stern (2006:456).

(I) These goals do not include the commitment on 33rd G8 summit at which G8 countries committed to reduce CO₂ by at least half by 2050 (Globe International, 2007).

(II) The Climate Change Act 2008 amends this target for at least 80% lower CO₂ emissions by 2050, considering 1990 levels as baseline (UK Parliament, 2008).

2.2 Greenhouse gas abatement policy instruments¹⁰

National GHG abatement policy instruments are used by countries to limit domestic emissions and enhance sequestration (IPCC, 2001a, 2007b). These instruments include (IPCC, 2001a): regulatory instruments, market-based instruments, voluntary agreements and informational instruments. Regulatory instruments are rules and regulations related to a specific subject to achieve a particular outcome (IPCC, 2001a). According to IPCC (2001a), four regulatory instruments are most frequently discussed in the literature: non-tradable permits, technology or performance standards, product bans, and direct governmental spending and investments. Table 2.4 describes the characteristics of these instruments.

Table 2.4: Regulatory instruments

| | CHARACTERISTICS |
|---|--|
| NON- TRADABLE PERMITS | Limit organizations' GHG emissions by setting emissions permits. These permits cannot be traded. |
| TECHNOLOGY OR PERFORMANCE STANDARDS | Regulations set GHG emissions limits for products or processes. |
| PRODUCT BAN | Prohibit the use of a specific product (for example incandescent light bulbs). |
| DIRECT GOVERNMENTAL SPENDING AND INVESTMENTS | It refers to direct government expenditure in research and development (R&D) to tackle GHG emissions or to enhance GHG sinks ¹¹ . |

Source: IPCC (2001a).

Market-based instruments directly change organizational cost and benefits with the aim of incentivising GHG emissions reductions. As an illustration, market-base instruments may require organizations to pay to pollute or be used to subsidise emission reductions. The outcomes achieved from using market-base are likely to depending on organizations' decision making processes and individual circumstances (IPCC, 2001a). IPCC (2001a; 2007b) focus on four market-base instruments that have been used to limit GHG: emission taxes, tradable permits, subsidies and financial incentives and

¹⁰ This section only mentions the GHG abatement policy instruments most frequently discussed in the literature. The IPCC (2001a; 2007b) were the principal source of this information.

¹¹ Sinks refer to any natural (e.g. Tree growth) or human activity that removes GHG, an aerosol or GHG/aerosol precursor from the atmosphere (IPCC, 2001a).

deposit /refund schemes. The table 2.5 describes the main characteristics of these instruments.

Table 2.5: Market-based instruments

| | CHARACTERISTICS |
|---|---|
| EMISSION TAXES | Charges fixed tax per unit of GHG or CO ₂ e emitted. |
| TRADABLE PERMITS | Emissions limits are set in form of permits that are distributed to entities. Entities should produce emissions at a level equal to permit allowances. The permits may or may not be traded between entities. |
| SUBSIDIES AND FINANCIAL INCENTIVES | Direct payments to entities or tax reduction are allocated by governments in order to encourage practices that reduce GHG emissions. |
| DEPOSIT REFUND | It requires a commodity which will be refunded when the entity implements a specific action to limit GHG emissions. |

Source: IPCC (2001a; 2007b).

The main objective of voluntary agreements is to avoid further regulation on GCC. There are three types of voluntary agreements (Krarup, 2001): unilateral commitments, negotiated agreements and public voluntary schemes. These types of agreements are defined on table 2.6.

Table 2.6: Voluntary agreements

| | CHARACTERISTICS |
|---------------------------------|--|
| UNILATERAL COMMITMENTS | It is a unilateral program for environmental improvement which is established by organizations and communicated to their stakeholders. Public authority is not involved. |
| NEGOTIATED AGREEMENTS | This type of agreement is settled between public authority and industry (individual entity or industrial association). Both paths know the contents of the agreements and may participate on its design. |
| PUBLIC VOLUNTARY PROGRAM | Agreements between the government and industry (individual entity or industrial association). However, this type of agreement is designed only by the public authority. |

Source: Krarup (2001).

Informational instruments are used to encourage or enquire information that should support actions to reduce GHG emissions. Informational instruments are mostly voluntary, but they can also be compulsory. An example of informational instrument is mandatory labelling programmes that have been implemented at international and national levels (IPCC, 2001a). Another example of informational instruments is voluntary disclosure and benchmarking of performance. Table 2.7 describes several of informational instruments.

Table 2.7: Informational instruments

| | CHARACTERISTICS |
|--|---|
| EDUCATIONAL PROGRAM | Educational program requiring information on GHG emissions to be published by several types of entities, individuals and media. It also includes information campaigns to tackle climate change (e.g. campaigns to promote energy efficiency programs). |
| LABELING | Labels provide information to consumers regarding to GHG emissions of the specific product. |
| MANAGEMENT PROGRAM OR SELF-REGULATION | Management programmes or self-regulation adopted by entities to achieve better levels of commitment during the process to reduce GHG emissions (e.g. GHG emissions audit). |

Source: The Partnership for Climate Actions (PCA, 2002), IPCC (2001a) and Department of Environment, Food and Rural Affairs (DEFRA, 2006a).

National policies tend to use several GHG abatement instruments to manage domestic emissions. The results achieved by the use of these instruments may differ in several aspects including: transaction costs, monitoring and enforcement, administrative costs and other socio-economic outcomes (IPCC, 2001a). Portfolios of instruments used also vary by country.

At the international level, countries can form groups to limit their GHG emissions. They could agree to implement one or mixed instruments. Table 2.8 illustrates different types of international GHG abatement policy instruments. Table 2.9 provides some examples of abatement policy instruments adopted by the ten largest economies in world.

The Kyoto Protocol is the most important agreement at an international level that seeds to address GCC. The main objective of the Kyoto Protocol is to achieve 5.2% reduction in GHG emissions during 2008 to 2012 as compared to 1990 emissions levels (Grubb *et al.*, 1999). In order to achieve this objective, the Protocol establishes emissions limits for six GHG: Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF₆) (United Nations - UN, 1998), see chapter 1 for more information on these gases. Countries are encouraged to apply abatement policies instruments to achieve country level targets that emerged from Kyoto Protocol. The next section describes the objectives of the Kyoto Protocol and how it operates. In addition, it illustrates how the Kyoto Protocol influences abatement policies in the European and the UK contexts.

Table 2.8: International GHG abatement policy instruments

| | CHARACTERISTICS |
|---|--|
| TRADABLE QUOTAS | Limit emissions levels by distributing permits among participating countries. Countries need to maintain current emissions at levels the permits they need. Trade permits is allowed and as a result any over/under GHG emissions can be equalised to permit emissions levels through buying or selling emissions. |
| JOINT IMPLEMENTATION | A country or entity that has to achieve emissions limits may implement a project to reduce GHG emissions or enhance sinks in another country to emissions reductions. Under the Kyoto Protocol, this instrument is implemented between Annex I parties (see appendix 1 and 2). |
| CLEAN DEVELOPMENT MECHANISM | A country or entity that has to achieve emissions limits implements a project to reduce GHG emissions or enhance sinks in another country with no national commitment to emissions reductions. Under the Kyoto Protocol, this instrument is implemented between Annex I and no-Annex I parties (see appendix 1 and 2). |
| HARMONIZED TAXES ON EMISSIONS, CARBON, AND/OR ENERGY | Application of common rate tax to emissions by different countries. |
| INTERNATIONAL TAX ON EMISSIONS, CARBON, AND/OR ENERGY | Application of a tax in emission sources within participating countries. This tax is imposed by international agency. |
| NON-TRADABLE QUOTAS | Establishes limits of emissions for each participating countries, which should be achieved by domestic actions. |
| INTERNATIONAL TECHNOLOGY AND PRODUCTS STANDARDS | Sets up a minimum standard required for products and/or technologies in participating countries. |
| INTERNATIONAL VOLUNTARY AGREEMENTS | Agreements established between two or more governments and one or more companies to limit GHG emissions or implement specific actions that should achieve this outcome. |
| DIRECT INTERNATIONAL TRANSFERS OF FINANCIAL RESOURCES AND TECHNOLOGY | Transfer of financial resources from one national government to another or between entities. These resources could be transferred directly or through international agency. |

Source: IPCC (2001a).

Table 2.9: Examples of abatement policy instruments on GCC adopted by 10 largest economies

| COUNTRY | EXAMPLES |
|---------------------------------|--|
| BRAZIL | <ul style="list-style-type: none"> • Educational programs (e.g. energy consumption), • Regulations and incentives to promote renewable energy, • Financial incentives to reduce transport emissions (e.g. tax reductions to promote vehicles with an engine of less 1,000 cc) |
| CHINA | <ul style="list-style-type: none"> • Regulations on energy conservation and renewable energy, • Application of energy efficiency standards and labeling, • Information about energy-saving technologies. |
| FRANCE | <ul style="list-style-type: none"> • Campaign to sensitize the public to reduce emissions, • Energy labeling, • Taxes to reduce emissions (e.g. transport and industry sectors), • Voluntary agreements to limit emissions in transport sector, • Regulations to set emissions limits (e.g. agriculture and industry sectors). |
| GERMANY | <ul style="list-style-type: none"> • Agreements to reduce emissions, • Ecological taxes (e.g. tax on energy use), • Financial assistance to promote R&D (e.g. renewable energy), • Information and educational measures (e.g. energy efficiency). |
| INDIA | <ul style="list-style-type: none"> • Promotion of renewable energy and energy efficiency (including measures such as energy audit, energy standards and labeling of equipments/appliances), • Campaigns focused at industry sectors to improve energy efficiency, • Emissions standards for motor cars and passenger vehicles. |
| ITALY | <ul style="list-style-type: none"> • Investments in renewable energy, • Promoting energy efficiency (e.g. standards applied to construction and renovating buildings), • Voluntary agreements to reduce emissions in the transport sector. |
| JAPAN | <ul style="list-style-type: none"> • Regulation on energy use and conservation. |
| RUSSIAN FEDERATION | <ul style="list-style-type: none"> • Promotion of energy savings using several measures such as regulation, taxation, economic incentives and information campaigns. |
| UNITED KINGDOM | <ul style="list-style-type: none"> • National emissions trading, voluntary agreements and energy tax, • Funding business to improve energy efficiency, • Information on energy savings. |
| UNITED STATES OF AMERICA | <ul style="list-style-type: none"> • Voluntary organization level reporting (e.g. California Climate Action Registry), • US Environment Protection Agency (EPA) climate leaders: Voluntary partnership between government and companies to adopt strategies to reduce emissions, • Financial incentives to reduce emissions in the transport sector, • Campaigns to improve energy efficiency. |

Sources: Inter-agency Commission of the Russian Federation on Climate Change (2002); World Business Council for Sustainability Development and World Resource Institute (2004); Ministério da Ciência e Tecnologia (2004); United Nations Framework Convention on Climate Change - UNFCCC (2005), Stern (2006), Ministère De L'écologie Et Du Développement Durable (2006), Government of the Federal Republic of Germany (2006); Ministero dell' Ambiente (2006); The Government of Japan (2006); DEFRA (2006b); US EPA (2006) Ministry of Environment and Forest (2007); National Development and Reform Commission People's Republic of China (2007); European Environmental Agency (2007).

2.3 The Kyoto Protocol

2.3.1 Antecedents

In the 1970s, the UN became concerned about the potential of GHG to create global warming and the associated environmental impact of this effect. In 1979 the first world climate conference was held and established the world climate research programme. In addition, during the 1980s the UN Environment Programme (UNEP) and World Meteorological Organisation (WMO) convened a series of international scientific workshops and a tentative scientific consensus on the nature of the problem emerged (Grubb *et al.*, 1999). In 1988, the IPCC was established with the purpose of providing authoritative assessments to governments about the state of knowledge concerning GCC. All countries were invited to participate in this body (Grubb *et al.*, 1999).

According to Grubb *et al.*, (1999), co-operation to limit GCC is always going to be difficult because policies affect country's economy and political interests. This happens because the most important factors affecting emissions are the use of fossil fuel and forestation practices. For most countries, these two activities dictate the type of development path that they can follow. In addition, companies who operate in the fossil fuel sector are the largest and the most powerful in the world (Kolk and Levy, 2004; Grubb, 2005). This fact places further obstacles in the way of co-ordinated international action.

In February 1991, there were some countries that wanted to take a more active approach to tackling GCC. These countries were: the OECD¹² countries, EU member states and other economies in transition (central and Eastern Europe). These countries met under UN auspices. The result of this meeting was the UN FCCC that was signed at the Rio Earth Summit in June 1992. The UN FCCC main objective is stabilize GHG in the atmosphere preventing its dangerous effects on the climate system (Grubb *et al.*, 1999). One important UN FCCC achievement in 1992 was to establish national inventories of

¹² Organization for Economic Co-operation and Development, comprising 30 full members: Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Republic of Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, Japan, Finland, Australia, New Zealand, Mexico, Czech Republic, South Korea, Hungary, Poland and Slovakia.

GHG emissions (Grubb *et al.*, 1999). There was no mandatory limits to GHG emissions when UN FCCC was signed in 1992.

The negotiations on emissions levels to be pursued started in the 1990s and took many years. It was only with Kyoto Protocol in 1997 that countries agreed to legally reduce GHG emissions, but emissions reductions levels suffered many revisions after Kyoto's meeting. Finally, in 2001 186 countries ratified and signed the Protocol setting a legal compromise to reduce emissions¹³. In 2005, the Kyoto Protocol entered into force¹⁴ (Maslin, 2004). In 2009, 184 counties and other governmental entities have signed and/or ratified (or accepted or approved or accessed)¹⁵ the Kyoto Protocol (UNFCCC, 2009). For consulting a list of these countries see appendix 1 and 2.

2.3.2 Objectives

The main objective of Kyoto Protocol is to achieve reductions in GHG emissions, setting a common commitment and establishing responsibilities for this reductions which will vary between parties of the protocol (see Article 10 of the Kyoto Protocol - UN, 1998). The Protocol assigns responsibility for emissions reductions predominantly in developed countries (see appendix 1), given that these countries have historically created past GHG emissions. In addition, given that fossil fuel and deforestation has historically driven development, it is believed that developing countries should not be penalized by the Kyoto Protocol (Panos London, 2006).

The Kyoto Protocol sets targets and monitoring rules for developed countries. Under the Kyoto Protocol, emissions limits were assigned only to Annex I parties (UN, 1998). Annex I parties can act autonomously or jointly to achieve their targets (Article 4 - UN,

¹³ At this point the USA withdrew the negotiations and still has not ratified the Kyoto Protocol.

¹⁴ In order to Kyoto Protocol became an international law it required legal consent of at least 55 parties and also, these parties had to represent at least 55% of the CO₂ emissions in 1990 (Bebbington and Larrinaga-Gonzalez, 2008). Russia and USA were the parties that represented the highest proportion of CO₂ emissions in 1990. The Kyoto Protocol only entered into force after Russia ratification, since Bush administration withdrew the Protocol in 2001 (UNFCCC, 2005).

¹⁵ The protocol signature is not bind consent, it only express the acceptance to participate during the threat process. For this reason, the Kyoto Protocol needs further legal consent, which is made by ratification, acceptance, approval or accession (UN, 1999). Ratification, acceptance, approval or accession are terms used in law to express legal consent.

1998). For example, the EU acts as a group of countries under the Kyoto Protocol. Periodically each Annex I party is required to produce reports describing the actions taken to comply with the Protocol. In addition, Annex I parties need to present an annual inventory by source of anthropogenic GHG emissions and removals (via sinks). These annual inventories are audited by experts (Articles 5, 7 and 8 - UN, 1998).

Under the Kyoto Protocol, countries are encouraged to implement domestic policies and measures in order to achieve their targets and promote sustainable development (article 2 - UN, 1998). The Protocol suggests some possible measures to reduce GHG emissions, such as: enhancing GHG sinks, promoting sustainable forms of agriculture and renewable energy (Article 2 - UN, 1998).

The Kyoto Protocol also promotes international co-operation between developing and developed countries. As an illustration, in order to help non-Annex I parties to reduce their emissions and adapt to GCC, the Kyoto Protocol requires developed countries to transfer financial resources to these countries (article 11- UN, 1998). The non-Annex I parties are mostly formed by developing countries, but it also includes other countries that are especially vulnerable with respect to GCC effects. The existence of Kyoto's mechanisms also aimed at promoting international co-operation.

2.3.3 Kyoto's mechanisms

The Kyoto Protocol promotes the implementation of mechanisms such as the Clean Development Mechanism (CDM), Joint Implementation (JI) and Emissions Trading (ET) (Sorrell and Skea, 1999; ten Brink, 2002; UNFCCC, 2006). The intention behind these mechanisms are to complement countries internal GCC policies with international instruments (ten Brink, 2002). The use of international mechanism has arisen from a desire to achieve implementation of the Protocol and it also seeks to achieve co-operation between nations (ten Brink, 2002).

The aim of CDM is to help non-Annex I parties to achieve sustainable development and Annex I parties achieve their emissions targets. This mechanism allows Annex I parties to implement projects that reduce GHG emissions in non-Annex I parties. The results

achieved by these projects generates Certified Emissions Reductions (CER), which can be used by Annex I party to achieve their targets (Article 12 - UN, 1998).

JI refers to the implementation of a project by Annex I party in other Annex I party. Only Annex I parties with emissions limits may participate in JI mechanisms (Annex B - UN, 1998). These projects need to promote GHG emissions reductions or enhance GHG removals via sinks. In return, the party that has implemented the project can count the result of emissions reductions to achieve its own target (Article 6 - UN, 1998).

Finally, ET allows parties to achieve their targets by purchasing emissions units from other parties (Article 17 - UN, 1998). Only parties with emissions limits may participate on this trading process (Annex B - UN, 1998). Emissions units were distributed over the period of commitment 2008-2012. All countries that have spare emissions can sell it in the carbon market. Emissions units originated from reforestation activities, JI and CDM can also be traded at carbon market. The initiation process to carbon trading started in June 2008. This process requires that parties should register emissions at 'International Transaction Log' and verifiers should confirm their national registry according to Kyoto Protocol rules. In July 2008, 37 parties have completed the initialization process (UNFCCC, 2008).

2.3.4 Post Kyoto

Currently, there is an active and fast moving debate on post Kyoto Protocol international measures on GCC. The 2007 UN conference on GCC was held in Bali, involving representatives of 180 countries and other intergovernmental and non-governmental organizations. Negotiations on post Kyoto dominated the agenda at this conference and a deadline for completing post Kyoto negotiations was set to end 2009. The 2008 UN conference on climate change was held in Poland (UNFCCC, 2008). This conference pushed countries for international action on GCC and achieved progress on the negotiations started in Bali in 2007 (UNFCCC, 2008).

In the 2009 UN conference on GCC, which will be held in Copenhagen, is expected that post Kyoto negotiations will be concluded (UNFCCC, 2008). The outcomes from post

Kyoto negotiation are unclear at the moment. The USA new positioning on GCC will certainly contribute on these negotiations. The new president-elect Barack Obama referred to GCC in several speeches stressing that USA policy on GCC will change (UNEP, 2008). His administration wants to implement a federal cap and trade emissions and annual targets for 2020 considering 1990 baseline (UNEP, 2008). The USA President Obama also committed to invest annually US\$15 million to support initiatives on clean energy (UNEP, 2008). Obama's administration expects to reduce emissions by 80% by 2050 (UNEP, 2008).

Apart from the UN context, there are other international initiatives on GCC. As an illustration, in February 2007 the G8+5¹⁶ countries declared publicly that they believed the existence of anthropogenic global warming (Washington Declaration). These countries proposed as a post Kyoto alternative measures, emissions limits and trading that include developed and developing countries.

Another example is 33rd G8 summit in 2007, in which a proposal to reduce CO₂ from G8 countries by at least half by 2050 emerged (Globe International, 2007). In 2008, the G8+5 countries proposed to reduce aggregate emissions between 25% and 40% below 1990 levels by 2020 and at least 60-80% below 1990 levels by 2050 (Globe International, 2008).

The Gleneagles Dialogue can also be highlighted as an important movement on GCC. The Gleneagles Dialogue was an informal ministerial meeting that brought together 20 countries to discuss GCC, 'clean' energy and sustainable development (Gleneagles Dialogue, 2008). This Dialogue was launched in 2005 at G8 conference in Gleneagles with the last ministerial meeting being held in Japan. Ministers and senior officials attending this meeting represented the G8, Australia, Brazil, China, India, Indonesia, Korea, Mexico, Nigeria, Poland, South Africa, Spain and Slovenia (Gleneagles Dialogue, 2008). At Gleneagles dialogue 2008, countries agreed on the importance of Post Kyoto (Gleneagles Dialogue, 2008).

¹⁶ G8+5 is a group formed by the eight largest economies (Canada, France, Germany, Italy, Japan, Russia, UK and US) plus five emerging economies (Brazil, China, India, Mexico and South Africa).

In European context, the EU set a communication in 2005 outlining the key elements for post Kyoto, which was called "Winning the Battle Against Global Climate Change". The communication included implementation of low carbon technologies, market-based instruments and other mechanisms. In 2008, EU committed to emissions reductions of at least 20% below 1990 by 2020 and generate 20% of its energy from renewable energy to by 2020 (Commission of the European Communities, 2008).

As illustrated previously, the vast majority of countries around the world recognize the existence of anthropogenic GCC and consider it as the most relevant environmental threat of our generation. Countries started to take initiatives outside the UN context trying to achieve other post Kyoto alternatives. However, Obama's election changed the expectations on post Kyoto negotiation in the UN context. There is finally a hope on future world-wide agreement and negotiation success will certainly depend on the USA proposition on the 2009 UN conference on GCC.

2.4 European Climate Change Programme

European Union (EU) is formed by 25 member states (EU-25), which are responsible for 14% of global GHG emissions. The EU commitment under Kyoto Protocol is to reduce emissions by 8% by 2008-2012 on a 1990 baseline (Commission of the European Communities, 2006). However, only 15 members (EU-15)¹⁷ had individual targets under Kyoto Protocol (Klaassen *et al.*, 2005). The expectation is that EU could achieve its Kyoto's targets by implementing European level regulation and domestic policies developed by each member states (Commission of the European Communities, 2006).

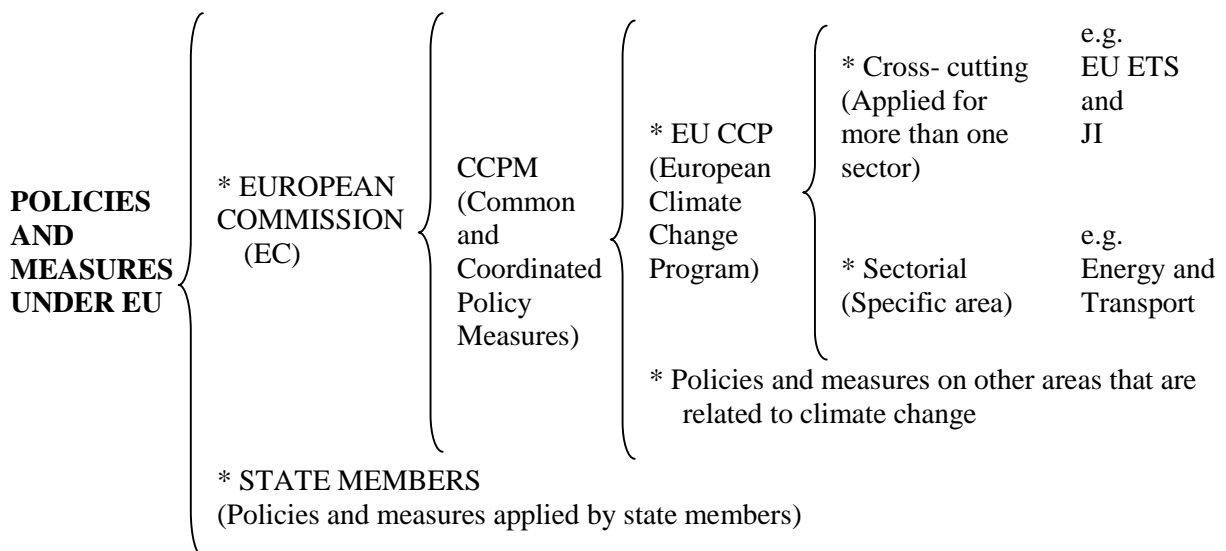
European policy on climate change is established on two levels (figure 2.2). The first level is called Common and Coordinated Policy Measures (CCPMs) which is applied to all state members. The second level refers to policies developed and applied by each state members (Commission of the European Communities, 2006).

¹⁷ EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

The European Climate Change Program (EU CCP) is a CCPM which was designed to help member states to achieve Kyoto's targets (Commission of the European Communities, 2006) and to identify cost-effective policies and measures to cut GHG (European Commission - EC, 2006). However, there are several CCPM under different areas that are also related with GCC. Examples of these measures are: EU's sixth environmental action program and EU's sustainable development strategy (EC, 2006).

The first EU CCP was implemented from the year 2000 until 2004. The second EU CCP was launched in 2005 (Commission of the European Communities, 2006). The EU CCP involves implementation of several policies and measures which are classified in two groups: cross-cutting measures and sectoral measures (EC, 2006). Cross-cutting measures involve more than one sector. Three types of these measures were implemented at European level: European Emissions Trading (EU ETS), JI and CDM and Mechanisms for monitoring (EC, 2006). Sectoral measures are related to a specific area, for example: energy supply, energy demand, transport, industry, waste, agriculture and forestry, see table 2.10 (EC, 2006) .

Figure 2.2: Policies and measures under EU



Source: EC (2006) and Commission of the European Communities (2006).

Cross-cutting measures are related to the implementation of Kyoto's mechanisms in the EU. The EU developed the EU ETS, which can be defined as the largest international cap¹⁸ and trade system for CO₂ in the world. It covers half of EU emissions and it involves approximately 12,000 installations (Commission of the European Communities, 2006). Participants on this scheme are the larger emitters from power and heat, generation industry and selected energy intensive industrial sectors (combustion plants, oil refineries, coke ovens, iron and steel plants and factories making cement, glass, lime, bricks, ceramic, pulp and paper) (EC, 2005).

The first period of EU ETS was from 2005 until 2007. The second period will be until 2012 (EC, 2005), but the scheme seems to continue afterwards (ENVIROS, 2006). Each member state must develop a National Allocation Plan to allocate emissions permits to the EU ETS participants (EC, 2005). Every year, emissions from installations must be audited by external verifiers. Installations achieve their targets if permits are equal to verified emissions. In case that the permits exceed the verified emissions, the difference is transformed in allowances. These allowances can be used, in the next period, by the installation itself or it can be traded on the market. Non-compliance with targets results in penalties, which is a fine for each excess of tonne emitted in the commitment period (EC, 2005; Commission of the European Communities, 2006). Credits obtained by JI and CDM mechanisms can also be used to help targets achievement.

The monitoring mechanism also helps countries to achieve their Kyoto's targets. The monitoring mechanism requires EU members to report progress towards the commitment made under UN FCCC. Every year EU members should report to the EU commission their GHG emissions by source (year X) and removal via sinks for the year before last (year X-2). Every two years EU member should report on their projected progress towards Kyoto's targets (Commission of the European Communities, 2006).

¹⁸ Emissions limit.

Table 2.10: Examples of sectorial policies and measures on GCC under EU

| EXAMPLES OF POLICIES AND MEASURES (I) | |
|--|---|
| ENERGY SUPPLY | <ul style="list-style-type: none"> • Promotion of renewable energy (e.g. regulation setting target of 21% in share of gross EU energy consumption by 2010). • Promotion of biofuels in transport (e.g. regulation setting target of 5.75% in the share of fuels sold by 2010). • Promotion of cogeneration of heat and electricity. • Biomass action plan (several measures). • Fund to promote intelligent energy use and more renewable energy. |
| ENERGY DEMAND | <ul style="list-style-type: none"> • Energy performance standards on buildings. • Energy labeling on domestic household appliances. • Eco-designing for energy-using products. • Regulation to set targets on energy consumption. • Action plan on energy efficiency. • Permit systems on energy efficiency to agricultural and industrial sector. • Voluntary program to improve energy efficiency in motor drive systems. • Funding program to support energy efficiency in industries and buildings. • Handbook to explain to public authorities regard energy efficiency. • Public campaign to aware about climate change. |
| TRANSPORT | <ul style="list-style-type: none"> • EU strategy to reduce CO₂ from passenger cars. • Shifting the balance between transport modes from road to rail & water (e.g. financial incentives). • Charging of heavy-duty vehicles for the use of road infrastructure (e.g. taxes). • Minimum taxation of mineral oils, coal, natural gas and electricity. • Proposal to phase out HFC-134a in car air conditioning systems. • Funding to promote fuel diversification, biofuels and energy efficiency in transport systems. • ‘Thematic’ strategy on the urban environment. It offers a guidance to reduce air pollution, GHG emissions and congestion caused by traffic. |
| INDUSTRY AND WASTE MANAGEMENT | <ul style="list-style-type: none"> • Proposal to regulate fluorinated greenhouse gases. • Prevention of emissions of GHG from industrial and agricultural installations (e.g. emissions permits). • Regulation to reduce methane emissions from landfills. • ‘Thematic’ strategy on waste prevention and recycling. It will revise EU waste legislation. |
| RESEARCH AND DEVELOPMENT | <ul style="list-style-type: none"> • Financial funds to promote research that directly or indirectly deals with climate change and nuclear research. • Financial funds to projects that directly or indirectly deal with climate change. Beneficiaries include enterprises, national and local authorities, Non-governmental organizations (NGOs), research institutions and inter-governmental bodies. |

Source: EC (2006).

(I) These measures, policies and instruments were implemented or are planned to be implemented.

2.5 The UK policies and measures to tackle climate change

The UK target under Kyoto Protocol is to reduce GHG emissions by 12.5 % below 1990 levels by 2008-2012. In 2007, the UK CO₂ was approximately 13% below 1990 levels (Department for Environment, Food and Rural Affairs - DEFRA, 2008). The actual UK internal goal is to reduce CO₂ emissions by 20% by 2010 (DEFRA, 2008).

In order to tackle GHG emissions the UK has set the UK Climate Change Programme (UK CCP). In 2006, new UK CCP was published setting measures and policies in order to deliver Kyoto's targets and other domestic commitments (Her Majesty's Government -HMG, 2006). In addition to UK CCP, the UK has successfully implemented the EU ETS and a national registry for holding, transferring and acquiring EU allowances and Kyoto's units (DEFRA, 2006b). Additional examples of national and international actions taking by the UK to reduce GHG emissions are (DEFRA, 2006b, 2008):

- Legal powers for national inventory;
- Meteorological and atmospheric observations contributing on Global Climate Observing Systems and International Steering Committee;
- Climate change communication initiatives to inform public about climate change;
- Financial contributions to bilateral development projects;
- Promotion of technological development in developing countries;
- Funding to support research on adaptation;
- Consultation on Climate Change Bill.

In the UK, the major responsible for implement measures and policy on climate change is the DEFRA. However, many policies on climate change are other government department responsibility, such as Department for Trade and Industry, Department for Transport, Department of Communities and Local Government and Department for International Development. In addition, Her Majesty's Treasury is responsible for fiscal issues involving the application of such policies and measures. At local level, policies and measures on climate change are implemented by the local Government (e.g. Scotland's Climate Change Programme).

The UK emissions reductions are monitored at national and international levels (HMG, 2006). At international level, the UK should present reports required, for instance, by the UN FCCC and EU. At national level, Sustainable Energy Policy Network (SEPN) monitors the progress of emissions reductions. The SEPN operates through a Ministerial Committee, an Advisory Board, Strategy Group, working-level group and Interdepartmental Analysts' Group. Additionally, the Government introduced a annual report to Parliament, informing the progress on emissions reductions e.g. DEFRA (2008).

The following sections will explain the UK CCP in more detail and will illustrate the UK Climate Change Act.

2.5.1 The UK Climate Change Programme 2000

The UK CCP was implemented as an approach to tackle GHG emissions in order to achieve the target committed under the Kyoto Protocol (Muizon and Glachant, 2003). The UK Climate Change Programme 2000 had two main objectives (Wordsworth and Grubb, 2003): increase the investment in low carbon techniques and increase Government's expenditure to promote innovation in low energy techniques. The UK CCP 2000 established some instruments in order to increase the investment in low carbon techniques. These instruments were classified by Wordsworth and Grubb (2003) in four types: direct Government expenditure, legislated requirements upon energy supply companies, taxes allowances and measures associated with the UK Climate Change Levy.

According to Wordsworth and Grubb (2003), R&D grants and low interest loans are examples of direct government expenditure. There are two instruments, classified as legislated requirements upon energy supply companies: Energy Efficiency Commitments (EECs) and the Renewable Obligation (ROCs). The main objective of EECs is to make energy and gas supplies companies to stimulate savings in their customer base. The ROCs requires electricity supply companies to generate or buy a certain percentage of renewable energy.

Taxes Allowances implements 'tax breaks' for environmental reasons and general incentives towards R&D. There are three types of 'tax break': Enhanced Capital Allowances (ECA), Road Tax Differentials (RTD) and Reduced Value Add Tax (VAT) on domestic energy saving materials. The ECA is an incentive that could raise 100% reduction of corporation Tax¹⁹. The main objective is to motivate companies to make investments in technologies that are classified as leading-edge energy efficiency equipment. The RTD is a reduction on the rate of Vehicle Excise Duty²⁰ for vehicles below a certain engine capacity. Finally, the Reduced VAT on domestic energy saving materials is a reduction of VAT²¹ to all insulation and heating controls.

The UK Emissions Trading Scheme (UK ETS) is an example of measures associated with the UK Climate Change Levy²² (CCL). This is a voluntary approach in which the main objective is to cut emissions of GHG. There is also an agreement called Climate Change Agreements (CCA) that promotes 80% derogation of this levy in change to companies achieving established emission level.

2.5.2 The UK Climate Change Programme 2006

The UK CCP 2006 major objective was to achieve Kyoto's targets. However, it is expected that this new programme may also contribute to the achievement of others UK domestic target such as: reduce 20% of CO₂ below 1990 level by 2010 (DEFRA, 2006b; HMG, 2006) and reduce 60% of CO₂ emissions below 1990 levels by 2050²³ (DEFRA, 2006b; HMG, 2006). Several policies and measures set by UK CCP 2000 continue in practice at the UK CCP 2006, such as EEC, ROC, ECA, RTD, VAT reductions, CCL and CCA (detailed definition of these measures are on section 2.5.1 previously). Some of these policies and measures have been reviewed, such as CCA targets and RTD.

¹⁹ Companies that are resident in the UK are subject to Corporation Tax on their profits (income plus gains) arising in an accounting period (<http://www.netaccountants.com/corptax.html>).

²⁰ It is the tax that is paid to obtain the vehicle licence in the UK (<http://www.dvla.gov.uk/vehicles/taxation.htm>).

²¹ VAT is a tax of sales on goods and services (<http://www.businesslink.gov.uk>).

²² It is a tax on the use of energy in industry, commerce and the public sector (<http://www.defra.gov.uk/environment/ccl/intro.htm>).

²³ The Climate Change Act 2008 amends this target to at least 80% lower CO₂ emissions by 2050, considering 1990 levels as baseline (UK Parliament, 2008).

Examples of new measures are: European directive and regulation on f-gases²⁴, Renewable Transport Fuels Obligations²⁵ (RTFO), voluntary agreements on new car fuel efficiency²⁶, code for sustainable homes²⁷, eco-design of Energy Using Products (EUP)²⁸, statutory labels²⁹ and billing and metering³⁰. Table 2.11 provides examples of sectoral policies and measures adopted under the UK CCP 2006.

2.5.2 The Climate Change Act 2008

The Climate Change Act 2008 is a legal long-term framework on initiatives to tackle GCC. This act establishes initiatives on mitigation and adaptation. It also requires regular accountability to the Parliament on the GCC actions adopted by the UK Government. Among other initiatives, the Climate Change Act 2008 amends the UK target to reduce CO₂ emissions by at least 80% by 2050, considering 1990 levels as baseline (UK Parliament, 2008). It also creates a Committee on Climate Change that is an independent body to advice the UK Government on carbon budgets and annual accountability to the UK Parliament regarding targets' progress. In order to achieve the 2050 target, Climate Change Act 2008 provides legal constraint to introduce several mechanisms such as, domestic emissions trading, community energy savings program, financial incentives to reduce household waste, guidelines for voluntary reporting on GHG and compulsory corporate reporting.

The framework established in the Climate Change Act 2008 will be implemented by a specific timeline. As an illustration, regulation on corporate disclosure will only be implemented after the Secretary of State reviews the contributions that it could make to achieve the UK objectives on GCC. This report should be finished by 01 December 2010 (UK Parliament, 2008). If this report recommends regulation, Companies Act 2006 should include the mandate report by 6 April 2012 (UK Parliament, 2008).

²⁴ This regulation aims to prevent and contain the f-gases emissions on the Kyoto Protocol (HMG, 2006).

²⁵ Obligations for fuel suppliers to provide part of sales from renewable sources (HMG, 2006).

²⁶ Agreement to improve fuel efficiency of new cars sold. These agreement are set between European Commission and the automotive industry (HMG, 2006).

²⁷ It will set voluntary standards that goes beyond the current building regulations (HMG, 2006).

²⁸ Standards for energy-using products (HMG, 2006).

²⁹ Performance information on energy-using products (HMG, 2006).

³⁰ Better information on bills providing a consumption feedback (HMG, 2006).

On the contrary, there is a requirement to report to the Parliament the reasons why such measures have not been implemented (UK Parliament, 2008). There is a similar timeline to amend the 2050 target and also, for implementing others requirements and mechanism that are introduced through this act.

Table 2.11: Examples of sectorial policies and measures on the UK CCP 2006

| | EXAMPLES OF POLICIES AND MEASURES |
|----------------------|---|
| ENERGY SUPPLY | <ul style="list-style-type: none"> • Renewable energy: ROC on licensed suppliers and financial funds to R&D. • Wave and tidal stream: Financial funds to R&D. • Network infrastructure for renewable: investments in energy transmission. • Biomass heat: Financial support to develop infrastructure. • Combined Heat and Power: Measures includes ECA, CCL and VAT reductions. • Microgeneration: Several measures were proposed, including government grants. • Carbon abatement technologies: Government grants. • Coal mine methane: Grant scheme to support projects in this area. • Hydrogen: Funds for programs on hydrogen and fuel cell technologies. |
| BUSSINESS | <ul style="list-style-type: none"> • CCL,CCA, UK ETS and EU ETS. • Carbon trust: Independent organization created by government to advice business and public sector. It also promotes ECA in return to investments in technologies. • Small and medium businesses: Interest free loans in energy efficiency projects. • Building regulations to deliver carbon saving and Regulation on F-gases (EU). • Reporting guidelines and Waste management (e.g. increase landfill taxes). |
| TRANSPORT | <ul style="list-style-type: none"> • Reducing the fossil carbon content: Incentives for alternative fuels, RTFO, ECA and grants for alternative refueling infrastructure. • Improving vehicles fuel efficiency: Voluntary agreements on new cars. • Encouraging a move towards environmentally means of transport (e.g. funds). • Aviation: Motivate carbon offset, R&D by aerospace manufactures and impacts reductions in airports activities, airlines and air traffic controllers. |
| DOMESTIC | <ul style="list-style-type: none"> • EEC was required for energy and gas suppliers. • Building regulations: Energy standards on new and refurbished buildings. • Code for sustainable homes: It will set out voluntary standards. • Energy performance of buildings directive: It will set standards on new buildings and larger buildings in renovation. It also requires energy performance certificates when buildings are constructed, rented or sold. • Encouraging consumer choice and raising standards: Informative campaigns on energy efficiency, EUP and statutory labels. • Consumer engagement: Grant-funded actions to promote energy efficiency. • Billing and metering: Funds to pilot project in partnership with suppliers. • Economic instruments: VAT reductions in return to energy savings achievements. • Tackling fuel poverty: Funds to reduce poor insulation and energy inefficiency. |
| PUBLIC SECTOR | <ul style="list-style-type: none"> • Financial funds to promote energy efficiency. • Central government: Reviewing targets, annual reporting procedures, encouragement to adopt carbon management program and energy audit. • Schools: Benchmarking on energy use/efficiency and funds to renewable energy. • National Health Service: Funds to promote energy efficiency and reduce energy consumption. |

Source: DEFRA (2006b) and HMG (2006).

2.6 Emissions trading proposed by the UK Government

2.6.1 The UK Emissions Trading Scheme

In 1998, a report published by Lord Marshall (Marshall, 1998) suggests that the use of economic instruments was necessary to control GCC. The report proposes a tax on energy and a trading scheme to address GHG emissions. In 1999, the UK Government started to put into operation these suggestions and implemented a tax in 2001 in the form of the CCL based on energy use (National Audit Office - NAO, 2004).

The application of CCL was very important for emissions control. However, the government felt the necessity to complement this policy by providing incentives to maintain their organizations' competitiveness (HMG, 2006). Consequently, in 2001, the CCA were also implemented. These agreements were established between the state and industry sectors. It provided 80% reduction of the CCL in return for emission reductions during 2002 to 2010. Approximately 10,000 facilities in 42 sectors (see appendix 3) participated in this agreements (HMG, 2006). In this scheme, organizations were called agreement participants (AP). The CCA had both, sector targets and targets for individual target units. The targets were fixed for the years 2002, 2004, 2006, 2008 and 2010. In those years the performance must be audited³¹. Operators and sectors had the option of emissions trading, that is, companies can buy allowance to meet their targets or sell any over-achievement (AEA Technology, 2004)

At the same time, however, DEFRA wanted to incentivize even better levels of emission reduction. Thus, 32 companies and other organizations (called direct participants - DP) bid voluntarily to reduce their emissions (see appendix 4). In return, £215 million was given as incentive over 5 years (2002 to 2006). Each DP received monetary incentive if it meet its annual targets. Annually, the reductions were converted into allowances. The DP could trade their allowances (emissions reductions) or save them for the future years. In addition, DP could choose to reduce the emissions or buy allowances to cover the exceeded emission (NAO, 2004).

³¹ An accredited verifier must verify all over-achievement that is converted to allowances. In order to know the accredited verify consult the web page: www.ukas.com.

There were also other two types of participants allowed in the trading schemes: project participants (PP) and other participants (DEFRA, 2001c). The PP were companies that did emission reduction projects and wanted to sell the reduction to the scheme. These organizations had to have their project approved by the Government and they received allowances after the emission reductions had been verified. Any other participant that didn't want to comply with emission target could sell or buy allowances in the trading scheme. Those kinds of organizations had to have an open account in the scheme registry.

In April 2002, the trading scheme began. The UK ETS was implemented to achieve three main objectives: secure cost-effective emissions reductions, provide UK companies early experience on emissions trading and encourage a established of an emissions trading in London (ENVIROS, 2006). The UK ETS ended in 2006 to DP.

A majority of organizations claimed that they learned from the UK ETS. Outcomes from DP highlighted learning benefits from this process, setting targets, trade operations, monitoring, reporting and emissions audit (ENVIROS, 2006). The scheme also allowed the UK government to develop a trade infrastructure. This generated several benefits such as: better understanding on how to treat allowances (in legal and financial terms), development of software to operate trade and elaboration of standards contracts that helps to reduce transaction costs (ENVIROS, 2006).

2.6.2 The Carbon Reduction Commitment

The UK government is working to implement an emissions trading to non-intensive energy commercial and public sector organizations (Benn, 2008). This initiative will include business that was not considered at the EU ETS such as supermarkets, hotels, banks and public organizations (Benn, 2008). The carbon reduction commitment will evolve approximately 5,000 organizations (Benn, 2008). The UK Government expects to initiate this emissions trading scheme in 2010.

2.6.3 Personal Carbon Trading

The UK Government is currently exploring the possibility to implement Personal Carbon Trading. This initiative requires personal emissions management. The UK Government will set cap and allocate emissions rights to the UK population. Emissions rights can be negotiated in the market. In 2008, the UK Government carried out an audit report on future implementation of this measure and submitted it to the UK Parliament, which welcomed this initiative (House of Commons Environmental Audit Committee, 2008). The Parliament support to the personal carbon trading was mainly due to the fact that the UK will probably not achieve its targets for 2050 without considering domestic and personal sectors (House of Commons, 2008).

2.7 Concluding comments

GHG abatement policy instruments have been used by countries to reduce its emissions levels. These instruments includes, for example (IPCC, 2001a): regulatory instruments, market-base instruments, voluntary agreements and informational instruments. The Kyoto Protocol is an international action in which countries had agreed to reduce GHG emissions. This Protocol tends to implement a co-operative behaviour between developed and developing countries. In order to achieve its objective, this Protocol set especial measures to developed countries, which includes emissions limits and rigorous monitoring of their action on GCC. The co-operation between developed and developing countries is also promoted by financial aids from developed countries and Kyoto's mechanisms. Developing countries are also motivated to take actions and achieve sustainable development.

The Kyoto Protocol is taken very seriously in the EU and the UK levels. GCC policies have been set in the EU and the UK in order to find better cost-effective measures to achieve Kyoto's targets. The UK ETS is an example of these measures. The UK ETS promoted organizational learning benefits, especially in regard to setting targets, trade operations, monitoring, reporting and emissions audit. The scheme also allowed the UK Government to develop a trade infrastructure.

Chapter 3:

RESEARCH METHODS

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List of abbreviations

| | |
|-----------------------|---|
| AR | Annual Report |
| CCL | Climate Change Levy |
| CDM | Clean Development Mechanisms |
| CH₄ | Methane |
| CO | Carbon Monoxide |
| CO₂ | Carbon Dioxide |
| CDP | Carbon Disclosure Project |
| CSD | Corporate Social Disclosure |
| CSEAR | Centre for Social and Environmental Accounting Research |
| CSR | Corporate Social Reporting |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DP | Direct Participants |
| DS | Data Set |
| EBIT | Earnings Before Interest and Taxation |
| EBITDA | Earnings Before Interests, Taxes, Depreciation and Amortization |
| EU CCP | European Climate Change Programme |
| EEA | European Environmental Agency |
| EU | European Union |
| EU ETS | EU Emissions Trading Scheme |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas/Gases |
| GRI | Global Reporting Initiative |
| GW | Global Warming |
| H₂ | Hydrogen |
| H₂O | Water Vapour |
| HESA | Higher Education Statistic Agency |
| HFCs | Hydrofluorocarbons |
| JI | Joint Implementation |
| MP | Match Pair |

List of abbreviations continues...

List of abbreviations continuation

| | |
|-----------------------|---|
| MRV | Measurement, Reporting and Verification |
| N₂O | Nitrous Oxide |
| NAEI | National Atmospheric Emissions Inventory |
| NAO | National Audit Office |
| NO_x | Nitrogen Oxide |
| O₃ | Ozone |
| PCA | Partnership for climate actions |
| PFCs | Perfluorocarbons |
| ROA | Returns on Assets |
| ROE | Return on Equity |
| RQ | Research Question |
| SA | Stand Alone Report |
| SF₆ | Sulphur Hexafluoride |
| SO₂ | Sulphur Dioxide |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK ETS | UK Emissions Trading Scheme |
| UN | United Nations |
| UNFCCC | UN Framework Convention on Climate Change |
| USA | United States of America |
| VOC | Volatile Organic Compounds |
| WBCSD | World Business Council for Sustainability Development |
| WRI | World Resource Institute |

Content

Objective

The purpose of this thesis is to study, for a sample of UK organizations, what they are disclosing with regard to global climate change (GCC) in their annual (AR) and stand alone (SA) reports. In order to achieve this aim, the two data sets are analysed. The first data set are SA and AR produced by direct participants (DP) in the UK Emissions Trading Scheme (UK ETS). The second data set are SA and AR produced by a sample of similar organizations to each DP in the UK ETS.

The objective of this chapter is to describe the method adopted in the research. The first section of this chapter describes content analysis as a method selected to collect and analyse the data. This section starts with a literature review on content analysis, which includes its definition and its use in corporate social disclosure (CSD) studies. The second section describes each of the two samples, clarifying the motivation in analyse them and connecting to an appropriate research question. The second section describes the matching pair procedure and describes the sources used to find the organizations'

reports. The third section describes how the data was collected. The data captured by the research instrument includes information about organizations' background, emissions and volume of disclosure by theme and inferred rationale behind the disclosures. The research instrument ends with a series of yes/no questions aimed at capturing GCC issues. Finally, the fourth section of this chapter describes the process used to verify the reliability of the data collected.

3.1 Content analysis

Content analysis is a method used to codify qualitative information in the form of categories. Capturing qualitative data categories allows quantitative inferences to be made by a text. The central idea in content analysis “*is that the many words of the text are classified in to much fewer content categories. Each category may consist of one, several, or many words. Words, phrases, or other units of text classified in the same category are presumed to have similar meaning.*” (Weber, 1990:12)

Content analysis has been used in several studies related to corporate social reporting (CSR). According to Gray *et al.*, (1995b), the prerequisites for proceeding with content analysis includes a definition of what will be analysed, the location of social disclosure (source of information) and specification of how to capture the data (measurement of the number of disclosures or the amount of disclosures). All those three requirements will be examined in this chapter.

Several aspects of CSR have been studied using content analysis. Examples of topics investigated using this method include discrimination and equal opportunities (Adams *et al.*, 1995), voluntary and mandatory CSD (Gray *et al.*, 1995a), woman's employment (Adams and Harte, 1998), organizational responses to regulatory changes (Buhr, 1998), disclosure subsequent to prosecution (Deegan and Rankin, 1996), influence of external pressures on CSD (Neu *et al.*, 1998) and disclosure about the community in which organizations exist (Campbell *et al.*, 2006). Despite the variety of matters explored by previous studies, the majority of CSD research explores different types/categories of environmental and social information disclosed by organizations. These categories have been found to differ according to organizations' size (Cowen *et al.*, 1987; Gray *et al.*,

1995a), profitability (Cowen *et al.*, 1987; Hackston and Milne, 1996; Neu *et al.*, 1998), industry sector (Cowen *et al.*, 1987; Neu *et al.*, 1998; Tsang, 1998; Campbell *et al.*, 2006) and countries of origin (Roberts, 1991; Hackston and Milne, 1996; Adams *et al.*, 1998; Campbell *et al.*, 2005).

With regard to the media in which CSD has been measured, the annual report has historically been used as a principal focus of disclosure, because it is a statutory document and produced regularly (Gray *et al.*, 1995a). However, some authors note that an analysis of CSD that concentrates exclusively on annual reports may not offer a complete idea of companies disclosure (Zéghal and Ahmed, 1990; Unerman, 2000). Additionally, the annual report is likely to include only a small proportion of companies' CSD. Thus, a more complete source of CSD could be found in annual and environmental/sustainable development/CSR reports (Unerman, 2000).

Articles about CSD have adopted different measuring methods. According to Unerman (2000), measure units could consist of: number of pages, number of documents, number of words, number of sentences, percentage of pages and percentage of total disclosure. Gray *et al.*, (1995a) have adopted number of pages as data measurement unit for two reasons. Firstly, pages express the total of space given to a topic, reflecting its relative importance. Secondly, the authors stressed that pages are the easiest measure to be done by hand. Unerman (2000) has also defended the use of pages. His argument against any measure based on number of characters (words or sentences) is that this approach misses non-narrative disclosure (e.g. graphics). On the other hand, the use of words provides the advantages of a restricted analysis and easier classification (Gray *et al.*, 1995a). However, using words as the measurement unit has been criticised, for example by Hackston and Milne (1996). Those authors stressed that the use of words in isolation is problematic. They had defended the use of sentences, based on the argument that sentences can be counted with more accuracy. Despite all this debate, Hackston and Milne (1996) also reported that quantifying disclosures in terms of sentences gives similar results to quantification in terms of proportions of a page.

Gray *et al.*, (1995b) addressed a methodological guidance to produce a research instrument applied in studies about CSR and content analysis. Milne and Adler (1999) could be considered an extension to this guidance. Those authors treat the procedures

applied to verify the reliability on the data collection. The research instrument and reliability matter applied to this research are discussed in the last two section of this chapter.

3.2 Sample selection

This research explores the disclosures on GCC in the two following data sets (DS).

(DS1) DP in UK ETS: It examines large data set for small sample (disclosures on SA and AR) over a larger period of time (from 2000 until 2004)³². The objective in analysing this data set is to examine the disclosure on GCC produced by organizations that joined the UK ETS. This time period includes the year that the UKETS started (2002), 2 years before and 2 years after that.

(DS2) MP sample: This sample includes a similar organization to each DP and analyses MP's disclosure on SA and AR from 2000 until 2004.

Table 3.1 describes how the two data sets will address the research questions that form the focus of this dissertation. This section continues with a description of what type of organizations constitutes the group of DP in the UK ETS. Additionally, this section presents a detailed explanation on the procedure that was undertaken to select similar organization for DP.

The DP are the 32 organizations that participated on the UK ETS. The majority of DP are companies (29) with other three organizations being the Kirklees Council, the National History Museum and the Battle McCarthy (a carbon club representing 7 universities). Table 3.2 shows the 29 companies that participated in the UK ETS and their characteristics in terms of legal constitution form, countries of origin and industry sector.

³² The reports for the year 2000 were those that presented end of the year a date between July/2000 until December/2000. All reports presenting end of the year before this interval were considered as 1999 year calendar.

Table 3.1: Research questions & data set

| RESEARCH QUESTIONS (RQ) | | DATA SET (DS) | |
|--------------------------------|--|----------------------|--|
| RQ1 | What disclosures do DP make in AR and SA on GCC and how have these disclosure changed over the time? | DS1 | <ul style="list-style-type: none"> • Provide a glimpse of what DP in the UK ETS disclosed about GCC during five years period, including the year that the UK ETS started (2002), two years before and two years after • Analyse the disclosure on GCC from two types of media AR and SA. |
| RQ2 | What do DP and MP disclose on GCC compared to each other? | DS1 DS2 | <ul style="list-style-type: none"> • Analyse the disclosure from two large groups of organization using two types of medias AR and SA. |
| RQ3 | To what extent could DP disclosure practices on GCC be explained using institutional theory? | DS1 DS2 | <ul style="list-style-type: none"> • Patterns of disclosure in the various samples will be used to address this RQ. |
| RQ4 | For a sample of DP and MP organizations, how does their disclosure on GCC in AR and SA compare to the disclosures that these organizations produced for the Carbon Disclosure Project (CDP)? | DS1 DS2 | <ul style="list-style-type: none"> • Suggest a method to compare the GCC initiatives taken by a sample of DP and MP. This comparison, not only contrasts MP and DP disclosure but also addresses the differences on GCC disclosure in three types of medias AR, SA and CDP. |

Table 3.2: DP's Characteristics

| | UK ETS DIRECT PARTICIPANTS (I) | LEGAL FORM | ORIGIN COUNTRY | INDUSTRY SECTOR (II) |
|----|--|-----------------------|---------------------------|--|
| 1 | Asda Stores Ltd | Private | USA | General retailers |
| 2 | Barclays Bank plc | Public | UK | Bank |
| 3 | BP plc | Public | UK | Oil & gas producers |
| 4 | British Airways plc | Public | UK | Travel & leisure |
| 5 | British Sugar plc | Public | UK | Food producers |
| 6 | Budweiser Stag Brewing Co. Ltd | Private | USA | Beverage |
| 7 | Dalkia Energy plc | Public | France | Gas, water & multiutilities |
| 8 | Dalkia Utilities Services plc | Public | France | Gas, water & multiutilities |
| 9 | Dana UK Holdings Ltd | Private | UK | Man. of parts and accessories for motor vehicles and their engines |
| 10 | Invista UK Ltd | Private | USA | Chemical |
| 11 | First Hydro Company | Private-Unlimited | UK | Electricity |
| 12 | Ford Motor Company Ltd | Private | USA | Automobiles & parts |
| 13 | General Domestic Appliances Ltd | Private | Italy | Manufacturing of electric domestic appliances |
| 14 | GKN (UK) plc | Private | UK | Automobiles & parts |
| 15 | Imerys Minerals Ltd | Private | France | Construction & materials |
| 16 | Ineos Fluor Ltd | Private | UK | Manufacture of industrial gases |
| 17 | Lafarge plc | Private | France | Construction & materials |
| 18 | Land Securities plc | Public | UK | Real state & development |
| 19 | Lend Lease Real Estate Investment Services Ltd | Private | Australia | Real state and development |
| 20 | Marks & Spencer plc | Public | UK | General retailers |
| 21 | Mitsubishi Corporation UK plc | Public | Japan | Support services |
| 22 | Motorola GTSS | Private | USA | Technology, hardware & equipment |
| 23 | Rhodia Organique Fine Ltd | Private | France | Manufacturing or other organic basic chemical |
| 24 | Rolls-Royce plc | Public | UK | Aerospace & defense |
| 25 | Royal Ordnance plc | Public | UK | Aerospace & defense |
| 26 | Shell UK Ltd | Private | UK | Oil & gas producers |
| 27 | Somerfield Stores Ltd | Private | UK | Food and drug retailers |
| 28 | Tesco Stores Ltd | Private | UK | Food and drug retailers |
| 29 | UK Coal Mining Ltd | Private | UK | Mining and agglomeration of hard coal |

(I) *Source:* National Audit Office (NAO, 2004).

(II) *Sources:* FTSE 500 ranking 2006 (<http://www.ft.com/reports/ft5002006/>), Amadeus database (NACE code) and Companies' reports.

The first step to start the matching pair procedure was to find a database that contained sufficient information about each DP organization to support the matching procedure. Several sources were used to create matching organizations' pairs, including the FTSE 500 ranking 2006³³, list of companies at London Stock Exchange³⁴, Amadeus database³⁵, Corporate Register webpage³⁶, companies' reports, companies' webpage, performance indicators in higher education by Higher Education Statistic Agency (HESA) and 2001 area classification for local Authorities by the Office of National Statistics. For the majority of organizations, the procedure adopted to find its respective MP is summarised at the following three rules.

Rule 1: This rule is applied to DP whose origin country is the UK. The initial step was to search for the company in the FTSE Global 500. If the company was listed in FTSE Global 500, the next step was to find a MP in the same list. The MP should also be a UK company, operating at the same sector as the DP with a similar market value. In a case where no company was found with those characteristics, a similar search was made at FTSE UK 500. If the DP was not listed at FTSE UK 500, a similar search was made of the list of companies registered at the London Stock Exchange. If a match was still not achieved, the respective pair was search in Amadeus database (see rule 3 about the procedures at Amadeus database).

Rule 2: This rule is applied to DP which had European or USA head offices. The search started with the FTSE Global 500 as in rule 1. If the DP was not listed at FTSE Global 500, the DP was searched at EU or USA FTSE 500. If DP was listed in the EU or USA FTSE 500, the respective MP was obtained from the FTSE UK 500. The search at FTSE UK 500 focused on the DP's sector and secondly, the most similar UK company in terms of market value.

³³ FTSE 500 ranking 2006 (<http://www.ft.com/reports/ft5002006/>).

³⁴ UK Listed Companies on the London Stock Exchange at 31/03/2006 - (<http://www.londonstockexchange.com/NR/rdonlyres/AA1BADA6-EEB0-469E-B20C-01A1B947194E/0/LISTDATEUKCOS.XLS>).

³⁵ This database permits to asses to the top 250,000 European companies with standardize annual accounting, financial rating, activities and ownership.

³⁶ Corporate Register is a free directory presenting CSR, Sustainability, and Environment reports from companies of all over the world (www.CorporateRegister.com).

If the DP was not found in the FTSE list, the first step to start the matching pair procedure was to find a database that contained sufficient information about each organization. Several sources were used for matching organizations' pairs: FTSE 500 ranking 2006, list of companies at London Stock Exchange, Amadeus database, corporate register webpage, companies' reports, companies' webpage, performance indicators in higher education by HESA and 2001 area classification for local Authorities by the National statistics. There were eight DP that did not yield MP following these rules. These were: British Airways, Motorola, Royal Ordinance, Mitsubishi, Lend Lease and Battle McCarthy Carbon Club, Kirklees Metropolitan Council and The Natural History Museum. The procedures adopted to find MP for each of those DP will be detailed at the end of this section.

Rule 3: This rule is specificity applied to limited companies and/or companies that are not listed at Global, EU, UK, USA and Japan FTSE 500. The procedure adopted to match the pair within Amadeus database was firstly, to find the DP's activity sector and secondly search for a MP in that industry sector. The company which has the most similar size in comparison to the respective DP was then selected as MP. Capital was used as a measure of size with a rate of operating revenue/turnover also being used as a guide.

This section continues with a description of the procedure adopted to match DP where the above three rules did not create a match. British Airways was listed at FTSE UK 500 in the industry sector travel & leisure. The nearest company to British Airways using the rules was Easy Jet. These two companies however, do not have similar characteristics in terms of size (market values were £3,994m and £1,425m to British Airways and Easy Jet, respectively) nor in terms of business attributes (for example destinations, clients and pricing policies). Using the London Stock Exchange, Easy Jet was also the nearest organization to British Airways. As a result, the Amadeus database was also searched. In this database, British Airways was classified in the industry sector called scheduled air transport. In this sector, the nearest match to British Airways' was Heathrow Airport Limited, based on the amount of capital and shareholders funds presented. No other company matched British Airways at this activity code and Heathrow Airport Limited was judged to be a similar organization to British Airways. A further search was made for a MP in the industry sector called transport via railways

to find another company which presents a similar business activity to British Airways. This search yielded, both Heathrow Airport Limited and London Underground and both have been used as possible similar organization. This is not a perfect matching, but data generated from this matching will be used with caution with regard to interpretation of results found.

In similar way to the British Airways, an appropriated pair to Royal ordinance (BAE System) could not be found following the rules. The search was made in the UK listed companies on the London Stock Exchange³⁴. As a result, Quinetiq Group³⁷ was selected to match with Royal ordinance (BAE System) because those companies were similar in terms of market value.

A pair to Motorola, Mitsubishi and Lend Lease could not be found by the rules because there was a need to apply specific geographic search criteria to find a match pair (MP) to those companies. Motorola was matched with Erickson because these companies were the ones listed in the FTSE Europe 500 that operate in the UK, in similar sectors and with a similar market value. Mitsubishi was matched with Sony since these companies were listed in the FTSE Japan 500 as firms which operate in the UK as they had a similar market value.

Liberty International was selected to match with Lend Lease, because they produced SA (according to corporate register webpage) and also, because these companies operate in the UK and in countries that had not signed the Kyoto Protocol. Lend Lease operates in Australia and Liberty International operates in the USA. The Corporate Register webpage was used to find this pair.

Battle McCarthy Carbon Club, Kirklees Metropolitan Council and The Natural History Museum are not organizations listed in company' data base. Normally, the type of measures used to analyse those organizations are not the similar to the measures used to analyse companies. Furthermore, in the case of Battle McCarthy (a club of universities) the DP organization is a synthetic organization. Given these characteristics, the rules set out could not be applied; their matching process is more complex.

³⁷ Quinetiq Group provides defense technology, services and consultancy (<http://www.qinetiq.com/home/defence.html>).

A pair for each of seven universities that make up Battle McCarthy Carbon-Club was selected using the most similar organization in terms of number of full-time first-degree entrants as found in HESA(2005) statistics. Bolton Council was chosen to be Kirklees Metropolitan Council's pair, based in a cluster summary of local authorities produced by the National Statistics (National Statistics, 2004). The cluster summary groups local authorities using socio-economic and demographic characteristics. Finally, the pair chosen to match with The Natural History Museum was The National Gallery. This selection was based on the amount of income and the number of employees³⁸ from similar museums in UK³⁹.

Table 3.3 illustrates the results of matching pairs procedure. The two first columns presents DP and MP respectively. The third column describes the variable used to compare organizations' size. The fourth column is called 'comparative size value', which represents a fraction between MP and DP size measure. The last column lists the data source that was used to match the organizations. Table 3.3 also separates pairs of organizations in 'clean' and 'dirty'. The pairs considered 'dirty' are those which the comparative size value shows a difference greater than 40%⁴⁰. The division between 'clean' and 'dirty' pairs will be used during results interpretation, because any comparisons of disclosure between 'dirty' MP should be made with caution.

³⁸ This information was collected in the annual report of each museum.

³⁹ <http://museums-in-england.brainsip.com/>

⁴⁰ This cut off was chosen on the basis of cluster distance adopted as comparative size to Kirklees Metropolitan Council and Bolton Council.

Table 3.3: Matched pairs results

| UK CLIMATE CHANGE AGREEMENTS DIRECT PARTICIPANTS (DP) UKETS (I) | SIMILAR ORGANIZATION (SO) | SIZE MEASURE | COMPARATIVE SIZE VALUE (SO/DO) | SIZE MEASURE SOURCE |
|--|--|--|-----------------------------------|--|
| CLEAN | | | | |
| 1 Barclays Bank plc | Halifax and Bank of Scotland (HBOS) | Market Value | 84% | FTSE 500 Global ranking 2006 |
| 2 Battle McCarthy Carbon Club | | | | |
| 2.1 University of Brighton | The University of Salford | Full-time first degree entrants | 100.16% | Performance Indicators in Higher Education |
| 2.2 Brunel University | The University of Teesside | Full-time first degree entrants | 99.78% | Performance Indicators in Higher Education |
| 2.3 Loughborough University | Bristol University | Full-time first degree entrants | 99.66% | Performance Indicators in Higher Education |
| 2.4 Middlesex University | The University of Wolverhampton | Full-time first degree entrants | 98.95% | Performance Indicators in Higher Education |
| 2.5 Kings Colledge London | University of Derby | Full-time first degree entrants | 100.00% | Performance Indicators in Higher Education |
| 2.6 University of Plymouth | The University of Sheffield | Full-time first degree entrants | 101.01% | Performance Indicators in Higher Education |
| 2.7 The University of Edinburg | The University of Glasgow | Full-time first degree entrants | 98.73% | Performance Indicators in Higher Education |
| 3 Budweiser Stag Brewing Co. Ltd (II) | SabMiller | Market Value | 89% | FTSE 500 Global ranking 2006 |
| 4 Dalkia Energy plc (III) | National Grid Transco | Market Value | 119% | FTSE 500 Global ranking 2006 |
| 5 Dalkia Utilities Services plc (III) | National Grid Transco | Market Value | 119% | FTSE 500 Global ranking 2006 |
| 6 Dana UK Holdings Ltd | Visteon UK Limited | Capital | 92% | Amadeus database |
| 7 First Hydro Company (IV) | United Utilities PLC | Capital | 95% | Amadeus database |
| 8 Ford Motor Company Ltd | Honda of the UK Manufacturing Limited | Capital | 67% | Amadeus database |
| 9 Imerys Minerals Ltd | Pilkington | Market Value | 78% | FTSE 500 European and UK ranking 2006 |
| 10 Ineos Fluor Ltd | Air Liquide UK Limited | Capital | 120% | Amadeus database |
| 11 Kirklees Metropolitan Council | Bolton Council | Distance in the cluster summarie | 2.2 | National Statistics |
| 12 Lafarge plc | Hanson | Market Value | 55% | FTSE 500 European and UK ranking 2006 |
| 13 Land Securities plc | British Land CO | Market Value | 71% | FTSE 500 UK ranking 2006 |
| 14 Marks & Spencer plc | Kingsfisher | Market Value | 61% | FTSE 500 UK ranking 2006 |
| 15 Motorola GTSS | Ericsson | Market Value | 107% | FTSE 500 USA and European ranking 2006 |
| 16 Natural History Museum | National Galary | Income | 71% | Annual reports |
| 17 Rhodia Organique Fine Ltd | Degussa Knottingley Limited | Capital | 89% | Amadeus database |
| 18 Rolls-Royce plc | Smiths Group | Market Value | 68% | FTSE 500 UK ranking 2006 |
| 19 Shell UK Ltd | Chevron | Market Value | 61% | FTSE 500 Global ranking 2006 |
| 20 UK Coal Mining Ltd | Mining (Scotland) Limited | Market Capital | 138% | Amadeus data base |
| DIRTY | | | | |
| 21 Asda Stores Ltd (V) | GUS | Market Value | 8% | FTSE 500 Global ranking 2006 |
| 22 BP plc | Exxon Mobil | Market Value | 159% | FTSE 500 Global ranking 2006 |
| 23 British Airways plc (VI) | London Underground (LU) and Heatrow Airport (HA) | Capital | HA 140.4% LU 158.67% | Amadeus database |
| 24 British Sugar plc (VII) | Tate & Lyle Industries Limited | Market Value | 41% | FTSE 500 UK ranking 2006 |
| 25 General Domestic Appliances Ltd (VIII) | Electrolux | Capital | 5283% | Amadeus database |
| 26 GKN (UK) plc | Wagon | Market Capital | 6% | London Stock Exchange |
| 27 Invista UK Ltd (IX) | ICI | Market Value | 21% | FTSE 500 USA and UK ranking 2006 |
| 28 Lend Lease Real Estate Investment Services Ltd | Liberty international | Shareholders funds Organization's 2004 reports | 290% | The UK FTSE 100 and Corporate Register |
| 29 Mitsubishi Corporation UK plc | Sony | Market Value | 121% | FTSE 500 Japan ranking 2006 |
| 30 Somerfield Stores Ltd | Safeway Stores Limited | Capital | 188% | Amadeus database |
| 31 Tesco Stores Ltd | Sainsbury's Supermarkets LTD | Market Value | 22% | FTSE 500 UK ranking 2006 |
| 32 Royal Ordnance plc (X) | Qinetiq Group | Market Capital | 9% | London Stock Exchange |

(I) Source: NAO (2004)

(II) Budweiser is part of Anheuser-Bush.

(III) Dalkia is part of Veolia.

(IV) First Hydro is part of Internarional Power Plc.

(V) Asda is part of Wal-Mart Stores (USA).

(VI) Especific pair to British Airways was found considering one simitar company in the same sector and other similar company in other transport sector (Transport via railways -NACE code 6010).

(VII) British Sugar is part of Associated British Food.

(VIII) Indesit owns General Domestic Appliances Ltd.

(IX) Invista is part of Du Pont.

(X) Royal Ordinance plc is part of BAE Systems

3.3 Report collection

In the first instance, reports were downloading from public sources such as organization's webpage and the Corporate Register website. If the reports were not found in the public domain, a request was sent to the organization for their reports. A search was also made of the libraries of the Centre for Social and Environmental Accounting Research (CSEAR) and the University of Dundee at the School of Accounting and Finance. From the total of 730 reports hunted, 509 reports were obtained. Those reports are distributed over two samples as indicated in table 3.4.

Table 3.4: Reports collected

| GROUPS | DP 2000-2004 | MP 2000-2004 | Total |
|---------------------|-------------------------|-------------------------|--------------|
| Stand alone Reports | 87 | 98 | 185 |
| Annual Reports | 158 | 166 | 324 |
| Total | 245 | 264 | 509 |

3.4 Research instrument

Having identified the sample and obtained the reports, the instrument that was constructed will be described. The research instrument was developed to capture organizations' disclosures on issues linked to greenhouse gas (GHG) emissions, including references to GCC. The data captured by the research instrument (appendix 5) comprised information on organizations' background (parts A and B)⁴¹, emissions data (part C), volume of disclosure (parts D and E), rationale behind the disclosure (part E) and the presence otherwise of a list of disclosure items on GCC. The objective of gathering this information was to allow a description of characteristics of the data disclosed. Each element in the instrument is described below.

PART A: Organization background and report characteristics

Part A of research instrument collects data on the characteristics of the report and entity whose disclosure is being analysed. Characteristics gathered include the organization's

legal form, industry sector and the country that the organization has its head office. The purpose of exploring the legal form of the organization is that the sample includes both commercial (e.g. limited and plc) and non-commercial organizations (e.g. museums and universities) and disclosure patterns may differ between these legal forms. While there is no research on disclosure, which identifies that legal form to be important, other aspects of organizations characteristics has been explored in the literature.

Many studies (Cowen *et al.*, 1987; Gray *et al.*, 1995a; Hackston and Milne, 1996; Tsang, 1998; Campbell *et al.*, 2003; Campbell *et al.*, 2006) have identified industry sector as being associated with social and environmental disclosure. Likewise, different industry sectors have relative different contributions to GHG emissions, leading to the assumption that information disclosure in this area could well vary by industry sector. Freedman and Jaggi (2005)⁴², for example, identified significant differences in the information disclosed about GHG emissions by chemical, oil and gas, energy, motor vehicles and casualty insurance industry. As a result, the research instrument captures data on industry sector of firm.

There are several ways to classify organizations by their respective sector activities (Gray *et al.*, 1995b). Industry classification of each DP and their respective matched organization (A3) has been drawn from the FTSE 500 where the organization is found in that index. If the organization was not in FTSE 500, the Amadeus database industry classification was used. Finally, in the case when the organization was neither listed on FTSE 500 nor in Amadeus database, the industry sector has been inferred from the report itself. This procedure was necessary for three types of organizations: universities, councils and museums.

⁴¹ Although, these parts were included in the research instrument, some variables (A3 and B1 until B8) did not agree with the objective of this research. For this reason, the data regard to this information was not collected at this stage.

⁴² This article considers disclosure on Kyoto protocol-related. More specifically, this article analyses organization disclosure on GCC exploring the following five items: i. Mention of global warming or the Kyoto Protocol; ii. Firm's plans for dealing with global warming and control of global warming; iii. Potential costs of the global-warming; iv. Current costs to reduce the greenhouse-gas emissions; v. Information on the extent of greenhouse-gas emissions.

National policies to tackle GCC are likely to have a role in creating the context in which an organization operates. For example, organizations from countries that have ratified the Kyoto Protocol have been found to disclose more about GHG compared to organizations from countries where Kyoto has not been ratified (Freedman and Jaggi, 2005). While it is likely that many factors come into play in influencing disclosure, this instrument seeks to investigate the possible role of Kyoto ratification. As a result, the item A4 captures the country where an organization has its head office.

The analysis of the changes in disclosure over time is another objective of this research. In order to achieve this aim, item A5 captures the year of the report that is being analysed. Additionally, the research covers two different types of reports, annual reports and accounts and SA (such as environmental, sustainability and corporate social responsibility reports). Thus, the last item in this section (A6) captures which of these report are being analysed.

PART B: Financial data

Many articles on CSD (see for example, Cowen *et al.*, 1987; Gray *et al.*, 1995b; Hackston and Milne, 1996; Adams *et al.*, 1998; Neu *et al.*, 1998; Freedman and Jaggi, 2005) have analysed the relationship between organizational disclosure and financial data. Part B of the research instrument captures organizations financial data related to GCC, as well as some financial statistics on the organization. This data is collected in order to have a range of possible variables which can be tested to see if they have an association with GHG disclosure.

Further, some CSD studies (see for example, Hackston and Milne, 1996; Adams *et al.*, 1998) found size to be correlated with magnitude and frequency of CSD patterns. As an illustration, Freedman and Jaggi (2005) found that larger firms have the large volume of GHG emissions disclosure. These authors suggest that large organizations might disclose more because they are exposed to highest pressures from media, regulators and society. According to Gray *et al.*, (1995b) the literature is not unanimous with regard to which size measure to use. Those authors suggested various options to measuring size. In line with this, the instrument captures several types of size measures, namely: capital employed (B1), number of employees (B5), sales (B2) and assets (B8).

Moreover, some authors (Gray *et al.*, 1995b; Hackston and Milne, 1996), have highlighted the possibility of finding associations between CSD and profitability. The assumption that profitable organizations may provide higher CSD is based on the thesis that those types of organizations may be more exposed to social pressures and that they have more freedom to undertake responsible programmes. The literature has not always identified association between profitability and CSD. As an illustration, Freedman and Jaggi (2005) found that the operating performance (measured by the ROA and debt-equity ratio) was not associated with the disclosure information about pollution/GHG emissions. In order to analyse if the association between operating performance and CSD is applicable for the context of this study, this research instrument gathers several measures namely: EBIT (B3), EBITIDA (B4), Total debt/Common equity (B6) and ROE (B7).

In addition to traditional financial measures, other financial items related specifically to GHG may also be associated with CSD. These include emission allowances disclosure which were recommended by the World Business Council for Sustainability Development and the World Resource Institute protocol (WBCSD and WRI, 2004). In addition, the International Financial Reporting Interpretations Committee (IFRIC, 2005) has set international standards for accounting for emissions allowances. These recommendations create an expectation that may be disclosures in this area. The item B9 is a yes/no question to capture if the organization discloses that it has GHG allowances. The other five items refer to the amount of GHG emissions bought (B10), sold (B11) or banked (B12), investments made (B13) and expenses incurred (B14) to reduce GHGs.

PART C: Disclosure of GHG emissions and targets

Several guidelines have been produced to specify how to report quantitative emissions data (Department for Environment, food and Rural Affairs - DEFRA, 2001b, 2003; UN, 2004; WBCSD and WRI, 2004; Global Reporting Initiative - GRI, 2006). The assumption is that this information is useful to a variety of parties. For example, emissions data may provide a basis for internal decisions and may enable benchmarking by internal (organizations executives) and external agents (government, environmentalists and other organizations).

Roeser and Jackson (2005) analysed FTSE 100 quantitative emissions data disclosure, which has described as limited. They found that the data disclosed was inconsistent, of poor quality and limited in scope. Additionally, data was not reported for all sources of emissions, monitoring varied by organizations and there was insufficient information about the data collection process. Furthermore, emissions data tended to be disclosed in different periods (calendar, fiscal or financial year) and little historical data was available.

This instrument captures disclosure of emissions via items C1 to C15. The aim in collecting this data is to record the extend to which organizations analysed in this research display the same limitations identified by Roeser and Jackson (2005). Emissions data is collected following the National Atmospheric Emissions Inventory - NAEI (AEA Technology, 2005), in which emissions are categorised as direct GHG (CO₂, SF₆, CH₄, HFC, PFC, N₂O), and indirect GHG (CO, NO_x, SO₂ and VOC). The research instrument also captures data on other climate change potential substances, such as H₂, aerosol and clouds, H₂O and tropospheric O₃.

Emissions data is also classified by how they are generated by the firms under analysis. Direct emissions are these generated by the organizations operations while indirect emissions are produced from the use of the product or service provided by the organization (The Partnership for Climate Actions - PCA, 2002). Disclosure of total emissions refers to the disclosure of total amounts including direct and indirect GHG emissions. It is important to note that the research instrument uses the terms 'direct' and 'indirect' in two different classifications. One of them refers to direct/indirect GHG and the other refers to how GHG emissions are generated if it is directly/indirectly related to the organizations' operations.

The instrument also captures if organizations take emissions data and convert it into indicators such as Global Warming Potential (C16), Global Warming Contribution (C17) and Global Warming Contribution per unit of net value added (C18). Those types of disclosure are recommended by some reporting guidelines, namely: United Nations (UN, 2004), WBCSD and WRI (2004).

Finally, several guidelines recommended disclosure on emissions targets (DEFRA, 2001b, 2003; WBCSD and WRI, 2004). This research instrument captures two types of targets: the target to comply with the UK Climate Change Agreements (C19) and organizations internal targets (C20).

PART D: Disclosure quantity on GCC/GHG issues

Part D of the instrument is designed to capture the total volume of disclosure on GCC/GHG issues. The importance in quantifying disclosure volume lies on the assumption that the amount of disclosure reflects the importance of the subject to the reporting organization (Krippendorff, 1980). Measurement of disclosure is made using proportion of pages. The measure of proportion of pages using a grid, which measures space to the nearest 1% a standard A4 page, following Gray *et al.*, (1995b).

Data is captured in four main categories: emissions data (D1), targets (D2), actions (D3) and other disclosure/narrative (D4) (see appendix 6 and 7 for categories description). The categories D1, D2 and D3 have been based on the steps suggested by PCA (2002) that are necessary in order to implement management programmes to reduce GHG.

Data on emissions may be presented in reports as text (D1a), graphs (D1b), tables (D1c) or other types of disclosure (D1d). Not only the volume of disclosure about emissions data but also how it is being presented are important issues to study. This is due to the fact that there is evidence that emissions data has not been disclosed uniformly (Roeser and Jackson, 2005).

The motivation to set targets could be driven by external requirements (e.g. regulations) or targets could be set voluntarily by organization. This instrument firstly captures information about targets established to comply with the UK ETS (D2a) and secondly, other types of targets (D2b), such targets to comply with the EU Emissions Trading Scheme (EU ETS) and voluntary targets.

Actions to limit GHG emissions are the means by which targets are achieved. In addition, actions represent proactive response to GCC agenda. Disclosure of actions may also reflect the kind of strategies that organizations are following to achieve better

emissions reductions. This knowledge permits better understanding of the context in which organizations operate. In this instrument, the actions to reduce GHG emissions were classified as: Internal actions (D3a), external actions (D3b), emissions trading (D3c) and others (D3d). This activity classification is an adaptation from the one presented in PCA (2002). Finally, all other GCC disclosure that have not previously captured (e.g. general and informative disclosure about GCC) are included under item A4.

PART E: An assessment of the rationale behind the emissions

This part of research instrument contains two forms of content analysis. The first form seeks to capture the rationale behind the GCC disclosure. The second type of content analysis is made to quantify, in number of pages, the amount of rationale disclosed. Currently, the anthropogenic causes of GCC, its sources and its estimative impacts are still contested, especially GCC 'deniers' (Singer, 1998; Soon *et al.*, 2001; Robinson and Orient, 2004). Organizations opinions/comments on GCC are so important because communication between organizations and society (e.g. via CSD) may create social reality (Livesey, 2002). In addition, Ereaut and Segnit have reviewed 600 articles from the UK daily and weekly press and magazines. They found that in the UK the discourse on GCC was confusing, contradictory and chaotic. For these reasons, the idea behind of this part of the instrument is of the research instrument is to identify the rationale behind disclosures produced on SA and AR. The category of rationale used in this instrument were developed based on three main references: Buhr (1998), Livesey (2002) and Ereaut and Segnit, (2006).

Buhr (1998) is an in-depth case study and historical overview of Falconbridge (an international resource company). Buhr used content analysis to examine the internal perspective of this organization on sulphur dioxide emissions and sulphur gas/fumes/pollution or acid rain. AR were analysed to describe how the organization responded to changing government regulation and how the organization presented its abatement activities. To achieve this aim two forms of categorization process were used i.e. quantity of disclosure (number of sentences) and issue context. The category of issue context referred to five areas of subject matter: (i) political – emissions reductions are considered in political context such as references to government regulations or

government standards, (ii) economic – emissions reductions are considered in economic context, for example via discussions about cost of emissions reductions and its impacts on organization health, (iii) social internal – emissions reductions are related to internal concerns, (iv) social external – emissions reductions are related to concerns external to the organization and (v) technological – emissions reductions are linked to technological change. This study proposes that disclosure may reflect corporate mindsets and the rationale for accepting the regulation will be reflected in the organizational disclosure. This assumption is accepted within this work.

Further, Livesey (2002), also based on case study, uses discourse analysis⁴³ to examine four advertorials on GCC published by ExxonMobil in the New York Times during 2000. This article compares ExxonMobil's discourse and the alternative discourse of environmentalists. This analysis highlights some discourse characteristics of ExxonMobil's disclosure on GCC. ExxonMobil considered GCC as serious but at the same time trivial problem. In addition, ExxonMobil referred to GCC impacts as harmful but at the same time beneficial and that there were no enough information to justify harming economy on GCC issues. ExxonMobil highlighted that most policies to tackle GCC was inappropriate and costly. ExxonMobil also stressed that developing countries should undermine growth to reduce their emissions and that corporate voluntarism will produce changes to tackle GCC.

Organizational responses to GCC issues are captured on this research instrument using rationale categories, which are presented in table 3.5. In addition, this table presents the literature background in which rationale categories were based. Appendix 8 and 9 presents definition and description each of these categories.

The expectation is that most of disclosure in part E will not have any speech underlying tone. As a result, the highest percentage of disclosure in part E is expected to be registered at the category called 'no tone can be inferred' (E12). With regard to the 'rationale' namely denial (E1), it is expected that this rationale will not dominate the disclosure. This is because most of organizations, considered in this research are from

⁴³ Discourse analysis is a qualitative method applied to analyze written, spoken or signed language. This method is used to study a range of contexts that could vary from macro-scale (e.g. historical analysis) to micro-scale (e.g. every day conversations).

countries that have ratified the Kyoto Protocol. Organizations from countries that have ratified the Kyoto Protocol appear to disclose different information about climate change issues compared to firms in other countries (Freedman and Jaggi, 2005).

Table 3.5: Rationale categories

| CATEGORIES | LITERATURE BACKGROUND |
|---|---|
| E1. Denial (down playing climate change impacts) | Ereaut and Segnit (2006) |
| E2. Business/environmental struggle | Livesey (2002) |
| E3. External policies as inappropriate | Livesey (2002) |
| E4. GHG's are developing countries' problem | Livesey (2002) |
| E5. Corporate voluntarism/autonomy | Livesey (2002) |
| E6. Rational economics | Livesey (2002) |
| E7. Market-base implementation mechanism | Livesey (2002) |
| E8. Technological solutions will sort the problem out | Buhr (1998) |
| E9. Behavior change of employees (or other individuals) will have an impact | Ereaut and Segnit (2006) Buhr (1998) |
| E10. The business GHG responsiveness will be good for business | Ereaut and Segnit (2006) Buhr (1998) |

The content analysis described on parts D and E of this research instrument is guided by the specification that each piece of disclosure can only be classified in one way. Thus, the total disclosure must score 100% at part D and 100% at part E. At the end of this chapter, there are appendixes which provide a guide to the content analysis process. The appendix 6 and 8 that describes all items included on the classifications used on parts D and E. The appendix 7 and 9 that presents a summary about these descriptions. Finally, the appendix 10 presents general and particular rules to guide the content analysis.

PARTS F, G, H and I

The objective of the next four sections of the research instrument (parts F, G, H and I) is to capture additional information about the GHG emissions disclosure. The measurement scale used to answer all the questions proposed in these parts is (0,1), where no is 'zero' and yes is 'one'. The topic areas of each part will now be described.

PART F: Opinion on GCC/GHG issues

This section was designed to capture organizations' opinions on GCC issues. Some organizations, for example ExxonMobil, have presented a denial discourse about anthropogenic causes of GCC (Livesey, 2002). According to Livesey (2002), ExxonMobil's discourse had a specific objective, which was to legitimate the USA position in rejecting the Kyoto Protocol. This example reinforces the importance in capturing the organizations' viewpoints about GCC, especially because this article highlights the effects that disclosure have on the society. As a consequence, the first question in this section seeks to capture disclosure of whether or not organizations state that anthropogenic global warming (GW) exists (F1) and any disclosure of organizations' contributions to GW (F2).

Organizations' commitment to tackling GCC can also be inferred from the actions they are taking with respect to their impact on GCC. Currently, organizations have been required by regulatory and social pressures to change their behaviour in order emit less (for more details, see Part G). Thus, disclosures of organization's risk policies (F3) (Mansley and Dlugolecki, 2001), current/potential costs associated with actions (F4 and F5) and objectives in controlling GHG (F6) provide a evidence of corporate views on GCC. Seeking an evidence on these sort of disclosure is also appropriate given that some authors (Chan-Fishel, 2002; Solomon and Solomon, 2006) have highlighted that investors have not been supplied with sufficient data to understand the impact of corporate adaptation to GCC.

PART G: Pressure for action

This section of the research instrument gathers data on disclosures that relate to organizations and documents that could be seen to create obligations for organization to respond to GHG production. These organizations include those who set environmental policies at global and national levels for GHG emission reduction. The following paragraphs present a brief description of policies at international and UK level.

In the international context, the UN Framework Convention on Climate Change (UNFCCC), sought to find ways of stabilizing GHG concentrations in the atmosphere

(Grubb *et al.*, 1999). The Kyoto Protocol supplements the UNFCCC, ratified in 2009 by 184 countries and other governmental entities (UNFCCC, 2009), the protocol sets limits on GHG emissions (European Environmental Agency - EEA, 2004) and has been considered one of the most relevant instrument for tackling GCC. Disclosure made by organizations about the Kyoto Protocol was considered by Freedman and Jaggi (2005) as being an indication of a responsiveness of organizations to political and social pressures. In the research instrument, question G1 captures organizations' disclosure of information about the Kyoto Protocol.

At European level, the European Climate Change Programme (EU CCP) has created measures for tackling GCC (EC, 2006). Examples of those measures include: The EU ETS, Joint Implementation (JI) and Clean Development Mechanisms (CDM), incentives to renewable energy as well as promotion of the use of biofuels. Since the UK is part of European Union (EU), it is important to capture disclosures made by organizations that could be inferred to reflect EU influence on the GHG emissions policy and processes (G2).

The UK Climate Change Programme has also established mechanism to increase the investment in low carbon techniques. Wordsworth and Grubb (2003) classified those instruments into four types: (i) Direct government expenditure; (ii) Legislated requirements upon energy supply companies; (iii) Taxes allowances and (iv) Measures associated with the UK Climate Change Levy⁴⁴ (CCL) - including emissions trading and Climate Change Agreements.

The UK Climate Change Agreements have been developed to assist organizations most affected by the CCL. These agreements provide an 80% reduction in the CCL in exchange for emission reductions by affected organizations (NAO, 2004). It is likely that the CCL has affected the organizations examined in this research⁴⁵. More than 10,000 organizations across 42 industry sector as well as 32 organizations have agreed directly with the UK Government (NAO, 2004) to reduce emissions in line with targets.

⁴⁴It is a tax on the use of energy in industry, commerce and the public sector (<http://www.defra.gov.uk/environment/ccl/intro.htm>).

⁴⁵ Two kinds of agreements have been established, i.e. sector agreements and direct agreements.

If organizations reduce GHG below targets levels they can convert these into allowances that can be traded at the UK ETS.

Several categories were considered in the research instrument to include the background previously described. Data is sought on disclosure about: (i) UK ETS (G3); (ii) CCL (G4), (iii) incentives (G5) and (iv) penalties with regard to no-commitment with policies (G6). Disclosure about trade association involvement with regard to GCC (G7) has also been captured. Bailey and Rupp (2006), for example, have argued that the trade associations' participation in the UK Climate Change Agreements has been significant in terms of the effectiveness of those agreements. As a result, one may expect to see disclosures on this theme. Finally, the research instrument captures disclosure about any awards that have been received with respect to actions taken to tackle GCC (G8).

PART H: GHG emissions measurement and targets

This part of the research instrument seeks to capture information about emissions Measurement, Reporting and Verification (MRV). Several protocols for MRV are currently available (GRI, 2002; WBCSD and WRI, 2004; DEFRA, 2006a). The complexity of adopting those various protocols vary by organization size and the industry sector. Without knowledge of actual emissions, however, organizations are unlikely to meet emissions targets. As result, one may expect disclosures about not only emissions but how emission data is verified.

The items included in the research instrument regard MRV starts with the emissions data reported that could be presented by sources (H1), country of origin (H2) and organizations facilities (H3). Finally, the last two items in this part seeks to capture disclosure of organizational targets (H4) and the verification process used by organizations (H5).

PART I: Disclosures on actions to tackle GCC

This part of the instrument seeks to capture actions that have been taken by the organizations to tackle GHG emissions. In order to identify the most likely actions a search was made through several reports guidelines (DEFRA, 2001c; GRI, 2002; PCA,

2002; 2003; UN, 2004; WBCSD and WRI, 2004; 2006a; GRI, 2006; CDP, 2007). In addition, SA produced by DP in the UK ETS were consulted to identify other types of actions undertaken by organizations to tackle GCC. From this review series of actions which disclosure may be anticipated have been developed (see table 3.6).

Table 3.6: Actions to tackle GCC

| ACTIONS | DESCRIPTION | LITERATURE BACKGROUND |
|---|--|--|
| I1. Use of new technologies | New technologies to tackle GCC. | GRI (2002) |
| I2. Redesigning products/process/services | Redesigning products/process/services to tackle GHG emissions. | GRI (2002); DEFRA (2006a) |
| I3. GHG certifications | e.g.: ISO 14064 and ISO 14065 | WBCSD and WRI (2004) |
| I4. Waste disposal | Monitoring of waste during the production process or at the end of the product life cycle. | CDP (2007); DEFRA(2001b; 2006a); UN (2004) |
| I5. Energy conservation | Reductions on energy consumption. | CDP (2007); GRI,(2006); DEFRA(2001b; 2006a); UN (2004) |
| I6. Energy: Use of renewable energy | Use of energy from renewable sources such as wind and solar. | DEFRA(2006a); UN (2004) |
| I7. Energy and fuel efficiency | Energy and fuel efficiency in order to tackle GHG emissions. | GRI (2002); UN (2004) |
| I8. Refrigeration and air-conditioning improvements | Improvements to reduce GHG emissions. | DEFRA (2001b) |
| I9. Transport use: Travel reductions | Reduction of travels made for instance by managers and employees. | DEFRA (2001b) |
| I10. Transport use: Logistic improvements | Improvements to reduce GHG emissions. | DEFRA (2001b) |
| I11. Use of alternative types of transport | Examples of alternative types of transports are hybrid or electric cars. | SA |
| I12. Management programme and strategies to reduce global warming | Implementation of internal strategies or management programmes to tackle GHG emissions. | CDP (2007); DEFRA (2001b) |
| I13. Performance against internal and external benchmarking | Examples of possible benchmarking could be regard to emissions levels and actions to tackle GHG emissions. | WBCSD and WRI (2004) |
| I9. Transport use: Travel reductions | Reduction of travels made for instance by managers and employees. | DEFRA (2001b) |
| I10. Transport use: Logistic improvements | Improvements to reduce GHG emissions. | DEFRA (2001b) |
| I11. Use of alternative types of transport | Examples of alternative types of transports are hybrid or electric cars. | SA |
| I12. Management programme and strategies to reduce global warming | Implementation of internal strategies or management programmes to tackle GHG emissions. | CDP (2007); DEFRA (2001b) |
| I13. Performance against internal and external benchmarking | Examples of possible benchmarking could be regard to emissions levels and actions to tackle GHG emissions. | WBCSD and WRI (2004) |
| I14. Board level responsibility | Specific area and/or personal responsible for GCC issues. | CDP (2007); WBCSD and WRI (2004) |

Table 3.6 continues...

Table 3.6 continuation

| ACTIONS | DESCRIPTION | LITERATURE BACKGROUND |
|---|---|----------------------------------|
| I15. Employees incentives to activities related to global warming | Example of employees incentives is award actions to reduce GCC. | CDP (2007) |
| I16. Employee training | Training employees on GCC issues. | SA of DP in the UK ETS |
| I17. Supply chain involvement | Involvement of supply chain on the process to tackle GHG emissions. | CDP (2007); DEFRA (2006a) |
| I18. Consumer training | Consumer training on GCC issues. | SA |
| I19. Research sponsorship | Financing researches on GCC issues. | SA |
| I20. Partnerships with external organizations | Partnerships to tackle GHG emissions. | SA |
| I21. Carbon sequestration | Reservoir to remove carbon emissions removing from the atmosphere. | PCA (2002); WBCSD and WRI (2004) |
| I22. Carbon offset | Purchase of carbon credits to compensate emissions. | PCA (2002); WBCSD and WRI (2004) |
| I23. EU emission trading | Influence of EU ETS on organization. | PCA (2002); WBCSD and WRI (2004) |
| I24. UK emissions trading | Influence of UK ETS on organization. | PCA (2002); WBCSD and WRI (2004) |
| I25. Chicago climate exchange | Influence of Chicago climate exchange on organization. | PCA (2002); WBCSD and WRI (2004) |
| I26. Internal emissions trading | Implementation of internal emissions trading by the organization. | PCA (2002) |

3.5 Reliability

Krippendorff (1980) describes the two most important requirements of content analysis as being reliability and validity. Reliability is based on the concepts of stability, reproducibility and accuracy of a research instrument. In other words, the results of content classification should be stable over the time (stability) and the results should not change if coded by more than one coder (reproducibility). In addition, the classification adopted during the analysis process should be considered as standard or norm (accuracy). An accuracy measure would explore the extent to which the classification (or construct) used by the author measures what the author really intends to measure. Thus, the reliability process ensures that the content analysis as reasonable methodology to analyse a qualitative database by a creation of quantitative indicators (Weber, 1990).

Milne and Adler (1999) recommend the use of tests for stability and reproducibility for CSD studies. Those two types of reliability are often called internal and external

reliability respectively. Internal reliability is established through a test-retest procedure. That is, internal reliability can be tested by a coder codifying reports more than once, within a specified period of time. If the coding presents the same results each time, internal reliability is confirmed. External reliability, or inter-rater reliability, measures the proportion of error that arises when the same text is coded by different coders using same decision rules.

This research considers two different samples. The first sample refers to AR and SA for the DP in the UK ETS during 5 years (2000-2004). The second sample involves AR and SA for a similar organization to each DP in the UK ETS during the same five years period. In order to ensure the accuracy and stability of the research instrument, AR and SA produced by DP during all those five years were analysed twice by the same coder (Thereza Raquel Sales de Aguiar), with an interval of a week between the two rounds. Several reasons motivated to carry double analysis of the same sample. First, there was a necessity to ensure that each category in the research instrument was sufficiently discrete to avoid double count. Second, the consistency of the application of rules needed to be certified. The final and probably the most important reason was to ensure that the coder achieved a sufficient degree of self training while using the research instrument and rules.

The internal reliability was measured by Krippendorff alpha, with agreement level above chance or better than 80% (Milne and Adler, 1999; Hasseldine *et al.*, 2005). When the level of disagreement was higher than 20% a cross check was made between two round analyses for the same report. The first possible cross check was made to verify the code assigned to the same piece of disclosure. This cross check was made to ensure that no mistakes had occurred during the transcription of the results from the report itself to the research instrument. The second cross check was related to the volume of disclosure. The divergence found between the volumes calculated to the same piece of disclosure, which was classified with the same code during the two rounds analyses was not significant. In this case, one of the two counts was considered to figure as final result. Finally, if after the cross check procedure there is still a level of disagreement higher than 20%, a third round analysis was made.

An additional check was conducted with the objective of verifying if all disclosure about GCC was included into the analysis. This check was made with a search of some key words in the reports' PDF files (see appendix 11). This procedure was adopted to all reports with PDF files in all samples.

After completing the internal reliability test, the next step was to prepare the data for the final analysis. For this purpose, the discrepancies were compared to each other and a decision was made with regard to which code was the appropriate to figure as final result.

3.6 Concluding comments

The purpose of the thesis is to explore the disclosure on the topic of GCC for a sample of UK organizations. In order to achieve this outcome content analysis has been used as a research method. This study focuses on UK ETS DP' disclosures. It captures disclosures from both SA and AR for the years 2000 until 2004. This study explores whether members of the UK ETS changes the nature and volume of disclosures related to GHG emissions. This is tested on both on a longitudinal basis (for DP) and also on basis of a matched pair.

Data has been collected using a research instrument which was designed following from the literature in this area (see for example, Buhr, 1998; Mansley and Dlugolecki, 2001; Chan-Fishel, 2002; Livesey, 2002; PCA, 2002; Freedman and Jaggi, 2005; Roeser and Jackson, 2005; Bailey and Rupp, 2006; Ereaud and Segnit, 2006). The data captured by the research instrument includes information about organizations' background, emissions, volume of disclosure by theme, inferred rationale behind the disclosures and other disclosures. The objective of gathering this data is to analyse disclosure trends and also to explore possible relationships between disclosures and organizational characteristics.

Chapter 4:

DATA ANALYSIS

CHAPTER 4: DATA ANALYSIS

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List of abbreviations

| | |
|---------------|--|
| AR | Annual Report |
| DP | Direct Participants |
| CSD | Corporate Social Disclosure |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas/Gases |
| Mdn | Median |
| MP | Match Pairs |
| SA | Stand Alone Reports |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK ETS | UK Emissions Trading Scheme |

Content

Objective

The objective of this chapter is to analyse the data collected using the research instrument. In order to achieve this aim, a statistical study is carried out in this chapter. This study is focused on analysing disclosure about global climate change (GCC) made by direct participants (DP) of the UK Emissions Trading Scheme (UK ETS) and a group of non-UK ETS participants (MP) in both annual (AR) and stand alone reports (SA). This chapter presents statistical analysis in two parts. The first part is the categorical

data analysis, which is focused on the incidence of reports that disclosed on GCC. The second part analyses the volume of disclosure in number of pages. This chapter ends by exploring the difference between the disclosure produced by DP and MP.

4.1 Introduction

This introduction describes in more detail how the data base used during the statistical analysis was built and also sheds light on some relevant characteristics of the data. This section starts by comparing the reports that could possibly exist in each category and the number of reports found. In addition, it shows the number of reports that present any disclosure on GCC. It also explains how reports were coded in the statistical programme (SPSS).

The total possible number of reports was considered to be 750 (see table 4.1). This total corresponds to 37⁴⁶ reports per year for DP and 38⁴⁷ reports per year for MP. The possible incidence of 750 reports is an estimated value if one assumes that all organizations produced both AR and SA, from 2000 until 2004. However, most organizations considered at this research produced AR, but did not produce SA during this period (see tables 4.6 until 4.8). Thus, the total number of reports expected to be found is less than 750, but a precise expected value is difficult to estimate because some organizations have not officially confirmed if they produced SA. After completed the report search⁴⁸, 509 reports were found (see table 4.2) and in subset of these reports (353 reports) GCC disclosure was found (see table 4.3).

⁴⁶ The total number of organizations that participated in the UK ETS is 32. In terms of numbers of reports produced, there is one only report for Dalkia Energy plc and Dalkia Utilities Services plc which is produced by the holding company. In addition, there is Battle McCarthy Carbon Club that is made up of seven universities (see previous chapter for more details on DP). Thus, in order to count the total of reports, 37 reports were considered to be possible per year for DP.

⁴⁷ The MP reports calculation considers one pair for each one of DP, except for British Airways which has two organizations as a pair (see chapter 3 for more details). For each category five years worth of reports were sought.

⁴⁸ The data collection included a search for the correspondent report at organization's and Corporate register's website. When the report was not found on those two electronic source, a letter was sent to organizations enquiring about the missing report (see chapter 3 for more detail). The disclosure review was only carried out after all these procedures had been previously taken.

After collecting and analysing all the reports found a disclosure review was carried out to decide how to code (using the statistical programme - SPSS⁴⁹) a situation in which one report for a specific organization in a specific year was not found. Two alternatives were considered. The first alternative is to assume that the report exists but that there was no GCC disclosure. This first assumption was taken when the majority of reports produced by this specific organization did not contain disclosure on GCC during the other years considered by this study. The second alternative was to make no assumption regarding GCC disclosure. This second alternative was taken when reports from a specific organization over the years did not give any grounds to assume that there will be no information on GCC in the missing report. If the second alternative was chosen, the report was treated as if it did not exist (missing value in the SPSS).

Table 4.4 shows the results after the disclosure review. The total of observations to be included on the statistical analysis is therefore 528. Tables 4.5, 4.6, 4.7 and 4.8 present the results of disclosure review for each organization and report type. In order to illustrate how the review of past disclosures was carried, the group of seven universities that participate on the UK ETS can be used as an example. Table 4.5 shows that no SA were found for the seven universities. Thus, despite the fact that some universities did not send an official letter saying that they had not produced a SA, it was assumed that they did not exist because there was no evidence that SA were produced by any of the seven universities during 2000-2004. Table 4.6 shows that some universities that participate in the UK ETS produced AR. In addition, some of these AR contained information on GCC. However, there were some cases that AR could not be obtained or located. For these cases, the disclosure review was carried. As an illustration, the Brunel University's AR for the year 2000 was not available (see table 4.6). However, Brunel University's AR for the years 2001-2004 was available and there was no disclosure in those reports. Thus, it was possible that if Brunel University's AR was available for the year 2000, it was mostly likely that this report will not present any information on GCC. The next section will explain the limitations to undertake statistical analysis considering final sample (table 4.4).

⁴⁹ Statistical analysis was made using SPSS 12.

Table 4.1: Possible report incidence

| | REPORT TYPE | | TOTAL (I) |
|---------------------|-------------|----------------|-----------|
| | STAND ALONE | ANNUAL REPORTS | |
| Direct participants | 185 | 185 | 370 |
| Match pairs | 190 | 190 | 380 |
| Total Reports | 375 | 375 | 750 |

(I) The calculation considers 31DP, but one of them is Battle McCarthy Carbon Club, which is made up of 7 universities. This represents a total of 37 DP over five years. The MP reports calculation considers one pair for each one of DP, except for British Airways, which has two organizations as a pair (see chapter 3 for more details). For each category five years worth of reports were sought.

Table 4.2: Numbers of reports found

| FREQUENCY BY YEAR | | | | | | |
|-------------------------------------|------------------------|------|------|------|------|-------|
| | REPORTS FOUND PER YEAR | | | | | |
| | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL |
| Direct participants - stand alone | 13 | 15 | 19 | 20 | 20 | 87 |
| Direct participants - annual report | 26 | 32 | 33 | 34 | 33 | 158 |
| Match pairs - stand alone | 14 | 18 | 21 | 23 | 22 | 98 |
| Match pairs - annual reports | 31 | 30 | 32 | 37 | 36 | 166 |
| Total Reports | 84 | 95 | 105 | 114 | 111 | 509 |

Table 4.3: Numbers of reports that presents GCC disclosure

| FREQUENCY BY YEAR | | | | | | | |
|-------------------------------------|-------------------------------------|------|------|------|------|-------|---------------------------|
| | REPORTS THAT CONTAIN GCC DISCLOSURE | | | | | | TOTAL REPORTS FOUND |
| | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL | |
| Direct participants - stand alone | 13 | 15 | 19 | 20 | 20 | 87 | 87 |
| Direct participants - annual report | 12 | 18 | 20 | 20 | 18 | 88 | 158 |
| Match pairs - stand alone | 14 | 18 | 20 | 22 | 22 | 96 | 98 |
| Match pairs - annual reports | 13 | 14 | 17 | 16 | 22 | 82 | 166 |
| Total Reports | 52 | 65 | 76 | 78 | 82 | 353 | 509 |

Table 4.4: Number of reports used for the statistical analysis

| | FREQUENCY BY YEAR | | | | | | | TOTAL DISCLOSURE ON GCC | TOTAL REPORTS FOUND |
|-------------------------------------|---|------|------|------|------|-------|-----|-------------------------------|---------------------------|
| | REPORTS USED FOR THE STATISTICAL ANALYSIS | | | | | | | | |
| | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL | | | |
| Direct participants - stand alone | 13 | 15 | 19 | 20 | 20 | 87 | 87 | 87 | |
| Direct participants - annual report | 28 | 32 | 33 | 34 | 33 | 160 | 88 | 158 | |
| Match pairs - stand alone | 14 | 18 | 21 | 23 | 22 | 98 | 96 | 98 | |
| Match pairs - annual reports | 36 | 36 | 37 | 37 | 37 | 183 | 82 | 166 | |
| Total Reports | 91 | 101 | 110 | 114 | 112 | 528 | 353 | 509 | |

Table 4.5: Disclosure review - Stand alone reports produced by direct participants

| DIRECT PARTICIPANTS - STAND ALONE | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL REPORTS |
|---|-----------|-----------|---------------|---------------|---------------|---------------|
| CLEAN | | | | | | |
| 1 Barclays Bank plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 2 Battle McCarthy Carbon Club | | | | | | |
| 2.1 University of Brighton | N | N | N | N | N | 0 |
| 2.2 Brunel University | N | N | N | N | N | 0 |
| 2.3 Loughborough University | N | N | N | N | N | 0 |
| 2.4 Middlesex University | N | N | N | N | N | 0 |
| 2.5 Kings College London | N | N | N | N | N | 0 |
| 2.6 University of Plymouth | N | N | N | N | N | 0 |
| 2.7 The University of Edinburgh | N | N | N | N | N | 0 |
| 3 Budweiser Stag Brewing Co. Ltd (II) | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 4 Dalkia Energy plc (III) | N | N | X Veolia (D) | X Veolia (D) | X Veolia (D) | 3 |
| 5 Dalkia Utilities Services plc (III) | - | - | - | - | - | 0 |
| 6 Dana UK Holdings Ltd | N | N | N | N | N | 0 |
| 7 First Hydro Company (IV) | NP | NP | NP | NP | NP | 0 |
| 8 Ford Motor Company Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 9 Imerys Minerals Ltd | N | N | N | X (D) | N | 1 |
| 10 Ineos Fluor Ltd | N | N | N | N | N | 0 |
| 11 Kirklees Metropolitan Council | NP | X (D) | X (D) | NP | X (D) | 3 |
| 12 Lafarge plc | NP | X (D) | X (D) | X (D) | X (D) | 4 |
| 13 Land Securities plc | X (D) | NC | X (D) | X (D) | X (D) | 4 |
| 14 Marks & Spencer plc | NP | NP | X (D) | X (D) | X (D) | 3 |
| 15 Motorola GTSS | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 16 Natural History Museum | NP | NP | NP | NP | NP | 0 |
| 17 Rhodia Organique Fine Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 18 Rolls-Royce plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 19 Shell UK Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 20 UK Coal Mining Ltd | NP | NP | NP | NP | NP | 0 |
| DIRTY | | | | | | |
| 21 Asda Stores Ltd (V) | N | N | N | N | N | 0 |
| 22 BP plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 23 British Airways plc (VI) | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 24 British Sugar plc (VII) | NP | NP | NP | X ABF WEB (D) | X ABF WEB (D) | 2 |
| 25 General Domestic Appliances Ltd (VIII) | N | N | X Merloni (D) | X Merloni (D) | X Indesit (D) | 3 |
| 26 GKN (UK) plc | N | N | N | N | N | 0 |
| 27 Invista UK Ltd (IX) | X (D) | X (D) | X (D) | X (D) | X Koch (D) | 5 |
| 28 Lend Lease Real Estate Investment Services Ltd | N | N | N | N | N | 0 |
| 29 Mitsubishi Corporation UK plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 30 Somerfield Stores Ltd | N | N | N | N | N | 0 |
| 31 Tesco Stores Ltd | NP | X (D) | X (D) | X (D) | X (D) | 4 |
| 32 Royal Ordnance plc (X) | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| TOTAL REPORTS | 13 | 15 | 19 | 20 | 20 | 87 |
| TOTAL REPORTS CONSIDERED ON THE ANALYSIS | 13 | 15 | 19 | 20 | 20 | 87 |
| TOTAL REPORTS WITH GCC DISCLOSURE | 13 | 15 | 19 | 20 | 20 | 87 |

X - The report exists

N - The report could not be found

NC - No copies available (This classification was only considered if the organization said they have a report but it could not be located)

NP - The report was not produced (This classification was only considered if the organization said they have not produced a report)

D - Disclosure on GCC was found

ND - No disclosure on GCC was found

Table 4.6: Disclosure review - Annual reports produced by direct participants

| DIRECT PARTICIPANTS - ANNUAL REPORT | | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL REPORTS |
|---|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------|
| CLEAN | | | | | | | |
| 1 | Barclays Bank plc | X(ND) | X(ND) | X (D) | X(ND) | X(ND) | 5 |
| 2 | Battle McCarthy Carbon Club | | | | | | |
| 2.1 | University of Brighton | X(ND) | X(ND) | X(ND) | X (D) | X (D) | 5 |
| 2.2 | Brunel University | N | X(ND) | X(ND) | X(ND) | X(ND) | 4 |
| 2.3 | Loughborough University | N | X(ND) | X (D) | X(ND) | X(ND) | 4 |
| 2.4 | Middlesex University | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 2.5 | Kings College London | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 2.6 | University of Plymouth | N | N | N | N | N | 0 |
| 2.7 | The University of Edinburgh | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 3 | Budweiser Stag Brewing Co. Ltd (II) | N | N | N | X(ND) | X(ND) | 2 |
| 4 | Dalkia Energy plc (III) | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 5 | Dalkia Utilities Services plc (III) | - | - | - | - | - | 0 |
| 6 | Dana UK Holdings Ltd | N | X(ND) | X (D) | X(ND) | X(ND) | 4 |
| 7 | First Hydro Company (IV) | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 8 | Ford Motor Company Ltd | X(ND) | X(ND) | X(ND) | X (D) | X (D) | 5 |
| 9 | Imerys Minerals Ltd | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 10 | Ineos Fluor Ltd | N | N | N | N | N | 0 |
| 11 | Kirklees Metropolitan Council | NP | NP | NP | NP | NP | 0 |
| 12 | Lafarge plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 13 | Land Securities plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 14 | Marks & Spencer plc | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 15 | Motorola GTSS | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 16 | Natural History Museum | X(ND) | X (D) | X (D) | X(ND) | X(ND) | 5 |
| 17 | Rhodia Organique Fine Ltd | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 18 | Rolls-Royce plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 19 | Shell UK Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 20 | UK Coal Mining Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| DIRTY | | | | | | | |
| 21 | Asda Stores Ltd (V) | X(ND) Wal-Mart | X(ND) Wal-Mart | X(ND) Wal-Mart | X(ND) Wal-Mart | X(ND) Wal-Mart | 5 |
| 22 | BP plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 23 | British Airways plc (VI) | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 24 | British Sugar plc (VII) | X (D) | X (D) | X(ND) | X (D) | X (D) | 5 |
| 25 | General Domestic Appliances Ltd (VIII) | N | N | X(ND)Merloni | X(ND)Merloni | X(ND) Indesit | 3 |
| 26 | GKN (UK) plc | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 27 | Invista UK Ltd (IX) | X (D) Dupont | X (D) Dupont | X (ND) Dupont | X (D) Dupont | NP | 4 |
| 28 | Lend Lease Real Estate Investment Services Ltd | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 29 | Mitsubishi Corporation UK plc | X(ND) | X(D) | X (D) | X (D) | X (D) | 5 |
| 30 | Somerfield Stores Ltd | X(ND) | X (D) | X (D) | X (D) | X(ND) | 5 |
| 31 | Tesco Stores Ltd | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 32 | Royal Ordnance plc (X) | X(ND) | X(ND) | X (D) | X (D) | X (D) | 5 |
| TOTAL REPORTS | | 26 | 32 | 33 | 34 | 33 | 158 |
| TOTAL REPORTS CONSIDERED ON THE ANALYSIS | | 28 | 32 | 33 | 34 | 33 | 160 |
| TOTAL REPORTS WITH GCC DISCLOSURE | | 12 | 18 | 20 | 20 | 18 | 88 |

X - The report exists

N - The report could not be found

NC - No copies available (This classification was only considered if the organization said they have a report but it could not be located)

NP - The report was not produced (This classification was only considered if the organization said they have not produced a report)

D - Disclosure on GCC was found

ND - No disclosure on GCC was found

Table 4.7: Disclosure review - Stand alone reports produced by match pairs

| MATCH PAIRS - STAND ALONE | | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL REPORTS |
|---|--|----------------------|----------------------|----------------------|----------------------|----------------------|---------------|
| CLEAN | | | | | | | |
| 1 | Halifax and Bank of Scotland (HBOS) | NC | X (D) | X (D) | X (D) | X (D) | 4 |
| 2 | Battle McCarthy Carbon Club | | | | | | |
| 2.1 | The University of Salford | N | N | N | N | N | 0 |
| 2.2 | The University of Teesside | N | N | N | N | N | 0 |
| 2.3 | Bristol University | N | N | N | N | N | 0 |
| 2.4 | The University of Wolverhampton | N | N | N | N | N | 0 |
| 2.5 | University of Derby | N | N | N | N | N | 0 |
| 2.6 | The University of Sheffield | N | N | N | N | N | 0 |
| 2.7 | The University of Glasgow | N | N | N | N | N | 0 |
| 3 | SabMiller | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 4 | National Grid Transco | X (D) Lattice | N | X (D) | X (D) | X (D) | 4 |
| 5 | National Grid Transco | - | - | - | - | - | |
| 6 | Visteon UK Limited | N | N | N | X (D) | X (D) | 2 |
| 7 | United Utilities PLC | X (D) | X (D) | N | X (D) | X (D) | 4 |
| 8 | Honda of the UK Manufacturing Limited | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 9 | Pilkington | NP | NP | NP | NP | NP | 0 |
| 10 | Air Liquide UK Limited | X (D) | N | N | N | N | 0 |
| 11 | Bolton Council | N | N | N | N | N | 0 |
| 12 | Hanson | X (D) | X (D) | N | X (D) | NP | 3 |
| 13 | British Land CO | NP | NP | X (D) | X (D) | X (D) | 3 |
| 14 | Kingsfisher | NP | X (D) | X (D) | X (D) | X (D) | 4 |
| 15 | Ericsson | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 16 | National Galary | N | N | N | N | N | 0 |
| 17 | Degussa Knottingley Limited | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 18 | Smiths Group | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 19 | Chevron | N | N | X (D) | X (D) | X (D) | 3 |
| 20 | Mining (Scotland) Limited | N | N | N | N | N | 0 |
| DIRTY | | | | | | | |
| 21 | GUS | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 22 | Exxon Mobil | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 23 | London Underground (LU) and Heatrow Airport (HA) | LU X (D) HA X (D) | LU X (D) HA X (D) | LU X (D) HA X (D) | LU X (D) HA X (D) | LU X (D) HA X (D) | 10 |
| 24 | Tate & Lyle Industries Limited | NC | NC | X (ND) | X (ND) | X (D) | 3 |
| 25 | Electrolux | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 26 | Wagon | N | N | N | N | N | 0 |
| 27 | ICI | N | X (D) | X (D) | X (D) | X (D) | 4 |
| 28 | Liberty international | NP | NP | X (D) | X (D) | X (D) | 3 |
| 29 | Sony | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 30 | Safeway Stores Limited | N | X (D) | X (D) | N | N | 2 |
| 31 | Sainsbury's Supermarkets LTD | X (D) | X (D) | X (D) | X (D) | X (D) | 6 |
| 32 | Qinetiq Group | NP | NP | NP | NP | NP | 0 |
| TOTAL REPORTS | | 14 | 18 | 21 | 23 | 22 | 98 |
| TOTAL REPORTS CONSIDERED ON THE ANALYSIS | | 14 | 18 | 21 | 23 | 22 | 98 |
| TOTAL REPORTS WITH GCC DISCLOSURE | | 14 | 18 | 20 | 22 | 22 | 96 |

X - The report exists

N - The report could not be found

NC - No copies available (This classification was only considered if it the organization said they have a report but it could not be located)

NP - The report was not produced (This classification was only considered if the organization said they have not produced a report)

D - Disclosure on GCC was found

ND - No disclosure on GCC was found

Table 4.8: Disclosure review - Annual reports produced by match pairs

| MATCH PAIRS - ANNUAL REPORTS | | 2000 | 2001 | 2002 | 2003 | 2004 | TOTAL REPORTS |
|---|--|----------------------|---------------------|---------------------|--------------------|--------------------|---------------|
| CLEAN | | | | | | | |
| 1 | Halifax and Bank of Scotland (HBOS) | X (D) | X (D) | X (D) | X (ND) | X (D) | 5 |
| 2 | Battle McCarthy Carbon Club | | | | | | |
| 2.1 | The University of Salford | X (ND) | X (ND) | X (ND) | X (ND) | X (ND) | 5 |
| 2.2 | The University of Teesside | X (ND) | X (ND) | X (ND) | X (ND) | X (ND) | 5 |
| 2.3 | Bristol University | X(ND) | X(ND) | X(ND) | X(ND) | X (D) | 5 |
| 2.4 | The University of Wolverhampton | X(ND) | X(ND) | X(ND) | X(ND) | N | 4 |
| 2.5 | University of Derby | N | N | N | X(ND) | X(ND) | 2 |
| 2.6 | The University of Sheffield | N | N | N | N | N | 0 |
| 2.7 | The University of Glasgow | X (ND) | N | N | X(ND) | X(ND) | 3 |
| 3 | SabMiller | X(ND) | X (D) | X (D) | X (D) | X (D) | 5 |
| 4 | National Grid Transco | X(ND) | X (D) | X (D) | X (D) | X (D) | 5 |
| 5 | National Grid Transco | - | - | - | - | - | 0 |
| 6 | Visteon UK Limited | N | N | N | X(ND) | X(ND) | 2 |
| 7 | United Utilities PLC | X (D) | HC (D) | X (D) | X (D) | X (D) | 5 |
| 8 | Honda of the UK Manufacturing Limited | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 9 | Pilkington | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 10 | Air Liquide UK Limited | N | X (ND) | X (D) | X (D) | X (D) | 4 |
| 11 | Bolton Council | N | N | N | X(ND) | X(ND) | 2 |
| 12 | Hanson | X(ND) | X(ND) | X(ND) | X(ND) | X (D) | 5 |
| 13 | British Land CO | X(ND) | X (D) | X (D) | X (D) | X (D) | 5 |
| 14 | Kingsfisher | X (D) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 15 | Ericsson | X(ND) | X(ND) | X(ND) | X(ND) | X (D) | 5 |
| 16 | National Galary | NC | NC | NC | X (ND) | X (ND) | 2 |
| 17 | Degussa Knottingley Limited | X (D) | X (ND) | X (ND) | X (ND) | X (D) | 5 |
| 18 | Smiths Group | X(ND) | X (D) | X (D) | X(ND) | X(ND) | 5 |
| 19 | Chevron | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 20 | Mining (Scotland) Limited | X (ND) | X (ND) | X (ND) | X (ND) | X (D) | 5 |
| DIRTY | | | | | | | |
| 21 | GUS | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 22 | Exxon Mobil | X (D) | N | X (D) | X (D) | X (D) | 4 |
| 23 | London Underground (LU) and Heatrow Airport (HA) | LU X(ND) HA X (D) | LU X(ND) HA X(D) | LU X(ND) HA X(D) | LU X(D) HA X(D) | LU X(D) HA X(D) | 10 |
| 24 | Tate & Lyle Industries Limited | X (D) | X (D) | X (D) | X (ND) | X (ND) | 5 |
| 25 | Electrolux | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 26 | Wagon | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 27 | ICI | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 28 | Liberty international | X(ND) | X(ND) | X(ND) | X (D) | X (D) | 5 |
| 29 | Sony | X (D) | X (D) | X (D) | X (D) | X (D) | 5 |
| 30 | Safeway Stores Limited | X (ND) | X (ND) | X (D) | X Morrisons (D) | X Morrisons (D) | 5 |
| 31 | Sainsbury's Supermarkets LTD | X(ND) | X(ND) | X(ND) | X(ND) | X(ND) | 5 |
| 32 | Qinetiq Group | N | N | X (ND) | X (ND) | X (ND) | 5 |
| TOTAL REPORTS | | 31 | 30 | 32 | 37 | 36 | 168 |
| TOTAL REPORTS CONSIDERED ON THE ANALYSIS | | 36 | 36 | 37 | 37 | 37 | 183 |
| TOTAL REPORTS WITH GCC DISCLOSURE | | 13 | 14 | 17 | 16 | 22 | 82 |

X - The report exists

N - The report could not be found

NC - No copies available (This classification was only considered if the organization said they have a report but it could not be located)

NP - The report was not produced (This classification was only considered if the organization said they have not produced a report)

D - Disclosure on GCC was found

ND - No disclosure on GCC was found

4.2 Data limitations and statistical tests

In order to explore the data collected by the research instrument two types of analysis were originally planned. The first was categorical analysis, which would explore variations in disclosure. The second analysis was to explore the volume of disclosure on GCC issues. Table 4.4 shows that the total observations considered in this study are 528 and from this total, 353 reports presented information on GCC issues. This means that approximately 30% of reports did not disclose any information on GCC. The existence of so many observations points with value equal to zero make the volume of disclosure not normal distributed.

A non normal distribution restricts analysis to the application of parametric tests. The name parametric tests come from parameters and this means that these tests rely on some parameters/characterises of the sample (Pallant, 2001). Those characteristics are often related to the population distribution (Pallant, 2001). For example, standardised means of a sample from a population that is normally distributed will be distributed following the t distribution if the tests applied uses repeated samples of equal size (Statsoft, 2008). This assumption cannot be taken if there is non normal distribution (Statsoft, 2008), as is the case here.

While evaluating the appropriate statistical tests to use, the possibility of excluding part of those reports that present disclosure on GCC and conducting the transformation required to correct failures of normality was considered. However, the exclusion of reports with no information on GCC could compromise the aims of this research. The fact that organizations did not disclose GCC is relevant to the study. The inclusion of all observations will not only explore disclosure characteristics on GCC but it will also call attention to the fact that there is still a lack of information disclosed by several organizations. The study including the entire data base will, therefore, allow a more realistic picture on organizations' reporting practices on GCC to be presented.

As result, two main reasons guided the application of non-parametric tests in this research. The first reason was the fact that non-parametric tests do not make assumptions on the distribution of the variable (Pallant, 2001). The second reason was the fact that the application of non-parametric tests is recommended for studies that

consider nominal data (Pallant, 2001) which is also important for the aims of this dissertation. Thus, select non-parametric techniques suited the characteristics of the data and could be applied to both categorical and volume of disclosure analysis. It is also important to stress that the use of non-parametric tests for both types of analysis may also not confuse the audience with different types of techniques.

Despite the fact that non-parametric tests do not make assumptions on the distribution of variables, these tests require other general assumptions. The first assumption is that the sample should be randomly selected. This research involves two groups of organizations: (i) the entire population of DP on the UK ETS and (ii) MP which represents non-UK ETS participants. The MP was selected to represent a group that could match (or be the most similar organization) to each one of DP at the UK ETS. In addition, MP were the best option represent the entire population of DP as if they had not participated in the UK ETS (see previous chapter to find more details on how MP were selected). Thus, these two groups of organization represent the entire population and not a sample of organizations, satisfying the first assumption. The second assumption refers to the independence of the sample. This means that each observation can only be counted once and the data from one subject cannot influence the data from another subject (Pallant, 2001). Given the data was collected from reports produced by different organizations in different medias (SA and AR), this data requirement was met.

The two general assumptions described previously are applied to each one of non-parametric tests. In addition to those general assumptions, some non-parametric tests require additional assumptions. Table 4.9 describes several types of non-parametric tests and it also shows the additional assumptions that each of these tests could require. Finally, this table present the parametric alternative to each non-parametric test where it exists.

Table 4.9: Non-parametric tests

| NON-PARAMETRIC TECHNIQUES | OBJECTIVE | ADDITIONAL ASSUMPTIONS | PARAMETRIC ALTERNATIVE |
|------------------------------------|--|--|---------------------------------------|
| 1. One-sample chi-square test | It evaluates if the proportion of cases into categories of a single variable are equal to hypothetical value. | A1. Large sample size: The expected frequencies should be greater or equal to 5 to 80% or more of the categories. | None. |
| 2. Chi-square for independence | It explores if the frequencies of various categories in one variable are different from frequencies of various categories in other variable. | A1. Expected frequency should be five or more in at least 80% of cells. For tables 2x2 the expected frequencies should be greater than five. | None. |
| 3. Mann-Whitney test | It is used to test if the medians from two independent groups from one variable are different. | A1. Same distributions between two populations. A2. Sample size needs to exceed 42. | Independent-samples t-test. |
| 4. Wilcoxon, McNemar and sign test | It evaluates the differences between paired scores. | A1. Wilcoxon only: The difference of scores should be continuously distributed without ties in the difference scores across pairs of scores. A2. Wilcoxon only: It is required a sample of at least 16 or more pairs of nontied scores. A3. McNemar and sign test: It is required a sample of at least 26 or more pairs of nontied scores. | Paired-samples t-test. |
| 5. Kruskal-Wallis test | It is used to test if the medians from more than two independent groups from one variable are different. | A1. Same distributions between two populations. A2. Number of cases should be greater or equal to 30. | One-way between-groups ANOVA. |
| 6. Friedman and Cochran tests | It is applied to repeated measures in two or more points in time (Pallant, 2001). | A1. Friedman only: The difference of scores should be continuously and symmetrical without ties. A2. Number of cases should be greater or equal to 30. | One-way repeated-measures ANOVA. |
| 7. Spearman rank order correlation | It calculates the relationship between two continuous variables. | None. | Pearson's product-moment correlation. |

Sources: Siegel & Castellan (1998), Green *et al.* (2000), Pallant (2001), and Field (2005).

Despite the fact that non-parametric techniques are recommended for small samples/populations⁵⁰ (Pallant, 2001), table 4.9 shows that some non-parametric test require a minimum sample/population size. When the reports were collected, they were divided into two groups, clean and dirty pairs (see previous chapter). However, due to small numbers of dirty pairs (twelve pairs) it became very difficult to undertake statistical analysis separately on these two different groups of organizations. Thus, the statistical tests in this chapter considered dirty and clean pairs together. Also, due to the small population size, it was not possible to include corporate characteristics, such as size and industry sector, in the statistical analysis carried on this research.

The next sections describe the statistical tests applied on this research. It starts with the categorical analysis followed by the analysis on the volume of disclosure. The chapter ends by comparing the disclosures on GCC produced by DP and MP.

4.3 Categorical data analysis: Direct participants and match pairs

This section is designed to provide categorical data analysis considering the incidence of GCC disclosure produced by DP and MP. This analysis aims to provide answers for two research questions.

RQ 1: What disclosures do DP make in AR and SA on GCC and how have these disclosure changed over the time?

RQ 2: What do DP and MP disclose on GCC compared to each other?

In order to address these research questions, this section presents descriptive statistics and non-parametric tests to explore possible differences on GCC disclosure between four different groups of reports:

- (i) SA produced by DP
- (ii) SA produced by MP
- (iii) AR produced by DP
- (iv) AR produced by MP

⁵⁰ The large the sample, the higher the probability of obtaining more accurate estimation (Siegel and Castellan, 1998). Thus, sample size is one of the parameters used to choose the appropriate statistical test to use.

4.3.1 Disclosure incidence by type of reports

Table 4.4 presents the total of 528 reports considered in this research distributed on the four report groups over 2000-2004. From the total of 528 reports, SA produced by DP and its MP represents 16% and 19% respectively. AR produced by DP and its MP represents 30% and 35%, respectively. Table 4.3 shows that 353 reports presented disclosure on GCC issues from 2000 until 2004. In terms of SA, the highest number of reports that mention GCC was found on SA produced by MP (27%) compared with SA produced by DP (25%). On the other hand, highest proportion of AR that mentioned GCC was the ones produced by DP (25%) compared with proportion of AR produced by MP (23%). The number of reports that spelling disclose on GCC issues increased over the five years for all types of reports with exception to AR produced by DP.

A two way contingency table was used to investigate if the number of reports that contained disclosure on GCC issues produced by DP is statistically significant from those produced by MP. However, this test was only applied to AR. The main reason for this was that the frequencies of SA that present and not presented disclosure on GCC did not differ much. As an illustration, all SA produced by DP presented disclosure on GCC and only two SA produced by MP did not presented disclosure on GCC. Applying contingency table for this sort of frequencies would have up to 20% of frequencies and not less than 5 observations, because this would compromise the accuracy of the test (Field, 2005). Table 4.10 presents the results comparing number of AR produced by DP and MP. The results of chi-square test indicate that differences exists for $p > 0.10$, Pearson $\chi^2(1, N=343) = 3.547$, $p=0.06$. The probability of AR presents disclosure on GCC was about 1.505 times more likely when reports were produced by DP as opposed to MP.

A two way contingency table was also used to explore if the disclosure produced by DP and MP differs before and after the UK ETS started. More specifically, this test was applied to investigate if the number of AR and SA (which contained disclosure) produced by DP and MP differs before (2000 and 2001) and after (2003 and 2004) the UK ETS started. The results indicate that there were no significant differences between number of AR that disclose on GCC produced by DP and its MP before and after the UK ETS started, Pearson $\chi^2(1, N=133) = 0.09$, $p=0.76$ (table 4.11).

Table 4.10: Two-way contingency table comparing annual reports produced by direct participants and match pairs

| | | ANNUAL REPORTS BY ORGANIZATION TYPE | | | | | |
|---------------|---------------------|---|--|----------|---------------------------------|----------|--|
| | | Non Disclosure GCC (numbers of reports) | Disclosure on GCC (numbers of reports) | <i>N</i> | Pearson Two - sided χ^2 | <i>p</i> | Odds ratio (Direct Participants/ Match Pairs) |
| Annual report | Match pairs | 101 | 82 | 343 | 3.547 | 0.06 | 1.505 |
| | Direct participants | 72 | 88 | | | | |

Table 4.11: Two-way contingency table comparing annual reports and stand alone produced before and after UK ETS

| | | DISCLOSURE PRODUCED BEFORE AND AFTER UK ETS STARTED | | | | |
|---------------|---------------------|---|----------------------------|----------|---------------------------------|----------|
| | | Disclosure Before UK ETS | Disclosure After UK ETS | <i>N</i> | Pearson Two - sided χ^2 | <i>p</i> |
| Annual report | Match pairs | 27 | 38 | 133 | 0.09 | 0.76 |
| | Direct participants | 30 | 38 | | | |
| Stand alone | Match pairs | 32 | 44 | 144 | 0.013 | 0.91 |
| | Direct participants | 28 | 40 | | | |

Similar results were achieved for SA, Pearson $\chi^2(1, N=144) = 0.013, p=0.91$ (table 4.11). This was a surprising result. The UK ETS requires DP to achieve greenhouse gas (GHG) emissions targets every year. Thus, it was reasonable to assume that DP would tend to increase their disclosure on GCC commitments compared with MP that were not under the UK ETS pressure to reduce GHG emissions. However, the fact that the DP did not increase the numbers of reports that disclosed on GCC did not mean that the UK ETS did not influence the disclosure made by these organizations. The next section will present further analysis considering volume of GCC disclosure produced by DP and MP, in order to explore in more details possible influence of the UK ETS.

4.3.2 Disclosure incidence of by category

Frequency analysis was carried in order to study differences on four GCC disclosure categories: Emissions data, targets, actions and narrative. Table 4.12 shows number of reports by categories of disclosure and per type of reports. The most frequent category of disclosure was actions, followed by emissions, targets and other/narrative disclosure.

A two-way contingency table was used to explore if the differences identified in table 4.12 on the numbers of reports that present information in each four disclosure categories are statistically significant. With regard to the AR, significant differences were found on the disclosure produced by DP and its MP. The results of two-way contingency table (table 4.13 and 4.17 for a results summary) indicate that DP produced highest numbers of reports that contained disclosure on targets ($\chi^2 = 9.09, p=0.003$) and actions ($\chi^2 = 8.53, p=0.003$), compared to its MP. SA also presented significant differences regard to disclosure categories (table 4.13). DP produced the highest numbers of reports that disclosed on targets comparing to its MP ($\chi^2 = 8.56, p=0.003$). Significant difference was found on the number of SA that disclosed narrative data between DP and MP. Results considering disclosure on narrative only (excluding other types of disclosure) shows that the number of SA produced by DP was higher compared with MP ($\chi^2 = 7.14, p=0.008$). Finally, there was no significant difference between the number of AR that disclosed narrative data between DP and MP ($\chi^2 = 1.93, p=0.165$). This result could suggest that the disclosure produced by DP could have improved on its

quality, since DP disclosed differently from MP in some categories, especially with regard to targets.

This section continues to explore descriptive statistics on three issues: type of narrative disclosed, actions to tackle GCC and other types of disclosure (such as opinions on GCC, pressure groups influence on organization's behaviour to tackle GCC and emissions measurement). The frequency analysis on those issues aims to further describe what DP disclose on GCC.

Table 4.14 shows frequency of reports per type of narrative⁵¹, type of reports and year. The majority of reports did not provide any narrative on GCC (see table 4.14). SA produced presented more narrative than AR. From the total of SA that presented disclosure on GCC the percentage of DP and MP reports that presented narrative were 43% and 24%, respectively. When narrative in the SA produced by DP was examined, the three most frequent categories were: (i) business GHG responsiveness will be good for business, (ii) market-base implementation mechanism and (iii) rational economics (focusing on technical analysis, such as cost-benefit). The three most frequent types of narrative presented at SA produced by MP were: (i) business GHG responsiveness will be good for business, (ii) external policies as inappropriate, (iii) market-base implementation mechanism. With regard to AR, two types of narrative were the most frequent disclosed by DP and MP. Those types of narrative were: (i) business GHG responsiveness will be good for business and (ii) market-base implementation mechanism. In general terms, where there was a narrative, both sets of organizations in all types of reports focused on narrative that GCC responsiveness will be good for business.

⁵¹ The detailed definitions of those narratives are contained in the chapter 3.

Table 4.12: Disclosure categories by report type

| NUMBER OF REPORTS PER CATEGORIES AND REPORT TYPE | | | | | |
|---|--|--|--------------------------------|-----------------------------------|-------|
| | Direct participants and stand alone | Direct participants and annual report | Match pairs and stand alone | Match pairs and annual reports | Total |
| Emissions | 80 | 26 | 85 | 31 | 222 |
| Targets | 66 | 41 | 53 | 20 | 180 |
| Actions | 83 | 83 | 94 | 65 | 325 |
| Narrative | 37 | 15 | 23 | 8 | 83 |
| Total Reports | 87 | 88 | 96 | 82 | |

Table 4.13: Two-way contingency table by disclosure category

| | | ANNUAL REPORTS BY ORGANIZATION TYPE | | | | | |
|---------------------------|---------------------|--|------------------------------------|---|---------------------------------|----------|--------------------------------------|
| | | Non Disclosure (numbers of reports) | Disclosure (numbers of reports) | <i>N</i> | Pearson Two - sided χ^2 | <i>p</i> | Odds (Disclosure/ Non-disclosure) |
| Emissions - Total reports | Stand Alone | 18 | 165 | 353 | 121.12 | 0.000 | 9.167 |
| | Annual reports | 113 | 57 | | | | 0.504 |
| Emissions - Annual report | Match pairs | 51 | 31 | 170 | 1.30 | 0.254 | |
| | Direct participants | 62 | 26 | | | | |
| Emissions - Stand alone | Match pairs | 11 | 85 | 183 | 0.60 | 0.439 | |
| | Direct participants | 7 | 80 | | | | |
| Targets - Total reports | Stand Alone | 64 | 119 | 353 | 29.96 | 0.000 | 1.859 |
| | Annual reports | 109 | 61 | | | | 0.560 |
| Targets - Annual report | Match pairs | 62 | 20 | 170 | 9.09 | 0.003 | 0.323 |
| | Direct participants | 47 | 41 | | | | 0.872 |
| Targets - Stand alone | Match pairs | 43 | 53 | 183 | 8.56 | 0.003 | 1.233 |
| | Direct participants | 21 | 66 | | | | 3.143 |
| Actions - Total reports | Stand Alone | 6 | 177 | 353 | 11.27 | 0.001 | 29.500 |
| | Annual reports | 22 | 148 | | | | 6.727 |
| Actions - Annual report | Match pairs | 17 | 65 | 170 | 8.53 | 0.003 | 3.824 |
| | Direct participants | 5 | 83 | | | | 16.600 |
| Actions - Stand alone | Match pairs | 2 | 94 | Not possible. Expected frequencies are less than five in 50% of cells. | | | |
| | Direct participants | 4 | 83 | | | | |
| Narrative - Annual report | Match pairs | 74 | 8 | 170 | 1.93 | 0.165 | |
| | Direct participants | 73 | 15 | | | | |
| Narrative - Stand alone | Match pairs | 73 | 23 | 183 | 7.14 | 0.008 | 0.315 |
| | Direct participants | 50 | 37 | | | | 0.740 |

Table 4.14: Frequencies of narrative by report type

| NARRATIVE DISCLOSURE BY REPORT TYPE | | | | |
|---|--|--|--------------------------------|-----------------------------------|
| | Direct participants and stand alone | Direct participants and annual report | Match pairs and stand alone | Match pairs and annual reports |
| 1. Denial (Down playing impacts) | 0 | 0 | 1 | 0 |
| 2. Bussiness/environmental struggle (Tension between business and environment) | 3 | 0 | 1 | 0 |
| 3. External policies as innapropriate (Policies could damage the economy) | 3 | 1 | 4 | 0 |
| 4. GHG are developing countries' problem (GCC is mostly caused by developing countries) | 0 | 0 | 1 | 1 |
| 5. Corporate voluntarialism/autonomy (Market can voluntarialy sort the problem out) | 6 | 0 | 0 | 0 |
| 6. Rational economics (Focus on technical analysis, such as cost-benefit) | 7 | 1 | 2 | 0 |
| 7. Market-base implementation mechanism (Market-base initiatives are appropriate to tackle GCC) | 14 | 6 | 3 | 5 |
| 8. Techinological solutions will sort the problem out (Technical changes) | 1 | 1 | 1 | 0 |
| 9. Behaviour change of employees (or other individuals) will have an impact to solve GCC | 3 | 0 | 0 | 0 |
| 10. The business GHG responsiveness will be good for bussiness ('Win-win' paradigm) | 17 | 6 | 14 | 2 |
| 11. Other (Other rationale that was not specified previously) | 0 | 1 | 1 | 0 |
| Total Reports | 37 | 15 | 23 | 8 |
| Total Reports with GCC disclosure | 87 | 88 | 96 | 82 |
| % Reports with narrative | 43% | 17% | 24% | 10% |

Table 4.15 shows that a large proportion of reports, for all types of reports, presented disclosure on actions related to energy use and energy/fuel efficiency. Larger proportion of DP reports disclosed on emissions trading if compared with MP reports. This result was expected since DP were participating in the UK ETS. In addition, the experience in the UK ETS could have motivated DP to disclose more about other possible emissions trading initiatives, such as EU ETS. MP, compared to DP, focused more on transport initiatives and actions on refrigeration and air conditioning.

Compared with DP, MP seemed to focus more on the existence and effects of anthropogenic global warming (table 4.16). In addition, MP is likely to offer more details on their emissions sources and countries that generate emissions. On the other hand, DP (considering AR and SA together) disclosed more on global political orders such as UN (via Kyoto Protocol) and EU. DP also disclosed more on incentives and awards received compared with MP.

Table 4.17 presents the summary of results on categorical statistical analysis. In sum, DP presented higher number of reports that disclose on GCC at AR compared with MP. In addition, DP presented highest numbers of SA that disclosed on targets and narrative and highest numbers of AR that disclosed on targets and actions. The disclosure on actions presented by DP was mostly centred on information related to energy use and energy/fuel efficiency. DP also stressed on the ‘win-win’ situation in which business responsibility on GCC will be good for business, pressure groups influence, incentives and awards to tackle GCC.

Table 4.15: Actions taken by organizations to tackle GCC by report type

| ACTIONS BY REPORT TYPE | | | | |
|---------------------------------------|-------------------------------------|---------------------------------------|-----------------------------|--------------------------------|
| | Direct participants and stand alone | Direct participants and annual report | Match pairs and stand alone | Match pairs and annual reports |
| 5. Energy conservation | 54 | 20 | 70 | 17 |
| 7. Energy and fuel efficiency | 50 | 22 | 68 | 14 |
| 1. New technologies | 44 | 15 | 40 | 7 |
| 20. Partnerships | 43 | 15 | 30 | 14 |
| 24. UK ETS (I) | 39 | 28 | 1 | 2 |
| 12. Strategies/Management programme | 36 | 19 | 48 | 14 |
| 6. Renewable energy | 30 | 17 | 32 | 6 |
| 2. Redesigning | 29 | 13 | 45 | 16 |
| 4. Waste | 21 | 11 | 18 | 2 |
| 23. EU ETS | 19 | 8 | 6 | 7 |
| 19. Research sponsorship | 14 | 2 | 8 | 5 |
| 14. Board level | 10 | 2 | 10 | 0 |
| 25. Chicago climate exchange | 9 | 3 | 0 | 0 |
| 9. Travel reductions | 9 | 1 | 20 | 2 |
| 17. Supply chain | 9 | 0 | 20 | 2 |
| 11. Alternative types transport | 7 | 0 | 10 | 0 |
| 13. Benchmarking | 6 | 3 | 9 | 3 |
| 21. Carbon sequestration | 6 | 2 | 3 | 0 |
| 16. Employees training | 6 | 0 | 11 | 0 |
| 8. Refrigeration and air conditioning | 5 | 2 | 23 | 1 |
| 10. Logistics | 5 | 1 | 20 | 0 |
| 18. Consumer training | 5 | 0 | 1 | 1 |
| 26. Internal emissions trading | 4 | 3 | 1 | 2 |
| 15. Employees incentives | 3 | 1 | 7 | 0 |
| 22. Carbon offset | 2 | 0 | 8 | 5 |
| 3. Certifications | 0 | 0 | 0 | 0 |

(*)Two match pairs disclosed on UK ETS. National Grid said that has participated on the scheme elaboration.

Pilkington said that traded emissions in this scheme as a climate change agreement participant.

Table 4.16: Other disclosure issues by report type

| | REPORT TYPE AND OTHER DISCLOSURE ISSUES | | | |
|--|---|---------------------------------------|-----------------------------|--------------------------------|
| | Direct participants and stand alone | Direct participants and annual report | Match pairs and stand alone | Match pairs and annual reports |
| The sources of GHG emissions are identified | 42 | 5 | 68 | 10 |
| The organization states clear that anthropogenic global warming exists | 37 | 6 | 56 | 8 |
| The organization discloses information on Kyoto Protocol | 33 | 21 | 26 | 8 |
| The organization states clear that GHG's have an impact on global warming | 33 | 6 | 52 | 8 |
| The organization discloses information on European Union (EU) involvement with regard to climate change issues | 26 | 20 | 29 | 10 |
| The organization discloses information on incentives received to reduce GHG emissions | 13 | 11 | 1 | 1 |
| The organization discloses information on awards received due to actions to tackle climate change | 12 | 7 | 11 | 3 |
| The organization discloses information on penalties with regard to no-commitment with policies | 3 | 1 | 0 | 3 |
| The amount of GHG are presented by county where GHG have been generated | 3 | 1 | 8 | 0 |
| Total Reports | 71 | 45 | 88 | 26 |

Table 4.17: Results summary -Categorical data analysis

| DISCLOSURE CHARACTERISTICS | STAND ALONE | ANNUAL REPORT | TABLE |
|--|--|--|--------------|
| RQ1 | | | |
| Two-way contingency table | | | |
| Number of reports that disclose GCC data | N | DPH | 4.10 |
| Number of reports before/after the UK ETS | N | N | 4.11 |
| RQ2 | | | |
| Two-way contingency table | | | |
| Number of reports that disclose emissions | N | N | 4.13 |
| Number of reports that disclose targets | DPH | DPH | 4.13 |
| Number of reports that disclose actions | N | DPH | 4.13 |
| Number of reports that discloses narrative | DPH | N | 4.13 |
| Frequency analyses | | | |
| Narrative | DP presented more reports with some rationale behind GCC disclosure. All types of reports stressed that GCC responsiveness will be good for business. | DP presented more reports with some rationale behind GCC disclosure. All types of reports stressed that GCC responsiveness will be good for business. | 4.14 |
| Actions | MP presented more reports with disclosure on actions. Large proportion of reports produced by DP and MP presented information related to energy use and energy/fuel efficiency. | DP presented more reports with disclosure on actions. Large proportion of reports produced by DP and MP presented information related to energy use and energy/fuel efficiency. | 4.13 4.15 |
| Other disclosures issues | DP presented more reports with disclosure on groups of political order, incentives and awards. MP presented more reports with disclosure on the existence and effects of GCC. | DP presented more reports with disclosure on pressure groups, incentives and awards. MP presented more reports with disclosure on the existence and effects of GCC. | 4.16 |

N: The difference on numbers of reports produced by direct participants and match pairs is not statistically significant.

DPH: Direct participants presented more GCC disclosure compared with match pairs.

4.4. Volume disclosed: Direct participants and match pairs

This section is designed to provide analysis considering the volume of GCC disclosure produced by DP and MP. This analysis aims to provide answers for two research questions.

RQ 1: What disclosures do DP make in AR and SA on GCC and how have these disclosure changed over the time?

RQ 2: What do DP and MP disclose on GCC compared to each other?

In order to address these research questions, this section presents descriptive statistics and non-parametric tests to explore possible differences on GCC disclosure between four different groups of reports:

- (i) SA produced by DP
- (ii) SA produced by MP
- (iii) AR produced by DP
- (iv) AR produced by MP

4.4.1 Volume of disclosure by type of reports

Before using non-parametric tests, a study considering measures of location (mean, median and mode), dispersion (variance and standard deviation) and graphic analysis will be presented to explore the volume of disclosure on GCC issues in the four groups of reports. In table 4.18 all reports collected (528 reports) are considered. In contrast, table 4.19 presents data only for those reports which presented disclosure on GCC issues. Differences between those two tables are mostly significant in AR produced by DP and MP. For instance, AR produced by DP disclosed 10% of a page in average. However, this percentage increase for 17% if only those reports that presented disclosure on GCC are considered. Figure 4.1 only considers reports that contain on GCC disclosure. As is evident from the figure the mean of disclosure made by MP in SA was higher than the mean disclosure presented by DP from 2000 until 2004. With regard to AR, the DP disclosed higher than its MP from 2000 until 2004. Those results did not change much when compared with figure 4.2, which includes only reports that contained disclosure on GCC. The next step is to apply non-parametric tests to investigate if the differences on the regarding to the volume of disclosure identified on the previous analysis are statistically significant.

Table 4.18: Measures of location and dispersion excluding missing values

| | TOTAL DISCLOSURE | | | | | |
|-------------------------------------|------------------|--------|------|----------|--------------------|----------|
| | Mean | Median | Mode | Variance | Standard Deviation | <i>n</i> |
| Direct participants - stand alone | 1.11 | 0.60 | 0.38 | 1.35 | 1.16 | 87 |
| Direct participants - annual report | 0.10 | 0.02 | 0.00 | 0.02 | 0.16 | 160 |
| Match pairs - stand alone | 1.48 | 0.84 | 0.52 | 2.80 | 1.67 | 98 |
| Match pairs - annual reports | 0.07 | 0.00 | 0.00 | 0.02 | 0.14 | 183 |
| Total stand alone | 1.30 | 0.69 | 0.38 | 2.14 | 1.46 | 185 |
| Total annual report | 0.08 | 0.00 | 0.00 | 0.02 | 0.15 | 343 |

Table 4.19: Measures of location and dispersion excluding missing values and observations with no disclosure

| | TOTAL DISCLOSURE | | | | | |
|-------------------------------------|------------------|--------|------|----------|--------------------|----------|
| | Mean | Median | Mode | Variance | Standard Deviation | <i>n</i> |
| Direct participants - stand alone | 1.11 | 0.60 | 0.38 | 1.35 | 1.16 | 87 |
| Direct participants - annual report | 0.17 | 0.11 | 0.04 | 0.03 | 0.18 | 88 |
| Match pairs - stand alone | 1.51 | 0.88 | 0.52 | 2.81 | 1.68 | 96 |
| Match pairs - annual reports | 0.15 | 0.07 | 0.01 | 0.03 | 0.18 | 82 |
| Total stand alone | 1.32 | 0.70 | 0.38 | 2.15 | 1.47 | 183 |
| Total annual report | 0.16 | 0.10 | 0.01 | 0.03 | 0.18 | 170 |

Figure 4.1: Total disclosure by report type excluding missing values and no disclosure

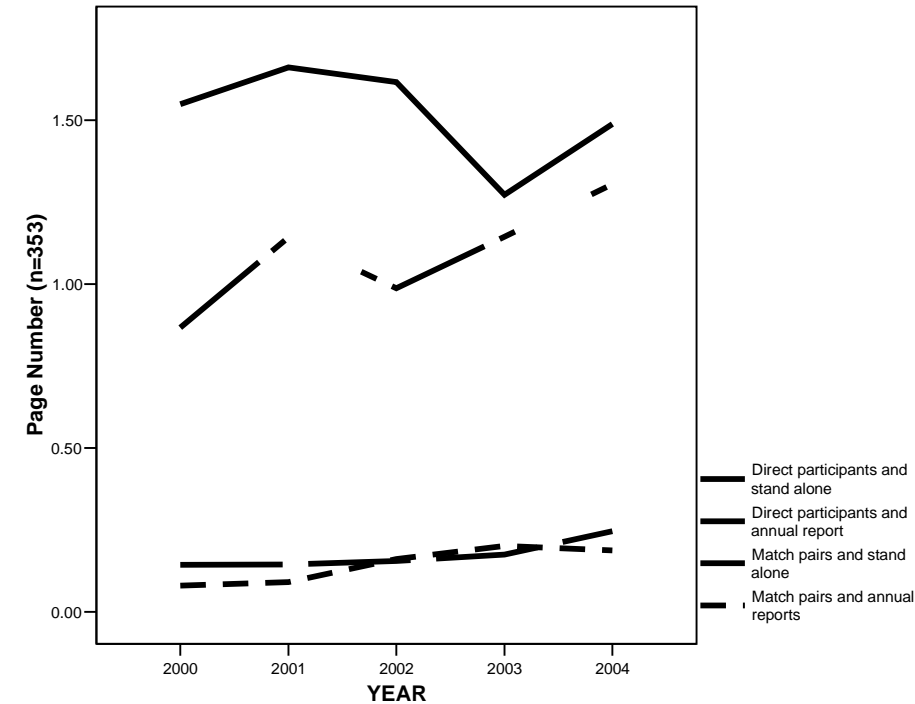
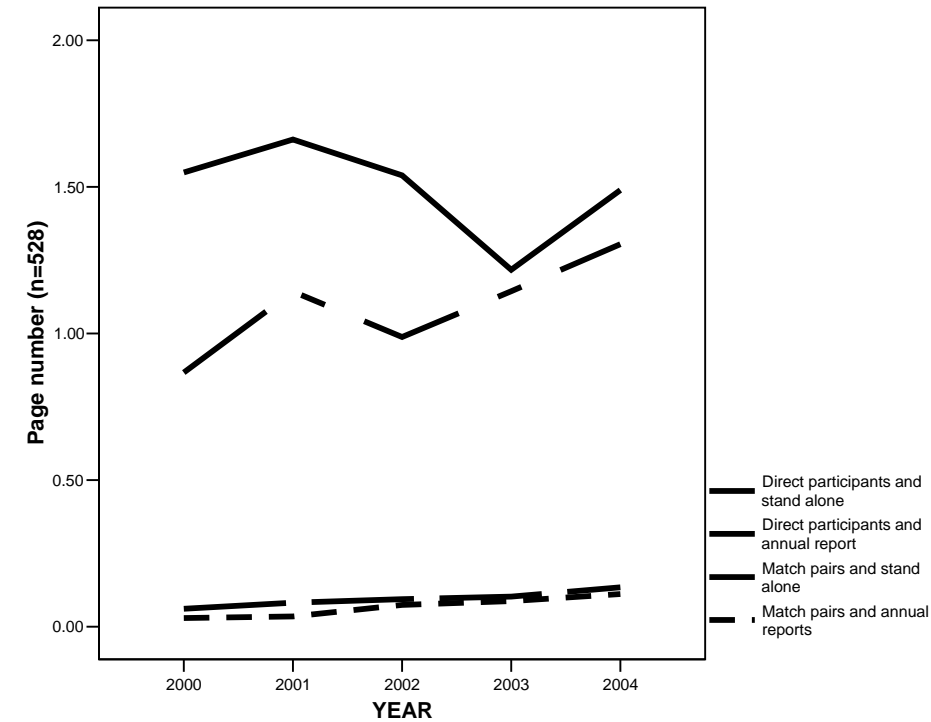


Figure 4.2: Total disclosure by report type excluding missing values



The first non-parametric test used was Mann-Whitney. This analysis is focused on identifying differences in the total volume disclosed on GCC issues by the four groups of reports. Data on the volume of disclosure on GCC by the four groups of report met the additional assumptions required by Mann-Whitney test (that is the distributions between populations to be analysed were similar and all reports groups presented more than 42 observations).

The results of Mann-Whitney test (table 4.20) shows that the disclosure made in SA by DP ($Mdn=0.6$) and MP ($Mdn=0.84$) didn't differ when considering the whole sample ($n=528$) including reports with no disclosure on GCC issues $U=3715.5$, ns , $r=-0.11$. However, the volume of disclosure made in SA by MP ($Mdn=0.88$) was higher than DP ($Mdn=0.6$) when one only considers those reports that presented disclosure on GCC issues $U=3541.5$, $p>0.1$, $r=-0.13$. Considering all observations, including reports with no disclosure on GCC ($n=528$), the volume of disclosure in AR produced by DP ($Mdn=0.02$) was higher compared with the volume of disclosure in GCC produced by MP ($Mdn=0.00$), $U=12528$ $p>0.01$, $r=-0.13$. Where only reports that contained disclosure on GCC issues are considered, the volume of disclosure at AR produced by DP ($Mdn=0.11$) was also significantly higher than MP ($Mdn=0.07$), $U=2988$, $p>0.05$, $r=-0.15$. Thus, it is possible to conclude that considering only those reports that presented disclosure on GCC, DP produced higher volume of disclosure on GCC in AR and MP produced higher disclosure on GCC in SA.

Non-parametric tests were also applied to check if there are any differences between the volume on the four groups of reports before and after the UK ETS started. The Wilcoxon Paired Signed Rank was used. According to Green, *et al.*, (2000), the application of this test requires continuous distribution of the differences scores (table 4.9). The data on four groups of report did not conform to this requirement. Thus, the Sign test could have been used. The Sign test however requires at least 26 pairs of nontied scores (see table 4.9). This requirement was also not achieved in all cases. Thus, a simplified analysis was undertaken with disclosures made in SA and AR grouped together.

Table 4.20: Mann-Whitney test results comparing direct participants and match pairs total disclosure

| | TOTAL DISCLOSURE BY REPORT TYPE | | | | | | | |
|------------------------|-------------------------------------|-----------------------------|---------------------------------------|-------------------------------|--|-----------------------------|---------------------------------------|-------------------------------|
| | Total of observations (n=528) | | | | Only observations with disclosure on GCC (n=353) | | | |
| | Direct participants and stand Alone | Match pairs and stand Alone | Direct participants and annual report | Match pairs and annual report | Direct participants and stand Alone | Match pairs and stand Alone | Direct participants and annual report | Match pairs and annual report |
| Mean rank | 86.707 | 98.587 | 185.200 | 160.459 | 84.707 | 98.609 | 92.545 | 77.939 |
| Number of observations | 87 | 98 | 160 | 183 | 87 | 96 | 88 | 82 |
| Mann Whitney U | | 3715.500 | | 12528.000 | | 3541.500 | | 2988.000 |
| Wilcoxon W | | 7543.500 | | 29364.000 | | 7369.500 | | 6391.000 |
| z | | -1.506 | | -2.470 | | -1.773 | | -1.937 |
| Asymp. sig. (2-tailed) | | 0.132 | | 0.014 | | 0.076 | | 0.053 |
| Exact sig. (2-tailed) | | 0.128 | | 0.013 | | 0.074 | | 0.052 |
| Effect size | | -0.111 | | -0.133 | | -0.131 | | -0.149 |

Results with Monte Carlo exact significance

The analysis considers the sums of disclosure before (years 2000 and 2001) and after (years 2003 and 2004) the UK ETS has started for DP and MP. The results of Sign test are presented on tables 4.21 and 4.22. Including reports with no disclosure on GCC, the volume of disclosure on GCC issues produced by DP after ($Mdn=0.43$) was significantly higher than before ($Mdn=0.19$) the UK ETS started with $z=-1.64$, $p>0.15$. MP also presented higher disclosure on GCC issues after ($Mdn=0.21$) compared with the volume produced before ($Mdn=0.06$) the UK ETS started, $z=-2.62$, $p>0.01$. Looking the mean of the scores (table 4.21) and the higher number of positive differences compared to negative differences and ties (table 4.22) it can be inferred that DP and MP disclosed (by volume) more after the UK ETS started compared to disclosure produced before the UK ETS started. Taken the earlier results on categories of disclosure, incidence of disclosure did not vary before and after, but the volume of disclosure increased. Thus, the UK ETS does appear to have influenced organizations disclosure.

These results alter if only the reports that presented disclosure on GCC are examined. In this case, the disclosure on GCC issues produced by DP before UK ETS started ($Mdn=0.49$) was not statistically significant compared with the disclosure produced after UK ETS started ($Mdn=0.72$), $z=-1.393$, *ns*. With regard to MP, the disclosure produced after ($Mdn=0.84$) was higher than before ($Mdn=0.44$) the UK ETS started, $z=-2.155$, $p>0.05$. However, those results should be treated with caution since Sign test ignores paired differences equal to zero, reducing the number of valid observations.

The next step was to run a Mann-Whitney test which allowed a non paired comparison between the global amount of disclosure produced before and after the UK ETS started. The results of Mann-Whitney test could be seen on tables 4.23. The first results refer to the whole sample including those reports with no disclosure on GCC. There was no significant difference, $z=-1.390$, *ns*, $r=-0.10$, between the disclosure made before ($Mdn=0.08$) and after ($Mdn=0.19$) the UKETS by DP. However, MP disclosed more after the UK ETS started ($Mdn=0.13$), compared with the disclosure made before ($Mdn=0.02$) the UK ETS started $z=-2.096$, $p>0.05$, $r=-0.14$. On the other hand, when Mann-Whitney test was run for the sample that only considers those reports with disclosure on GCC, no significant difference was found between disclosure produced

before and after the UK ETS started for MP, $z=-0.918$, ns , $r=-0.08$, and neither for DP, $z=-0.956$, ns , $r=-0.08$.

4.4.2 Volume of disclosure by theme

This section explores if there are differences in the four report groups with respect disclosures on emissions, targets, and actions and other/narrative. The disclosure means per disclosure category and report type are available in tables 4.24 and 4.25. Analysing graphically the volume of disclosure on GCC means by disclosure categories it seems that the disclosure on GCC issues was higher on actions followed by emissions, other/narrative and targets (figures 4.3 and 4.4).

Non-parametric tests was also used to identify if these disclosure differences are statistically significant. The nonparametric option to answer this question is to use the Friedman Test. The scores differences, however, are not continuous and symmetrical distributed thereby violating Friedman's test additional assumptions. The alternative test is the Cochran test, which evaluates differences regarding proportions. In addition, Cochran test identifies if there is a difference between groups, but it does not show which groups are different from each other. In order to identify specific differences between groups, Cochran test needs to be applied jointly with McNerma test.

The results of Cochran's test and McNerma test, which are pairwise comparisons, are presented in tables 4.26 and 4.27, respectively. The result indicates that proportions of reports that disclose in emissions, targets, actions and other/narrative are significantly different, $Q= 173.474$, $p=0.000$. The results of pairwise comparison indicate that the highest proportion of reports presented disclosure on actions followed by other/narrative, emissions and targets. Individual analysis per report type was not undertaken due to small number of nontied scores. According to Green *et al.*, (2000), McNerma Test requires 26 or more of nontied scores. Separate analysis was made for DP and MP instead.

Table 4.21: Descriptive statistics - Sign test before and after UK ETS

| TOTAL DISCLOSURE BEFORE AND AFTER THE UK ETS STARTED | | | | | | | | |
|--|--------------------------------------|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|------------------------------|-----------------------------|
| | Total of observations (n=528) | | | | Only observations with disclosure on GCC (n=353) | | | |
| | Direct participants Before UK ETS | Direct participants After UK ETS | Match Pairs Before UK ETS | Match Pairs After UK ETS | Direct participants Before UK ETS | Direct participants After UK ETS | Match Pairs Before UK ETS | Match Pairs After UK ETS |
| Number of observations | 48 | 55 | 57 | 60 | 34 | 41 | 37 | 45 |
| Mean | 0.68 | 1.04 | 0.95 | 1.14 | 0.96 | 1.39 | 1.46 | 1.51 |
| Median | 0.19 | 0.43 | 0.06 | 0.21 | 0.49 | 0.72 | 0.44 | 0.84 |
| Std. Deviation | 1.31 | 1.87 | 2.40 | 2.12 | 1.48 | 2.06 | 2.87 | 2.33 |

Table 4.22: Sign test before and after the UK ETS started

| TOTAL DISCLOSURE BY REPORT TYPE | | | | |
|---------------------------------|--|------------------------------------|--|------------------------------------|
| | Total of observations (n=528) | | Only observations with disclosure on GCC (n=353) | |
| | Direct participants After-Before UK ETS | Match Pairs After-Before UK ETS | Direct participants After-Before UK ETS | Match Pairs After-Before UK ETS |
| Number of observations | 48 | 55 | 33 | 32 |
| Negative differences | 13 | 12 | 12 | 9 |
| Positive differences | 24 | 30 | 21 | 22 |
| Ties | 11 | 13 | 0 | 1 |
| z | -1.644 | -2.623 | -1.393 | -2.155 |
| Asymp. sig. (2-tailed) | 0.100 | 0.009 | 0.164 | 0.031 |
| Exact sig. (2-tailed) | 0.107 | 0.008 | 0.165 | 0.030 |

Results with Monte Carlo exact significance

Table 4.23: Mann-Whitney test results comparing disclosure before and after UK ETS

| TOTAL DISCLOSURE BY REPORT TYPE | | | | | | | | |
|---|--------------------------------------|-------------------------------------|------------------------------|-----------------------------|--|-------------------------------------|------------------------------|-----------------------------|
| | Total of observations (n=528) | | | | Only observations with disclosure on GCC (n=353) | | | |
| | Direct participants Before UK ETS | Direct participants After UK ETS | Match Pairs Before UK ETS | Match Pairs After UK ETS | Direct participants Before UK ETS | Direct participants After UK ETS | Match Pairs Before UK ETS | Match Pairs After UK ETS |
| Mean rank | 91.892 | 103.023 | 102.558 | 120.252 | 64.905 | 71.173 | 67.127 | 73.787 |
| Number of observations | 88 | 107 | 104 | 119 | 58 | 78 | 59 | 82 |
| Mann Whitney U | | 4170.500 | | 5206.000 | | 2053.500 | | 2190.500 |
| Wilcoxon W | | 8086.500 | | 10666.000 | | 3764.500 | | 3960.500 |
| z | | -1.390 | | -2.096 | | -0.918 | | -0.956 |
| Asymp. sig. (2-tailed) | | 0.165 | | 0.036 | | 0.359 | | 0.339 |
| Exact sig. (2-tailed) | | 0.161 | | 0.037 | | 0.358 | | 0.341 |
| Effect size | | -0.100 | | -0.140 | | -0.079 | | -0.081 |
| Results with Monte Carlo exact significance | | | | | | | | |

Table 4.24: Means of disclosure categories considering all observations

| TOTAL DISCLOSURE BY CATEGORIES | | | | | |
|---------------------------------------|------------------|----------------|----------------|------------------------|----------|
| | Emissions (Mean) | Targets (Mean) | Actions (Mean) | Other/Narrative (Mean) | <i>n</i> |
| Direct participants - stand alone | 0.31 | 0.08 | 0.39 | 0.32 | 87 |
| Direct participants - annual report | 0.02 | 0.01 | 0.05 | 0.02 | 160 |
| Match pairs - stand alone | 0.55 | 0.17 | 0.52 | 0.23 | 98 |
| Match pairs - annual reports | 0.02 | 0.01 | 0.03 | 0.02 | 183 |
| Total Reports | 0.17 | 0.05 | 0.19 | 0.11 | 528 |

Table 4.25: Means of disclosure categories considering only observations that disclosed on GCC issues

| TOTAL DISCLOSURE BY CATEGORIES | | | | | |
|---------------------------------------|------------------|----------------|----------------|------------------------|----------|
| | Emissions (Mean) | Targets (Mean) | Actions (Mean) | Other/Narrative (Mean) | <i>n</i> |
| Direct participants - stand alone | 0.31 | 0.08 | 0.39 | 0.32 | 87 |
| Direct participants - annual report | 0.03 | 0.02 | 0.10 | 0.03 | 88 |
| Match pairs - stand alone | 0.56 | 0.17 | 0.53 | 0.24 | 96 |
| Match pairs - annual reports | 0.04 | 0.02 | 0.06 | 0.03 | 82 |
| Total Reports | 0.25 | 0.08 | 0.28 | 0.16 | 353 |

Figure 4.3: Disclosure by category excluding missing values

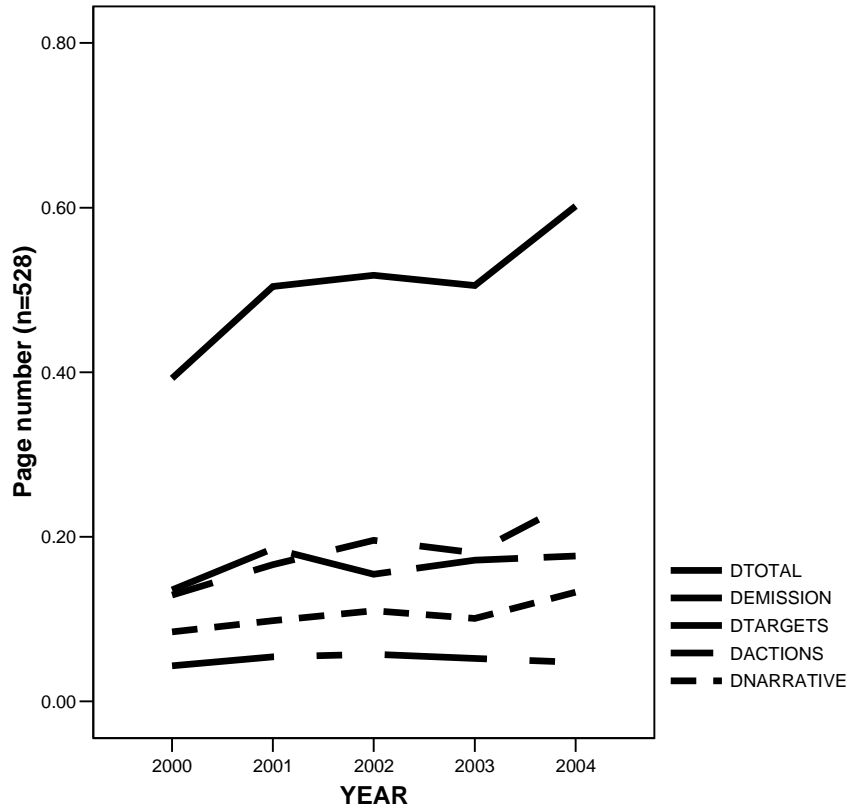


Figure 4.4: Disclosure by category excluding missing values and no disclosure

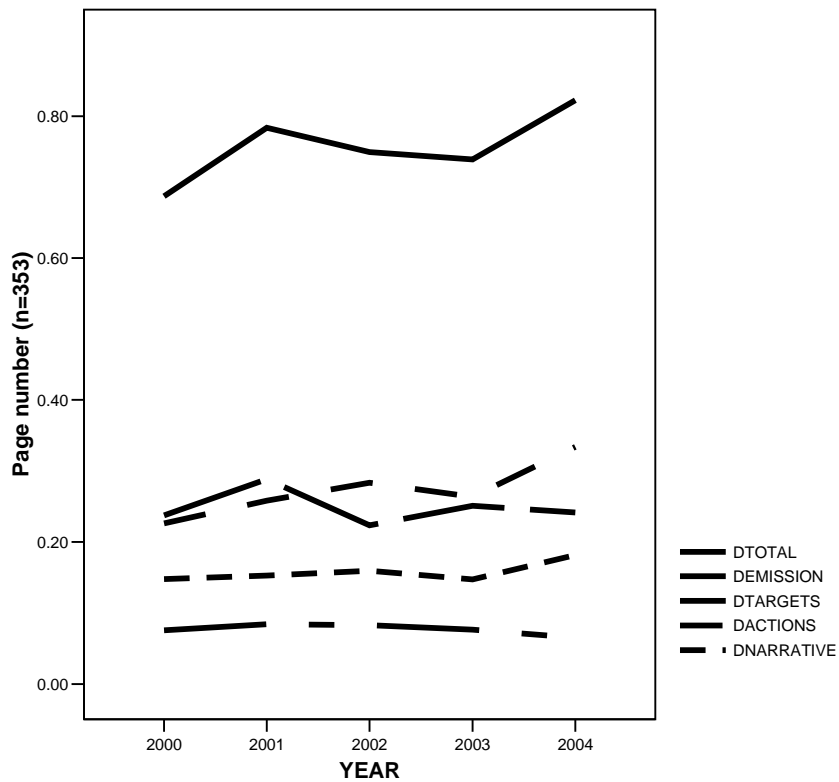


Table 4.26: Cochran's test for disclosure categories

| | DISCLOSURE BY CATEGORIES | | | Cochran's Test |
|------------------------|--------------------------|---------------------------|-------|----------------|
| | Non-disclosure | Frequencies Disclosure | Total | |
| Emissions | 306 | 222 | 528 | |
| Targets | 348 | 180 | 528 | |
| Actions | 203 | 325 | 528 | |
| Other/Narrative | 275 | 253 | 528 | |
| Cochran's Q | | | | 173.474 |
| df | | | | 3 |
| Asymp. sig. (2-tailed) | | | | 0.000 |
| Exact sig. (2-tailed) | | | | 0.000 |

Results with Monte Carlo exact significance

Table 4.27: McNemar test for disclosure categories

| | DISCLOSURE BY CATEGORIES | | | | | |
|--------------------------------------|--------------------------|------------------------|-------------------------------|---------------------|-----------------------------|------------------------------|
| | Emissions - Targets | Emissions - Actions | Emissions- Other/Narrative | Targets- Actions | Target - Other/Narrative | Actions - Other/Narrative |
| N | 528 | 528 | 528 | 528 | 528 | 528 |
| Exact Sig. (2-tailed) | 0.000 | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 |
| Holm's Sequential Bonferroni (alpha) | 0.008 | 0.010 | 0.050 | 0.013 | 0.017 | 0.025 |

Results with Monte Carlo exact significance

Tables 4.28 and 4.29 present results for Cochran's test and McNerma test for DP. The results indicates that proportions of reports that disclose on emissions, targets, actions and other/narrative are significantly different, $Q= 77.672$, $p=0.000$. The results of pairwise comparison indicate that the highest proportion of reports presented disclosure on actions. However, there was no significant difference between proportions of reports that present disclosure on emissions, targets and other/narrative.

Tables 4.30 and 4.31 are results for the Cochran's test and McNerma test for MP. The results indicates that proportions of reports that disclose on emissions, targets, actions and other/narrative are significantly different, $Q= 112.537$, $p=0.000$. The results of pairwise comparison indicate that there was no significant difference between proportions of reports that present disclosure on emissions and other/narrative. However, significant higher proportion of reports presented disclosure on actions and smaller proportion of reports presented disclosure on targets.

Table 4.32 presents a summary of the study that considers the volume of disclosure on GCC issues. The first results of this table confirm the results achieved on categorical analyse, in which DP presented higher disclosure on GCC at AR, not only in terms of incidence of reports but also in terms of volume of disclosure on GCC. This table also shows that differences existed on the disclosure produced by DP before and after the UK ETS started if considered all observations. Finally, DP presented highest disclosure proportions on actions and no differences were found between the disclosures proportions made on other disclosure categories. The next chapter will use Institutional Theory to explore in more details possible influence that UK ETS could have on the results achieved in this section.

Table 4.28: Cochran's test for disclosure categories- Direct participants

| | DISCLOSURE BY CATEGORIES | | | Cochran's Test |
|------------------------|--------------------------|---------------------------|-------|----------------|
| | Non-disclosure | Frequencies Disclosure | Total | |
| Emissions | 141 | 106 | 247 | |
| Targets | 140 | 107 | 247 | |
| Actions | 81 | 166 | 247 | |
| Other/Narrative | 124 | 123 | 247 | |
| Cochran's Q | | | | 77.672 |
| df | | | | 3 |
| Asymp. sig. (2-tailed) | | | | 0.000 |
| Exact sig. (2-tailed) | | | | 0.000 |

Results with Monte Carlo exact significance

Table 4.29: McNemar test for disclosure categories- Direct participants

| | DISCLOSURE BY CATEGORIES | | | | | |
|--------------------------------------|--------------------------|------------------------|-------------------------------|---------------------|-----------------------------|------------------------------|
| | Emissions - Targets | Emissions - Actions | Emissions- Other/Narrative | Targets- Actions | Target - Other/Narrative | Actions - Other/Narrative |
| N | 247 | 247 | 247 | 247 | 247 | 247 |
| Exact Sig. (2-tailed) | 1.000 | 0.000 | 0.027 | 0.000 | 0.076 | 0.000 |
| Holm's Sequential Bonferroni (alpha) | 0.050 | 0.010 | 0.017 | 0.008 | 0.025 | 0.013 |

Results with Monte Carlo exact significance

Table 4.30: Cochran's test for disclosure categories - Match pairs

| | DISCLOSURE BY CATEGORIES | | | Cochran's Test |
|------------------------|--------------------------|---------------------------|-------|----------------|
| | Non-disclosure | Frequencies Disclosure | Total | |
| Emissions | 165 | 116 | 281 | |
| Targets | 208 | 73 | 281 | |
| Actions | 122 | 159 | 281 | |
| Other/Narrative | 151 | 130 | 281 | |
| Cochran's Q | | | | 112.537 |
| df | | | | 3 |
| Asymp. sig. (2-tailed) | | | | 0.000 |
| Exact sig. (2-tailed) | | | | 0.000 |

Results with Monte Carlo exact significance

Table 4.31: McNemar test for disclosure categories- Match pairs

| | DISCLOSURE BY CATEGORIES | | | | | |
|--------------------------------------|--------------------------|------------------------|-------------------------------|---------------------|-----------------------------|------------------------------|
| | Emissions - Targets | Emissions - Actions | Emissions- Other/Narrative | Targets- Actions | Target - Other/Narrative | Actions - Other/Narrative |
| N | 281 | 281 | 281 | 281 | 281 | 281 |
| Exact Sig. (2-tailed) | 0.000 | 0.000 | 0.076 | 0.000 | 0.000 | 0.000 |
| Holm's Sequential Bonferroni (alpha) | 0.008 | 0.010 | 0.050 | 0.013 | 0.017 | 0.025 |

Results with Monte Carlo exact significance

Table 4.32: Results summary: Analysis on volume disclosed

| DISCLOSURE CHARACTERISTICS | STAND ALONE | ANNUAL REPORT | MP STAND ALONE AND ANNUAL REPORT | DP STAND ALONE AND ANNUAL REPORT | TABLE |
|--|-------------|---------------|----------------------------------|----------------------------------|-----------------|
| RQ1 | | | | | |
| Mann-Whitney test | | | | | |
| Difference on volume of disclosure on GCC issues per groups of reports considering all observations (n=528) | N | DPH | – | – | 4.20 |
| Difference on volume of disclosure on GCC issues per groups of reports considering only reports that disclose on GCC (n=353) | MPH | DPH | – | – | 4.20 |
| Sign test (paired comparison) | | | | | |
| Difference on volume of disclosure on GCC issues per groups of reports before and after the UK ETS started considering all observations (n=528) | – | – | S After UK ETS | S After UK ETS | 4.21 4.22 |
| Difference on volume of GCC disclosure per groups of reports before and after the UK ETS started considering only reports that disclose on GCC (n=353) | – | – | S After UK ETS | N | 4.21 4.22 |
| Mann-Whitney test (non-paired comparison) | | | | | |
| Difference on volume of disclosure on GCC issues per groups of reports before and after the UK ETS started considering all observations (n=528) | – | – | S After UK ETS | N | 4.23 |
| Difference on volume of GCC disclosure per groups of reports before and after the UK ETS started considering only reports that disclose on GCC (n=353) | – | – | N | N | 4.23 |
| RQ2 | | | | | |
| Cochran's and McNerma test | | | | | |
| Number of reports that disclose emissions | – | – | N | N | 4.26 until 4.31 |
| Number of reports that disclose targets | – | – | N | N | 4.26 until 4.31 |
| Number of reports that disclose actions | – | – | HP | HP | 4.26 until 4.31 |
| Number of reports that disclose other/narrative | – | – | LP | N | 4.26 until 4.31 |

N: The difference is not statistically significant.

S: The difference is statistically significant.

DPH: Highest volume of disclosure on GCC produced by direct participants compared with match pairs.

MPH: Highest volume of disclosure on GCC produced by match pairs compared with direct participants.

HP: Highest proportion of reports presented disclosure on this disclosure category.

LP: Less proportion of reports presented disclosure on this disclosure category.

4.5 Concluding comments

This section focused on describing the results of the statistical analysis. Categorical and volume of disclosure analysis were both carried in order to answer two research questions. The first research questions explore what DP and MP disclose in AR and SA on GCC and how these disclosures changed over time. The second question explores how DP and MP disclosure compares with each other. All these questions were answer together, since they explore complementary characteristics of disclosure practices. An additional analysis of these questions will be undertaken in chapter 5 using the lens of institutional theory.

Content analysis has been used to explore several issues on Corporate Social Disclosure (CSD). However, few studies have been conducted on GCC (but see for example, Kolk and Pinkse, 2004; Freedman and Jaggi, 2005) and there is also little emphasis on the differences in the disclosures made in SA and AR (but see for example, Coulson, 2008). This study includes both elements and it also sheds light on the possible influence the UK ETS on the nature and volume of CSD on GCC.

Arranging from the summaries contained in tables 4.17 and 4.32, DP disclosed more on GCC issues compared with MP in the AR. This result was found statistically significant not only in terms of numbers of reports but also in terms of volume of disclosure. Thus, it is possible to suggest that that DP may use more the disclosure on GCC, compared to MP, to construct their financial image (Gray *et al.*, 1995b).

With regard to disclosures produced before and after the UK ETS started, there was no significant difference between the numbers of reports produced by DP and MP over these two different periods. However, statistic tests carried out on volume of disclosure indicated that MP produced a higher volume of disclosure after the UK ETS started. There was also significant difference on the volume of disclosure produced by DP before and after the UK ETS started, if considered all observations (n=528) and paired comparison.

The fact that DP disclosure volume did not increased for DP, if considering only reports that disclosed on GCC, does not mean that this scheme has not influenced on the nature

of disclosure. In fact, differences between DP and MP disclosure exist and could be answered to relate to the quality of disclosure rather than quantity of disclosure. As an illustration, the results of paired comparison indicate that the highest proportion of reports produced by DP contained disclosure on actions. However, there was no significant difference between proportions of reports that present disclosure on emissions, targets and other/narrative (tables 4.26 until 4.31), which suggests that similar proportions of DP reports mentioned most of disclosure categories. MP appeared to focus their disclosure on actions, giving less importance to other categories, especially targets (tables 4.26 and 4.31). Reports that cover most of these disclosure categories could give better level of understanding on how organizations are dealing with GHG emissions and what are their concerns on GCC.

Differences on GCC disclosure made by categories were also identified when the analysis was taken by report type. Two-way contingency tables applied for different types of reports indicated that DP presented more disclosure on narrative and targets compared with MP in SA (table 4.13). Two-way contingency tables also indicated that DP presented more reports that disclosed on targets and actions compared with MP at AR (table 4.13).

Large proportion DP disclosed on global political order (UN via Kyoto Protocol and EU), incentives and awards. These results could confirm what Nye and Owens (2008) called as 'symbolic politics'. Nye and Owens (2008) suggested that organizations primarily motivation in supporting economic instruments, such as emission trading, is to achieve economic efficiency. However, the economic rationale for doing so is diminished or constrained by existing policy frameworks or wider socio-economic contexts.

Some similarities were also found on the disclosure produced by DP and MP when frequency analysis was used to study the disclosure rationale and organizations' actions to tackle GCC. As an illustration, the predominant narrative stressed by both, DP and MP, was GCC responsiveness will be good for business (table 4.14). In addition, DP and MP stressed much energy use and energy/fuel efficiency as actions taken to tackle its effect on GCC (table 4.15). The highest level of disclosure on those actions could be

partially explained by the strong importance that the UK Government have been given on issues related to energy consumption improvement (Marshall, 1998).

These results suggest that instruments of environmental policy may influence CSD on GCC issues. In particular, being a DP in the UK ETS is associated with increased GCC disclosure and especially with disclosure in a media (the AR) where the norms of efficiency and mainstream business rationale are accepted. Thus, despite the fact that AR and SA reports both contain CSD, in this study they contain different patterns of disclosure and therefore may constitute different (rather than complementary) disclosure media. In addition, the use of AR and SA for disclosure may represent response to diverse sources of demands (such as participation at the UK ETS) and those demands may vary depending on organizational context.

Chapter 5:

INSTITUTIONAL THEORY AND GLOBAL CLIMATE CHANGE DISCLOSURE

CHAPTER 5: INSTITUTIONAL THEORY AND GLOBAL CLIMATE CHANGE DISCLOSURE

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5.4 Concluding comments

List of abbreviations

| | |
|--------------|--|
| AR | Annual Report |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DP | Direct Participants |
| EU | European Union |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas/Gases |
| MP | Match Pairs |
| MRV | Measurement, Reporting and Verification |
| NAO | National Audit Office |
| NERA | National Economic Research Association |
| NIE | New Institutional Economics |
| NIS | New Institutional Sociology |
| OIE | Old Institutional Economics |

List of abbreviations continues...

List of abbreviations continuation

| | |
|---------------|--|
| RD | Resource Dependency |
| SA | Stand Alone Report |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK ETG | UK Emissions Trading Group |
| UK ETS | UK Emission Trading Scheme |
| UKAS | UK Accreditation Service |
| UN | United Nations |

Content**Objective**

The objective of this chapter is to analyse the nature of organizational disclosure on global climate change (GCC) using the lens of institutional theory. In order to achieve this objective, the first section explores the difference between several types of institutionalization used in accounting field. The second section suggests how New Institutional Sociology (NIS) could contribute to understanding the patterns of GCC disclosure produced by direct participants (DP) and match pairs (MP) from 2000 until 2004. The third section explores the strategic responses to institutional pressures proposed by Oliver (1991) and analyses the DP strategic responses to the UK Emissions Trading Scheme (UK ETS) using this framework. This chapter uses documents that described the origins and purposes of the UK ETS as well as interviews of DP which were conducted by the UK Government (NAO, 2004; NERA, 2004; ENVIROS, 2006) and academics (Von Malmborg and Strachan, 2005; Nye and Owens, 2008). The last section of this chapter uses the strategic responses proposed by Oliver (1991) to explain how disclosure changes over the years examined.

5.1 Different types of institutionalization

There are several branches of institutional theory involving multiple theories and disciplines (DiMaggio and Powell, 1991a; Peters, 1999; Scott, 2008). However, in the accounting field three specific branches of institutionalism are mostly drawn on (Moll *et al.*, 2006): New Institutional Economics (NIE), Old Institutional Economics (OIE) and New Institutional Sociology (NIS).

NIE emerged in the 1960's (Coase, 1960), reflecting a renewed interest by economists in the study of institutions within a neo-classical economics framework (Moll *et al.*, 2006). NIE influenced several disciplines such as economic history, game theory, organizational economics, law and economics (DiMaggio and Powell, 1991a). Theorists from NIE focus their attention on transactions, justifying institutional survival on the basis that the costs of transactions are outweighed by the benefits (DiMaggio and Powell, 1991a).

Due to the fact that OIE and NIS share some similarities, they will be discussed together. OIE originated from Veblen's seminal work. NIS originated from Meyer's article titled 'The effects of education as institutions' and Meyer and Rowan's article 'Institutionalised organizations: Formal structure as a myth and ceremony' (DiMaggio and Powell, 1991a). Both, OIE and NIS recognize the influence of the environment on organizational process, reject rational models of organization operations and highlight the importance of culture influencing organizational reality (DiMaggio and Powell, 1991a). Differences between these two latter approaches also exist. Scott summarized the difference between OIE and NIS as follows: "the newer conceptual models emphasize cognitive over normative frameworks and have focused primary attention on the effects of cultural belief systems operating in the environments of organizations rather than on intraorganizational process" (Scott, 2008:45). A more detailed explanation on some differences between OIE and NIS as contained in DiMaggio and Powell (1991a).

Other important difference between OIE and NIS lies in the definitions of 'environment'. The OIE concept of environment is centred on local communities where organization interactions will generally be based on personnel fidelity and face-to-face interactions (DiMaggio and Powell, 1991a). On the other hand, NIS focused on non-local environments, such as boundaries of industries and national societies. According to NIS theorists, the environment penetrates into organizations and influences interpretations of the reality that those organizations face (DiMaggio and Powell, 1991a).

Both approaches consider that organizational behaviour is not simply a result of individual actions. OIE and NIS theorists however, differ on their explanation of the rationale of organizational behaviour. For OIE theorists, individuals pursue their own interests and they tend to oppose organizational rationality (DiMaggio and Powell, 1991a). On the other hand, NIS tend to believe that individuals will act as part of the organization (DiMaggio and Powell, 1991a).

Both OIE and NIS recognise the influence of cultural concepts on the institutionalization process, but again the way in which this happens differs between these two approaches. OIE stresses that organizations become institutionalised when they are influenced by their own internal values, norms and attitudes shaping individuals' preferences (DiMaggio and Powell, 1991a). In contrast, the NIS stress that organizations are formed by taken-for-granted moral frame, which is constituted by classifications, routines, scripts and schemes (DiMaggio and Powell, 1991a). For NIS theorists, the cognitive process starts in society and it is not created by specific organizations.

The process of institutionalization is also framed differently within the OIE and NIS approaches. The OIE focuses on adaptation to the local environment with organizations assumed to adapt to changes in this environment. Change for OIE theorists is, therefore, a part of the process of institutionalization. In addition, for OIE there are different environments with different characteristics and this variety of local environments create institutional diversity (DiMaggio and Powell, 1991a). On the other hand, NIS focus its analysis on institutionalised elements which reduce variety and promote organizational homogeneity (DiMaggio and Powell, 1991a). DiMaggio and Powell (1991b) stress that isomorphism is the process that best describes homogeneity. For these authors the influence of the external environment (such as market competition and inter-institutional pressures to adopt new values, norms and attitudes) are the drivers of isomorphic changes. The influence of external environment and institutions create a need for adaptation in that institutions can only survive by isomorphic change. This need for adaptation cycle is referred by DiMaggio and Powell (1991b) as "the iron cage". DiMaggio and Powell (1991b) also suggested that isomorphic change happens through three mechanisms, coercive (formal and informal pressures exerted by other

organizations), normative (usually arising from professionalization) and mimetic (referring to organizational tendencies to copy each other).

NIS has been criticized for focusing on institutional stability (Fernandez-Alles and Valle-Cabrera, 2006). However, there are recent efforts to explore the process of change in NIS studies (Seo and Creed, 2002; Colyvas, 2007; Oliver and Holzinger, 2008). The dynamic aspect within NIS arises because it assumes that institutions are influenced by the external environment which is itself constantly changing and that organizations also influence each other to absorb these transformations in the external environment (DiMaggio and Powell, 1991b). According to NIS theorists, institutional change occurs by three pillars of institutions (Scott, 2008): regulative (institutions' regulative behaviour), normative (values and norms) and cultural-cognitive (shared concepts from social realm) pillars.

Several accounting studies have used institutional theory. This theory has been applied in accounting field to understand different contexts such as: budgets' influence on organizations (Covaleski and Dirsmith, 1995; Collier, 2001), performance measurement practices (Hussain and Gunasekaran, 2002; Hussain and Hoque, 2002; Modell, 2005), implementation of ISO 9000 standards (Boiral, 2003), accounting change in product development department (Burns, 2000), changes in auditing firms (Suddaby and Greenwood, 2005), social and environmental reporting (Rahaman *et al.*, 2004) and sustainability reporting (Larrinaga-Gonzalez, 2007; Bebbington *et al.*, 2009).

Institutional theory was also used to analyse organizational responses to emissions trading. As an illustration, Pinkse and Kolk (2007; 2009) used Oliver (1991) and Suchman (1995) to suggest scenarios to study multinational responses to carbon marketing. Pinkse (2007) also used institutional theory to identify what drives companies to engage in emissions trading. This article suggests a different emphasis from Pinkse (2007) and Pinkse and Kolk (2007; 2009), it uses Oliver's framework to identify organizational responses to the UK ETS. The description of the UK ETS following Oliver's classification permits identification of what happened at the UK ETS context. Some of these pressures may have influenced GCC disclosure. Thus, the identification of these pressures help to understand how GCC disclosure may change with the UK ETS influence. The main objective of this study is not only to contribute to

the literature analysing the process of changing on CD by the lens of institutional theory, but it also raises questions on the role of environmental policies to promote social accountability.

The next section describes the theoretical framework that will be used to analyse GCC disclosure in this research.

5.2 Analyzing global climate change disclosure as a strategic response to institutional pressures

The main objective of this section is to use NIS to identify how DP responded to institutional pressures that emerged from the UK ETS. Some of the pressures identified could be suggested as plausible influences on GCC disclosure. The identification of institutional pressures, if they exist, could provide evidence as to how GCC disclosure changed due to the introduction of the UK ETS.

This section is divided in two parts. The first part describes the five institutional antecedents to institutional pressures suggested by Oliver (1991). The description, following Oliver's classification, allows the explanation of pressures in the institutional field and it may allow predicting of how organizations could have responded to these pressures. The second part of this section uses these five predictors to suggest possible influences that the UK ETS could have had on GCC disclosure. This second part analyses interviews carried by academics, National Audit Office (NAO), National Economic Research Associates (NERA) and Enviros Consulting Limited (ENVIROS) with DP as well as others documents that explored the origins and operation of the UK ETS. Finally, this analysis also seeks to link GCC disclosures made by DP to institutional pressures.

5.2.1 Predictors of strategic responses⁵²

Oliver (1991) combined NIS and resource dependency (RD) perspectives in order to analyse strategic responses to institutional process. The main objective for seeking to integrate NIS and RD perspectives is to analyse not only conformity and isomorphism, but also to recognize that organizations' responses to institutional pressures⁵³ can vary along several dimensions. RD theory suggests that organizations can conform, resist or manipulate institutional pressures and that these responses will occur on different levels or dimensions with organizations trying to achieve different objectives from different responses. For example, "it is suggested here that organizational responses will vary from conforming to resistant, from passive to active, from preconscious to controlling, from impotent to influential, and from habitual to opportunistic, depending on the institutional pressures toward conformity that are exerted on organizations" (Oliver, 1991:151).

When organizations comply to institutional pressures, they are trying to obtain rewards such as legitimacy, prestige, professional acceptance and social recognition (DiMaggio and Powell, 1991a, 1991b; Oliver, 1991; Scott, 2008). On the other hand, when organizations are resistant to pressures they tend to be seeking to maintain their autonomy over decision making, gain flexibility to adapt to new pressures or alter the external environment to suit the organization's own interests (Oliver, 1991). Finally, when organizations adopt a manipulation strategy they are assumed to be seeking to express their organization's internal expectations over institutional pressures (Oliver, 1991).

On the basis of these observations, Oliver (1991) suggested five types of organizational responses to institutional pressures (see table 5.1): acquiescence, compromise, avoidance, defiance and manipulation. Acquiescence involves complying with institutional pressures and may take three forms (Oliver, 1991). The first form of acquiescence is habit and refers to the unconsciousness observance to taken-for-granted

⁵² This section is based on strategic responses to institutional process proposed by Oliver (1991).

⁵³ Oliver (1991) defines institutional pressures as demands and expectations generated by the institutional constituents. Examples of institutional constituents are: state, professions, interests groups and public opinion. Oliver (1991) concept of institutions arises from Scott (1987:147) definition who considered institutions as being regulatory structures, governmental agencies, laws, courts and professions.

rules or values. The second form is imitation and refers to conscious or unconscious mimetic behaviour in which organizations imitate successful organizations. The third is form is compliance and it describes conscious observation of values, norms or institutional pressures.

Compromise behaviour arises at the border between compliance and resistance (Oliver, 1991). This sort of response leads to balancing, pacifying or bargaining with regard to discrepancies between institutional pressures and organization's internal objectives (Oliver, 1991). Balancing tries to achieve commonality between multiple external expectations and internal objectives. In adopting pacifying tactics, organizations attempts to conform to a minimum level of external expectations. Bargaining tactics arise where organizations negotiate concessions with these creating institutional pressures.

Table 5.1: Strategic responses to institutional process

| STRATEGIES | TACTICS | EXAMPLES |
|-------------------|--------------------------------|--|
| Acquiesce | Habit Imitate Comply | Following invisible, taken-for-granted norms Mimicking institutional models Obeying rules and accepting norms |
| Compromise | Balance Pacify Bargain | Balancing the expectations of multiple constituents Placating and accommodating institutional elements Negotiating with institutional stakeholders |
| Avoid | Conceal Buffer Escape | Disguising nonconformity Loosing institutional attachments Changing goals, activities, or domains |
| Defy | Dismiss Challenge Attack | Ignoring explicit norms and values Contesting rules and requirements Assaulting the sources of institutional pressure |
| Manipulate | Co-opt Influence Control | Importing influential constituents Shaping values and criteria Dominating institutional constituents and process |

Source: Oliver (1991:152)

Avoidance is characterised by attempting to avoid the need to conform (Oliver, 1991). Organizations can avoid institutional pressures by concealment, buffering and escape (Oliver, 1991). Concealment tactics try to mask nonconformity behind artificial agreement. Buffering is the attempt to reduce external evaluation or inspection. Finally, escape reflects the situation in which organizations escape the domain in which institutional pressures are exerted or alter part of its internal operation to avoid having to pursue conformity.

A defiance strategy emerges from opposition to institutional pressures (Oliver, 1991). Three forms of defiance are dismissal, challenge and attack (Oliver, 1991). Dismissal tactics are used to ignore or dismiss institutional pressures. Challenge is an offensive tactic to repel institutional pressures. Attack is more aggressive tactic than challenge and tends to assault, humiliate or denounce institutional values or institutional constituents that support them.

Manipulation seeks to change the content of institutional pressures (Oliver, 1991). Manipulation could arise in three ways: co-opt, influence and control (Oliver, 1991). Co-opting reflects the opportunistic use of institutional links to demonstrate organizational acceptance to other external constituents. An influence strategy attempts to manipulate institutionalised values and beliefs. Controlling tactics attempt to impose power over the constituents that are exerting institutional pressures.

According to Oliver (1991), organizational capacity and ability to comply, resist or manipulate pressures can be predicted depending on the five factors that create a need to respond to institutional pressures. The analysis of organizational responses to institutional pressures using the five strategic responses provides a base from which to predict what institutional factors may influence organizational responses to those pressures (Oliver, 1991). Oliver (1991) suggested five factors that are antecedents to responses to institutional pressures. Those factors are: cause, constituents, content, control and context (table 5.2). Since the five institutional factors (table 5.2) are used to predict organizational strategic response to institutional pressures (table 5.1), these factors and strategic responses are linked to each other and table 5.3 summarises these relationships. The five factors that could predict organizational strategic responses to institutional pressures (table 5.2) will now be described. This description will also consider the link between these institutional factors and strategic response to institutional pressures (table 5.3).

Cause refers to the rationale that drives organizations to conform to institutional pressures with the need to achieve social and economic fitness giving rise to institutional pressures (Oliver, 1991). Social fitness is related to the social acceptability of actions, while economic fitness is related to organizational efficiency. Organizations

will tend to resist institutional pressures when conforming to these pressures results in lower social legitimacy and/or the loss of economic gain.

Oliver (1991) considers institutional constituents to be the state, professions, interests groups and public opinion. The level of conformity to, resistance of, or manipulation of institutional pressures varies depending on the numbers of constituents in a field and the degree of organizational dependence on institutional constituents (Oliver, 1991). The existence of multiple institutional constituents means that organizations could face incompatible and competing institutional pressures (Oliver, 1991).

Thus, the degree of organizational resistance to institutional pressure will increase depending on the extent to which there are multiple constituents. This is assumed to happen because satisfying one constituent could create dissatisfaction in others. As a result, organizations will attempt to reduce uncertainties that emerge from these multiples demands. In addition, organizations will tend to defy or manipulate institutional pressures when their level of dependence with institutional constituents is low. This happens arises because the risks that organization creates through resisting pressures are minimal since its performance and survival does not depend on institutional constituents. In contrast, avoidance tactics tend to be chosen by organization when there is a moderate degree of dependence between organizations and institutional constituents. Finally, organizations will tend to acquiesce to and compromise on institutional pressures that are exerted by constituents on whom their performance and survival depend.

The category of content describes the type of demands or expectations that organizations are pressured to conform to (Oliver, 1991). Requirements for conformity could be consistent (or not) with organizations' internal goals and could also constrain organizational autonomy (Oliver, 1991). Thus, organizations will be more likely acquiesce to institutional pressures if these pressures are compatible with their internal goals. When there is a moderate compatibility, organizations will tend to compromise and/or avoid conformity.

Table 5.2: Antecedents of strategic responses

| INSTITUTIONAL FACTOR | RESEARCH QUESTION | PREDICTIVE DIMENSION |
|-----------------------------|--|--|
| Cause | Why is the organization being pressured to conform to institutional rules or expectations? | Legitimacy or social fitness Efficiency or economic fitness |
| Constituents | Who is exerting institutional pressures on the organization? | Multiplicity of constituent demands Dependence on institutional constituents |
| Content | To what norms or requirements are the organization being pressured to conform? | Consistency with organizational goals Discretionary constraints imposed on the organization |
| Control | How or by what means are the institutional pressures being exerted? | Legal coercion or enforcement Voluntary diffusion of norms |
| Context | What is the environmental context within which institutional pressures are being exerted? | Environmental uncertainty Environmental interconnectedness |

Source: Oliver (1991:160).

Table 5.3: Institutional antecedents and predicted strategic responses

| PREDICTIVE FACTOR | STRATEGIC RESPONSES | | | | |
|---|----------------------------|----------------------|----------------------|-------------|---------------------|
| | ACQUIESCE | COMPROMISE | AVOID | DEFY | MANIPULATIVE |
| Cause Legitimacy Efficiency | High High | Low Low | Low Low | Low Low | Low Low |
| Constituents Multiplicity Dependency | Low High | High High | High Moderate | High Low | High Low |
| Content Consistency Constraint | High Low | Moderate Moderate | Moderate High | Low High | Low High |
| Control Coercion Diffusion | High High | Moderate High | Moderate Moderate | Low Low | Low Low |
| Context Uncertainty Interconnectedness | High High | High High | High Moderate | Low Low | Low Low |

Source: Oliver (1991:160).

Organizations will tend to defy or manipulate institutional pressures when the compatibility with organizational goals is low. These pressures are slightly different for nonprofits compared to and for-profit organizations (Oliver, 1991). For-profit firms are likely to resist institutional pressures if they compromise their efficiency. On the other hand, nonprofits firms are likely to resist when pressures are oriented to economic goals. A high level of constrain could motivate organizations to avoid, defy and/or manipulate

institutional pressures. Organizations will tend acquiesce to institutional pressures when the degree of constrain is low. Finally, a moderate level of constrain could motivate organizations to compromise with respect to institutional pressures.

Control describes how institutional pressures are exerted (Oliver, 1991). Institutional pressures are generally exerted by legal coercion or voluntary diffusion (Oliver, 1991). With regard to coercion, organizations options to conform, resist or manipulate institutional pressures will vary depending to the degree of legal coercion. As an illustration, organizations tend to acquiesce when the degree of legal coercion is high because there are likely to be punitive consequences for non-compliance. With respect to the diffusion of institutional pressures, organizations' options to conform, resist or manipulate institutional pressures will vary depending to the degree to which these pressures are supported by society. For example, organizations will tend to acquiesce and/or compromise to institutional pressures when these pressures are supported by society and well diffused through out it.

Context describes the environment in which institutional pressures arise and is characterised into two dimensions: uncertainty and interconnectedness (Oliver, 1991). Uncertainty refers to the extent to which future events can be predicted (Oliver, 1991). Given organizations will normally opt for stability, when there is high degree of uncertainty organizations will tend to choose acquiesce, compromise or avoidance strategies. Manipulation and defiance strategies are risky for organizations when there are high levels of uncertainty, because such reaction expose organizations to environmental instability (Oliver, 1991). Interconnectedness refers to the degree which a relationship exist between members of an institutional field (Oliver, 1991). The interconnected environment tends to promote mimetic behaviour (Oliver, 1991). Thus, organizations will be more likely to adopt acquiesce and conformity strategies when the environment is highly interconnected. If there is a high degree of fragmentation, organizations will tend to adopt avoidance, defiance and manipulation strategies (Oliver, 1991).

The objective of this section was to describe the theoretical framework that will be used to analyse the influence of UK ETS on the GCC disclosure. More specifically, five institutional factors were described and there was a discussion as to how those factors

could help to predict organizational strategic responses to institutional pressures. The next section will analyse the UK ETS using these five antecedents of strategic responses in order to identify if GCC disclosure shows some evidence of the institutional pressures that could be argued to have emerged from the UK ETS implementation.

5.2.2 UK Emissions Trading Scheme and antecedents of strategic responses

The objective of this section is to analyse the UK ETS using the antecedents of strategic responses to institutional pressures (institutional factors) proposed by Oliver (1991). According to Oliver's framework, each institutional factor corresponds to specific questions (see table 5.2). Answering these questions may allow the institutional pressures that may have been exerted on DP when they participated at the UK ETS.

5.2.2.1 Cause (why is the organization being pressured to conform to institutional rules or expectations?)

There are two reasons for asserting that the pressures created by the UK ETS were based on efficiency or economic fitness. Firstly, according to ENVIROS (2006) and NERA (2004), the UK ETS sought to achieve three outcomes: (1) to create cost-effective greenhouse gas (GHG) emissions reductions; (2) to prepare organizations for participating in emissions trading, especially the EU ETS and (3) to establish an emissions trading centre in London. These rationales support the proposition that one of the main UK Government objectives in creating the UK ETS was to achieve cost-effective GHG emissions reductions (NAO, 2004). Secondly, the UK ETS was designed to offer economic incentives to DP. As an illustration, the UK Government set emissions targets for DP who could achieve the targets, buy allowances or reduce emissions in excess of the targets. A total of £215 million was given as monetary incentive to those DP who achieved targets during the time period that the UK ETS functioned. In addition, emissions reductions beyond a DP's target were converted in allowances, which could be sold in the market (NAO, 2004).

The assumption that DP conformed to economic incentives that the UK Government set to promote the UK ETS was also highlighted by Von Malmborg and Strachan (2005) and Nye and Owens (2008)⁵⁴. Von Malmborg and Strachan (2005), for example, used a questionnaire to ask DP to rank their motivations for participating on the UK ETS. The results suggested that DP searched for economic fitness when participating in the UK ETS. From 19 responses no DP claimed that the main reason they participated in the UK ETS was to comply with moral, social and ethical responsibility. Von Malmborg and Strachan (2005) summarised the reasons highlighted by DP to participate at the UK ETS (table 5.4). As can be seen from the table, economic fitness ranked highly with social fitness aspects appearing further down the rankings.

Table 5.4: DP's reasons to participate at the UK ETS

| | |
|----------------|--|
| Main reason | Receive incentive payments |
| Second reason | Comply with corporate priority in reduce GHG emissions |
| Third reason | Emission trading was considered a good business practice |
| Fourth reason | Achieve better corporate image and reputation |
| Fifth reason | Gain experience for EU ETS ⁵⁵ |
| Sixth reason | Comply with moral, social and ethical responsibility |
| Seventh reason | Gain experience on voluntary instruments |

Source: Von Malmborg and Strachan (2005).

5.2.2.2 Constituents (who is exerting institutional pressures on the organization?)

At least three constituents exerted pressure in the UK ETS context: The United Nations (UN, via the Kyoto Protocol), the European Union (EU) and business community. Multiple and conflicting demands emerged from these constituents. At one hand, the UN and EU demanded emissions reductions from the UK Government (MacKenzie, 2009).

⁵⁴ Von Malmborg and Strachan (2005) and Nye and Owens (2008) findings were different from NERA (2004) and ENVIROS (2006) where gaining experience in emissions trading and energy savings/emissions reductions were respectively believed to be DP's prior motivations.

⁵⁵ Eleven DP were also covered by EU ETS (NERA, 2004).

On the other hand, the business community pressured the UK Government to not take initiatives to reduce emission that could affected their competitiveness. Examples of the business community pressures are described by Nye and Owens (2008) who stressed that the voluntary participation the UK ETS was mostly driven by the absence of mandatory scheme and by the opportunity to achieve cost-effectiveness GHG reductions. Nye and Owens (2008) also highlighted possible opportunism behaviour of some DP on site as evidence of this that in the first years of the UK ETS targets were easily achieved (NAO, 2004; ENVIROS, 2006). This observation is also supported by the lower trading volumes in reductions certificates that took place during the three early years of the UK ETS.

According to Oliver (1991), organizations tend to resist conformity with constituents and if there are multiple demands they will seek to adapt strategies to manipulate those demands. Perhaps in anticipation of this response, the UK Government tried to reduce potential conflict around UK ETS. One aspect of this effort was the fact that the UK ETS was initially designed by the UK Emissions Trading Group (UK ETG) which was formed by influential UK business (Nye and Owens, 2008)⁵⁶. The UK ETG was created by the Confederation of Business Industry and the Advisory Council for Business and Environment (NAO, 2004; Von Malmberg and Strachan, 2005). Thus, the process of developing the UK ETS encouraged cooperation between business and Government (NAO, 2004). This context could suggest that the UK Government attempted to reduce the possibility that it would create demands that would conflict with business rationales.

Nye and Owens (2008) interviewed business representatives and government officials that participated in the UK ETG. Those authors suggested that the participation in the UK ETS was driven by symbolic politics (or a range of symbolic motives), which included the establishment of a network to influence legislation. In particular, Nye and Owens (2008) argue that organizations participated in the UK ETS in order to avoid a compulsory legislation which could lead to them incurring high operational costs. The voluntary participation in the UK ETS gave organizations the opportunity to self-regulate, incurring in little economic risks and promoting 'green impression management' (Nye and Owens, 2008).

⁵⁶ The initial UK ETS design was made by the UK ETG. In the later stage, the UK ETS was developed by the government in partnership with the UK ETG (Von Malmberg and Strachan, 2005).

5.2.2.3 Content (To what norms or requirements are the organization being pressure to conform?)

In its first year the UK ETS created 4.64 million tonnes of emission reduction (NAO, 2004). This represented an excess of 3.85 million tonnes compared with projected reductions (NAO, 2004) of the 32 DP with 23 DP reducing emissions above their targets (NAO, 2004). According to an interview conducted by the NAO with four DP (DuPont/Invista, Ineos Fluor, Rhodia and BP), several reasons contributed targets being exceed (NAO, 2004). For example, some DP implemented internal policies to reduce emissions well before the UK ETS was launched and felt the benefit of those initiatives in the first year of the scheme (e.g. Invista and BP) (NAO, 2004). Those companies had set internal targets and installed equipment to meet other regulatory requirements (NAO, 2004). Also BP, for example, was considered to be an institutional entrepreneur because it experimented with internal emissions trading before the UK ETS was operating (Pinkse and Kolk, 2007). Thus, for some DP complying with the UK ETS was compatible with their own internal goals. However, compatibility does not seem to exist for all DP. Indeed, NERA (2004) recognised that DP possessed different levels of preparation at the outset of the UK ETS (NERA, 2004).

According to Oliver (1991), organizations tend to conform when pressures are compatible with their internal goals. As an illustration, for-profit organizations tend to resist environmental pressures affect their efficiency. On the other hand, non-profit organizations tend to resist when pressures emphasise economic rationale because it creates inconsistencies with their goals. DP differ from each other, not only in terms of size, but also in terms of their economic activities, type and level of GHG emissions (NERA, 2004; ENVIROS, 2006). Thus, some participants of this heterogeneous group could have faced discrepancies between their internal goals and pressures around UK ETS context. For instance, some of DP, specially the small organizations, argued that the verification process was demanding, time consuming and costly (NAO, 2004; ENVIROS, 2006). This could be explained by the fact that verification rules set by the UK ETS were not part of organizations' prior activities or objectives.

5.2.2.4 Control (How or by what means are the institutional pressures being exerted?)

According to Oliver (1991), when a compulsory scheme is implemented by regulation or law organizations tend to be aware of the public interest issues included in the regulation and, as a consequence, conform with environmental pressures. The UK ETS was a voluntary scheme. However, compulsory and external verification process were used to control target achievement (NERA, 2004; ENVIROS, 2006). Every year DP had to produce a report on their emissions reductions. Verification rules were designed by accounting firms, technical auditors, manufacturing industry, Department for Environment, Food and Rural Affairs (DEFRA), the UK Accreditation Service (UKAS) and UK ETG (NERA, 2004). Several issues, however, arose with respect to the verification process. First, reports produced by verifiers were treated as confidential information. DEFRA were only informed if DP had (or not) achieved their targets. Second, verification rules required the use of technical expertise and a highly specialised vocabulary (ENVIROS, 2006). According to an interview with DEFRA staff⁵⁷, the verification reports on DP operation were difficult to interpret without technical support. Third, there were some penalties established for DP that did not conform with the UK ETS agreement (DEFRA, 2001a). However, according to the same interview with DEFRA staff, during the whole scheme there were no serious non-conformity. For example, one DP changed the activity base and did not communicate this to DEFRA. This DP had part of its allowances cancelled.

5.2.2.5 Context (What is the environmental context within which institutional pressures are being exerted?)

A certain degree of uncertainty emerged around the UK ETS. The pilot nature of UK ETS was mentioned as one of the reasons why the UK ETS created an unpredictable environment. This scheme was first initiative to consider all six GHG emissions and several activity sectors (NAO, 2004). In addition, the UK Government had to launch this innovative initiative in condensed time table, from 2000 when scheme was

⁵⁷ This interview was held in London at DEFRA at 20th February 2007. The PhD student and supervisor (Prof. Bebbington) attended to this interview.

announced to its implementation in 2002 (NAO, 2004). Indeed, those two reasons were highlighted by organizations when the UK Government asked why they had not participated at UK ETS (NAO, 2004; NERA, 2004). Other causes highlighted by non-participating organizations were the perceived high cost of complying with UK ETS requirements and their concerns regarding target achievement (NAO, 2004; NERA, 2004). The other possible area of uncertainty related to the differences between UK ETS and EU ETS (NAO, 2004). Organizations appeared to be concerned about the future transition between those two schemes (NAO, 2004; Pinkse and Kolk, 2007).

Business involvement and cooperation gave a certain level of legitimacy to the scheme. However, UK Government had to work very hard to attract 32 DP (NAO, 2004). In 2001 the UK Government asked around 5,000 companies about their interest in participating in the scheme. From this total, only 30 showed interest. The UK Government then tried to recruit DP via a public relations firm. In January 2002, there were less than 20 companies registered. In order to convince organizations to participate in the UK ETS, the UK Government appointed Shell chief executive as ‘emissions trading champion’ (NAO, 2004).

Uncertainties around policy frameworks have been referred as a barrier to carbon management (Okereke, 2007) and to long-term emissions reductions intentions (Hoffman, 2007a; 2007c). Uncertainties seem to have affected the operation of the UK ETS. For example, the UK Government noted that did not change the targets once the scheme was already run, because that would be risk for DP withdrawing from the scheme. In addition, the UK ETS was viewed an important contributor to the EU ETS. Indeed, EU recognised the UK efforts and noted that the UK ETS facilitated the debate on emissions trading (NAO, 2004). The failure of UK ETS would have, therefore, compromised the future of EU ETS, since the UK ETS was launched to give political and symbolical support for the EU ETS (Engels *et al.*, 2008; Braun, 2009). To avoid this risk, the UK Government reduced uncertainty around UK ETS and thereby secured organizations’ conformity.

5.3 Organizational disclosure: Plausible evidence of strategic responses

According to the NAO (2004) the UK ETS emerged as an alternative for achieving cost-effective GHG emission reductions. The UK Government also tried to establish common ground between multiple demands. On the one hand, the UK ETS required emissions reductions and the other hand these were sought without affecting organizations' competitiveness. In order to achieve these two objectives, the UK Government encouraged cooperation between business and government (NAO, 2004). The UK Government called on the business community to participate in UK ETS design and offered monetary incentives to those organizations that participated in the scheme. The UK Government seemed to have attracted DP with the idea that it would be cost-efficient to participate in the UK ETS. Indeed, Von Malmborg and Strachan (2005) note that the main reason given by DP to participated in the UK ETS was to receive incentive payments. In the same vein, Nye and Owens (2008) suggested that organizations' primarily motivation in supporting economic instruments, such as emission trading, is to achieve economic efficiency. However, the economic rationale for doing so is diminished or constrained by existing policy frameworks or wider socio-economic contexts.

GCC disclosure made by organizations may also provide some evidence that DP sought to achieve economic fitness while also reducing GHG emissions. As an illustration, the result found in this dissertation suggest that DP were more likely to disclose data on GCC in their annual reports (AR), compared with MP (tables 4.10 and 4.20). This results was found statistically significant not only in terms of number of reports (table 4.10), but also in terms of volume of disclosure (table 4.20). According to Gray *et al.*, (1995b), the AR represents an organization's construction of their own rationale. In an AR organizations tend to construct a financial image and social and environmental disclosure in an AR could generate conflicts with organization's financial ambitions (Gray *et al.*, 1995b). In this study, the relative emphasis on AR disclosures suggests that DP found AR to be a more 'comfortable' location in which to disclose GCC data compared with MP. This could partially be explained by the fact that DP acquiescence/compliance to reduce emissions under the UK ETS has been rewarded with economic incentives.

Most of reports analysed did not present any explicit rationale with regard to GCC disclosure. Where the rationale existed, however, it was more likely to be found in DP reports. The main rationale disclosed by DP in AR and stand alone reports (SA) was that business GHG responsiveness will be good for business. The fact that DP stressed this rationale also reinforces that DP acquiescence to GCC disclosure was probably related to the higher levels of efficiency achieved by DP.

Despite the fact that DP differs from each other in terms of size, economic activities, type and level of GHG emissions (NERA, 2004; ENVIROS, 2006), the disclosures made by them in SA had a lower standard deviation compared with MP (tables 4.18 and 4.19). This could be evidence of acquiescence/imitation or mimetic behaviour among DP. One possible influence on achieving levels of isomorphism could have been the compulsory Measurement, Reporting and Verification (MRV) process set within the UK ETS. The UK ETS required a external verification process for all DP (NERA, 2004; ENVIROS, 2006). Thus, the enforcement of similar MRV rules could have also influenced DP mimetic behaviour around GCC disclosure volumes.

The compulsory MRV process could also have influenced DP to acquiesce/comply regarding to volume and the nature of CSD. DP presented significant highest volume of GCC disclosure after the UK ETS started, if considered paired comparison and total of reports analysed (table 4.21 and 4.22). In addition, the GCC disclosure analysis in chapter four indicates that DP produced higher levels of disclosure on actions than MP while there was no significant difference between proportions of reports that present disclosure on emissions, targets and other/narrative (4.26 until 4.31). In contrast, MP produced significant higher levels of incidence of disclosure on actions and a smaller proportion of these reports presented disclosure on targets (4.26 until 4.31). The proportions of DP reports that disclosed data on emissions, targets and other/narrative may be evidence that MRV motivated DP to produce more balanced disclosure than MP, bearing in mind the multiple characteristics of GCC.

With respect to the disclosure of actions to tackle GCC, MP disclosed more compared with DP in the SA (table 4.15). On the other hand, DP presented more AR disclosure on actions to tackle GCC than MP. This result may suggest that DP used avoidance/buffering tactics. The disclosure on actions to reduce GHG emissions at SA

may have been considered unsuitable if DP considered economic efficiency to be more important than social fitness with respect to taking action. On the other hand, DP appeared to follow an acquiesce/compliance strategy as they presented more AR disclosures on actions to tackle GCC compared with MP.

5.4 Concluding comments

This chapter sought to analyse the UK ETS using the antecedents of strategic responses to institutional pressures proposed by Oliver (1991). This study explored how DP appeared to have responded to the pressures that the UK Government may have exerted on them when they joined the UK ETS. In addition, this analysis provides some tentative suggestions as to how GCC disclosure could have been influenced by the UK ETS. The results of the disclosure analysis suggest that the UK ETS influenced the nature of disclosure about GCC. This influence was shown to be significant not only in terms of the type of media chosen by DP (AR or SA) but also in terms of the quantity and type of disclosure made.

In particular, DP were more likely to disclose in the AR. This type of report focuses on economic performance and the need to efficiently reduce GHG emissions do not contradict this rationale. On the other hand, the MP disclosures seem to be more focused around the SA which emphasises issues of social fitness. This result raises a question as to how instruments of environmental policy could better contribute to promote social accountability and to what extent instruments of environmental policy could and should promote social over economic fitness.

The requirements for MRV within the UK ETS also seemed to have influenced GCC disclosure. DP disclosure covered more aspects of GCC disclosures while MP seemed to concentrate disclosure around actions and emissions targets. These results could suggest that GCC disclosure could be affected by MRV. These requirements may have created a better understanding of emissions sources which lead more detailed disclosure of GHG emissions.

Chapter 6:

GLOBAL CLIMATE CHANGE DISCLOSURE - A COMPARATIVE STUDY

CHAPTER 6: GLOBAL CLIMATE CHANGE DISCLOSURE – A COMPARATIVE STUDY

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List of abbreviations

| | |
|------------------------|-----------------------------|
| AR | Annual Report |
| CDM | Clean Development Mechanism |
| CDP | Carbon Disclosure Project |
| CES | Chevron Energy Solutions |
| CH₄ | Methane |
| CO | Carbon Monoxide |
| CO₂ | Carbon Dioxide |
| CO₂e | Carbon Dioxide Equivalent |
| CSD | Corporate social Disclosure |
| CSR | Corporate Social Reporting |

List of abbreviations continues...

List of abbreviations continuation

| | |
|-----------------------|---|
| DEFRA | Department for Environmental, Food and Rural Affairs |
| DP | Direct Participants |
| EPA | Environmental Protection Agency |
| EU | European Union |
| EU ETS | EU Emission Trading Scheme |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas/Gases |
| GRI | Global Reporting Initiative |
| HFC | Hydrofluorocarbon |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Match Pairs |
| N₂O | Nitrous Oxide |
| NO_x | Nitrogen Oxide |
| PCA | Partnership for Climate Actions |
| PFC | Perfluorocarbon |
| SA | Stand Alone Report |
| SF₆ | Sulphur Hexafluoride |
| SO₂ | Sulphur Dioxide |
| SEC | Securities and Exchange Commission |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK ETS | UK Emission Trading Scheme |
| UN | United Nations |
| USA | United States of America |
| VOC | Volatile Organic Compound |
| WBCSD | World Business Council for Sustainability Development |
| WRI | World Resource Institute |

Content

Objective

This chapter presents a comparative study of disclosures made by organizations in annual report (AR), stand alone report (SA), and the Carbon Disclosure Project (CDP). The objective of this analysis is to achieve a finer comparative analysis on GCC disclosure produced by three pairs of direct participants (DP) in the UK Emissions trading Scheme (UK ETS) and non-UK ETS DP (called match pairs - MP). This comparison is carried considering three pairs of similar organizations that belong to three different industry sectors, in order to reduce the effect of size and industry on GCC disclosures. The data on GCC disclosure is collected via a check list that incorporates principles developed from institutional theory. This comparative study also

highlights differences on GCC information found on the three disclosure medias analysed: AR, SA and the CDP.

6.1 Introduction

Different studies on GCC disclosure have tried to establish comparisons between groups of organizations in order to evaluate their GCC disclosure (see for example, Roeser and Jackson, 2005). These studies highlighted several difficulties of conducting comparisons on GCC disclosure. Roeser and Jackson (2005), for example, analysed GCC disclosure produced by FTSE 100 and participants in the UK Emissions Trading Scheme (UK ETS). They concluded that the GCC information disclosed used different parameters, which made comparisons of performance difficult. As an illustration, Roeser and Jackson (2005) identified that emissions data reported by organizations were calculated considering different periods of time and there were little information on the amount emitted on previous years.

In addition, Pinkse and Kolk (2009) found that some companies were not transparent with regard to the methodology used to calculate emissions and that the methodology used have not being consistent over the years. The absence of an agreement in the methodology to measure emissions difficult comparison between organizations. A similar problem was also identified regarding to targets set. Companies set targets in different ways, for example targets for direct or indirect emissions, local or global emissions, energy use only and targets for different timetable (Pinkse and Kolk, 2009).

Despite the fact that Sullivan *et al.*, (2008) suggested a procedure for benchmarking FTSE 100 disclosure at Corporate Social Reporting (CSR) and the CDP, these authors also highlighted limitations on GCC information reported by organizations, which also make comparisons complicated. As an illustration, Sullivan *et al.*, (2008) noted that companies did not clearly describe how they treated emissions from their subsidiaries and did not considered all geographic operations when creating emissions inventories.

The above studies compared large groups of organizations. In contrast, this chapter seeks to compare GCC disclosure by examining information of paired organizations.

This comparison will consider pairs of similar organizations in an attempt to add to the existing literature. In particular, the comparison (through the matching pair procedure) seeks to minimise differences in disclosure approach that could be linked to industry or company size. It is hoped, therefore, that differences due to UK ETS membership may be more apparent. In addition, this comparison will allow a more fine grained analysis of disclosures of the six organizations examined: Shell, Chevron, Barclays, HBOS, Ford and Honda.

The analysis undertaken examines types of initiatives taken by organizations on GCC and investigates what can be inferred from the disclosure about organizations' motivations and responses to GCC issues. The importance of analysing motivations and responses lies in the fact that the decisions related to GCC are within the discretion of managers and the GCC outcomes achieved depend on how companies interpret and effectively use GCC information (Pinkse and Kolk, 2009). Sullivan *et al.*, (2008) suggested that disclosure of GCC does not always mean that there are effective initiatives undertaken by an organization. As an illustration, some companies disclose risks arising from GCC because they are required to and not because they are conducting a systematic GCC risk assessment (Sullivan *et al.*, 2008). Sullivan *et al.*, (2008) also suggested that few companies opposed to recognise that they need to change their business to adapt to GCC and most companies focus on taking actions that provide financial returns.

The analysis undertaken in this chapter is organized in five steps. The first step explains the parameters considered to select the three disclosure medias analysed. The second step describes the process adopted to decide on the pairs of organizations to be used for comparisons. The third step illustrates GCC disclosure highlighting six aspects: emissions, targets, actions, environmental policies, organizations' motivations and responses to GCC issues. The fourth step summarises comparison between organizations to a check list which contains some topics on GCC. Finally, the fifth step is focused in highlight the differences identified on the GCC information in the three disclosure medias: SA, AR and the CDP

6.2 Global climate change disclosure in different medias

CSR is defined by Gray *et al.*, (1995b) as all types of data that are published in the public domain such as annual report, stand alone report, press notes, advertisements, organizations' magazines and webpages. The annual report has been used as a principal focus of studies related to CSR, because it is a statutory document produced regularly (Gray *et al.*, 1995a). However, given changes in disclosure practices, studies that only examines AR are unlikely to fully capture corporate social disclosure (CSD). Thus, a more complete perspective on CSD will also include other types of CSR, such as environmental/sustainable development/CSR reports (Unerman, 2000).

GCC disclosure could be provided by organizations through several types of CSR. As an illustration, Coulson (2008) analysed Lloyds disclosure on GCC and highlighted that Lloyds used multiple vehicles of communications including annual report, corporate social report, annual corporate responsibility review (as well as other documents for stakeholders including the CDP) and employee magazines. After analysing the information in these different communication media, Coulson (2008) concluded that different information was provided in the these medias with the differences being attributed to diverse stakeholders audiences.

Pinkse and Kolk (2009) also highlighted different types of CSR on GCC. The first type CSR, Pinkse and Kolk (2009) viewed as being inferred by public affairs concerns. The second type of report was associated to Securities and Exchange Commission (SEC) disclosure that is disclosure linked to material effects on financial position. The third type of reporting was the CDP. The CDP was formed in 2000 and emerged in response to an investors petition that required information on GCC. The main objective of this initiative was to promote standardised information on GCC and create dialogue between investors and corporations. The CDP started by inviting FTSE 500 to provide data on GCC and currently involves more than 3,700 companies in different industry sectors and different parts of the world (including, for example, countries in Europe, Asia, North America, Latin America and Australia). Since 2003, the CDP has sent questionnaires annually to organizations requiring information on GCC (CDP and Innovest StrategicValueAdvisor, 2006).

This chapter examines GCC disclosure at AR and SA, which could be seen as, representing organizations' financial and social image on GCC, respectively (Gray *et al.*, 1995b; Unerman, 2000; 2007; Coulson, 2008; Pinkse and Kolk, 2009). The information disclosed within the CDP is also included in the study. The first reason to consider the CDP lies on the fact that the disclosure in the CDP could provide a different disclosure perspective compared with AR and SA, since AR, SA and the CDP could have been produced to attend to different stakeholders demands (Coulson, 2008; Pinkse and Kolk, 2009). The second reason is due to the scope of the CDP, which including large numbers of companies in different sectors and from various countries.

6.3 Method for selecting organizations and organization descriptions

Organizations that participated in the UK ETS formed the starting point of this analysis. Analysing DP and MP individually allows far more detailed understand of the impact of the UK ETS on the disclosure. Three DP were chosen for analysis: Shell, Barclay and Ford. The first reason for selecting these organizations was because they belong to different sectors, which creates pattern to investigate if industry sector affects organizational motivations and responses to GCC issues. The second reason was the fact that these organizations were part of FTSE 500 ranking (in 2006), which make them leaders (at least in economic terms) of their respective sectors. The third reason for selecting these organizations was because they were the ones which presented 'clean' match pair (see chapter 3 for more details on pairs selection) and they also participated/responded during the first three years of the CDP (see table 6.1). The information used at this analysis considers disclosures for the years 2002, 2003 and 2004. The reason to start the analysis in 2002 was because this was the year that the CDP questionnaire and UK ETS were launched. Each organization will now be briefly introduced.

Shell is a group of organizations, which include energy and petrochemical companies. Shell operations around the world are classified in upstream and downstream activities. Upstream activities refer to oil and natural gas exploitation as well as trading of natural gas and electricity with downstream activities including crude oil refining (Shell, 2004a). Shell's net income was 8,712 million Euros in 2004 (Shell, 2004a). At this same year,

the total of Shell's assets (excluding liabilities) was 39,645 million Euros (Shell, 2004a). Royal Dutch Shell Petroleum Company (original from Netherlands) owns 60% of Shell's principal activities interest and 40% was owned by Shell Transport from the UK (Shell, 2004a). Shell operates in more than 140 countries and territories (Shell, 2004a).

Barclays provides financial services (Barclays, 2004b). In 2004, Barclays had over 18 million consumers and clients, net income was 6,842 million pounds and assets in 2004 was 522,089 million pounds (Barclays, 2004a). The vast majority of Barclays' operations are located in the UK. However, Barclays also operate in over 60 countries.

Ford operates in two main businesses: automobiles and services (Ford, 2004b). The automobile business includes the following brands: Aston Martin, Ford, Jaguar, Land Rover, Lincoln, Mazda, Mercury and Volvo (Ford, 2004b). The services business involves: Motor Credit Company, Genuine Parts & Service and Hertz (Ford, 2004b). In 2004, Ford's net income and assets were: 3,487 million dollars and 305,341 million dollars, respectively (Ford, 2004b). In the same year, Ford operated in 200 markets around six continents world and employed approximately 325,000 employees (Ford, 2004b).

6.4 Check list of GCC disclosure

The comparison between pairs of organizations will be guided by a check list (appendix 12) that was gathered to explore GCC disclosure in six issues: emissions, targets, actions, instruments of environmental policies, organization motivations and organization responses to GCC issues. These topics were inspired on the research instrument described on chapter 3. The check list differs from the research instrument in two aspects. First, the check list presents a more condensed list of issues to explore GCC disclosure compared with the research instrument. Secondly, the check list incorporates principles developed from institutional theory that guides a discussion on organizations' motivations to respond to GCC issues and what type of responses was given.

Table 6.1: Response to Carbon Disclosure Project questionnaires

| UK CLIMATE CHANGE AGREEMENTS DIRECT PARTICIPANTS (DP) UKETS | CDP1 (2002) | CDP2 (2003) | CDP3 (2005) | SIMILAR ORGANIZATION (SO) | CDP1 (2002) | CDP2 (2003) | CDP3 (2005) |
|--|----------------|----------------|----------------|---|----------------|----------------|----------------|
| CLEAN | | | | | | | |
| 1 Barclays Bank plc | X | X | X | Halifax and Bank of Scotland (HBOS) | X | X | X |
| 2 Battle McCarthy Carbon Club | | | | | | | |
| 2.1 University of Brighton | N | N | N | The University of Salford | N | N | N |
| 2.2 Brunel University | N | N | N | The University of Teesside | N | N | N |
| 2.3 Loughborough University | N | N | N | Bristol University | N | N | N |
| 2.4 Middlesex University | N | N | N | The University of Wolverhampton | N | N | N |
| 2.5 Kings Colledge London | N | N | N | University of Derby | N | N | N |
| 2.6 University of Plymouth | N | N | N | The University of Sheffield | N | N | N |
| 2.7 The University of Edinburg | N | N | N | The University of Glasgow | N | N | N |
| 3 Budweiser Stag Brewing Co. Ltd | N | N | N | SabMiller | N | N | X |
| 4 Dalkia Energy plc | N | N | X | National Grid Transco | X | X | X |
| 5 Dalkia Utilities Services plc | N | N | X | National Grid Transco | X | X | X |
| 6 Dana UK Holdings Ltd | N | N | N | Visteon UK Limited | N | N | N |
| 7 First Hydro Company | N | N | N | United Utilities PLC | N | N | N |
| 8 Ford Motor Company Ltd | X | X | X | Honda of the UK Manufacturing Limited | PD | PD | PD |
| 9 Imerys Minerals Ltd | N | N | N | Pilkington | N | N | N |
| 10 Ineos Fluor Ltd | N | N | N | Air Liquide UK Limited | NR | PD | PD |
| 11 Kirklees Metropolitan Council | N | N | N | Bolton Council | N | N | N |
| 12 Lafarge plc | X | X | PD | Hanson | N | N | N |
| 13 Land Securities plc | N | N | N | British Land CO | N | N | N |
| 14 Marks & Spencer plc | N | X | X | Kingfisher | N | (**) | X |
| 15 Motorola GTSS | NR | X | X | Ericsson | DP | X | X |
| 16 Natural History Museum | N | N | N | National Galary | N | N | N |
| 17 Rhodia Organique Fine Ltd | N | N | N | Degussa Knottingley Limited | N | N | N |
| 18 Rolls-Royce plc | N | N | N | Smiths Group | N | N | N |
| 19 Shell UK Ltd | X | X | X | Chevron | DP | X | X |
| 20 UK Coal Mining Ltd | N | N | N | Mining (Scotland) Limited | N | N | N |
| DIRTY | | | | | | | |
| 21 Asda Stores Ltd | NR | N | N | GUS | X | X | X |
| 22 BP plc | X | X | X | Exxon Mobil | (*) | X | X |
| 23 British Airways plc | N | N | N | London Underground and Heathrow Airport | X | X | N |
| 24 British Sugar plc | N | N | N | Tate & Lyle Industries Limited | N | N | N |
| 25 General Domestic Appliances Ltd | N | N | N | Electrolux | N | N | N |
| 26 GKN (UK) plc | N | N | N | Wagon | N | N | N |
| 27 Invista UK Ltd | (*) | X | X | ICI | N | N | N |
| 28 Lend Lease Real Estate Investment Services Ltd | N | N | N | Liberty international | N | N | N |
| 29 Mitsubishi Corporation UK plc | X | X | X | Sony | X | X | X |
| 30 Somerfield Stores Ltd | N | N | N | Safeway Stores Limited | DP | DP | N |
| 31 Tesco Stores Ltd | DP | PD | X | Sainsbury's Supermarkets LTD | X | N | N |
| 32 Royal Ordnance plc | X | N | X | Qinetiq Group | N | N | N |
| TOTAL REPORTS | 7 | 9 | 12 | TOTAL REPORTS | 7 | 9 | 10 |

Source: <http://www.cdproject.net/>

CDP - Carbon Disclosure Project

X - The organization participated on CDP

PD - The organization participated on CDP but did not permit public access on the report

N - The organization did not participated on CDP

DP- The organization declined to participate on CDP

NR - The organization did not responded to CDP questionnaire

(*) Information provided but not available at CDP webpage; (**) Questionnaire forthcoming and not available at CDP webpage

The first topic on the check list examines disclosure of emissions and it seeks to capture characteristics of the organization's greenhouse gas (GHG) inventory. The description distinguishes between direct (emissions produced by organization own operations) and indirect (emissions produced by the use of organizations products or services) emissions as well as, emissions produced by the supply chain (The Partnership for Climate Actions - PCA, 2002). The analysis also capture the type of GHG (AEA Technology, 2005) the amount emitted and period to which the emissions data refers to. In addition, the description captures if emissions are reported by source and county of origin. Finally, the check list seeks to identify if the organization discloses other types of GCC indicators, such as global warming contribution (UN, 2004; WBCSD and WRI, 2004).

The second topic on the check list refers to targets set by organisations, capturing data as to whether targets refer to direct and/or indirect emissions. In addition, description data about the type of GHG to which a target related is captured. Targets can also vary by countries that organization operates and by sources of emissions (Pinkse and Kolk, 2009), so these characteristics are also distinguished in the checklist. Finally, whether targets were set voluntarily or as result of external organizations such as, government (Pinkse and Kolk, 2009).

The third category on the check list seeks to capture actions that organizations could undertake in order to tackle GCC. Those actions are classified as internal or external actions. Internal actions are those determined by the organization itself. External actions are those developed with external bodies. The most frequent actions that are noted in GHG reporting guidelines were listed in the check list (Department for Environment, Food and Rural Affairs - DEFRA, 2001c; Global Reporting Initiative - GRI, 2002; PCA, 2002; 2003; 2004; WBCSD and WRI, 2004; 2006a; GRI, 2006; CDP, 2007).

The fourth category seeks to capture disclosure made by organizations as other involvement in voluntary or compulsory elements of environmental policy. Examples of policies were incorporated in the check list, including these related to mechanism adopted by the Kyoto Protocol (such as emissions trading, the clean development and joint implementation mechanisms (United Nations - UN, 1998) and others such as market-base, regulatory and voluntary agreements (Intergovernmental Panel on Climate Change - IPCC, 2001a; Krarup, 2001).

The fifth and sixth categories in the check list was developed in order to analyse organizational responses to GCC issues using Oliver (1991). Oliver (1991) combines institutional theory and resource dependency perspective to suggest a classification of possible organizational responses to external pressures. Oliver also suggested a classification on possible antecedents (motivations) to organizations responses to such pressure (these categories are explained in more details in the chapter 5).

The objective of adapting the concepts proposed by Oliver (1991) to this analysis is to explore how organizations interpret GCC initiatives in the environment that they play out in. The identification of potential motivations to respond to GCC issues may give some insight into disclosures about the process of change in adapting to GCC issues and regulations. Oliver (1991) would be better applied to primary data (such as interviews) rather than secondary data (such as CSD), because interviewing would allow perspectives on organizational motivations and responses to be gathered. However, an analysis using disclosure in the AR, SA and the CDP may also provide interesting data. In addition, it may be useful to examine motivations and responses that can be inferred from these three different disclosure medias.

The purpose of completing the check list is to identify aspects highlighted on the descriptive summary, helping on the comparison between organizations. The check list is divided in six topics and each topic contains categories. The categories should be marked with the symbol (✓) if the disclosure presents any evidence of the category in reference and () otherwise.

6.5 Summary description on global climate change disclosure: A pair wise comparison

Two different but related comparisons were carried in this chapter. The first comparison considers differences and similarities between GCC disclosure produced by the three pairs of organizations. This first comparison is mostly centred in identify differences on the GCC disclosure produced by DP and MP. The second comparison emphasise differences on GCC information in the three disclosure medias: AR, SA and the CDP. This second comparison is made separately from the first one and it is presented in this

chapter in the part number 6.6. The reason to produce two different comparisons was to answer two questions separately. The first question is what type of pair wise comparison can be produced based on GCC disclosure and the second question is if there is any difference between the disclosure presented on the these three disclosure medias.

This part of the chapter presents the first comparison that is carried by an analysis of what type of GCC information each organization discloses. This study helps to understand the information produced by DP and MP in the three types of disclosure medias. The fact that pairs of organizations are similar in several aspects, such as industry sectors and size, reinforce the fact that any difference found on data comparison can be interpreted as a possible future way to improve organizations' GCC disclosure and/or performance to tackle GCC.

The first comparison analyses the disclosure on the following three pairs or organizations: Shell and Chevron, Barclays and HBOS and Ford and Honda. The DP are: Shell, Barclays and Ford. The MP to each of these DP are: Chevron, HBOS and Honda, respectively. For each pair of organization, six different disclosure issues are explored: (i) Emissions, (ii) Targets, (iii) Actions, (iv) Instruments of environmental policy, (v) Organizational motivations and (vi) responses to pressures on GCC issues.

6.5.1 Shell (Direct participant) and Chevron (Match pair)

EMISSIONS

The emissions data disclosed in SA by Shell in 2002 and 2003 only contain information on its direct emissions (these emissions are generated by the organizations own operations) (see table 6.2). Shell only produced information on its indirect emissions (these emissions produced from the use of the product or service provided by the organization) in 2004.

Table 6.2: Shell emissions data

| | 2002 | 2003 | 2004 |
|--------------------------|---|---|---|
| Direct GHG emissions | 106 million tonnes of CO ₂ e | 112 million tonnes of CO ₂ e | 112 million tonnes of CO ₂ e |
| Indirect GHG emissions | - | - | 763 million tonnes of CO ₂ e |
| CO ₂ | 88 million tonnes | 106 million tonnes | 106 million tonnes |
| VOC | 363 thousand tonnes | 294 thousand tonnes | 265 million tonnes |
| CH ₄ | 239 million tonnes | 234 million tonnes | 243 million tonnes |
| Other Kyoto's gases | 9 thousand tonnes | - | - |
| NO _x | 202 thousand tonnes | 219 thousand tonnes | 197 million tonnes |
| SO ₂ | 250 thousand tonnes | 292 thousand tonnes | 304 million tonnes |
| N ₂ O | 202 thousand tonnes | - | - |
| HFC | 47 tonnes | - | - |
| Global Warming Potential | 94 million tonnes CO ₂ e | 112 million tonnes CO ₂ e | 112 million tonnes CO ₂ e |

Source: Shell (2002b; 2003c; 2004c) – Stand alone reports.

Chevron disclosed data on direct emissions but not indirect emissions (see table 6.3). Chevron also disclosed information on direct and indirect GHG⁵⁸ (Chevron Texaco, 2004b). In addition, Chevron separated its emissions by upstream and downstream business activities and emissions produced by Combustion and Flaring & Venting (Chevron Texaco, 2002a, 2003a, 2004b). Chevron's emissions data from 2002 and 2003 were audited by KPMG and URS, respectively (Chevron Texaco, 2002a, 2003a). Chevron also mentioned that intended to continue with third-party verification in the future (Chevron Texaco, 2003a). In their SA, neither Shell nor Chevron disclosed emissions by product and by country of origin.

In the CDP, Shell disclosed its 2002 emissions split by CO₂, CH₄, other GHG and Global Warming Potential. These emissions were distributed in three categories: Global, Kyoto Annex B countries and EU Emissions Trading Scheme (EU ETS) context (Shell, 2004b). Chevron also presented its emissions using these parameters for the years 2002 and 2003 (Chevron Texaco, 2004a, 2005). Thus, Shell and Chevron used the similar parameters to disclosure on emissions at the CDP in only one year analysed 2002.

⁵⁸ Direct GHG (CO₂, SF₆, CH₄, HFC, PFC, N₂O) and indirect GHG (CO, NO_x, SO₂ and VOC). For more details on direct and indirect GHG emissions see chapter 1 and 3.

Neither companies have had significant change in the total GHG from 2002 until 2003 (see tables 6.2 and 6.3). In addition, Shell and Chevron used different parameters and measures to disclosure on GHG emissions. The emissions data disclosed by Shell and Chevron illustrate the difficulties in comparing companies' performance on GHG emissions. These difficulties rely in several aspects such as different emissions origins countries and sometimes the absence of the data. Chevron held the most complete emissions data set in terms of direct emissions (these generated by the organizations operations) but Chevron did not disclosed on indirect emissions and Shell did.

TARGETS

Shell disclosed that they had targets for GHG emission reductions before Chevron did so. In their 2001 SA, Shell's information on targets was disclosed by activity and different types of GHG (Shell, 2003b). In 2002, Shell achieved their targets to reduce GHG emissions by 10%, baseline a 1990. In 2003, Shell established a new target at SA to achieve 5% reductions on its GHG emissions by 2010, benchmarked 1990 emissions level (Shell, 2003c).

In contrast in 2003, Chevron published information for the first time in their SA on emissions target with that target being to reduce emissions by 63 million metric tons of CO₂ e by 2004 (Chevron Texaco, 2003a). Chevron met its target in 2004 and set a commitment to continue emit 63 million metric tons of CO₂ e in 2005 (Chevron Texaco, 2004b). This data suggest that Chevron stabilized emissions at a level equivalent to one year of emissions reductions. In the CDP, Chevron mentioned their commitment to improve energy efficiency by 10 percent from 2002 to 2012 as part of the American Petroleum Institute's commitment to the Bush Administration.

Both Shell and Chevron did not disclose targets by county of origin (Shell, 2003b). The parameters used by Shell and Chevron to establish targets were different which again makes comparisons between them impossible.

Table 6.3: Chevron emissions data

| | 2002 | 2003 | 2004 |
|---------------------------------------|---|---|---|
| Direct GHG emissions | 63.4 million metric tons of CO ₂ e | 64 million metric tons of CO ₂ e | 62 million metric tons of CO ₂ e |
| GHG by sector: Upstream | 34.4 million metric tons of CO ₂ e | 37 million metric tons of CO ₂ e | 35.3 million metric tons of CO ₂ e |
| GHG by sector: Downstream | 23.5 million metric tons of CO ₂ e | 23.7 million metric tons of CO ₂ e | 24 million metric tons of CO ₂ e |
| GHG by sector: Others (I) | 2.3 million metric tons of CO ₂ e | 3.2 million metric tons of CO ₂ e | 3.2 million metric tons of CO ₂ e |
| GHG by type: Direct | 62.8 million metric tons of CO ₂ e | 62.6 million metric tons of CO ₂ e | 61.8 million metric tons of CO ₂ e |
| GHG by type: Indirect | 1.5 million metric tons of CO ₂ e | 2.1 million metric tons of CO ₂ e | 1.6 million metric tons of CO ₂ e |
| GHG by type: Grid Credits (II) | 0.9 million metric tons of CO ₂ e | 0.9 million metric tons of CO ₂ e | -0.9 million metric tons |
| CH ₄ | 13% | 11% | 11% |
| CO ₂ | 87% | 89% | 89% |
| N ₂ O | Trace amount | Trace amount | Trace amount |
| Combustion | 56% 38.8 million metric tons | 61% 38.9 million metric tons | 61% 38.1 million metric tons |
| Flaring & Venting | 26% 15.8 million metric tons | 25% 16.2 million metric tons | 24% 14.9 million metric tons |
| Other sources (III) | 18% 8.8 million metric tons | 14% 8.8 million metric tons | 15% 9.5 million metric tons |
| End-use CO ₂ emissions | 415.2 million tons | — | 377 million metric tons |
| NO _x global | - | 125,630 metric tons | 114.3 thousand metric tons |
| NO _x by sector: Upstream | - | 100,046 metric tons | 89,764 metric tons |
| NO _x by sector: Downstream | - | 13,109 metric tons | 13,877 metric tons |
| NO _x by sector: Others (I) | - | 12,475 metric tons | 10,656 metric tons |
| USA NO _x | 8,213 metric tons | 7,990 metric tons | 7,303 metric tons |
| USA NO _x | 24 metric tons p/million barrels processed | 24 metric tons p/million barrels processed | 23 metric tons p/million barrels processed |
| VOC global | - | - | 426.800 metric tons |
| VOC by sector: Upstream | - | - | 402.362 metric tons |
| VOC by sector: Downstream | - | - | 24.330 metric tons |
| VOC by sector: Others (I) | - | - | 80 metric tons |
| USA VOC | 8,535 metric tons | 8,555 metric tons | 7,153 metric tons |
| USA VOC _x | 25 metric tons p/million barrels processed | 25 metric tons p/million barrels processed | 22 metric tons p/million barrels processed |

Source: Chevron Texaco (2002; 2003a; 2004b).

(I) Others: Includes ChevronTexaco's shipping, power and gasification and coal business as well as administrative and corporate services.

(II) Credits from electricity exported in efficient way, avoiding waste

(III) This includes acid gas removal, coke combustion, crude oil transport, crude oil storage, flashing, fugitives, glycol dehydrators, indirect emissions and Sulphur recovery.

ACTIONS

In 2004 Shell mentioned its responsibility to help consumers to reduce their emissions. Shell recognized that the demand for energy will increase approximately 60% by 2050. Shell also disclosed that they believed that this demand will affect GCC (if energy sources focused on burning fossil fuel). Despite the fact that Shell recognised the impact of burning fossil fuel on GCC, the amount of investment in clean energy (\$700 million over 5 years) was less than the investments made in only one year (2004) on oil exploitation and production (\$ 9,868 million). In addition, there were no details on actions taken in different parts of the world. Examples of other types of actions taken by Shell to tackle GCC were: internal emissions trading, hydrogen filling stations development, development of advanced biofuels, waste disposal, carbon sequestration (in Norway), GHG management (in Canada) and partnership with other organizations to reduce impacts on GCC (e.g. Rocky Mountain Institute to improve energy efficiency in Denmark and London) (Shell, 2002b, 2003c, 2004c). Shell also included the effect of GHG emissions in their investment analysis (Shell, 2002b, 2003c). This procedure favors projects with lower carbon emissions (Shell, 2002b, 2003c). Shell also highlighted that has appointed a group of GCC advisers in some countries depending on the demand on GCC issues (Shell, 2004b).

Chevron considered GCC as relevant issue in energy industry (ChevronTexaco, 2002a) and defended transparency on energy industry regarding to information on energy management and GHG emissions (Chevron Texaco, 2002a). Chevron developed software to estimate these type of information internally and this software was later made available for other external organizations without charge (Chevron Texaco, 2002a). Chevron also recognized that the use of its products contributes to GCC (Chevron Texaco, 2002a). Chevron pronounced disclosures on its work with external stakeholders to tackle GCC (Chevron Texaco, 2002a). For example, Chevron participated in cogeneration projects in the USA (Chevron Texaco, 2002a), co-funded a work of the Massachusetts Institute of Technology Joint Program of Science and Policy for GCC (Chevron Texaco, 2002a), supported a variety of CO₂ capture such as global CO₂ capture project, GEOSSEQ, GEODISC and Weyburn project (Chevron Texaco, 2002a).

Chevron highlighted several internal actions to tackle GHG emissions, for example, improved efficiency by using technology, reduced flaring of gas and emissions, reduce energy consumption, investing and using renewable energy (Chevron Texaco, 2002a, 2003a, 2004b). Chevron also developed an internal benchmarking on emissions at business unit, country and facility levels in order to tackle emissions in a systematic and measurable way across their operations (Chevron Texaco, 2004b). In addition, Chevron set an internal GCC steering council in order to deploy strategies on GCC, coordinate information and motivate best practices share (Chevron Texaco, 2002a). As part of its strategy, Chevron included GHG emissions in their analysis of major capital projects (Chevron Texaco, 2003a). Chevron revised its inventory to align it with guidelines suggested by International Petroleum Industry, Environmental conservation Association, American Petroleum Institute, International Association of Oil and Gas producers report (Chevron Texaco, 2003a). Chevron created a subsidiary called Chevron Energy Solutions (CES), which advised institutions and business with projects to conserve energy (Chevron Texaco, 2004b).

Chevron's GCC issues are managed by their general manager in Corporate Health, Environmental and Safety (Chevron Texaco, 2004a, 2005). At a global level, Shell had a group that provide advice on GCC issues (Shell, 2004b). However, depending on the demand of a country in which Shell's operates, Shell designates an special advisor to this region (Shell, 2004b). This occurs, for example, in Canada and Europe to deal with Kyoto Protocol implementation issues (Shell, 2004b).

Both companies did not disclose information on the costs and benefits related to actions to tackle GCC. In addition, neither of them disclosed very much on their actions and investments to reduce end-user emissions.

INSTRUMENTS OF ENVIRONMENTAL POLICIES

Shell and Chevron stated clearly that they continue to pursue growth (Shell, 2003b) by exploiting non renewable sources (Chevron Texaco, 2004a, 2005). Both companies disclosed on emissions trading. Shell mentioned that support global carbon market, but did not disclose detailed data on its allowances banked and traded (Shell, 2002b, 2003b, 2004c). Shell mentioned its participation at the UK ETS committing to reduce CO₂

emissions more than 10% below 1998-2000 by 2006 (Shell, 2002b). Shell recognised that business has important role to play in to tackling GCC, but government must provide leadership in this regard (Shell, 2003b). Shell stressed its concerns about different policies being implemented in different countries, which they suggested could compromise competition (Shell, 2004b). Shell mentioned that despite the fact that governments failed to agree a common international framework for action to tackle GCC, Shell continued to act in order to reduce its GHG emissions (Shell, 2003b) and to adapt to GCC policies (Shell, 2002b). Shell was also planning to participate in the Clean Development Mechanism (CDM) by investing in low-carbon energy projects (Shell, 2002b). Shell also supported the EU ETS (Shell, 2002b).

Chevron supported the development of market mechanisms to tackle GCC (Chevron Texaco, 2002a, 2003a). Chevron's personnel participated in two scientific review process conducted by the IPCC (Chevron Texaco, 2003a). Besides the fact that Chevron has taken actions to tackle GHG emissions, Chevron presented some contradictory disclosure. For example, Chevron believed that fuel fossil will continue to represent the vast majority of energy sources over the next 30 years and renewable sources will continue represent only a small fraction of total available energy (Chevron Texaco, 2002a, 2003a). In addition, Chevron did not entirely support the Kyoto Protocol (Chevron Texaco, 2002a, 2003a, 2004b). Chevron also stressed that those policies that encourage GHG emissions reductions have the potential to affect its investments and expected returns (Chevron Texaco, 2004b). Thus, Chevron continued to incorporate cost of carbon into its capital projects (Chevron Texaco, 2004b). Chevron also established carbon market team to help during the engagement in the EU ETS, in order to achieve lower emissions cost and maximizing earning of emissions credits (Chevron Texaco, 2004b). Chevron was also exploring whether it would participate in the CDM (Chevron Texaco, 2004b).

Shell and Chevron supported the development of market mechanisms to tackle GCC, especially emissions trading and CDM. The disclosure produced by Shell and Chevron suggest that despite these companies support mechanism to tackle GCC, they both are still more worried in not loose their competitiveness. Both companies offered small proportion renewable sources energy and it seems that there is no (or very little) intention in change their focus on non renewable sources.

ORGANIZATIONAL MOTIVATIONS AND RESPONSES

Shell and Chevron's disclosure on GCC also provided a glimpse to possible responses to institutional pressures. Analysis of disclosures related to institutional pressures is conducted in two steps. Firstly, disclosures that may be inferred to relate to the antecedents of strategic responses are analysed. Secondly, some examples of responses to institutional pressures founding on organization's disclosure are highlighted.

With regard to *constituents* of pressures, Shell and Chevron's disclosure suggest that multiple constituents had possibly exerted institutional pressures. Examples of pressures constituents mentioned by Shell and Chevron were: the European Union (EU) (via EU ETS), national Governments (via UK Emissions Trading Scheme - UK ETS), International Petroleum Industry Association, Environmental Conservation Association, American Petroleum Institute and International Association of Oil and Gas producers.

The type of *control* that these constituents attempted to exert on Shell/Chevron was diverse. Some responses to these pressures were given voluntarily (for example partnerships with other companies to develop new technologies to help end-users reduce their emissions) while others had final legal coercion as the EU ETS.

Regarding to the *cause* of why those organizations respond to such pressures, Shell/Chevron discourse was very much focused on securing their economic growth. For example, both companies said that different pressures exerted by different governments would reduce their competitiveness. In addition, these companies disclosed that supported market based instruments, claiming that they allow flexibility as to how emissions are reduced and that this approach has better economic incentives. Thus, the *content* of these pressures may be consistent or not with Shell/Chevron internal goal of focus on economic performance.

Continued exploitation of fuel fossil means that GHG emissions will also increase. For these companies, therefore, tackling GCC means shifting the current sources of energy and this will demand significant amount of effort and investment. These actions have the potential to reduce profits. Thus, for these two companies GCC create an uncertain *context*. However, the degree of uncertainty may not be that high, since our current

society is extremely dependent of oil & gas and producers operate almost at monopoly level. Thus, despite the fact that oil & gas producers are exposed to high society pressures to tackle GCC, their position in the market encourage straightforward resistance to such pressures.

With regard to Shell/Chevron responses to institutional pressures, both companies disclosed that energy sources will remain focused on fuel fossil. This could be interpreted as *defying a challenging* the rationale of the GCC agenda. In addition, they stated that they believed renewable sources of energy will represent a small fraction of their business for at least the next twenty years. They both made clear that their objective is to pursue economic growth in the future. A possible explanation to those responses could be the low level of uncertainty and coercion currently exerted on those companies.

When Shell and Chevron made disclosures that could be interpreted as showing compliance with institutional pressures to tackle GCC, it seems that they tried to *pacify* the demands of the GCC agenda. However, Shell seemed to be less resistant to pressures than Chevron. For example, Shell disclosed its internal targets before Chevron. Another example was their respective response to the Kyoto Protocol, where Chevron disclosed more reservations on this policy mechanism. Indeed, Chevron *attacked* the usefulness of the protocol. An explanation for this reaction could be the fact that Chevron is owned by shareholders in the USA. Thus, at this point in time there is no constituent dependence, no legal coercion and no need to search for legitimacy or efficiency with respect to the GCC position of their government.

Both companies made disclosure that could be interpreted to reflect *acquiescence/comply* to the EU ETS. This level of acquiescence could be explained by several factors. The EU ETS is market mechanism, which tries to reduce emissions while maintaining economic efficiency. The use of an economically focused response to GCC is consistent with the rationale of private companies. Shell and Chevron also operate at EU context and will have a need to remain aligned with EU regulation. Finally, given the EU ETS it is likely to affect future operating conditions more strongly than voluntary schemes. This may make the EU ETS a less appropriate corporate strategy.

The last example came from Chevron, which developed software that estimates GHG emissions. Chevron provided this software free of charge for all interested users, in order to promote standardization of GHG estimation. This response can be viewed as attempt to *manipulate/influence* other companies in adopt the same parameters as Chevron. Chevron being one of the economic leaders of its sector can influence other companies, which to respond to their own pressures will probably tend respond *mimetically* adopting Chevron's standards.

6.5.2 Barclays (Direct participant) and HBOS (Match pair)

EMISSIONS

Emissions data disclosed by Barclays in its SA was more detailed compared with information disclosed by HBOS (see table 6.4) (Barclays, 2002b, 2003b; HBOS, 2003c, 2004c). This was especially because Barclays disclosed overseas emissions data. However, in 2004 HBOS disclosed much more information on emissions data, including information on previous years emissions (see table 6.5) (Barclays, 2004b; HBOS, 2005b).

The data disclosed by these two companies allowed a comparison between CO₂ emissions in the UK (see table 6.6). The comparison showed that HBOS emitted less CO₂ than Barclays in all three years. Compared with HBOS, Barclays emitted more CO₂ from its business travel especially air travel. Barclays' emissions from energy consumption were also higher in 2003 and 2004, compared with HBOS emissions. However, this comparison should be taken with care because, despite the fact that both companies were considered similar in this research, their operation in the UK context may present significant differences when GHG emissions are account.

The disclosures made by HBOS in the CDP included emissions from energy consumption, business travel and the total of overseas emissions (Australia) (HBOS, 2003b, 2004b, 2005a). In addition, HBOS disclosed the impact of their operations on their clients' emissions in terms of the paper used for communications and marketing (HBOS, 2003b, 2004b, 2005a). HBOS did not calculate specifically the GCC impact

related to their supply chain, but stated it was working to measure the total of its supply chain environmental impacts (HBOS, 2003b, 2004b, 2005a). In the CDP, Barclays presented only emissions for the UK. Since 2001, Barclays also disclosed its emissions per each UK current bank accounts (Barclays, 2005). However, Barclays stated it was impossible to calculate emissions from its supply chain and measure its emissions per product (Barclays, 2002c, 2003c, 2005). Barclays also disclosed that its emissions were verified by SGS group (Barclays, 2003c, 2005).

Table 6.4: Barclays' emissions data

| | 2002 | 2003 | 2004 |
|---|----------------|------------------|----------------|
| CO₂ emissions in the UK | | | |
| Energy | - | 149,336 tonnes | 162,434 tonnes |
| Electricity | 116,272 tonnes | - | - |
| Gas | 27,892 tonnes | - | - |
| Business travel | - | - | 37,711 tonnes |
| Car travel | 13,251 tonnes | 14,240 tonnes | - |
| Rail travel | 1,371 tonnes | 1,240 tonnes | - |
| Air travel – short haul | 5,101 tonnes | 7,547 tonnes (I) | - |
| Air travel – long haul | 6,857 tonnes | 9,753 tonnes (I) | - |
| Car | 0.1865kg/km | 0.1842kg/km | 0.1843kg/km |
| CO₂ emissions in France, Spain and Portugal | | | |
| Electricity | 4,887 tonnes | - | - |
| Business travel – Short haul | 110 tonnes | - | - |
| Business travel – Long haul | 216 tonnes | - | - |
| European CO ₂ emissions -Energy use | - | - | 7,295 tonnes |

Source: Barclays (2002b; 2003b; 2004b).

(I) Those values include USA air travel.

Table 6.5: HBOS' emissions data in the UK

| | 2002 | 2003 | 2004 |
|--|--|--|--|
| CO ₂ from energy consumption (II) | 146,841,696 kg | 148,741,464 kg | 147,067,975 kg |
| Energy consumption (II) | 160.86 CO ₂ kg/m ² | 164.30 CO ₂ kg/m ² | 161.47 CO ₂ kg/m ² |
| Energy consumption (II) | 2,739,48 CO ₂ kg/FTE (I) | 2620.44 CO ₂ kg/FTE (I) | 2,525.16 CO ₂ kg/FTE (I) |
| Percentage of renewable energy (II) | 3% | 5% | 16% |
| CO ₂ from business travel (II) | 25,486,288 kg | 28,927,398 kg | 15,887,321 kg |
| CO ₂ from car travel (II) | 19,501,646 kg | 24,182,041 kg | 9,192,884 kg |
| CO ₂ from rail travel (II) | 172,731 kg | 189,060 kg | 328,978 kg |
| CO ₂ kg from air travel (II) | 5,811,911 kg | 4,556,297 kg | 6,365,459 kg |
| Business travel (II) | 475.47 CO ₂ kg/FTE (I) | 509.63 CO ₂ kg/FTE (I) | 272.79 CO ₂ kg/FTE (I) |
| CO ₂ from travel and energy | 185,092 tonnes | - | - |

Source: HBOS (2003c; 2004c; 2005b).

(I) FTE: Full Time Employees.

(II) This historical data was disclosed at 2004 SA.

Table 6.6: Comparison of Barclays and HBOS CO₂ emissions data in the UK

| Tonnes of CO ₂ | BARCLAYS | | | HBOS | | |
|----------------------------|----------|---------|---------|---------|---------|---------|
| | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 |
| Energy and Business travel | 182,702 | 199,416 | 200,145 | 172,328 | 177,669 | 162,955 |
| Energy | 144,164 | 149,336 | 162,434 | 146,842 | 148,741 | 147,068 |
| Business travel | 38,538 | 50,080 | 37,711 | 25,486 | 28,927 | 15,887 |
| Car travel | 13,251 | 14,240 | - | 19,502 | 24,182 | 9,193 |
| Rail travel | 1,371 | 1,240 | - | 173 | 189 | 329 |
| Air Travel | 11,958 | 17,300 | - | 5,812 | 4,556 | 6,365 |
| Air travel – short haul | 5,101 | 7,547 | - | - | - | - |
| Air travel – long haul | 6,857 | 9,753 | - | - | - | - |

Source: Barclays (2002b; 2003b; 2004b) and HBOS (2005b).

TARGETS

Barclays set targets for energy consumption in the UK, Spain, Portugal and France as well as for reduce their business travel in the UK only (they do not intend to extend this target to other countries - Barclays, 2003c). More specifically, Barclays committed to reduce 6% of CO₂/Km from its business travel by 2005, against a 2002 as baseline. Barclays also set targets on energy consumption, but did not quantify the impact that this reduction on its CO₂ emissions (Barclays, 2002b, 2003b, 2004b).

HBOS exceed their target to reduce emissions from energy consumption per full time employee by 10% in 2004 (HBOS, 2005b). In the CDP HBOS set a target to reduce 10% of its CO₂ emissions from business travel by 2005 (HBOS, 2003b). Again, while both of these companies set targets, they are not comparable with each other because they relate to different aspects of emissions such as different emissions sources, different time periods and different country performance.

ACTIONS

Compared with HBOS, Barclays disclosed more proactive actions regard to instruments of environmental policy to reduce GHG emissions. Evidence of this includes Barclays disclosure on the UK ETS and EU ETS. For example, Barclays created a team to advise clients on their participation in the EU ETS.

In contrast, HBOS appear to have implemented several actions to reduce not only its internal emissions but emissions from its clients and supply chain. HBOS calculated the impact of its operation on its client's emissions. HBOS was seeking to evaluate its supply chain environmental impact. In addition, HBOS worked in partnership with carbon trust to advise clients on the advantages of reducing GHG emissions. HBOS also funded projects on renewable energy and sustainable homes.

Barclays disclosures suggested that they believed that GCC would bring some opportunities and, at the same time, some risks for their business (Barclays, 2002c, 2003c, 2005). Barclays disclosure focused on actions to reduce CO₂ emissions from its business travel, energy consumption and emissions trading (Barclays, 2002b, 2003b). Barclays stated that it intended to reduce CO₂ emissions by investing in energy-efficiency technologies and limiting emissions from employee travel (Barclays, 2004b). In the CDP, Barclays disclosed that has included electric hybrid vehicle and bio-fuel cars on the choice list for those employees who have a car for business use (Barclays, 2005). Barclays stated that their staff use responsibly resources and this was one of the reasons why they could achieve their targets on GCC (Barclays, 2002c, 2003c). Barclays also involved the facilities that manage their buildings in the energy-savings targets (Barclays, 2004b) and used renewable energy (Barclays, 2005). Barclays set up a team to explore trading opportunities involving CO₂ at EU ETS context (Barclays, 2004b). Barclays stated that they invested the incentives received in the UK ETS in air-conditioning improvements (Barclays, 2004b).

HBSO stated that they consider GCC to be a major global environmental challenge (HBOS, 2005b) and its impact will have to be included in HBOS investment analysis (HBOS, 2005b). HBOS disclosed GCC business risk to be of the same nature and content as risks that they usually deal with (HBOS, 2003b, 2004b, 2005a). In addition, HBOS indicated that GCC brought several opportunities bring for its business, such as the opportunity to investment in companies that produce renewable energy (HBOS, 2003b, 2004b, 2005a) and offer insurance in areas with high flood risk (HBOS, 2005b). HBOS also worked with the Carbon Trust to develop energy and carbon management projects and to communicate to small and medium sized enterprises the benefits of energy management and GHG emission reductions (HBOS, 2003c, 2005b). In addition,

HBOS disclosed at SA that they were mentioned by the CDP as one of 50 top global companies with respect to their efforts to address GCC (HBOS, 2005b).

As internal actions, HBOS highlighted £1.2 m investment in energy savings equipment over the last three years (HBOS, 2003c). HBOS had their energy reductions verified by the National Energy Foundation Energy Accreditation (HBOS, 2003c). HBOS contracted and funded (as a member of Aeolus Consortium) renewable energy (HBOS, 2003c). HBOS also disclosed actions that they had undertaken with regard to building using heating by low-emissions systems (HBOS, 2003c) and transport improvements replacing its vehicle fleet every four years in order to reduce emissions (HBOS, 2005b).

In the CDP, HBOS disclosed data on cost and benefits of implementing actions to reduce energy consumption, between 1999 and 2004 spent £3.6 m in energy saving and had achieved £12.9m in related cost savings (HBOS, 2005a). In similar view, Barclays estimated that had saved 638 tonnes of CO₂ per year which was saved to meet future targets (Barclays, 2005). Also in the CDP, HBOS disclosed that their kg CO₂ per £ profit was 0.066 (HBOS, 2005a). In the CDP these companies also disclosed that they had people of board level responsible for GCC issues, HBOS stated that GCC issues are the responsibility of their Corporate Responsibility Team (HBOS, 2004b, 2005a). In Barclays issues related with GCC were responsibility of two teams: Environmental Management and Environmental Risk management (Barclays, 2003c, 2005).

INSTRUMENTS OF ENVIRONMENTAL POLICIES

Barclays disclosed that it was the only financial services company to participate in the UK ETS (Barclays, 2002b). As a consequence of having to meet its target under the UK ETS, Barclays received monetary incentives that were reinvested in energy efficiency projects (Barclays, 2004b). Barclays also mentioned in the CDP that purchased renewable energy from Climate Change Levy exempted sources (Barclays, 2005). HBOS criticised the UK Climate Change Levy saying that this is compromise competitiveness, profitability and the ability of UK business investing in low carbon technology (HBOS, 2003b, 2004b, 2005a). In addition, HBOS said that was not participating in emissions trading, but was working partnership Carbon Trust to reduce

emissions (HBOS, 2003b, 2004b, 2005a). Apart from these comments, HBOS disclosure was centered in adopt voluntary actions to reduce GCC impacts.

ORGANIZATIONAL MOTIVATIONS AND RESPONSES

Many actions to tackle GCC require reduction of resource consumption. Actions to achieve GHG reductions may require financial expenditure with varying financial payoff, depending upon the action taken. For these reasons, in the financial sector, some impacts are linked directly to their activities (such as energy use in buildings) while other impacts are linked to the impacts of those they fund (Kolk and Pinkse, 2007). This latter category of impact is grater than companies own impacts.

The GCC effect on financial services' organizations could be seem as a cascade effect that starts with their own impacts, moves to impact of consumers/clients and ends in financial services itself. Thus, the *context* for financial services firms could be considered to be uncertain, because banks' impacts are not all under direct control. The cascade effect could also mean that if there is high interconnectedness between consumers/clients and financial service, voluntary diffusion of norms and values could arise.

With regard to *constituents* of pressures, it appears that multiple demands from multiple constituents have been exerted on organizations in the financial services sector. One example of these constituents could be EU through its EU ETS. Financial services cannot participate at EU ETS but certainly their big costumers/clients will be involved on this scheme. Thus, financial services need to adapt their business to offer alternatives to costumers/clients to deal with the EU ETS requirements. Other constituents may also exert direct pressures on financial services, for example, national government such as the UK implemented the UK Climate Change Levy, which was commented by HBOS as being affecting UK business ability to invest in low carbon technology. Barclays mentioned its participation in the UK ETS and that they were taken actions (e.g. Energy efficiency) to achieve their targets under the scheme. Thus, both HBOS and Barclay disclosed that instruments of environmental policy were affecting their operations. This analysis suggests that there are multiple and sometimes conflictive demands being

exerted at financial services sector and this type of environment did not promote conformity with pressures, since it is difficult to respond to all of them (Oliver, 1991).

The *content* of those pressures are sometimes consistent with Barclays/HBOS's internal goals. For example, there are opportunities to fund new 'green' businesses that emerge to tackle GHG emissions. According to Oliver (1991), for-profit organizations (such as Barclays and HBOS) will be more likely to conform to institutional pressures that do not affect their underlying rationality.

With regard to dimensions of *control*, there was no disclosure of legal coercion imposed on Barclays and HBOS to reduce its own GHG emissions. The norms and values of GCC seem to be adopted and diffused voluntarily by these banks. However, proactive actions taken by these banks may have been driven by regulation enforcement on their customers/clients.

Both organizations disclosed several examples of *acquiesce/compliance* to institutional pressures. HBOS was working with the Carbon Trust to help clients to identify opportunities to reduce GHG emissions. HBOS also funded projects that contribute to reducing GHG emissions. Barclays created a team to advise consumers/clients as to how maximise opportunities in the EU ETS. These actions may result in customers/clients to buying new services offered by the bank. Barclays and HBOS also set targets to reduce their own GHG emissions. Actions to achieve these targets were taken focusing on energy efficiency and business travel reductions. These examples of *acquiesce/compliance* could be partially explained by the economic advantages gained by implementing these actions.

In addition, Barclays presented some disclosures that could be seen to *defy/challenge* to institutional pressures. Barclays asserted that it was impossible to calculate the GHG impact of its supply chain. In contrast, HBOS was working to calculate its supply chain environmental impact. As a result, while it would be difficult, calculating supply chain impacts on the environment is probably not impossible. HBOS also presented a *defy/attack* response when it criticised the UK Climate Change Levy in the CDP disclosure, saying that this levy compromised competitiveness, profitability and the ability of UK business to invest in low carbon technology (HBOS, 2003b, 2004b,

2005a). These disclosures could be seen as hostile (defy) to institutional pressures due to the lack of consistency of these pressures to for-profit organizations' goals.

6.5.3 Ford (Direct participant) and Honda (Match pair)

EMISSIONS

Comparing Ford and Honda's emissions data in the SA, Ford did not mention its emissions per origin country (see table 6.7). On the other hand, Honda disclosed its emissions by products and there was not much detail on emissions by origin country or source of GHG emissions (see table 6.8). Honda focused its emissions data on Japan expectative. In addition, in some years Honda also disclosed emissions in other countries, such as China (Honda, 2004b).

Table 6.7: Ford' emissions data

| | 2002 | 2003 | 2004 |
|--|---------------------------|---------------------------|---------------------------|
| Worldwide facility CO ₂ emissions | 8.7 million metric tonnes | 8.3 million metric tonnes | 8.4 million metric tonnes |
| Worldwide facility direct CO ₂ emissions | 3.0 million metric tonnes | 2.8 million metric tonnes | 2.8 million metric tonnes |
| Worldwide facility indirect CO ₂ emissions | 5.7 million metric tonnes | 5.5 million metric tonnes | 5.6 million metric tonnes |
| Worldwide facility CO ₂ emissions per vehicle | 1.33 metric tonnes | 1.34 metric tonnes | 1.33 metric tonnes |
| USA fleet CO ₂ emissions | 237 grams per miles | 375 grams per miles | 386 grams per miles |
| % European CO ₂ performance of 1995 base- Ford | 83 | 82 | 80 |
| % European CO ₂ performance of 1995 base - Jaguar | 79 | 77 | 63 |
| % European CO ₂ performance of 1995 base – L. Rover | 86 | 87 | 86 |
| % European CO ₂ performance of 1995 base - Volvo | 90 | 91 | 89 |
| VOC Ford North America | 30 g/m ² | 29 g/m ² | - |

Source: Ford (2002b; 2004a; 2005).

In their SA, Ford disclosed worldwide CO₂ emissions levels, its direct and indirect emissions, but not all types of GHG. For instance, there was no disclosure of NO_x, HFC, PFC and SF₆. In contrast, Honda did not present its global emissions and did not present its direct and indirect emissions.

Fords disclose of emissions data in the CDP comprised the following data (Ford, 2002c, 2003b, 2004c): worldwide facilities CO₂ emissions, worldwide facilities energy

consumption per vehicle and worldwide facilities energy consumption. Ford also disclosed on its USA direct and indirect CO₂ emissions and USA CO₂ emissions from new cars and trucks. In addition, there was information on Ford USA CO₂ emissions per vehicle built (Ford, 2002c, 2003b, 2004c). Ford also disclosed its European CO₂ performance per passenger vehicle (Ford, 2004c). Further, Ford stated in its CDP response that information on Global Warming Potential and other emissions for European vehicles were available to investors only (Ford, 2003b). In 2004, Ford disclosed on life cycle for CO₂ emissions for USA middle size car (Ford, 2004c). Ford also stated that did not disclosed (although it can be presumed that it has this data) any information on the percentage of the total revenue that is represented by the costs of fossil fuels and electric power (Ford, 2004c). Also in the CDP, Ford stated that had no intention to measure and disclose on its supply chain emissions (Ford, 2002c, 2003b). However, Ford said that is working with supplies to encourage them to implement environmental management systems (Ford, 2002c, 2003b).

Table 6.8: Honda's emissions data

| | 2002 | 2003 | 2004 |
|--|--|---|--|
| Production (I) | 482,000 CO ₂ tons | 445,000 CO ₂ tons | 468,000 CO ₂ tons |
| Logistic | 125,058 CO ₂ tons | 107,229 CO ₂ tons | 109,555 CO ₂ tons |
| Purchasing- Suppliers CO ₂ emissions reductions | 6.5% reduction in energy unit compared with previous years | Carbon intensity was reduced 4.0% compared with 2000 | Carbon intensity was reduced 4.4% compared with 2000 |
| Life Cycle Assessment to CO ₂ | Products manufactured increase 6% and emissions increased 2% | Products manufactured increase 11.8% and emissions increased 5% | Products manufactured increase 3% and emissions reduced 1% |
| VOC emissions (II) | 36.5g/m ² | 33.0g/m ² | 32,8g/m ² |
| HFC recycled from end-of-life vehicles | - | - | 2,465 kg |
| Emissions by automobiles sold in Japan | YES | YES | YES |
| Emissions in office buildings (III) | - | - | 14,276 CO ₂ tons |
| Europe - Factory data | 117,447 CO ₂ tons | 72,189 CO ₂ tons | - |
| Asia and Oceania - Factory data | 300,808 CO ₂ tons (IV) | 58,732,341 CO ₂ tons | - |
| China - Factory data | - | 32,201,328 CO ₂ tons | - |

Source: Honda (2003b; 2004b; 2005).

(I) Emissions at Saitama, Tochigi, Hamamatsu, Suzuka, and Kumamoto factories.

(II) VOC emissions at Saitama, Suzuka, and Tochigi Factories.

(III) Emissions at Aoyama, Wako, Shirako and Yaesu.

(IV) Emissions were not disclosure for some factories in Asia and Oceania.

The way in which these two companies disclosed emissions data were different, not only in terms of measures, but also with regards to country emissions origin. Thus, establish comparisons between their emissions performance would be impossible. The only possible comparison is with regard to VOC emissions level, where Honda's emissions level in Japan was higher than those emitted by Ford in the USA.

TARGETS

Comparing Ford and Honda's targets, most of Ford targets appeared to be driven by third parties' influence. These influences came, for example, from organizations and governments in different parts of the world, such as the Australian Autoindustry, European Automobile Manufacturers Association and UK ETS. Honda did not disclose data that could be used to inform that it has influenced by external parties when set its targets. Both Ford and Honda, set commitments to reduce energy consumption and improve fuel economy. These companies did not appear to set targets for all countries that they operated, nor for all types of GHG that they emitted. Ford and Honda targets to reduce GHG emissions are given on table 6.9 and 6.10 respectively.

Table 6.9: Honda's main targets

| | 2002 | 2003 | 2004 |
|--|---|---|-------------------------------------|
| Production - Energy efficiency | 480,000 CO ₂ tons | 485,000 CO ₂ tons | 481,000 CO ₂ tons |
| Logistic | 126,400 CO ₂ tons | 132,400 CO ₂ tons | 114,900 CO ₂ tons |
| TARGET: Reductions on HC and NO _x emissions for new cars | 75% by 2005 relative to 1995 levels | 75% by 2005 relative to 1995 levels | 75% by 2005 relative to 1995 levels |
| PROGRESS: Reductions on HC and NO _x emissions for new cars | 72.5% | 83.7% | 86% compared with 1996 levels |
| TARGET: Reductions on HC and NO _x emissions for power products | 30% by 2005 relative to 1995 levels | 30% by 2005 relative to 1995 levels | 30% by 2005 relative to 1996 levels |
| PROGRESS: Reductions on HC and NO _x emissions for power products | 34% | 36% | 38% |
| TARGET: Energy unit in green factories | 22.4 CO ₂ ton per 100 million Yen in Japan | 21.9 CO ₂ ton per 100 million Yen in Japan | 21.8% over the fiscal 1990 level |
| PROGRESS: (I) Energy unit goal in green factories | 22.2 CO ₂ ton per 100 million Yen | 22.3 CO ₂ ton per 100 million Yen | 23.6% over the fiscal 1990 level |

Source: Honda (2003b; 2004b; 2005).

(I) Energy consumption per unit of production output.

Table 6.10: Ford's main targets

| | 2002 | 2003 | 2004 |
|--|---|---|---|
| European Automobile Manufacturers Association CO ₂ commitment | 25% CO ₂ reduction of for newly registered cars compared to 1995 | 25% CO ₂ reduction of for newly registered cars compared to 1995 | 25% CO ₂ reduction of for newly registered cars compared to 1995 |
| Australian fuel economy commitment (autoindustry) | Cut fuel used by new petrol passages cars to 6.8 liters per 100km by 2010 | Cut fuel used by new petrol passages cars to 6.8 liters per 100km by 2010 | Cut fuel used by new petrol passages cars to 6.8 liters per 100km by 2010 |
| UK ETS | 5% reduction of CO ₂ emissions over 2002-2006 having 1998-2001 as baseline | 5% reduction of CO ₂ emissions over 2002-2006 having 1998-2001 as baseline | 5% reduction of CO ₂ emissions over 2002-2006 having 1998-2001 as baseline |
| Chicago Climate Exchange | 4% reduction of GHG emissions over 2003-2006 having 1998-2001 as baseline | 4% reduction of GHG emissions over 2003-2006 having 1998-2001 as baseline | 4% reduction of GHG emissions over 2003-2010 having 1998-2001 as baseline |
| Alliance of automotive manufactures commitment under USA Department of Energy Business Challenge | 10% reduction of GHG per vehicle produced on USA facilities between 2002-2012 | 10% reduction of GHG per vehicle produced on USA facilities between 2002-2012 | 10% reduction of GHG per vehicle produced on USA facilities between 2002-2012 |
| USA Dep. Energy GHG registry | GHG inventory | GHG inventory | GHG inventory |
| Ford Australia Greenhouse Challenge (Commonwealth government) | Several commitments, verification and reporting | National pollutant inventory | National pollutant inventory |
| USA Env. Protection Agency (EPA) Green Power Partnership | 2% of USA energy from green power | 2% of USA energy from green power | - |
| Sport Utility Vehicle (SUV) goal | 25% USA SUVs fleet fuel economy by 2005 | This target will not be met | - |
| Ford manufacturing energy efficiency target | 14% energy efficiency on manufacturing between 2000-2005 | 14% energy efficiency on manufacturing between 2000-2005 | 1% energy efficiency on manufacturing year over year |
| VOC Ford North America | 31 g/m ² | 30 g/m ² | - |
| The Atlanta Assembly Plant commitment with US EPA | - | - | Reduce VOC by more than 24 tons |
| Canadian Greenhouse Gas Memorandum of Understanding | - | - | Reduce GHG by 5.3 megatonnes by 2010 |

Source: Ford (2002b:37); Ford (2004a:60) and Ford (2005:16).

Honda presented voluntary internal targets to reduce CO₂, NO_x and exhaust emissions. Also, Honda disclosed their progress against these targets. In addition, there were targets to improve fuel economy in automobiles, motorcycles and power products, but Honda did not disclose clearly how much GHG emissions reduction was achieved in this area (Honda, 2003b, 2004b, 2005). With reference Life Cycle Assessment, since

2002 that Honda's business units use this approach to calculate CO₂ emissions by each department in Japan. Based on that data, Honda set CO₂ emissions reductions targets for each department.

ACTIONS

Comparing Honda and Ford's disclosures on actions to reduce GCC impacts, Ford tended to focus on dialogue with stakeholders (including employees, clients, NGOs and universities). Both, Ford and Honda, disclosed similar actions, such as expenditure on GCC issues, investment on new technologies, improvement of fuel efficiency and reduction on energy consumption. Most of these actions, however, were not implemented in all the countries that these companies operated in.

Ford implemented several internal initiatives aimed at reducing its impact on GCC. Examples of these actions were (Ford, 2002c, 2002b, 2003b, 2004a, 2004c, 2005): estimating its GHG emissions associated with lifecycle of its product, improving the fuel economy, reducing VOC associated with painting process, reducing NO_x levels from diesel vehicles involved to improve fuel economy, logistic improvements, reducing energy consumption, use of renewable energy in the USA, CO₂ sequestration and developing new technologies to reduce GHG emissions. Ford stressed that GCC involved of several areas of activity company (Ford, 2003b, 2004c). Ford also created a group of senior leaders to develop their approach to GCC issues (Ford, 2005).

With regard to external actions, Ford participated in \$15 million carbon mitigating initiative partnership with Princeton University and BP (Ford, 2002b). Ford also commented on its sponsorship to Massachusetts Institute of Technology Joint Program on the Science and Policy of Global Change and the Alliance for Global Sustainability (Ford, 2002b). In Canada, Ford received the Gold Champion Level award due to their involvement in the Climate Change Voluntary Challenge and Registry (Ford, 2004a). In Australia, Ford committed voluntarily in partnership with Australian automakers to reduce fuel consumption (Ford, 2002b). In Germany, Ford offered eco-driving training courses to consumers (Ford, 2002b). In addition, Ford established a partnership with Alcan to develop aluminum technology (Ford, 2004a) and with Ford's supply chain to tackle GCC (Ford, 2005). Ford also highlighted that their reporting practices improved

with respect to information provided on their GCC as a result of following the United Nations Environmental Program benchmarking methodology (Ford, 2005).

Honda also provided disclosure on internal and external actions. Examples of internal actions were: plans to make their conventional gasoline powered less CO₂ intensive (Honda, 2002), CO emissions reductions to one-third of the EU standard and NO_x to half in a motorcycle model (Honda, 2002), studying next-generation motorcycle power sources from the perspective of reducing emissions (Honda, 2004a). In the AR, Honda also disclosed the development of a new air-condition system, improvements in energy use and logistic improvements (Honda, 2003b, 2004b, 2005). Honda revised its employees training programmes on HFC emissions (Honda, 2004b). In the USA, Honda improved its generation of hydrogen efficiency, thereby reducing CO₂ emissions (Honda, 2004b). In addition, Honda disclosed its investment and expenses to prevent GCC and ozone layer depletion as well as other environmental conservation, see table 6.11 (Honda, 2003b, 2004b, 2005).

Table 6.11: Investments and expenses on global warming and other environmental conservation

| <i>Million of yen</i> | 2002 | 2003 | 2004 |
|-----------------------|-------------|-------------|-------------|
| Investment | 1,331 | 528 | 1,037 |
| Expense | 224 | 203 | 2,055 |

Source: Honda (2003b; 2004b; 2005).

With regards to external actions, Honda highlighted that the Japan's Ministry of the Environment awarded their actions to prevent GCC through the use of the GX390K1 natural gas engine (Honda, 2003b), that Honda Canada encouraged its suppliers to reduce CO₂ emissions (Honda, 2003b), that Honda China was working to properly dispose of HFCs at its contracted factories (Honda, 2003b). Honda also disclosed that it was encouraging dealers to implement environmental management systems to reduce CO₂ (Honda, 2004b, 2005) and HFCs (Honda, 2004b).

Honda disclosure on actions was concise and objective. On the contrary, Ford disclosure showed its rationale and presented detailed explanations on how Ford was acting to tackle GCC. As an illustration, Ford recognised the importance of GCC issues and that they could bring risks and opportunities (Ford, 2002c). Ford mentioned that was

committed to reduce GHG emissions, but also needed to maintain economic growth (Ford, 2003b, 2004c).

Ford also presented viewpoints on GCC issues drawn from inside their organization. Ford employees stressed the need for Ford to adapt in order to follow change that occurs in the world, respond to customer demand, achieve financial success and consequently, secure their business (Ford, 2004a). Internal problems that prevent Ford from taking a more proactive action on GCC were also mentioned. Examples of those problems were (Ford, 2004a): changes in the internal culture and engaging their supply chain in reducing GHG emissions. Three main types of rationale were identified behind those viewpoints. Firstly, there was a necessity to involve other individuals in order to make a change (Ford, 2004a). Secondly, the rationale offered in the report was on economic one and this perspective is going to be used in order to find a balance between both short term costs and long-term benefits related to GHG emissions reductions (Ford, 2004a). Thirdly, Ford considers that being proactive regard to GCC creates opportunity to business (Ford, 2004a).

In addition, Ford asserted that GCC requires societal change and requires all stakeholders' involvement (Ford, 2003b, 2004c). However, Ford failed to set a timetable for pursuing GCC (Ford, 2004a). In addition, Ford noted that they were committed to disclose actions they had taken to reduce GHG emissions, but did not believe it appropriate to commit to following externally mandated actions (Ford, 2004a). Ford also exchanged information with several groups in order to understand their views on GCC such as: Rainforest Action Network, Global Exchange and Bluewater Network (Ford, 2004a).

In addition, Ford recognized the interest of several stakeholders with respect to GCC, such as: customers, investors, governments, NGOs, media, business leaders and scientists (Ford, 2005). Ford suggested that tackling GCC depended on collaboration of all these elements in society (Ford, 2005). As a result, Ford sought help, not only internally, but also with these external agents (Ford, 2005). Ford also engaged with several stakeholders who represented large groups, such as the Interfaith Center on Corporate Responsibility, the Union of Concerned Scientist and the Natural Resources Defense Council (Ford, 2005).

INSTRUMENTS OF ENVIRONMENTAL POLICY

Both, Ford and Honda provided disclosures about the influence of different government standards on their operations. As an illustration, Honda discussed emissions standards set by USA, European and Japanese Government, such as standards on exhaust emissions and fuel economy (Honda, 2003b, 2004b, 2005). Further, Honda disclosed that it had achieved the federal Government's exhaust emissions standard (Honda, 2004a). In Europe, Honda disclosed data on low-fuel-consumption vehicles, hybrid vehicles and clean diesel vehicles as a way to reduce CO₂ levels (Honda, 2004a). Honda also highlighted that its factory in Barcelona (Spain) was working to exceed the standards set by the EU on VOC emissions (Honda, 2003b). Finally, Honda also provided narrative on Japan's commitments under the Kyoto Protocol.

Ford recognized that their operation impacted on GHG emissions and stated that they believed that reducing GHG emissions was the key environmental issue of the century. In addition, Ford disclosed that they needed to work internally as well as cooperate with others in order to reduce GHG emissions. Ford stated that it exceed its commitment made under the Environmental Protection Agency (EPA), of supplying 5% of its USA energy needs from 'green' sources (Ford, 2002b, 2004a). Ford also commented on the regulatory standards for fuel efficiency set by the USA and Chinese Governments (Ford, 2002b, 2004a, 2005) and made some critical commentary on public policy in the USA that has tried to establish fuel economy standards on a state-by-state basis, these standards are sending to impose more stringent than federal standards (Ford, 2005). Further, Ford stated that were working with the government to promote incentives for consumers to purchase advanced-technology vehicles (Ford, 2004a). Ford also provided data on its achievement of several targets that arised from its participation in instruments of environmental policy (see table 6.9).

Honda did not disclose any involvement with flexible mechanism such as emissions trading. On the other hand, Ford disclosed an interest to explore opportunities involving flexible mechanisms (Ford, 2002c, 2003b, 2004c). Ford clearly supported CDM and emissions trading (Ford, 2005) and mentioned its participation in emissions trading in the USA and the UK (Ford, 2002b, 2004a, 2005). Ford also highlighted that it had 15 facilities that would come under the EU ETS (Ford, 2005) and that it would like to see

emissions trading across other regions and its motivation to participate on those emissions trading was to gain experience in cost-effective GHG emissions reductions and help to shape public policy (Ford, 2002c, 2003b, 2004c).

ORGANIZATIONAL MOTIVATIONS AND RESPONSES

Some antecedents of strategic responses can be suggested by analysing Ford and Honda's disclosure. For example, Ford asserted that GCC can bring business opportunities, while also nothing that tackling GCC will impact on the economy (Ford, 2005). In addition, Ford stressed that it was committed to maintaining its economic success while tackling GCC (Ford, 2005). This narrative could be an evidence that Ford's search for economic fitness while arise their need to reduce GCC impact.

With regard to *constituents*, Ford recognised the interest of several stakeholders on GCC, such as customers, investors, governments, NGOs, media, business leaders and scientists (Ford, 2005) and stated that it was open to establishing a dialogue with these stakeholders. Ford was also trying to involve employees in GCC issues. This disclosure could be an example of the outcome of multiple pressures demands exerted on Ford. In addition, only some pressures noted were exerted by institutions that Ford depends on, such as governments and customers. The higher level of dependency between constituents, the greater likelihood that an organizations has to conform to those pressures (Oliver, 1991).

However, the *content* of institutional pressures does not seemed to have been consistent with Ford's desire to achieve economic fitness. According to Oliver (1991), when there are pressures that are not consistent with organizational internal goals, organizations will tend to resist to such pressures.

With regard to *control*, some pressures exerted on Ford and Honda originated from legal enforcement, such as standards on fuel efficiency set by governments. However, Ford also pronounced disclosure on voluntary commitments with governments and the Automotive Association. Both legal coercion and voluntary diffusion of norms, values and practices increases the likelihood to organizations comply with pressures (Oliver,

1991). In this instance it appears that both regulatory and voluntary pressures are pointing in the same direction.

In the *context* which automotive industry operates is possible to identify some degree of uncertainty. Currently, the impact of transportation on GCC is an issue that concerns all levels of society (Kolk and Pinkse, 2007). Some governments have implemented differential taxes that affect in efficient vehicles. In addition, governments are also supporting the use of public transport in varying degrees. Likewise some governments have implemented road user changing schemes. According to Oliver (1991), higher level of uncertainty could increase the likelihood of organizations to comply with institutional pressures (Oliver, 1991). The disclosure produced by Ford and Honda showed that they were engaging with various external parties (such as scientists and governments) in order to reduce GCC impacts. The uncertainty around the automobile industry may explain the fact that these companies were trying to attending different demands to secure their place at this dynamic market.

Ford and Honda showed signs of *acquiescence/compliance* on their disclosure. For instance, both companies made commitments to reduce their GHG emissions, has expanded resources on GCC issues, improved energy consumption and improved fuel efficiency. Most of these actions could also have been driven by economic gains, but not necessarily so. The acquiescence response to institutional pressures could also be justified by legal coercion exerted on those companies. As an illustration, Ford and Honda had to implemented measures to achieve government standard on fuel efficiency.

However, other actions implemented by Ford and Honda could be explained as an attempt by those companies to find a way to accommodate multiples demands in a way that will allow them to be consistent with each other and the goal of the organization. As an illustration, one of the reasons Ford gave for engaging voluntarily in the UK ETS was the fact that it brought cost-effective opportunities to reduce GHG emissions (Ford, 2003b, 2004c). Ford's *compromise/balance* strategy in this context could have been driven by the need to bring together the UK Government's demand for GHG emissions reductions and with demands for economic success.

Ford also presented some disclosures that could be inferred to represent a *defy/challenge* response to institutional pressures. For example, Ford stated that it was open to dialogue on GCC issues with external stakeholders (Ford, 2004a), while being resistant to the pressure set by those stakeholders to adopt a timetable in which their proposals would be met (Ford, 2004a). In addition, Ford disclosed on actions taken to reduce GHG emissions, but did not accepted the need to follow guidelines on what disclosure and what actions to take (Ford, 2004a). This resistance to institutional pressures could possibly be explained by the low dependence between field's constituents, low degree of consistency between the pressure and Ford's internal goals and low level of coercion that fields constituents could impose on Ford.

6.5.4 Discussions

This section aims to present a summary of the comparison on GCC disclosure produced by DP and MP, which was presented on the previous sections. The comparison on GCC disclosure produced by the three pairs of companies was summarized in the proposed check list, allowing refined comparisons between organizations' GCC disclosures. The results on the check list are presented in the appendix 13 and the next paragraphs will comment the analysis made on this summary result.

The comparison between pairs shows some differences in GCC disclosures. These differences are more evident in targets and instruments of environmental policy. The DP in the UK ETS presented more detailed disclosure on targets compared with organizations that did not participated on the scheme. DP also seemed to be more aware to instruments of environmental policy. For example, Barclays participated voluntarily in the UK ETS and undertook initiatives to reduce the impacts caused by the Climate Change Levy. On the other hand, HBOS criticized some government initiatives. A similar pattern is found between Ford and Honda. Ford disclosed its participation in several types of instrument of environmental policy around the world and Honda did not disclosed much about these matters.

With regard to actions, comparison between pairs of organizations could provide suggestions for how organizations could provide more complete disclosure on potential

actions. For example, Ford disclosed that used renewable energy, designated group of senior employees to suggest GCC initiatives and carried a benchmarking survey of GCC disclosures. These sorts of initiatives were not disclosed by Honda. This bags two questions. First, it may be that Honda has undertaken similar actions but have not disclosed this fact. Second, it may be that these actions have not been undertaken. While it is impossible to tell examining disclosures, the absence of disclosure may point to a lack of actions, which itself could be verified by direct control with the organization in question.

Similar procedure could be conducted on emissions disclosure. Honda disclosed on supply chain emissions while Ford did not. Honda also gave more details on emissions by country than Ford. Other comparisons could also emerge adopting a cross-sector analysis. For instance, only Barclays disclosed the use of alternative types of transport as an action to reduce GHG emissions. Shell, Chevron and HBOS did not disclose anything on logistic improvements. Only Chevron and Ford established a process to benchmark on GCC initiatives. The comparison using three different activity sectors also identified different responses given by organizations which are likely to be affected by diverse pressures.

The use of antecedents of strategic responses proposed by Oliver (1991) helped to identify organizational responses and disclosures that could be inferred to go beyond the extremes of compliance or resistance. In particular, this framework allowed to explore other layers of responses to institutional pressures (Oliver, 1991). As an illustration, the majority of emissions caused by oil and gas companies came from indirect emissions. Oil and gas companies disclosed their several responses to pressures to reduce their direct (internal) emissions. However, Shell/Chevron have not recognized pressures to change the emissions caused by the use of its product in a way that has triggered disclosure on these matters. Changes in sources of energy will require substantial investments and profits will be affected in the short/medium term by fuel transitions. Thus, organizations that operate in the oil and gas sector do not produce many disclosures on this topic and seemed to have promoted very slowly changes on energy sources.

Currently, energy could be considered as indispensable resources to all organizations and individuals and as a result, consumers are left without alternatives to fossil fuel based energy. If there are few alternatives, it is possible to suggest that any pressure that comes from consumers would probably be ineffective to motivate organizations to change. Organizations know that consumers will not stop using energy and consequently, consumers do not have any power to affect company profits. Other constituents, governments for instance, could create pressures for change. However, the disclosure analyzed did not contain information on pressures exerted in this regard. Environmental policies affecting these companies, including emissions trading, were focused in reducing direct emissions.

Barclays and HBOS disclosures suggested that they responded to pressures to reduce their direct and indirect emissions. However, these organizations also felt pressured to help consumers/clients to reduce their own GHG emissions. Barclays and HBOS stressed that GCC could bring some risks, but also some business opportunities. They disclosed that some instruments of environmental policy are affecting the competitiveness of their clients. For this reason, these organizations disclosed on actions they had taken to help their customers/clients overcome these pressures. Thus, it could be suggested that Barclays and HBOS tried to not lose profits by advising consumers/clients how to remain competitive while reducing GHG. In addition, Barclays and HBOS were also pursuing opportunities by offering consumers/clients products to help them tackle GHG emissions.

Ford and Honda also seemed to feel pressured to reduce both direct and indirect emissions. However, the type of control exerted on those organizations to make them respond to this pressures seemed to come from different sources. Actions to reduce direct emissions were mostly taken voluntarily by those companies. As an illustration, disclosure made by Ford mentioned its voluntary support for flexible mechanisms, such as emissions trading, which promotes cost-effectiveness GHG emissions reductions. On the other hand, actions to reduce indirect emissions seemed to be driven by legal enforcement, such as government standards on fuel efficiency. In this respect, it is important to highlight that automobile industry produces more indirect than direct emissions (Kolk and Pinkse, 2007). Ford was also open to pressure from different institutional constituents (apart from government), but Ford seemed to be resistant to

changes that could compromised its goal of includes economic growth. If this is the case, the compliance with other constituent's pressures will probably depend on consumer's commitments to reduce GHG emissions (such as buying fuel economic cars or buying less cars) and future improvements in public transport.

6.6 Global climate change disclosure produced in different medias: A pair wise comparison

The main objective of this section is to explore differences on GCC information presented in the three disclosure medias: SA, AR and the CDP. This analysis is carried considering the pairs of similar organizations from the same industry, in order to reduce size and industry effects.

6.6.1 Shell (Direct participant) and Chevron (Match pair)

Shell and Chevron's SA contained detailed information on their views on GCC, emissions data, targets and actions (ChevronTexaco, 2002a; Shell, 2002b; ChevronTexaco, 2003a; Shell, 2003c; ChevronTexaco, 2004b; Shell, 2004c) while these companies disclosed very little about GCC in their AR (ChevronTexaco, 2002b; Shell, 2002a; ChevronTexaco, 2003b; Shell, 2003a; ChevronTexaco, 2004c; Shell, 2004a). Their disclosure in the CDP could be described as medium point between the information provided in the SA and AR (Shell, 2003b; ChevronTexaco, 2004a; Shell, 2004b; ChevronTexaco, 2005). Shell did not respond directly to the CDP questionnaire in 2004. Further, Shell attached their SA in response to the survey. In 2002, Chevron declined to participate in the CDP, but did so in 2003 and 2004. Their disclosure in the CDP was concise, but at the same time covered many issues related to GCC.

Comparing Chevron's and Shell's disclosure in the CDP, Chevron disclosed more details about their actions to tackle GCC. In addition, because the CDP questionnaire contains direct questions, Shell and Chevron disclosed some information that was not in their SA. For example, the information provided in response to the CDP made clear that

Shell wanted information on the financial cost and benefits of tackling GHG emissions confidential.

Chevron disclosed information on actions to reduce GHG emissions by different regions of the world and also, disclosed the amount saved with energy efficiency improvements. Shell disclosed emissions data by three locations/regions in the CDP but did not disclose this information in the SA. The information on emission data disclosed by Shell and Chevron in the CDP used the similar parameters in only one of the years analysed. This result suggests that while the CDP could be seen as a standard for GCC disclosure, organizations continue to follow their own disclosure preferences in their SA.

6.6.2 Barclays (Direct participant) and HBOS (Match pair)

Both Barclays and HBSO disclosed more on GCC in their SA than in their AR (Barclays, 2002b, 2002a; HBOS, 2002; Barclays, 2003b, 2003a; HBOS, 2003a, 2003c; Barclays, 2004b, 2004a; HBOS, 2004a, 2004c, 2005b). In SA, Barclays and HBOS presented emissions data that allowed a comparison to be established with regard to UK emissions. In the CDP these companies disclosed information that was not informed in SA (Barclays, 2002c, 2003c; HBOS, 2003b, 2004b; Barclays, 2005; HBOS, 2005a). As an illustration, the disclosure in the CDP included companies as views on risks/opportunities associated with GCC, supply chain emissions and cost/benefits achieved when reduced GHG emissions.

6.6.3 Ford (Direct participant) and Honda (Match pair)

Honda did not allow public access to their CDP submissions from 2002 until 2004 (see table 6.1). Ford and Honda did not disclose much on GCC in their AR (Ford, 2002a; Honda, 2002; Ford, 2003a; Honda, 2003a; Ford, 2004b; Honda, 2004a). Ford disclosed more information in their SA compared with the CDP (Ford, 2002b, 2003b, 2004a, 2004c, 2005). Ford disclosure in SA contains detailed description on actions taken to reduce GHG emissions, Ford's views on GCC and Ford's future plans to tackle GHG emissions. However, Ford disclosed some information on emissions data in the CDP

that was not disclosed in their SA. The disclosure in their AR was mostly limited to providing examples of actions taken by Ford to tackle their GHG emissions.

Honda's disclosure in their SA did not change much from 2002 until 2004 (Honda, 2003b, 2004b, 2005). In all three years, Honda recognised that their activities impacted on GCC. The report was divided in six main areas: (i) Products, (ii) Purchasing and Production, (iii) Logistics, (iv) Sales and Services, (v) Disposal and Recycling and (vi) Administration. For most of those areas, Honda disclosed their impact on GHG emissions, see also table 6.17 (Honda, 2003b, 2004b, 2005). Honda's AR from 2002 until 2004 presented little disclosure about GCC and what disclosure was focused on actions and targets. Given the lack of public access to their CPD responses, no further comparison can be made

6.7 Concluding comments

This section compared GCC disclosure in SA, AR and the CDP produced by three pairs of organizations over three years. This analysis was carried out to compare GCC initiatives between organizations as well as organizations' motivations to respond to GCC issues. Firstly, the comparison identified that there were differences on the disclosure produced by DP and non-UK ETS participants. DP presented more detailed disclosure on targets and supported better instruments of environmental policy. Secondly, the comparison provided some alternatives on how organizations could improve their GCC initiatives and disclosure. Finally, the results suggested that organizations from different sectors presented different motivations to respond to different institutional pressures, chiming Kolk and Pinkse, 2007.

This section also studied differences on GCC information among the three disclosure medias analyzed. In general, the SA presented more disclosure on GCC when compared to the AR. In some cases, the disclosure in the CDP contained information that was not found in the SA. As an illustration, Barclays and HBOS presented better quality of information on GCC in the CDP. The disclosure made by those organizations in the CDP was more detailed with regard to their views on GCC risks/opportunities, measurement of supply chain emissions and actions taken to tackle GCC in their

overseas operations. Despite the fact that the SA, AR and the CDP disclosed information on GCC, these disclosures still did not offer sufficient data to establish an accurate comparison between organizations with regard to the GCC impacts. As an illustration, all organizations selected in this chapter operated overseas. Their information on targets, emissions and actions were mostly presented in aggregate figures. There were not many details on how organizations were reducing emissions in various countries that they operated in. In addition, targets and emissions data were not presented for all types of GHG that organizations emitted, by product, by sources of emissions or by direct/indirect emissions. Moreover, sometimes targets (such as energy consumption) did not quantify how much these reductions are of the total GHG emissions.

The discussion carried on this chapter contributes to the current debate on compulsory disclosure under the UK Climate Change Act 2008. The UK Government is carrying out a consultation on the impact that voluntary and compulsory GCC disclosure may have on the UK objectives to tackle GCC. The final report on this consultation should be sent to the UK Parliament by 01 December 2010 (UK Parliament, 2008). If this regulation was included in the Companies Act 2006 by 2012, organizations will need to change their disclosure practices. This argument is mostly based on Roeser and Jackson (2005), Pinkse and Kolk (2009), Sullivan *et al.*, (2008) and also, on the results showed in this chapter that highlight the current GCC disclosure does not allow comparisons between organizations. In order to achieve highest levels of benefits to tackle GCC with the implementation of compulsory disclosure on GHG emissions, the UK Government may need to carefully evaluate positive effects that comparisons between organizations' performance on GCC could possibly bring. Comparisons will not only tell us about organizations' impacts on GCC, but it will also provide information on how organizations can be more responsible. In addition, the UK Government may promote the enforcement of accountability on organizations if external parties have information on organizations GCC impacts, allowing the understanding of organizations' actions and the benchmark on organizations' GCC performance.

Chapter 7:

CONCLUSIONS

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List of abbreviations

| | |
|---------------|--|
| AR | Annual Report |
| CD | Corporate Disclosure |
| CDP | Carbon Disclosure Project |
| DECC | Department of Energy and Climate Change |
| DP | Direct Participant |
| GCC | Global Climate Change |
| GHG | Greenhouse Gas/Gases |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Match Pair |
| MRV | Monitoring, Reporting and Verification |
| NIS | New Institutional Sociology |
| OECD | Organization for Economic Co-operation and Development |
| SA | Stand Alone Report |
| UK | United Kingdom of Great Britain and Northern Ireland |
| UK ETS | UK Emissions Trading Scheme |

Content

Objective

The aim of this chapter is to present the concluding comments that emerged from this dissertation as a whole. In order to achieve this objective, three main aspects are discussed. The first part of the chapter presents the conclusions of the study that explores Global Climate Change (GCC) behind corporate disclosure (CD). In particular, the analysis of GCC disclosure in different medias is discussed. The second part of the chapter describes the implications that arise from these results and their relevance for the existing literature on CD. Finally, the third part of the chapter suggested areas for future research.

7.1 Conclusions of the study

Several ecological and economics consequences might arise from GCC. While noting the difficulty of predicting exactly what may happen, broad consequences may include (Intergovernmental Panel on Climate Change - IPCC, 2007a):

- Greater intensity of floods and droughts;
- Displacement and extinction of some species;
- Global sea level rise causing, for instance, variations in land use;
- Negative impacts on food, fibre and forest production;
- Burden of health systems due to malnutrition, diarrhoea, cardio-respiratory and infections diseases.

In order to mitigate the causes of GCC, countries are seeking to implement various policies, measures and instruments (see for example Organization for Economic Co-operation and Development - OECD, 1989; Jäger and Ferguson, 1991; Gibson, 2000; IPCC, 2001a; Krarup, 2001; Mortensen, 2001; Harrington *et al.*, 2004). These instruments include (IPCC, 2001a, 2007b): regulatory instruments, market-based instruments, voluntary agreements and informational instruments. National policies tend to combine different types of abatement instruments.

Instruments of environmental policies could possibly influence CD. The main objective of this research was to explore if joining the UK Emissions Trading Scheme (UK ETS) changed the nature of GCC disclosures. The analysis was carried on both longitudinal and matched pair (MP) basis. The thesis also considered GCC disclosure produced in different medias, namely: stand alone reports (SA), annual reports (AR) and the Carbon Disclosure Project (CDP). The motivation for this focus arises from two key beliefs. Firstly, that GCC is the most significant environmental concern of our current age. Secondly, the belief that the study of CD will tell us not only something of value about organizations, but also the possibilities for changing organizations to be less environmentally damaging with regard to GHG emissions. This second belief has, in turn, two elements. First, that disclosure provides a valuable lens into the life of the organization and their response to the climate agenda (this includes the role of information inductance). Second, that those parties external to an organization are more

able to enforce accountability on organizations if they have information about their actions. External parties may include government (in its various guises), markets and anyone else who wishes to understand corporate actions in this area and/or to benchmark corporate performance. In particular, this dissertation sought to address the four following questions.

- What disclosures do direct participants (DP) in the UK ETS make in AR and SA on GCC and how have these disclosure changed over the time?
- What do DP and match pairs (MP) disclose on GCC compared to each other?
- To what extent could DP disclosure practices on GCC be explained using institutional theory?
- For a sample of DP and MP organizations, how is their disclosure on GCC in AR and SA compare to the disclosures that these organizations produced for the CDP?

In order to answer these questions, GCC disclosure produced by DP and MP were captured using a research instrument based on relevant literature in this area. The disclosure was analysed using two measures: volume (number of pages) and quality of disclosure (as measured by completeness and type of data disclosed). The analysis covered disclosure in both SA and AR for the years 2000 until 2004. This period captured the year that the UK ETS started (2002), as well as the two years before and after that. In total, 528 SA and AR were considered in this study. The fourth question analyse SA, AR and the CDP for a sample of three pairs of organizations in three different sectors during the period 2002-2004.

In general terms, this study suggested that the UK ETS influenced the volume and the nature of CD on GCC in both DP and MP organizations, but that this impact was felt in different ways. The analysis also raised questions about the role of environmental policies and how they can better promote social accountability in the future. In addition, the results suggested that AR, SA and the CDP are different disclosure medias.

The first part of the statistical analysis presented the frequency of GCC disclosure. The results showed that large proportion of reports contained disclosure on actions related to energy use and energy/fuel efficiency. The highest level of disclosure on these actions could be partially explained by the importance that the UK Government have given to

issues related to energy consumption improvement (Marshall, 1998). With regard to other types of actions, different results were found for each type of report. For example, a larger proportion of DP reports disclosed data on emissions trading. This result was expected since DP were participating in the UK ETS.

The three most frequent disclosure categories narratives produced by DP were that: Business GHG responsiveness will be good for business, market-base mechanisms are an appropriate initiatives to tackle GCC and rational economics. On the other hand, the most frequent types of narrative presented by MP were: Business GHG responsiveness will be good for business, external policies are that inappropriate and market-base mechanisms are an appropriate initiatives to tackle GCC. The fact that both MP and DP suggested in their disclosure that 'business GHG responsiveness will be good for business' confirms Banerjee's (2001) suggestion that corporate environmentalism is highly influenced by the economic bottom line.

The second part of statistical analysis was to use non-parametric tests in order to understand the incidence and volume of GCC disclosures. The results of this part of statistical analysis were interpreted using concepts from institutional theory and specifically from new institutional sociology (NIS). In particular, this analysis identify which pressures organizations may respond to (Oliver, 1991) when they participated in the UK ETS and how these responses may have influenced GCC disclosure. The results suggested that DP disclosed more in AR compared with MP. This result was found statistically significant not only in terms of number of reports, but also in terms of volume of disclosure. In AR, organizations tend to construct a financial image (Gray *et al.*, 1995b).

The fact that DP disclosed more in AR could be evidence that DP found AR a less conflictive environment to disclose on GCC, compared with MP. Indeed, the UK Government provided monetary incentives for DP to reduced emissions and this could have motivated DP to join the UK ETS. Thus, the economic motivations that emerge within the UK ETS may have stimulated DP to disclose in the AR because for these organizations, GCC issues were manifested in economic terms. The issue question that emerges in this study is wheatear or not instruments of environmental policy should

motivate the organizations to build an image of social fitness rather than economic fitness in terms of seeking to reduce GHG emissions.

There were also some other impacts of the UK ETS on CD. For example, the analysis of GCC disclosure showed that DP presented significantly higher volumes of GCC disclosure after the UK ETS started (if considered non-paired comparison and total of reports analysed). The analysis of GCC disclosure also illustrated that DP produced more 'balanced' disclosure in terms of subject of disclosure (emphasizing similarly emissions, targets and narrative) compared with their MP. Actions to reduce GCC impact was the most frequent disclosed by DP. However, there were no significant difference between the proportion of reports that made disclosure on targets, emissions and narrative. This was not the case for MP, who disclosed more on actions and less on targets. In addition, DP disclosed more on targets compared with MP. These disclosures may have been influenced by compulsory targets setting and Monitoring Reporting and Verification (MRV) established by the UK ETS. This findings also chimes with Larrinaga-Gonzalez (2007) who suggested that CD is not a static practice and institutional pressures influence changes at the level of organizational fields. In addition, Rahaman, Lawrence and Roper (2004) suggested that CD could be influenced by normative, coercive and mimetic isomorphism, which could be achieved by compulsory pressures exerted on organizations to make them to comply with professional groups (requirements such as auditors) in order to achieve similar and high standards of information.

Despite the fact that DP were an heterogeneous group (NERA, 2004), these results suggest that participating in the UK ETS promoted certain level of isomorphism (DiMaggio and Powell, 1991a, 1991b) in terms of volume of disclosure. For example, the standard deviation of the volume of disclosure produced by DP in SA was lower than MP. These levels of isomorphism were identified in DP and in terms of SA, not in the AR. These results suggest that the UK ETS may influence DP to adopt mimetic response and this pressure was mostly assimilated in a disclosure media that emphasize social fitness. This results could confirm Bebbington *et al.*, (2009) findings that mimetic pressures encourage CD and influence its nature.

This dissertation also included an analysis of GCC disclosure for a sample of organizations using three different disclosure medias: AR, SA and the CDP. This study suggested that SA presented more volume and quality of GCC disclosure if compared with AR. In some cases, however, the disclosure in the CDP presented information that was not considered at SA neither at AR. In addition, despite the fact that the SA, AR and the CDP disclosure presented information on GCC, these various reports still did not provide sufficient data to establish an accurate comparison between organizations, especially in quantitative terms.

In order to propose an alternative way to compare GCC disclosure, the dissertation included a suggestion for a method to analyze CD on a qualitative basis. The method suggested, responds to the call that Bebbington and Larrinaga-Gonzalez (2008) made on the need of a more ambitious accounting and reporting which could promote better understanding on possible effects of GCC on corporate performance. The method to analyze GCC disclosure suggested in this dissertation considers pairs of similar organizations from the same industry in order to eliminate size and industry effect on disclosure. The method suggested also used the antecedents of strategic responses proposed by Oliver (1991) to highlight how organizations perceptions with regard to GCC issues may affect the disclosure. There are a number of actions on GCC that will not always direct lead to reduction in GHG emissions (Sullivan *et al.*, 2008; Pinkse and Kolk, 2009). It is suggested, however, that organizational perceptions of this need to respond to GCC issues, plays a role in GCC disclosure analysis. Specially, while it might be important to analyze organizations' emissions data, targets and actions to tackle GHG emissions, organizational perceptions regarding to GCC will also signal how seriously organizations are dealing with their GCC consensus. Further, these latter types of disclosure may provide an indication of how organizations intend to act in the future.

7.2 Implications of the current study

Several studies applied content analysis to explore CD but few of them have explored CD on GCC (but see, for example, Kolk and Pinkse, 2004, Freedman and Jaggi, 2005 and Pinkse and Kolk, 2009). In addition, there is little data in social and environmental

accounting literature on the differences in the disclosures made in SA and AR (but see for example, Coulson, 2008). As a result, this dissertation adds to the existing literature by including in both of these two aspects thought its analysis of 528 reports produced by UK organizations. In particular, being a DP in the UK ETS is associated with increased GCC disclosure and especially with disclosure in a media (the AR) where the norms of efficiency and mainstream business rationale are accepted. Thus, despite the fact that AR and SA both contain CD, in this study they contain different patterns of disclosure and therefore may constitute different (rather than complementary) disclosure medias. In addition, the used of AR and SA for disclosure may represent a response to diverse sources of demands (such as participation at the UK ETS) and those demands may vary depending on organizational context.

This dissertation also adds to existent discussions on the achievements of the UK ETS (see Roeser and Jackson, 2005; Von Malmborg and Strachan, 2005; Nye and Owens, 2008). More specifically, this research suggested that the UK ETS influenced CD on GCC issues and highlights the power that regulations may have in changing social accountability for GCC.

In addition, this research used concepts from NIS to understand how the process of CD change may arise. According to Hoffman (1999), fields are formed around an issue with fields being defined as are a common channel for dialogue and discussion. Thus, a disruptive event could end the institutional inertia around a field (Hoffman, 1999). The UK ETS may have constituted an example of an event that disrupted CD inertia. As an illustration, organizations perceptions on GCC disclosure may have changed in response to compulsory MRV set for the UK ETS. According to Hoffman (1999), organizations will strategically search for the more convenient option to respond to the disruptive event and these options happen within a range of available possibilities. In addition, when organizations in a field conform to particular pressures, the range of available possibilities is opened up (Hoffman, 1999). The fact that the UK ETS appears to have influenced CD suggest that CD changes happen due to a disruptive event that occurs around an issue. Thus, the understanding of process of change in CD may be better explored if studies in this area became to be centered on the analysis of these events itself rather than analyzing who caused a disruptive event (stakeholder and legitimacy theory).

7.3 Areas for future research

Further studies could emerge from this dissertation. One possible future avenue alternative could exploring how instruments of environmental policy (Sullivan, 2008) could contribute to achieve better accountability levels and how social accountability can be applied to improve the efficacy on carbon mitigation. For example, studies could further explore disclosure influenced by various Kyoto Mechanisms, with special attention paid to emissions trading since it is relatively new instrument (Callon, 2009). Further, the relevance of emissions trading may increase if an international agreement to reduce GHG emissions is achieved in Copenhagen at the end of 2009. Another possible extension of this work is to explore several other emissions trading systems home developed and around the world and analyze how these emissions trading appear to have influenced CD.

As an illustration, the UK Government is working to implement an emissions trading for non-intensive energy commercial and public sector organizations in format of the Carbon Reduction Commitment (Benn, 2008). This initiative will include business that is not included in the EU ETS (Benn, 2008). The Carbon Reduction Commitment will involve approximately 5,000 organizations (Benn, 2008). The UK Government expects to initiate this emissions trading scheme in 2010. Of particular interest is that this scheme will include a number of public sector organizations and it may be that their GCC disclosures would not focus closely on economic fitness, but may extend more to issues of social accountability.

Another interesting possibility is to explore if compulsory GCC disclosure could result in an ability to compare organizations' initiatives to tackle GHG emissions. Compulsory disclosure on GCC is likely to happen for the UK companies by 2012 under the UK Climate Change Act (Department of Energy and Climate Change - DECC, 2009). This would be of particular interest given the findings of this thesis that comparability of GCC performance of different organization is currently impossible. If comparability is to be achieved in the future, disclosure practice will need to change.

Further research could focus on disclosure in the CDP. The CDP constitute a semi-private GCC disclosure context and hence the CDP disclosures may be more complete

and focus more on value relevant matters (given the CDP is run by investors). There are issues in accessing the CDP disclosures, but it is likely that this is a significant source of data or corporate attitudes to GCC and actions taken to address this issue.

Finally, NIS could be used to further understand how CD may drive organizational change and vice versa. The results of this dissertation suggested that CD might arise from events that require change. Thus, an interesting study would be to work within organizations to explore how they have responded to changes in GCC requirements. NIS has been criticized to give more emphasis on isomorphic behavior than process of change. However, several studies have currently used notions of NIS to explain process change, for example, in CSR concepts (Hoffman, 2007b; Matten and Moon, 2008) and the nature of stand alone reports (Larrinaga-Gonzalez, 2007; Bebbington *et al.*, 2009).

REFERENCES

- Adams, C. A., Coutts, A. and Harte, G. (1995). Corporate equal opportunities (non-) disclosure. *The British Accounting Review*, 27 (2), 87-108.
- Adams, C. A. and Harte, G. (1998). The changing portrayal of the employment of women in British banks' and retail companies' corporate annual reports. *Accounting, Organisations and Society*, 23 (8), 781-812.
- Adams, C. A., Hill, W. Y. and Roberts, C. B. (1998). Corporate social reporting practice in western Europe: Legitimizing corporate behaviour. *British Accounting Review*, 30 (1), 1-21.
- AEA Energy & Environment.(2006).UK emissions of air pollutants 1970 to 2004, available on the internet at <http://www.naei.org.uk/reports.php>. Accessed 23.08.2007.
- AEA Technology. (2004). Climate Change Agreements. Results of the first target period assessment, AEA Technology plc, Vol. Version 1.2: 1-90.
- AEA Technology.(2005). UK emissions of air pollutants 1970 to 2003:, available on the internet at <http://www.naei.org.uk/reports.php>. Accessed 23.08.2007.
- AEA Technology.(2007).UK greenhouse gas inventory, 1990 to 2005: Annual report for submission under the Framework Convention on Climate Change, available on the internet at <http://www.naei.org.uk/reports.php>. Accessed 23.08.2007.
- Bailey, I. and Rupp, S. (2006). The evolving role of trade associations in Negotiated Environmental Agreements: The case of United Kingdom Climate Change Agreements. *Business Strategy and the Environment* (15), 40-54.
- Balling, R.(2003).The increase in global temperature: What it does and does not tell us. Marshall institute, available on the internet at <http://www.marshall.org/pdf/materials/170.pdf>. Accessed 03.06.2009.
- Banerjee, S. B. (2001). Managerial perceptions of corporate environmentalism: Interpretations from industry and strategic implications for organizations. *Journal of Management Studies*, 38 (4), 489-513.
- Barclays.(2002a).Barclays plc annual report 2002, available on the internet at www.barclays.com. Accessed 25.05.2006.
- Barclays.(2002b).Barclays plc corporate social responsibility report 2002: Making business sense, available on the internet at www.barclays.com. Accessed 14.12.2004.
- Barclays.(2002c).Response to Carbon Disclosure Project first questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Barclays.(2003a).2003 Annual report, available on the internet at www.barclays.com. Accessed 25.05.2006.
- Barclays.(2003b).Barclays plc corporate social responsibility report 2003, available on the internet at www.barclays.com. Accessed 14.12.2004.
- Barclays.(2003c).Response to Carbon Disclosure Project second questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Barclays.(2004a).Annual report 2004, available on the internet at www.barclays.com. Accessed 25.05.2006.
- Barclays.(2004b).Working responsibility: Barclays plc corporate responsibility report 2004, available on the internet at www.barclays.com. Accessed 25.05.2006.
- Barclays.(2005).Carbon Disclosure Project- Barclays Bank- Greenhouse gas emissions questionnaire 2005, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.

- Bebbington, J., Higgins, C. and Frame, B. (2009). Initiating sustainable development reporting: Evidence from New Zealand. *Accounting, Auditing & Accountability Journal*, 22 (4), 588-625.
- Bebbington, J. and Larrinaga-Gonzalez, C. (2008). Carbon trading: Accounting and reporting issues. *European Accounting Review*, 17 (4), 697-717.
- Benn, H. (2008). Written ministerial statement by Hilary Benn: Update on the carbon reduction commitment, 16 July 2008. London.
- Boiral, O. (2003). ISO 9000: Outside the iron cage. *Organization Science*, 14 (6), 720-737.
- BP.(2000).Environmental and social review, available on the internet at www.bp.com. Accessed 14.12.2004.
- BP.(2001).Performance for all our futures: Environmental and social review 2001, available on the internet at www.bp.com. Accessed 14.12.2004.
- Braun, M. (2009). The evolution of emissions trading in the European Union- The role of policy networks, knowledge and policy entrepreneurs. *Accounting, Organisations & Society*, 34, 469-487.
- British Airways.(2000).British Airways social and environmental report, available on the internet at www.britishairways.com. Accessed 14.12.2004.
- British Airways.(2002).British Airways social and environmental report, available on the internet at www.britishairways.com. Accessed 14.12.2004.
- British Airways.(2004).Social and environmental report, available on the internet at www.britishairways.com. Accessed 14.12.2004.
- Buhr, N. (1998). Environmental performance, legislation and annual report disclosure: The case of acid rain and Falconbridge. *Accounting, Auditing and Accountability Journal*, 11 (2), 163-190.
- Burns, J. (2000). The dynamics of accounting change: Interplay between new practices, routines, institutions, power and politics. *Accounting, Auditing & Accountability Journal*, 13 (5), 566-596.
- Callon, M. (2009). Civilizing markets: Carbon trading between in vitro and in vivo experiments. *Accounting, Organisations & Society*, 34, 535-548.
- Campbell, D., Beckb, C. and Shrivessb, P. (2005). A note on comparative language interrogation for content analysis: The example of English vs. German. *The British Accounting Review*, 37, 339-350.
- Campbell, D., Craven, B. and Shrivess, P. (2003). Voluntary social reporting in three FTSE sectors a comment on perception and legitimacy. *Accounting, Auditing and Accountability Journal*, 16 (4), 558-581.
- Campbell, D., Moore, G. and Shrivess, P. (2006). Cross-sectional effects in community disclosure. *Accounting, Auditing & Accountability Journal*, 19 (1), 96-114.
- Carbon Disclosure Project - CDP.(2007).Carbon Disclosure Project (CDP 5) greenhouse gas emissions questionnaire 01 February 2007, available on the internet at <http://www.cdproject.net/questionnaire.asp>. Accessed 05.02.2007.
- Carbon Disclosure Project - CDP and Innovest StrategicValue Advisor. (2006). Global FT 500: On behalf of 225 investors with assets of \$31 trillion. London: Carbon Disclosure Project.
- Chan-Fishel, M. (2002). Survey of climate change disclosure in SEC filings of automobile, insurance, oil & gas, petrochemical, and utilities companies: 1-35. US: Friends of the Earth.
- Chevron Texaco.(2002a).2002 Chevron Texaco: Corporate responsibility report: Integrity and learning in a involving world, available on the internet at www.chevrontexaco.com. Accessed 11.02.2007.

- Chevron Texaco.(2002b).Up to the challenge: 2002 annual report, available on the internet at www.chevrontexaco.com. Accessed 04.08.2006.
- Chevron Texaco.(2003a).2003 Chevron Texaco: Corporate responsibility update, available on the internet at www.chevrontexaco.com. Accessed 11.02.2007.
- Chevron Texaco.(2003b).Powering performance: 2003 annual report, available on the internet at www.chevrontexaco.com. Accessed 04.08.2006.
- Chevron Texaco.(2004a).Chevron Texaco response to Carbon Disclosure Project (CDP) greenhouse gas emissions questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Chevron Texaco.(2004b).Identifying issues, taking actions, improving performance: Chevron corporation 2004 corporate responsibility report, available on the internet at www.chevrontexaco.com. Accessed 11.02.2007.
- Chevron Texaco.(2004c).A new equation: 2004 annual report, available on the internet at www.chevrontexaco.com. Accessed 04.08.2006.
- Chevron Texaco.(2005).Chevron Texaco response to Carbon Disclosure Project (CDP) greenhouse gas emissions questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Clayton, A. M. H. and Radcliffe, N. J. (1996). Sustainability- A system approach. London: Earthscan publications Ltd.
- Coase, R. H. (1960). The problem of social cost. *The Journal of Law and Economics*. III. 1-44. Spanish version: *El problema del coste social. Hacienda Publica Española*, 68, 245-274 (1981).
- Collier, P. M. (2001). The power of accounting: A field study of local financial management in a police force. *Management Accounting Research*, 12, 465-486.
- Colyvas, J. A. (2007). From divergent meanings to common practices: The early institutionalization of technology transfer in the life sciences at Stanford University. *Research Policy*, 36, 456-476.
- Commission of the European Communities.(2006).Communication from the Commission-Fourth national communication from the European community under the UN Framework Convention on Climate Change (UNFCCC), available on the internet at <http://unfccc.int/resource/docs/natc/eunce4add.pdf>. Accessed 25.09.2007.
- Commission of the European Communities.(2008).Proposal for a decision of European Parliament and of the Council on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, available on the internet at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008PC0017:EN:NOT>. Accessed 15.12.2008.
- Coulson, A. B. (2008). Reporting on climate change: The case of Lloyds TSB. In R. Sullivan (Ed.), *Corporate responses to climate change: Achieving emissions reductions through regulation, self-regulation and economic incentives*. Sheffield: Greenleaf Publishing Limited.
- Covaleski, M. A. and Dirsmith, M. W. (1995). The preservation and use of public resources: Transforming the immoral into the merely factual. *Accounting Organisations and Society*, 20 (2/3), 147-173.
- Cowen, S. S., Ferreri, L. B. and Parker, L. D. (1987). The impact of corporate characteristics on social responsibility disclosure: A typology and frequency-based analysis. *Organizations and Society*, 12 (2), 111-122.
- Department of Energy and Climate Change - DECC.(2009).Climate change act 2008 - impact assessment, available on the internet at

- <http://www.defra.gov.uk/environment/climatechange/uk/legislation/docs.htm>. Accessed 25.07.09.
- Deegan, C. and Rankin, M. (1996). Do Australian companies objectively report environmental news? An analysis of environmental disclosures by firms successfully prosecuted by the environment protection authority. *Accounting, Auditing and Accountability Journal*, 9 (2), 50-67.
- Department for Environment, Food and Rural Affairs - DEFRA.(2001a).Direct participant agreement for the UK greenhouse gas emission trading scheme, available on the internet at http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/trading-dp_agreement.pdf. Accessed 09.12.2004.
- Department for Environment, Food and Rural Affairs - DEFRA.(2001b).Guidelines for company reporting on greenhouse gas emissions, available on the internet at <http://www.defra.gov.uk/environment/business/envrp/gas/index.htm>. Accessed 12.04.2006.
- Department for Environment, Food and Rural Affairs - DEFRA.(2001c).A summary guide to the UK Emissions Trading Scheme, available on the internet at <http://www.defra.gov.uk>. Accessed 03.01.2005.
- Department for Environment, Food and Rural Affairs - DEFRA.(2002).The UK Greenhouse Gas Emissions Trading Scheme 2002: Arrangement of scheme, available on the internet at <http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/trading-consolidated.pdf>. Accessed 03.06.2009.
- Department for Environment, Food and Rural Affairs - DEFRA.(2003).Guidelines for the measurement and reporting of emissions by direct participants in the UK Emission Trading Scheme, available on the internet at <http://www.defra.gov.uk/environment/climatechange/trading/uk/pdf/trading-reporting.pdf>. Accessed 14.12.2004.
- Department for Environment, Food and Rural Affairs - DEFRA.(2006a).Environmental reporting guidelines – Key performance indicators, available on the internet at <http://www.defra.gov.uk/environment/business/envrp/guidelines.htm>. Accessed 04.12.2006.
- Department for Environment, Food and Rural Affairs - DEFRA.(2006b).The UK's fourth national communication under the United Nations Framework Convention on Climate Change, available on the internet at <http://unfccc.int/resource/docs/natc/usnc4.pdf>. Accessed 24.09.2007.
- Department for Environment, Food and Rural Affairs - DEFRA.(2008).UK Climate Change Programme - Annual Report to Parliament, available on the internet at <http://www.defra.gov.uk/environment/climatechange/uk/ukccp/index.htm>. Accessed 15.12.2008.
- Deloitte&Touche. (2002). Accounting for carbon under the UK Emissions Trading Scheme: 1-28: Deloitte & Touche.
- DiMaggio, P. J. and Powell, W. W. (1991a). Introduction. In W. W. Powell (Ed.), *The new institutionalism in organizational analysis*. Chicago: The University of Chicago Press.
- DiMaggio, P. J. and Powell, W. W. (1991b). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. In W. W. Powell (Ed.), *The new institutionalism in organizational analysis*. Chicago: The University of Chicago Press.

- European Commission - EC.(2005).The European Climate Change Programme - EU Emissions Trading an open scheme promoting global innovation, available on the internet at http://ec.europa.eu/environment/climat/pdf/emission_trading2_en.pdf. Accessed 25.09.2007.
- European Commission - EC. (2006). The European Climate Change Programme - EU actions against climate change: 1-24: European Commission.
- European Environmental Agency - EEA. (2004). Impacts of Europe's changing climate- An indicator-based assessment: 1-107. Copenhagen: EEA.
- European Environmental Agency - EEA. (2007). Greenhouse gas emission trends and projections in Europe - tracking progress towards Kyoto targets: 1-102. Copenhagen: European Environmental Agency.
- Engels, A., Knoll, L. and Huth, M. (2008). Preparing for the 'real' market: National patterns of institutional learning and company behaviour in the European Emissions Trading Scheme (EU ETS). *European Environment*, 18, 276-297.
- Enviros Consulting Limited - ENVIROS. (2006). Appraisal of years 1-4 of the UK Emissions Trading Scheme: 1-60. London: Enviros Consulting Limited.
- Ereaut, G. and Segnit, N. (2006). Warm words: How are we telling the climate story and can we tell it better?: 1-21. London: IPPR (Institute for Public Policy Research).
- Earth Science Education Forum - ESEF. (2001). Climate science and policy: Making the connection. The European science and environmental forum. Washington: George C. Marshall Institute.
- Exxon Mobil.(1999).1999 Annual report, available on the internet at http://www.exxonmobil.com/Corporate/Newsroom/Publications/shareholder_publications/c_annual_99/c_index.html. Accessed 12.11.2006.
- Fernandez-Alles, M. d. I. I. and Valle-Cabrera, R. (2006). Reconciling institutional theory with organizational theories: How Neoinstitutionalism resolves five paradoxes. *Journal of Organizational Change Management*, 19 (4), 503-517.
- Field, A. (2005). Discovering statistics using SPSS and sex, drugs and rock 'n' roll (2 ed.). London: Sage publications.
- Ford.(2002a).2002 Annual report, available on the internet at www.ford.com. Accessed 15.12.2004.
- Ford.(2002b).2002 Corporate citizenship report. Our principles, progress and performance, available on the internet at www.ford.com. Accessed 25.05.2006.
- Ford.(2002c).Response to Carbon Disclosure Project questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Ford.(2003a).2003 Annual report, available on the internet at www.ford.com. Accessed 15.12.2004.
- Ford.(2003b).Voluntary reporting of greenhouse gases, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Ford.(2004a).2003/04 Corporate citizenship report: Our principles, progress and performance, available on the internet at www.ford.com. Accessed 25.05.2006.
- Ford.(2004b).2004 Annual report, available on the internet at www.ford.com. Accessed 25.05.2006.
- Ford.(2004c).Voluntary reporting of greenhouse gases, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Ford.(2005).Connecting with society - Ford sustainability report 2004/5. Our route to sustainability, available on the internet at www.ford.com. Accessed 26.02.2006.

- Freedman, M. and Jaggi, B. (2005). Global warming, commitment to the Kyoto Protocol, and accounting disclosures by the largest global public firms from polluting industries. *The International Journal of Accounting*, 40, 215-232.
- Gibson, R. B.(2000).Encouraging voluntary initiatives for corporate greening some considerations for more systematic design of supporting frameworks at the national and global levels, available on the internet at United Nations Environment Programme. Accessed 03/Nov/2004.
- Gleneagles Dialogue.(2008).Gleneagles-Dialogue on climate change, clean energy and sustainable development 4th ministerial meeting, available on the internet at <http://www.defra.gov.uk/environment/climatechange/internat/pdf/gleneagles-conclusions.pdf>. Accessed 15.12.2008.
- Globe International.(2007).G8 + 5 climate change dialogue - Brussels legislators forum, available on the internet at http://www.globeinternational.org/docs/content/GLOBE%20BROCHURE_260207_Optimized.pdf. Accessed 21.09.2007.
- Globe International.(2008).Combating climate change: An international cooperation framework beyond 2012 - A consensus paper by legislators from the G8 and +5 countries, available on the internet at http://www.globeinternational.org/docs/content/globe_post2012_paper_tokyo_final.doc. Accessed 15.12.2008.
- Goldsmith, E., Allen, R., Allaby, M., Davull, J. and Lawrence, S. (1972). A blueprint for survival. London: Tom Stacey.
- Government of the Federal Republic of Germany.(2006).Fourth national report by the government of the federal republic of Germany, available on the internet at <http://unfccc.int/resource/docs/natc/gernc4.pdf>. Accessed 24.09.2007.
- Gray, R., Kouhy, R. and Lavers, S. (1995a). Corporate social and environmental reporting a review of the literature and a longitudinal study of UK disclosure. *Accounting, Auditing and Accountability Journal*, 8 (2), 47-77.
- Gray, R., Kouhy, R. and Lavers, S. (1995b). Methodological themes: Constructing a research database of social and environmental reporting by UK companies. *Accounting, Auditing and Accountability Journal*, 8 (2), 78-101.
- Gray, R., Owen, D. and Adams, C. (1996). Accounting and accountability: Changes and challenges in corporate social and environment reporting (1 st ed.). London: FT Prentice Hall.
- Green, S. B., Salkind, N. J. and Akey, T. M. (2000). Using SPSS for windows: Analysing and understanding data. New Jersey: Prentice Hall.
- Global Reporting Initiative - GRI.(2002).Sustainability reporting guidelines, available on the internet at www.globalreporting.org. Accessed 17.04.2006.
- Global Reporting Initiative - GRI.(2006).RG: Sustainability reporting guidelines - version 3.0, available on the internet at www.globalreporting.org. Accessed 22.11.2006.
- Grubb, M. (2005). The climate change challenge : Scientific evidence and implications: 1-21. London: The Carbon Trust.
- Grubb, M., Vrolijk, C. and Brack, D. (1999). The Kyoto Protocol: A guide and assessment. Washington: Royal Institute of International Affairs.
- Hackston, D. and Milne, M. J. (1996). Some determinants of social and environmental disclosures in New Zealand companies. *Accounting, Auditing and Accountability Journal*, 9 (1), 77-108.
- Hadley Centre. (1999). The greenhouse effect and climate change : A briefing from the Hadley Centre. London: The Met. Office Communication.

- Harrington, W., Morgenstern, R. D. and Sterner, T. (Eds.). (2004). *Choosing environmental policy: Comparing instruments and outcomes in the United States and Europe*. Washington: Resources for the future.
- Hasseldine, J., Salama, A. I. and Toms, J. S. (2005). Quantity versus quality: The impact of environmental disclosures on the reputation of UK plcs. *The British Accounting Review*, 37, 231-248.
- HBOS.(2002).Annual report and accounts 2002, available on the internet at www.HBOSplc.com. Accessed 03.08.2006.
- HBOS.(2003a).Annual report and accounts 2003, available on the internet at www.HBOSplc.com. Accessed 03.08.2006.
- HBOS.(2003b).Carbon Disclosure Project greenhouse gas emissions questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.08.2008.
- HBOS.(2003c).HBOS corporate social responsibility, available on the internet at <http://www.hboscr.com/printable.asp>. Accessed 03.08.2006.
- HBOS.(2004a).Annual report and accounts 2004, available on the internet at www.HBOSplc.com. Accessed 03.08.2006.
- HBOS.(2004b).Carbon Disclosure Project 2003 - Greenhouse gas emissions questionnaire, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- HBOS.(2004c).Taking care of tomorrow: The HBOS corporate social responsibility report 2004, available on the internet at www.HBOSplc.com. Accessed 03.08.2006.
- HBOS.(2005a).Carbon Disclosure Project greenhouse gas emissions questionnaire 2004, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- HBOS.(2005b).Taking care of tomorrow: The HBOS corporate social responsibility report 2005, available on the internet at www.HBOSplc.com. Accessed 29.02.2008.
- Higher Education Statistic Agency - HESA.(2005).Performance indicators in higher education in the UK 2003/04. Participation of under-represented groups in higher education: Young full-time first degree entrants 2003/04, available on the internet at <http://www.hesa.ac.uk/pi/0304/>. Accessed 26.02.2006.
- Her Majesty's Government - HMG.(2006).Climate change: The UK Programme 2006, available on the internet at Accessed 24.01.2007.
- Hoffman, A. J. (1999). Institutional evolution and change: Environmentalism and the U.S. Chemical industry. *Academy of Management Journal*, 42 (4), 351-371.
- Hoffman, A. J. (2007a). Carbon strategies: How leading companies are reducing their climate footprint. Ann Arbor: The University of Michigan Press.
- Hoffman, R. C. (2007b). Corporate social responsibility in the 1920s: An institutional perspective. *Journal of Management History*, 13 (1), 55-73.
- Hoffman, V. H. (2007c). EU ETS and investment decisions: The case of Germany electricity industry. *European Management Journal*, 25 (6), 464-474.
- Honda.(2002).Honda motor co., ltd. Annual report 2002, available on the internet at www.honda.com. Accessed 08.08.2006.
- Honda.(2003a).Annual report 2003, available on the internet at www.honda.com. Accessed 08.08.2006.
- Honda.(2003b).Honda environmental annual report 2003, available on the internet at www.honda.com. Accessed 08.08.2006.
- Honda.(2004a).Annual report 2004, available on the internet at www.honda.com. Accessed 08.08.2006.

- Honda.(2004b).Honda environmental annual report 2004, available on the internet at www.honda.com. Accessed 08.08.2006.
- Honda.(2005).Honda environmental annual report 2005, available on the internet at www.honda.com. Accessed 15.10.2007.
- Houghton, J. (1994). Global warming: The complete briefing (3 ed.). Cambridge: Cambridge University Press.
- House of Commons. (2008). Environmental audit - seventh special report. <http://www.publications.parliament.uk/pa/cm200708/cmselect/cmenvaud/1135/113502.htm>, 05.11.2008.
- House of Commons Environmental Audit Committee. (2008). Personal carbon trading: Fifth report of session 2007–08: 1-118. London: House of Commons.
- Hussain, M. and Gunasekaran, A. (2002). An institutional perspective of non-financial management accounting measures: A review of financial services industry. *Managerial Auditing Journal*, 17 (9), 518-536.
- Hussain, M. and Hoque, Z. (2002). Understanding non-financial performance measurement practices in Japanese banks: New institutional sociology perspective. *Accounting, Auditing & Accountability Journal*, 15 (2), 162-183.
- International Financial Reporting Interpretations Committee - IFRIC.(2005).IFRIC 3, available on the internet at <http://www.iasplus.com/interps/ifric003.htm>. Accessed 15.05.2006.
- Inter-agency Commission of the Russian Federation on Climate Change.(2002).Third national communication of the Russian federation, available on the internet at <http://unfccc.int/resource/docs/natc/rusnce3.pdf>. Accessed 24.09.2007.
- Intergovernmental Panel on Climate Change - IPCC.(1996).Revised 1996 IPCC guidelines for national greenhouse gas inventories. Reporting instructions. Vol.1, available on the internet at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs4.htm>. Accessed 21.09.2005.
- Intergovernmental Panel on Climate Change - IPCC. (2001a). Climate change 2001: Mitigation. New York: Cambridge University Press.
- Intergovernmental Panel on Climate Change - IPCC. (2001b). Climate change 2001: The scientific basis. Cambridge: Cambridge University Press.
- Intergovernmental Panel on Climate Change - IPCC. (2007a). Climate change 2007: Impacts, adaptation and vulnerability. New York: IPCC.
- Intergovernmental Panel on Climate Change - IPCC. (2007b). Climate change 2007: Mitigation of climate change. Cambridge: Cambridge University Press.
- Jäger, J. and Ferguson, H. L. (1991). Climate change: Science, impacts and policy - proceedings of the second world conference. Cambridge: Cambridge University Press.
- Klaassen, G., Nentjes, A. and Smith, M. (2005). Testing the theory of emission trading: Experimental evidence on alternative mechanisms for global carbon trading. *Ecological Economics*, 53, 47-58.
- Kolk, A. and Levy, D. (2004). Multinationals and global climate change: Issues for the automotive and oil industries. In S. Lundan (Ed.), *Multinationals, environment and global competition*, Vol. 9. Oxford: Elsevier, Research in Global Strategic Management.
- Kolk, A. and Pinkse, J. (2004). Market strategies for climate change. *European Management Journal*, 22 (3), 304-314.
- Kolk, A. and Pinkse, J. (2007). Towards strategic stakeholder management? Integrating perspectives on sustainability challenges such as corporate responses to climate change. *Corporate Governance*, 7 (4), 370-378.

- Krarup, S. (2001). Can voluntary approaches ever be efficient? *Journal of Cleaner Production*, 9, 135–144.
- Krippendorff, K. (1980). Content analysis: An introduction to its methodology. London: Sage.
- Lafarge.(2001).Building a sustainable world: A first report on our economic social and environmental performance 2001, available on the internet at www.lafarge.com. Accessed 17.04.2005.
- Lafarge.(2002).Building value in the long run: 2002 sustainability report, available on the internet at www.lafarge.com. Accessed 21.12.2004.
- Larrinaga-Gonzalez, C. (2007). Sustainability reporting: Insights from neo-institutional theory. In B. O'Dwyer (Ed.), *Sustainability accounting and accountability*. Oxon: Routledge.
- Livesey, S. M. (2002). Global warming wars: Rhetorical and discourse analytic approaches to Exxon Mobil's corporate public discourse. *The Journal of Business Communication*, 39 (1), 117-148.
- McKenzie, D. (2009). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organisations & Society*, 34, 440-455.
- Mansley, M. and Dlugolecki, A. (2001). Climate change- A risk management challenge for institutional investors: 1-60. London: Universities superannuation scheme Ltd.
- Marshall, L. (1998). Economic instruments and the business use of energy. *Government Task Force on the Industrial Use of energy*.
- Maslin, M. (2004). Global warming: A very short introduction. New York: Oxford University Press.
- Matten, D. and Moon, J. (2008). "Implicit" and "Explicit" CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of Management Review*, 33 (2), 404-424.
- Meadows, D., Randers, J. and Meadows, D. (2004). Limits to growth. London: Earthscan.
- Ministère De L'écologie Et Du Développement Durable - MIES.(2006).Quatrième communication nationale à la convention cadre des nations unies sur les changements climatiques, available on the internet at <http://unfccc.int/resource/docs/natc/franc4f.pdf>. Accessed 24.09.2007.
- Milne, M. J. and Adler, R. W. (1999). Exploring the reliability of social and environmental disclosures content analysis. *Accounting, Auditing and Accountability Journal*, 12 (2), 237-256.
- Ministério da Ciência e Tecnologia.(2004).Comunicação nacional inicial do Brasil a convenção-quadro das Nações Unidas sobre mudança do clima, available on the internet at http://www.mct.gov.br/upd_blob/0005/5586.pdf. Accessed 24.09.2007.
- Ministero dell' Ambiente.(2006).Italian report on demonstrable progress under article 3.2 of the Kyoto Protocol, available on the internet at <http://unfccc.int/resource/docs/dpr/ita1.pdf>. Accessed 24.09.2007.
- Ministry of Environment and Forest.(2007).Climate change: India's initiatives, available on the internet at <http://www.envfor.nic.in/cc/initiatives.htm>. Accessed 24.09.2007.
- Modell, S. (2005). Students as consumers? An institutional field-level analysis of the construction of performance measurement practices. *Accounting, Auditing & Accountability Journal*, 18 (4), 537-563.

- Moll, J., Burns, J. and Major, M. (2006). Institutional theory. In Z. Hoque (Ed.), *Methodological issues in accounting research*. London: Spiramus.
- Montzka, S. A., Myers, R. C., Butler, J. H., Cummings, S. C. and Elkins, J. W. (1993). Global tropospheric distribution and calibration scale of hcf-22. *Geophysical Research Letters*, 20 (8), 703-706.
- Mortensen, B. O. G. (2001). The legal efficiency of voluntary environmental agreements illustrated by the EU electricity sector. *Journal of Cleaner Production*, 9, 155-166.
- Muizon, G. d. and Glachant, M. (2003). The UK Climate Change Levy Agreements: Combining negotiated agreements with tax and emission trading. In P. Talman (Ed.), *Voluntary approaches to climate protection. An economic assessment of private-public partnership*: Edward Elgar.
- National Audit Office - NAO.(2004).The UK Emissions Trading Scheme: A new way to combat climate change, available on the internet at <http://www.nao.org.uk>. Accessed 09.12.2004.
- National Development and Reform Commission People's Republic of China.(2007).China's National Climate Change Programme, available on the internet at <http://en.ndrc.gov.cn/newsrelease/P020070604561191006823.pdf>. Accessed 24.09.2007.
- National Statistics.(2004).National statistics 2001 area classification for local authorities, available on the internet at http://www.statistics.gov.uk/about/methodology_by_theme/area_classification/1a/default.asp. Accessed 26.02.2006.
- NERA Economic Consulting - NERA. (2004). The review of first and second years of the UK Emissions Trading Scheme: 1-20. London: NERA Economic Consulting.
- Neu, D., Warsame, H. and Pedwell, K. (1998). Managing public impressions: Environmental disclosure in annual report. *Accounting Organisations and Society*, 23 (3), 265-282.
- Nye, M. and Owens, S. (2008). Creating the UK Emission Trading Scheme: Motives and symbolic politics. *European Environment*, 18, 1-15.
- Organization for Economic Co-operation and Development - OECD. (1989). Economic instruments for environmental protection. Paris: OECD.
- Okereke, C. (2007). An exploration of motivations, drivers and barriers to carbon management: The UK FTSE 100. *European Management Journal*, 25 (6), 475-486.
- Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review*, 16 (1), 145-179.
- Oliver, C. and Holzinger, I. (2008). The effectiveness of strategic political management: A dynamic capabilities framework. *Academy of Management Review*, 33 (2), 496-520.
- Pallant, J. (2001). SPSS survival manual. Buckingham: Open University Press.
- Panos London. (2006). Whatever the weather: Media attitudes to reporting climate change. London: Panos London.
- Partnership for Climate Actions - PCA. (2002). Common elements among advanced greenhouse gas: 1-57. New York: Environmental Defence.
- Peters, B. G. (1999). Institutional theory in political science: The new institutionalism. New York: Pinter.
- Pinkse, J. (2007). Corporate intentions to participate in emission trading. *Business Strategy and the Environment*, 16, 12-25.

- Pinkse, J. and Kolk, A. (2007). Multinational corporations and emissions trading: Strategic responses to new institutional constraints. *European Management Journal*, 25 (6), 441-452.
- Pinkse, J. and Kolk, A. (2009). International business and global climate change. Oxon: Routledge.
- Porritt, J. (2005). Capitalism as if the world matters. London: Earthscan.
- Rahaman, A. S., Lawrence, S. and Roper, J. (2004). Social and environmental reporting at the VRA: Institutionalised legitimacy or legitimization crisis? *Critical Perspectives on Accounting*, 15, 35-56.
- Roberts, C. B. (1991). Environmental disclosures: A note on reporting practices in mainland Europe. *Accounting, Auditing & Accountability Journal*, 4 (3), 62-71.
- Robinson, A. B., Baliunas, S. L., Soon, W. and Robinson, Z. W. (1998). Environmental effects of increased atmospheric carbon dioxide, available on the internet at <http://zwr.oism.org/pproject/s33p36.htm>. Accessed 30/09/2005.
- Robinson, A. B. and Orient, J. M. (2004). Science, politics and death. *New American Journal*, 20 (12).
- Roeser, F. and Jackson, T. (2005). Early experiences with emissions trading in the UK. In D. Levy (Ed.), *The business of climate change: Corporate response to Kyoto*. Sheffield: Greenleaf Publishing Limited.
- Scott, R. W. (1987). The adolescence of institutional theory. *Administrative science quarterly*, 32, 493-511.
- Scott, R. W. (2008). Institutions and organizations: Ideas and interests. California: Sage Publications, Inc.
- Seo, M.-G. and Creed, W. E. D. (2002). Institutional contradictions, praxis, and institutional change: A dialectical perspective. *Academy of Management Review*, 27 (2), 222-247.
- Shell. (2000). People, planet & profits: The shell report, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2002a). Annual report and accounts 2002, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2002b). Meeting the energy challenge: The shell report 2002, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2003a). Annual report and accounts 2003, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2003b). Greenhouse gas questionnaire - carbon disclosure project, available on the internet at <http://www.cdproject.net/>. Accessed 25.08.2008.
- Shell. (2003c). The shell report 2003: Meeting the energy challenge-our progress in contributing to sustainable development, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2004a). Annual report and accounts 2004, available on the internet at www.shell.com. Accessed 28.05.2006.
- Shell. (2004b). Greenhouse gas questionnaire - carbon disclosure project, available on the internet at <http://www.cdproject.net/>. Accessed 24.06.2008.
- Shell. (2004c). The shell report 2004: Meeting the energy challenge-our progress in contributing to sustainable development, available on the internet at www.shell.com. Accessed 28.05.2006.
- Siegel, S. and Castellan, J. N. J. (1998). Nonparametric statistics for the behavioural sciences (2 ed.). London: McGraw-Hill Book Company.
- Singer, F. S. (1998). Hot talk, cold science: Global warming's unfinished debate. Oakland: The Independent Institute.

- Solomon, J. F. and Solomon, A. (2006). Private social, ethical and environmental disclosure. *Accounting, Auditing & Accountability Journal*, 19 (4), 564-591.
- Soon, W., Baliunas, S. L., Robinson, A. B. and Robinson, Z. W. (2001). Global warming: A guide to the science. Risk controversy series 1. Vancouver: Vancouver British Columbia.
- Sorrell, S. and Skea, J. (1999). Pollution for sale: Emissions trading and joint implementation. Cheltenham: Edward Elgar Publishing Limited.
- Statsoft.(2008).Nonparametric statistics, available on the internet at <http://www.statsoft.com/stnonpar.html>. Accessed 02.09.2008.
- Stern.(2006).Stern review on the economics of climate change, available on the internet at http://www.hm-treasury.gov.uk/independent_reviews/. Accessed 15.08.2007.
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20, 571-610.
- Suddaby, G. and Greenwood, R. (2005). Rhetorical strategies of legitimacy. *Administrative Science Quarterly*, 50, 35-67.
- Sullivan, R. (Ed.). (2008). *Corporate responses to climate change: Achieving emissions reductions through regulation, self-regulation and economic incentives*. Sheffield: Greenleaf.
- Sullivan, R., Crossley, R. and Kozak, J. (2008). Corporate greenhouse gas emissions management: The state of play. In R. Sullivan (Ed.), *Corporate responses to climate change: Achieving emissions reductions through regulation, self-regulation and economic incentives*. Sheffield: Greenleaf Publishing Limited.
- ten Brink, P. B., , UK (Ed.). (2002). *Voluntary environmental agreements: Process, practice and future use*. Midsomer Norton: Greenleaf Publishing.
- Tesco.(2004).Corporate responsibility review 03/04, available on the internet at www.tesco.com. Accessed 16.12.2004.
- The Government of Japan.(2006).Japan's fourth national communication under the United Nations Framework Convention on Climate Change, available on the internet at <http://unfccc.int/resource/docs/natc/japnc4.pdf>. Accessed 24.09.2007.
- Tsang, E. W. K. (1998). A longitudinal study of corporate social reporting in Singapore: The case of the banking, food and beverages and hotel industries. *Accounting, Auditing & Accountability Journal*, 11 (5), 624-635.
- UK Parliament.(2008).Climate Change Act 2008, available on the internet at http://www.opsi.gov.uk/acts/acts2008/pdf/ukpga_20080027_en.pdf. Accessed 25.07.09.
- United Nations - UN.(1998).Kyoto Protocol to the United Nations Framework Convention on Climate Change, available on the internet at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>. Accessed 19.09.2007.
- United Nations - UN.(1999).United Nations treat collections: Treat reference guide, available on the internet at <http://untreaty.un.org/English/guide.asp#glossary>. Accessed 19.09.2007.
- United Nations - UN. (2004). A manual for the preparers and users of eco-efficiency indicators. New York: United Nations Publications.
- United Nations Environment Programme - UNEP. (2000). The Montreal Protocol on substances that deplete the ozone layer: 1-47. Kenya: UNON.
- United Nations Environment Programme - UNEP.(2008).UNEP Executive Director welcomes Obama's speech on climate change, available on the internet at <http://www.unep.org/Documents/Multilingual/Default.asp?DocumentID=550&ArticleID=5994&l=en>. Accessed 04.02.2009.

- Unerman, J. (2000). Methodological issues - Reflections on quantification in corporate social reporting content analysis. *Accounting, Auditing and Accountability Journal*, 13 (5), 667-681.
- United Nations Framework Convention on Climate Change - UNFCCC.(2005).List of projects submitted by parties not included in Annex I to the Convention, available on the internet at <http://unfccc.int/resource/docs/2005/sbi/eng/inf08.pdf>. Accessed 24.09.2007.
- United Nations Framework Convention on Climate Change - UNFCCC.(2008). International transaction log, available on the internet at http://unfccc.int/kyoto_protocol/registry_systems/itl/items/4065.php. Accessed 04.02.2009.
- United Nations Framework Convention on Climate Change - UNFCCC.(1997).Kyoto Protocol to the United Nations Framework Convention on Climate Change, available on the internet at <http://ghg.unfccc.int/index.html>. Accessed 19.09.2007.
- United Nations Framework Convention on Climate Change - UNFCCC.(2005).Press release: Kyoto Protocol to enter into force in 16 February 2005, available on the internet at http://unfccc.int/files/press/news_room/press_releases_and_advisories/application/pdf/press041118_eng.pdf. Accessed 04.02.2009.
- United Nations Framework Convention on Climate Change - UNFCCC.(2006).Kyoto mechanism - Background, available on the internet at http://unfccc.int/kyoto_mechanisms/items/2998.php. Accessed 23.09.2003.
- United Nations Framework Convention on Climate Change - UNFCCC.(2008).The United Nations Climate Change Conference, Poznan, Poland - COP 14:1-12 December 2008, available on the internet at <http://unfccc.int/2860.php>. Accessed 15.12.2008.
- United Nations Framework Convention on Climate Change - UNFCCC.(2009).Kyoto Protocol: Status of ratification, available on the internet at http://unfccc.int/files/kyoto_protocol/status_of_ratification/application/pdf/kp_ratification.pdf. Accessed 03.06.2009.
- US Environmental Protection Agency.(2006).US Climate Action Report-2006: Fourth national communication of the United States of America under the United Nations Framework Convention on Climate Change, available on the internet at <http://unfccc.int/resource/docs/natc/usnc4.pdf>. Accessed 24.09.2007.
- Veolia. (2002). Sustainable development report: 1-48: Veolia.
- Von Malmberg, F. and Strachan, P. A. (2005). Climate policy, ecological modernization and the UK Emission Trading Scheme. *European Environment*, 15, 143-160.
- World Business Council for Sustainability Development - WBCSD and World Resource Institute - WRI.(2004).The greenhouse gas protocol: A corporate accounting and reporting standard, available on the internet at <http://www.wri.org/project/ghg-protocol>. Accessed 04.12.2006.
- Weber, R. P. (1990). Basic content analysis. California: Sage.
- Wordsworth, A. and Grubb, M. (2003). Quantifying the UK's incentives for low carbon investment. *Climate Policy*, 3, 77-88.
- Zéghal, D. and Ahmed, S. A. (1990). Comparison of social responsibility information disclosure media used by Canadian firms. *Accounting, Auditing & Accountability Journal*, 3 (1), 38-53.

Appendix 1: Kyoto Protocols' Annex I

1. Australia
2. Austria
3. Belarus
4. Belgium
5. Bulgaria
6. Canada
7. Croatia
8. Czech Republic
9. Denmark
10. Estonia
11. European Community
12. Finland
13. France
14. Germany
15. Greece
16. Hungary
17. Iceland
18. Ireland
19. Italy
20. Japan
21. Latvia
22. Liechtenstein
23. Lithuania
24. Luxembourg
25. Monaco
26. Netherlands
27. New Zealand
28. Norway
29. Poland
30. Portugal
31. Romania
32. Russian Federation
33. Slovakia
34. Slovenia
35. Spain
36. Sweden
37. Switzerland
38. Ukraine
39. United Kingdom of Great Britain and Northern Ireland
40. United States of America

Source: UNFCCC, 2009

Note: USA signed the protocol but have not ratified, accepted, accessed or approved

Appendix 2: Kyoto Protocols' non-annex I

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|---|--------------------------------------|
| 1. Albania | 46. Fiji |
| 2. Algeria | 47. Gabon |
| 3. Angola | 48. Gambia |
| 4. Antigua and Barbuda | 49. Georgia |
| 5. Argentina | 50. Ghana |
| 6. Armenia | 51. Grenada |
| 7. Azerbaijan | 52. Guatemala |
| 8. Bahamas | 53. Guinea |
| 9. Bahrain | 54. Guinea-Bissau |
| 10. Bangladesh | 55. Guyana |
| 11. Barbados | 56. Haiti |
| 12. Belize | 57. Honduras |
| 13. Benin | 58. India |
| 14. Bhutan | 59. Indonesia |
| 15. Bolivia | 60. Iran (Islamic Republic of) |
| 16. Bosnia and Herzegovina | 61. Israel |
| 17. Botswana | 62. Jamaica |
| 18. Brazil | 63. Jordan |
| 19. Burkina Faso | 64. Kazakhstan |
| 20. Burundi | 65. Kenya |
| 21. Cambodia | 66. Kiribati |
| 22. Cameroon | 67. Kuwait |
| 23. Cape Verde | 68. Kyrgyzstan |
| 24. Central African Republic | 69. Lao Democratic People's |
| 25. Chile | 70. Lebanon |
| 26. China | 71. Lesotho |
| 27. Colombia | 72. Liberia |
| 28. Comoros | 73. Libyan Arab Jamahiriya |
| 29. Congo | 74. Madagascar |
| 30. Cook Islands | 75. Malawi |
| 31. Costa Rica | 76. Malaysia |
| 32. Cote D'ivoire | 77. Maldives |
| 33. Cuba | 78. Mali |
| 34. Cyprus | 79. Malta |
| 35. Democratic People's Republic of Korea | 80. Marshall Islands |
| 36. Democratic Republic of Congo | 81. Mauritania |
| 37. Djibouti | 82. Mauritius |
| 38. Dominica | 83. Mexico |
| 39. Dominican Republic | 84. Micronesia (Federated States of) |
| 40. Ecuador | 85. Mongolia |
| 41. Egypt | 86. Montenegro |
| 42. El Salvador | 87. Morocco |
| 43. Equatorial Guinea | 88. Mozambique |
| 44. Eritrea | 89. Myanmar |
| 45. Ethiopia | 90. Namibia |
| 91. Nauru | 136. Tuvalu |
| 92. Nepal | 137. Uganda |
| 93. Nicaragua | 138. United Arab Emirates |
| 94. Niger | 139. United Republic of Tanzania |
| 95. Nigeria | 140. Uruguay |
| 96. Niue | 141. Uzbekistan |

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|--|----------------|
| 97. Oman | 142. Vanuatu |
| 98. Pakistan | 143. Venezuela |
| 99. Palau | 144. Viet Nam |
| 100. Panama | 145. Yemen |
| 101. Papua New Guinea | 146. Zambia |
| 102. Paraguay | |
| 103. Peru | |
| 104. Philippines | |
| 105. Qatar | |
| 106. Republic of Korea | |
| 107. Republic of Moldova | |
| 108. Rwanda | |
| 109. Saint Kitts and Nevis | |
| 110. Saint Lucia | |
| 111. Saint Vincent and The Grenadines | |
| 112. Samoa | |
| 113. San Tome and Principe | |
| 114. Saudi Arabia | |
| 115. Senegal | |
| 116. Serbia | |
| 117. Seychelles | |
| 118. Sierra Leone | |
| 119. Singapore | |
| 120. Solomon Islands | |
| 121. South Africa | |
| 122. Sri Lanka | |
| 123. Sudan | |
| 124. Suriname | |
| 125. Swaziland | |
| 126. Syrian Arab Republic | |
| 127. Tajikistan | |
| 128. Thailand | |
| 129. The Former Yugoslav Republic of Macedonia | |
| 130. Timor-Leste | |
| 131. Togo | |
| 132. Tonga | |
| 133. Trinidad And Tobago | |
| 134. Tunisia | |
| 135. Turkmenistan | |

Source: UNFCCC, 2009

Note: Kazakhstan signed the protocol but have not ratified, accepted, accessed or approved

Appendix 3: Industrial sectors with agreements with DEFRA

1. Aerospace
2. Agricultural Supply
3. Aluminum
4. Brewing
5. Cathode Ray Tubes
6. Cement
7. Cenerititous Slag
8. Ceramics
9. Chemicals
10. Craft Bakeries
11. Dairy Industry
12. Egg Product
13. Egg Products
14. Food & Drink
15. Foundries
16. Glass
17. Gypsum Products
18. Leather
19. Lime
20. Malting
21. Metal Packaging
22. Metal Forming
23. Mineral Wool
24. Motor Manufacturers
25. Non-Ferrous
26. Paper
27. Pigs
28. Poultry Meat Processing
29. Poultry Meat Rearing
30. Printing
31. Red Meat
32. Rendering
33. Rubber
34. Semiconductors
35. Spirits
36. Steel
37. Supermarkets
38. Surface Engineering
39. Textiles
40. Vehicle Builders and Repairers
41. Wallcoverings
42. Wood Panel

Source: AEA Technology (2004).

Appendix 4: The 32 direct participants in the UK Emissions Trading Scheme

1. Asda Stores Ltd
2. Barclays Bank plc
3. Battle McCarthy (*)
4. British Airways plc
5. British Sugar plc
6. BP plc
7. Budweiser Stag Brewing Company Ltd
8. Dalkia plc
9. Dalkia Utilities Services plc
10. Dana UK Holdings Ltd
11. Dupont (U.K.) Ltd
12. First Hydro Company
13. Ford Motor Company Ltd
14. General Domestic Appliances Ltd
15. GKN (U.K.) plc
16. Imerys Minerals Ltd
17. Ineos Fluor Ltd
18. Kirklees Metropolitan Council
19. Lafarge plc
20. Land Securities plc
21. Lend Lease Real Estate Investment Services Ltd
22. Marks & Spencer plc
23. Mitsubishi Corporation UK plc
24. Motorola GTSS
25. The Natural History Museum
26. Rhodia Organique Fine Ltd
27. Rolls-Royce plc
28. Royal Ordnance plc
29. Shell UK Ltd
30. Somerfield Stores Ltd
31. Tesco Stores Ltd
32. UK Coal Mining Ltd

Source: NAO (2004).

(*) Represent a group of seven universities.

Appendix 5: Research instrument

PART A – Organization background and report characteristic

- Items of this section seek to capture data on organization and the type of report that is being analysed.

A1. Organization name

A2. Legal form

A3. Industry sector

A4. Country of head office

A5. Report year

2000 (1)

2001 (2)

2002 (3)

2003 (4)

2004 (5)

A6. Type of report

Annual report and accounts (1)

Standalone report (2)

Additional notes

PART B – Financial data

- Items of this section seek to explore financial information concerning the reporting organization. Items B1 until B8 will be collected using the DataStream data base. Items B9 until B14 will be collected using organization's reports.

B1. Capital

B2. Sales

B3. EBIT⁵⁹

B4. EBITDA⁶⁰

B5. Number of employees

B6. Total Debit % Common Equity

B7. Returns on Equity (ROE)

B8. Assets

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B9. Does the organization make financial disclose about greenhouse gas (GHG) emissions allowances?

Yes (1)

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No (2)

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If the previous answer was yes, please complete the following items, if disclosed.

B10. Allowances bought

B11. Allowances sold

B12. Allowances banked

B13. Investment spent in order to reduce GHG

B14. Expenditure in order to reduce GHG

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Other financial disclosures identified

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⁵⁹ Earnings before interest and taxation.

⁶⁰ Earnings before interests, taxes, depreciation and amortization.

PART C – Disclosure of GHG emissions and targets

- Items on the section B relate specifically to data and text directly related to data.

| Actual emissions record | Direct ⁶¹ | | Indirect ⁶² | | Emissions ⁶³ | |
|--|----------------------|-----------------|------------------------|-----------------|-------------------------|-----------------|
| | Quantity | Unit of measure | Quantity | Unit of measure | Quantity | Unit of measure |
| Direct GHG | | | | | | |
| C1. CO₂ | | | | | | |
| C2. SF₆ | | | | | | |
| C3. CH₄ | | | | | | |
| C4. HFC | | | | | | |
| C5. PFC | | | | | | |
| C6. N₂O | | | | | | |
| C7. CO₂ equivalent | | | | | | |
| Indirect GHG | | | | | | |
| C8. CO | | | | | | |
| C9. NO_x | | | | | | |
| C10. SO₂ | | | | | | |
| C11. VOC | | | | | | |
| Other GHG and Climate Change Potential | | | | | | |
| C12. H₂ | | | | | | |
| C13. Aerosol and clouds | | | | | | |
| C14. H₂O | | | | | | |
| C15. Tropospheric O₃ | | | | | | |

C16. Global Warming Potential

C17. Global Warming Contribution

C18. Global Warming Contribution per unit of net value added

C19. The UK Climate change agreement target for the year

C20. Organization internal target for the year

Additional notes

⁶¹ Direct emissions are those generated from organizations operation.

⁶² Indirect emissions are those produced with the use of product of service provided by the organisation.

⁶³ Direct and indirect emissions not separately disclosed.

PART D - Disclosure quantity on GCC/GHG emissions

- Items of this section relate to content analysis. Total disclosure in each category must sum to 100% of disclosure. This means that each piece of disclosure should be considered in only one of the following categories.

D1. Emissions Disclosure

D1a. Text

D1b. Graph

D1c. Table

D1d. Other (To be referred here).....

D2.Targets

D2a. The UK ETS

D2b. Other (To be referred here).....

D3. Actions

D3a. Internal actions

D3b. External Actions

D3c. Emissions trading

D3d. Other (To be referred here).....

D4. Other disclosure/narrative

TOTAL[illegible]

Additional notes

| Sl. No. | Name of the Candidate | Grade | Score | Remarks |
|---------|-----------------------|-------|-------|---------|
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| 100 | | | | |

PART E – An assessment of the rationale behind the emissions

- Items of this section seek to record the ‘rationale’ behind the emissions disclosure. The data kept in this part are also related to content analysis and the total disclosure must score 100% of disclosure. This means that each piece of disclosure should be considered in only one of the following categories

| | No. of Squares |
|---|----------------|
| E1. Denial (down playing climate change impacts) | |
| E2. Business/environmental struggle | |
| E3. External policies as inappropriate | |
| E4. GHG’s are developing countries’ problem | |
| E5. Corporate voluntarism/autonomy | |
| E6. Rational economics | |
| E7. Market-base implementation mechanism | |
| E8. Technological solutions will sort the problem out | |
| E9. Behaviour change of employees (or other individuals) will have an impact | |
| E10. The business GHG responsiveness will be good for business | |
| E11. Other (to be referred here)..... | |
| E12. No rationale can be inferred | |
| TOTAL | |

Additional notes

- Items in sections (F, G, H and I) below seek to capture additional characteristics of information about GHG emissions. Measurement scale to be used (0,1), where answers of: No (0) and Yes (1).

PART F – Opinion GCC/GHG issues

(Items of this section seeks to record the organizational opinions and comments on GCC/ GHG)

- F1. The organization states clearly that anthropogenic global warming exists**
- F2. The organization states clearly that GHG's have an impact on global warming**
- F3. The organization disclosure information on key impacts, risks and opportunities that global warming could possibly generate**
- F4. The organization states clearly the potential costs regard global warming objectives**
- F5. The organization states clearly the current cost to reduce the GHG emissions**
- F6. The organization states clearly that it has an objective to control global warming/GHG emissions**

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Additional notes

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PART G – Pressure for action

(Items of this section seeks to record if organization had mention the influence of external policies on its operation)

- G1. The organization discloses information on the Kyoto Protocol**
- G2. The organization disclose information on European Union (EU) involvement with regard to climate change issues**
- G3. The organization discloses information on UK emissions trading**
- G4. The organization discloses information on the UK energy tax (The Climate Change Levy – CCL)**
- G5. The organization disclose any information on incentives received to reduce GHG emissions**
- G6. The organization discloses information on penalties with regard to no-commitment with policies**
- G7. The organization disclose information on trade association involvement with regard to climate change issues**
- G8. The organization disclosure information on any awards received due to actions to tackle climate change**

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Additional notes

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PART H – GHG emissions measurement and targets

(Items of this section seeks to record the type of GHG emissions measurement, how the GHG data have been presented and targets suggested by the organization)

H1. The sources of GHG emissions are identified

H2. The amount of GHG are presented per country which had been generated

H3. The amount of GHG are presented per organization's facilities

H4. The organization disclosure any information about the last year's target achievement

H5. The organization disclosure information about the verification process of emissions measurement

Additional notes

PART I–Disclosures on actions to tackle GCC

(Items of this section seek to record what actions are being undertaken to tackle GCC)

I1. Use of new technologies

I2. Redesigning products/process/services

I3. GHG certifications

I4. Waste disposal (during process or at the end of the product life cycle)

I5. Energy conservation (consumption reductions)

I6. Energy: Use of renewable energy

I7. Energy and fuel efficiency

I8. Refrigeration and air-conditioning improvements

I9. Transport use: Travel reductions

I10. Transport use: Logistic improvements

I11. Use of alternative types of transport (such as hybrid or electric cars)

I12. Management programme and strategies to reduce global warming

I13. Performance against internal and external benchmarking

I14. Board level responsibility

I15. Employees incentives to activities related to global warming

I16. Employee training

I17. Supply chain involvement

I18. Consumer training

I19. Research sponsorship

I20. Partnerships with external organizations

I21. Carbon sequestration

I22. Carbon offset

I23. EU emission trading

I24. UK emissions trading

I25. Chicago climate exchange

I26. Internal emissions trading

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Additional notes

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Appendix 6: Definitions of categories used on research instrument at Part D - Disclosure quantity on GCC/GHG emissions

The purpose of this appendix is to explain what should be considered in which category included on Part D of research instrument. The taxonomy that follows illustrates types of disclosure about GHG emissions that could be expected on the information disclosed about GCC/GHG at annual reports or stand alone reports.

D1. Emissions disclosure⁶⁴

Generic description: This category includes information disclosed about emissions data.

This information can be found in different formats including:

- *D1a. Text:* Emissions data that are found in text format.
- *D1b. Graph:* Graphics that contains data about emissions levels.
- *D1c. Table:* Tables that contains data about emissions levels.
- *D1d. Other:* Any other disclosure information about emission data that cannot be classified on the previous items.

Specific description (examples):

- Amount of GHG emissions
- Sources of emissions
- Type of emissions
- Type of measurement
- Period of measurement

Citations (Examples):

E1. “We track our performance on all GHG emissions by collating data from all facilities in which we have a financial equity share, whether operated by BP or other company. Our direct GHG emissions in 2000, on an equity share basis, were 72.2 million tonnes, compared with 79.8 million tonnes in 1999. This means that, for 2000, our reported GHG emissions were 9.6% lower than 1999.” (BP, 2000:20)

E2. “Over the year we have improved our information systems to develop a more complete inventory on CO₂ emissions. The overall total, just under 18 million tonnes, is dominated by the contribution from aircraft. In preparing this inventory we have followed, where possible, guidelines issued by DETR. These guidelines are not specific enough to allow

⁶⁴ All numerical data is captured separately under Part C. This item captures the space devoted to these and other disclosure.

us to calculate the small contribution from terrestrial emissions of other greenhouse gases.”(BritishAirways, 2000:38)

- E3.”Some greenhouse gases contribute more to global warming than others, so we report our emissions of all six gases covered by the Kyoto Protocol in terms of their GWP. This indicator is expressed in terms of carbon dioxide (CO₂) equivalent and therefore provides a more consistent picture of our impacts. After several years of steady reduction our GHG emissions showed a 2% increase in 2000 to 101 million tonnes CO₂ equivalent, 11% below 1990 levels and ahead of our 2002 target. Increases of 2% in CO₂ emissions and 15% in flaring at the Group level mainly resulted from higher production in Nigeria.”(Shell, 2000:13)

D2. Targets

Generic description: This category includes information disclosed about emissions targets. This information should be classified in the following items.

- *D2a. The UK emissions trading targets:* Target set to comply with the UK climate change agreement.
- *D2b. Other:* Any other target not specified previously.

Specific description (examples):

- Internal GHG emissions targets
- Target set to comply with external initiatives to reduce GHG emissions levels

Citations (Examples):

E1.”The airline has committed to reducing its carbon dioxide emissions in the UK by 125,000 tonnes over 5 years.” (BritishAirways, 2002:20)

E2.”For example, the UK has started an Emission Trading System. Our UK oil production facilities have joined-capping their CO₂ emissions more than 10% below their 1998-2000 baseline emissions by 2006”(Shell, 2002b:28)

E3.”To ensure reductions in our own emissions, we have set a company-wide target of reducing GHG emissions to 10% below 1990 levels by 2010.”(BP, 2000:20)

D3. Actions

Generic description: Information disclosed about actions taken by the organization to reduce GHG emissions, should be classified in the following items.

- *D3a. Internal actions:* It refers to the organization’s internal actions to reduce GHG emissions.
- *D3b. External actions:* It refers to the adoption of external actions to reduce GHG emissions.
- *D3c. Emissions trading:* It refers to the organization’s participation in the emissions trading to reduce GHG emissions.

- *D3d. Other:* Any other actions, which could not possible to be classified on the previous items.

Specific description (examples):

- *D3a. Internal actions:*
 - Use of new technology
 - Redesigning products/process
 - Waste disposal
- *D3b. External actions:*
 - Carbon sequestration
 - Carbon off-set
 - Consumers training
 - Supply chain involvement
 - Research sponsorship
- *D3c. Emissions trading:*
 - EU emissions trading
 - UK emissions trading
 - Chicago climate exchange
 - Internal emissions trading

Citations (Examples):

- E1. "Products: We are introducing more fuel-efficient technologies on our current vehicles (see pages 16 and 22) and developing lower-carbon technologies for the future (see the following pages)." (Ford, 2004a:60) (Category: D3a)
- E2. "In 1999, we initiated the Carbon Capture Project (CCP), the industry's first large-scale project to develop technology for capturing and storing carbon dioxide. In 2004, we will pilot the technology at our In Salah gas plant in Algeria – the world's first project of this scale in producing gas field. " (BP, 2003:25) (Category: D3b)
- E3. "In 2001 we joined the United Kingdom Emissions Trading Scheme (UK ETS) covering emissions from our domestic air services and United Kingdom properties." (BritishAirways, 2004:13) (Category: D3c)

D4. Other disclosure/narrative

Generic description: Any other information disclosed that cannot be classified on the previous items. Especially, narrative disclosure on opinions and comments given by the organizations about climate change, global warming or GHG emissions.

Specific description (examples):

- Organization's own opinions and comments about anthropogenic global warming
- Implications/effects of reducing GHG emissions

Citations (Examples):

- E1. "Climate change is an issue that raises genuine public concern. BP shares this concern and believes that industry should be leading the search for practical and cost-effective solutions." (BP, 2000:5)
- E2. "Our views: We share the concerns of other groups about the implications of man's contribution to global warming and climate change, including contributions from aviation." (British Airways, 2000:35)
- E3. "Climate change remains one of the most important environmental issues of our time. We are acting to reduce our own emissions and supporting our customers, partners and suppliers to reduce theirs." (Shell, 2000:13)

Appendix 7: Disclosure Volume – Categories Summary (Part D)

| | CATEGORIES | GENERIC DESCRIPTION | EXAMPLES |
|----|------------------------------------|--|---|
| D1 | Emissions disclosure | Emissions data, including verification and measurement <ul style="list-style-type: none"> • <i>D1a. Text:</i> Emissions data that are found in text format. • <i>D1b. Graph:</i> Graphics reflecting emissions data. • <i>D1c. Table:</i> Tables that contains emissions data. • <i>D1d. Other:</i> Any other information about emission data. | <ul style="list-style-type: none"> • Amount of GHG emissions • Sources of emissions • Type of emissions • Type of measurement • Period of measurement |
| D2 | Targets | Information about emissions targets. <ul style="list-style-type: none"> • <i>D2b. The UK climate change agreement target:</i> Target set to comply with the UK climate change agreement. • <i>D2c. Other:</i> Any other target not specified previously | <ul style="list-style-type: none"> • Internal GHG emissions targets • Target set to comply with external initiatives to reduce GHG emissions levels |
| D3 | Actions | Information about actions taken by the organization to reduce GHG emissions, should be classified in the following items. <ul style="list-style-type: none"> • <i>D3a. Internal actions:</i> It refers to the organization's internal actions to reduce GHG emissions. • <i>D3b. External actions:</i> It refers to the adoption of external actions to reduce GHG emissions. • <i>D3c. Emissions trading:</i> It refers to the organization's participation in the emissions trading. It also includes internal emissions trading. • <i>D3d. Other:</i> Any other actions, which could not possible to be classified on the previous items. | <ul style="list-style-type: none"> • <i>D3a. Internal actions:</i> <ul style="list-style-type: none"> • Use of new technology • Redesigning oducts/process/services • Waste disposal • Fuel (and energy) efficiency • Renewable energy • Benchmarking • <i>D3b. External actions:</i> <ul style="list-style-type: none"> • Carbon sequestration/off-set • Consumers training • Supply chain involvement • Research sponsorship • Partnerships with external organizations/regulation/awards • <i>D3c. Emissions trading:</i> <ul style="list-style-type: none"> • EU and UK emissions trading • Internal emissions trading |
| D4 | Other disclosure /narrative | Any other information that cannot be classified on the previous items. | <ul style="list-style-type: none"> • Narrative opinions and comments • General information • Table of contents and glossary |

Appendix 8 : ‘Rationale’ descriptions (Part E)

E1. Denial (down playing climate change impacts)

Generic description: The message given is that there is no sufficient information that can prove the anthropogenic causes of climate change. This ‘rationale’, most of the time, refer to the so called sceptical scientists on climate change.

Citation (Example):

“The climate change policy debate focuses on the possible need to limit the use of fossil fuels to reduce the risk that carbon dioxide emissions may result in climate change with serious consequences. ExxonMobil recognizes that potential climate change is an important issue. We understand that the public has become concerned about the wide range of views on the issue and by scenarios that show serious effects from long-term climate changes. However, such scenarios rely on speculative assumptions and results from unproven models.”(ExxonMobil, 1999) Safety, health and environment section.

E2. Business/environmental struggle

Generic description: It is also called a health/harm metaphor. It demonstrates the tension and uncertainty between business and the environmental struggles. Climate change is seeing, at the same time, as serious or trivial and it means a possible harmful or beneficial future impacts. The discourse is not clear, it is a struggle.

Citations (Examples):

“Lafarge takes the climate change problem seriously and is committed to playing its role in search for innovative climate-friendly solutions that could involve new approaches to our business...”(Lafarge, 2001:46)

E3.External policies as inappropriate

Generic description: This ‘rationale’ tends to construct the image that some external policies to reduce GHG emissions are costly and it will probably damage the economy. Thus, those policies are inappropriate.

Citations (Examples):

“Lafarge opposes energy taxes for energy-intensive industry because they will either have little effect on CO₂ emissions or will drive production elsewhere for purely competitiveness reasons.” (Lafarge, 2001:30)

E4. GHG’s are developing countries’ problem

Generic description: Climate change is mostly caused by the developing countries. There is a certainty that developing countries should take a more proactive action against climate change, for instance, improving their energy use and technologies.

Citations (Examples):

“As far as global warming is concerned, the economic growth of countries such as China or India because of their size will lead to a significant increase of global carbon emissions unless patterns of production and consumption adjust. Building materials, including cement, have to be part of this adjustment.” (Lafarge, 2001:31)

E5. Corporate voluntarism/autonomy

Generic description: Market can voluntarily sort the problem out. Incompetence and insufficiency around regulations and/or other mechanism of environmental policies are normally discussed.

Citation (Example):

“Concerning the Kyoto targets, we acknowledge that they are not ambitious enough to solve the problem of climate change. It is a long-term problem and we expect more demanding objectives afterwards. This is one of the reasons for our involvement in the WWF’s Climate Savers program which includes complementary voluntary targets.” (Lafarge, 2002:41)

E6. Rational economics

Generic description: It tends to focus on technical analysis such as cost-benefits to justify policies, investments in development of technical options and other actions to reduce GHG emissions.

Citation (Example):

“...We have therefore met the target we set ourselves in 1998, well ahead of the 2010 schedule and at no cost to our business. This demonstrates that environmental and business performance can go hand in hand to meet our commitments to take precautionary measures against climate change.” (BP, 2001:3)

E7. Market-base implementation mechanism

Generic description: The ‘rationale’ supports market-based initiatives and it is mostly centred in defend market-base initiatives as appropriate to tackle climate change.

Citation (Example):

“We continue to work through the International Air Transport Association (IATA) in promoting emissions trading for international aviation emissions. Work by the International Civil Aviation Organization (ICAO) concluded recently that emissions trading is far more cost-effective mechanism for limiting international aviation emissions relative to taxes and charges, which could result in massive cost increases for the industry with uncertain environmental benefits.” (BritishAirways, 2004:13)

E8. Technological solutions will sort the problem out

Generic description: Technological changes can sort problems related to GHG emissions.

Citation (Example):

“Cogeneration, an efficient technique of simultaneously producing heat and electricity, is one of the most effective ways to reduce greenhouse gases in view of its good energy efficiency.”(Veolia, 2002:39)

E9. Behaviour change of employees (or other individuals) will have an impact

Generic description: It refers to the organization’s believes that the changing of employees or other individuals behaviour will have a relevant impact to reduce GHG emissions.

Citation (Example):

“These green travel plan outline the measures that we have take to reduce the number of store employees coming to work by car, including staff travel surveys, car sharing and walking buddies.”(Tesco, 2004:28)

E10. The business GHG responsiveness will be good for business

Generic description: This ‘rationale’ is also called ‘win-win’ paradigm. It calls for profitable opportunities when GHG emissions are reduced.

Citation (Example):

“The climate change challenge is global in scope, and playing our part in it will be core to our long-term business success. Our impact – and that of our competitors – on atmospheric CO₂ results from activities along our value chain, not just within our fencelines. It goes downstream to the consumer and upstream to those who provide our raw materials and component parts – our suppliers.”(Ford, 2004a:49)

E11. Other

Generic description: Any other ‘rationale’ that was not specified previously.

E12. No rationale can be inferred ⁶⁵

Generic description: If no rationale can be inferred from the piece of disclosure.

⁶⁵ It is expected that the majority of information disclosed in reports will not contain ‘rationale’. Technical and data disclosure (for instance) is unlikely to be associated with any specific ideology.

Appendix 9: ‘Rationale’ categories summary (Part E)

| | CATEGORIES | GENERIC DESCRIPTION |
|------------|---|---|
| E1 | Denial | The message given is that there is no sufficient information that can prove the anthropogenic causes of climate change. |
| E2 | Business/environmental struggle | It demonstrates the tension and uncertainty between business and the environmental struggles. Climate change is seeing, at the same time, as serious or trivial and it means a possible harmful or beneficial future impacts. |
| E3 | External policies as inappropriate | It tends to construct the image that some external policies to reduce GHG emissions are costly and it will probably damage the economy. |
| E4 | GHG’s are developing countries’ problem | Climate change is mostly caused by the developing countries. There is a certainty that developing countries should take a more proactive action against climate change, for instance, improving their energy use and technologies |
| E5 | Corporate voluntarism/ autonomy | Market can voluntarily sort the problem out. Incompetence and insufficiency around regulations and/or other mechanism of environmental policies are normally discussed. |
| E6 | Rational economics | It tends to focus on technical analysis such as cost-benefits to justify policies, investments in development of technical options and other actions to reduce GHG emissions. |
| E7 | Market-base implementation mechanism | The ‘rationale’ supports market-based initiatives and it is mostly centred in defend market-base initiatives as appropriate to tackle climate change. |
| E8 | Technological solutions will sort the problem out | Technological changes can sort problems related to GHG emissions. |
| E9. | Behaviour change of employees (or other individuals) will have an impact | It refers to the organization’s believes that the changing of employees or other individuals behaviour will have a relevant impact to reduce GHG emissions. |
| E10 | The business GHG responsiveness will be good for business | This ‘rationale’ is also called ‘win-win’ paradigm. It calls for profitable opportunities when GHG emissions are reduced. |
| E11 | Other | Any other ‘rationale’ that was not specified previously |
| E12 | No rationale can be inferred | If no rationale can be inferred from the piece of disclosure. |

Appendix 10: Decision rules for GHG emission disclosure

General rules

- The disclosure to be considered are those related to greenhouse gas (GHG), global climate change (GCC) and/or global warming (GW).
- If any piece of disclosure has more than one possible classification, the disclosure should be classified as the item most emphasized (Adapted from Hackston and Milne, 1996).
- Any disclosure which is repeated shall be recorded each time it is discussed (Adapted from Hackston and Milne, 1996).
- Photos and pictures are not included within the analysis
- All the content should be recorded from section (on the report that is being analysed) in which the title refers specifically about GHG, GCC and/or GW.
- Actions on climate change that is a description of a product or services sold by the organization should not be recorded. However, in this particular case, the piece of disclosure that refers specific and only to the impact of this product or service on GHG, GCC and/or GW should be recorded. As an illustration, the whole general description about the progress to implement renewable energy sold by power companies should not be recorded. On the other hand, it should record the specific part disclosed about the impact of this product or service on GHG, GCC and/or GW.

Specific rules

C20 Organization internal targets

- Where an organization has more than one target, the target that is captured is the most generic one, which involves as many as subsidiaries of the entity.

D1 Emissions disclosures

- Emissions data from the whole organization, facilities, divisions or continents.
Exception: Emissions data about a specific programme, products, services or process, should be considered to be 'actions' (Category D3).
- Emissions sources from the whole organization, facilities, divisions or continents.
Exception: Information on specific type of emission sources.
- Disclosure about emissions measurement.

Exception: Improvements in emissions measurement caused by specific programme, products, services or process. This type of disclosure should be considered as ‘actions’ (Category D3).

- Any text close to the graphic, which does not refer explicitly to emissions data, should NOT be considered as ‘Emissions disclosure’ (Category D1).
- Graphics and tables in which disclosure about emissions data are made. Title of the graphic or table should be classified as part of the respective graphic (Category D1b) or table (Category D1c).

Exception: Any text close to the graphic, which does not refer explicitly to emissions data.

- Notes made to graphics or tables should be considered as text (Category D1a).
- In case of the graphic or table include GHG and other gases the proportion to be considered is just the piece of disclosure that refers to GHG.

D2 Targets

- Targets related with the UK emissions trading schemes (UK ETS) should be classified as ‘UK ETS’ (Category D2a).
- Targets related to emissions trading, different from UK ETS, should be classified as ‘other’ (Category D2b).

D3 Actions

- Only disclosure about actions that is currently in operation.

Exception: It does not include planned actions (Category D4).

- Only actions made by the organization, which the report is being analyzed.

Exception: Actions made by third organizations (Category D4).

- Information about fuel efficiency, energy efficiency and renewable energy should be considered if its effect on GHG, GCC or GW is identified (Category D3a).
- General description about benchmarking organization’s actions (Category D3a).

Exception: Specific results of benchmarking should be classified with respect to the results achieved: Emissions data (D1), Targets (D2), Actions (D3) and Others (D4)

- Information about other sources of disclosure (different from standalone report) made by the organization about GHG, GCC or GW (Category D3b).

Exception: The disclosure made refers to a specific internal action (Category D3a) or emissions trading (Category D3c).

- Mention of social groups related to emissions trading (Category D3b).
- Mention of the promotion of global solutions (category D3d)
- Research sponsorship and results of its implementation (Category D3b).

Exception: The simple description of external research results (Category D4).

D4 Other disclosure / narrative

- Disclosure that shows the opinions of professionals or other members of society that do not work directly for the organization (employee, directors, so on) that is being analysed
- Titles that were not possible to be classified in any specific categories mentioned previously.
- General information and/or informative disclosure, which do not mentioned any organization's emissions data, targets or actions.
- Information about stakeholder's requests.

G2 The organization disclose information on European Union (EU) involvement with regard to climate change issues

- The mention of the EU emissions trading should be considered as EU influence

Appendix 11: Key words on GCC disclosure

- Emission
- Trading
- Greenhouse
- Gas
- Climate
- Global
- Warming
- Kyoto
- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Hydrofluorocarbons (HFC)
- Perfluorocarbons (PFC)
- Sulphur Hexafluoride (SF₆)
- Water vapour (H₂O)
- Ozone (O₃)
- Carbon Monoxide (CO)
- Volatile Organic Compounds (VOC)
- Sulphur Dioxide (SO₂)
- Nitrogen Oxide (NO_x=NO+N₂O)
- Hydrogen (H₂)
- Aerosol
- Clouds

Appendix 12: Check list

A- Emissions

| | | |
|------------|---|---|
| A.1 | Direct emissions | Emissions produced by organizations own operations. |
| A.2 | Indirect emissions | Emissions produced by the use of organizations product or services. |
| A.3 | Supply chain emissions | Emissions produced by organizations' supply chain. |
| A.4 | Direct GHG emissions | Emissions related to the following GHG: CO ₂ , SF ₆ , CH ₄ , HFC, PFC and N ₂ O. |
| A.5 | Indirect GHG emissions | Emissions related to the following GHG: CO, NO _x , SO ₂ and VOC. |
| A.6 | Other GHG and Climate Change Potential | Emissions related to the following gases: H ₂ , aerosol and clouds, H ₂ O and tropospheric O ₃ . |
| A.7 | Emissions by origin country | Emissions given by countries in which organization operates. |
| A.8 | Emissions by sources | Emissions given by organization's activities, products or services. |
| A.9 | Other indicators of GCC | Other forms to disclosure on emissions, for example Global Warming Contribution. |

B- Targets

| | | |
|------------|---|--|
| B.1 | Targets to reduce direct emissions | Targets to reduce emissions produced by organizations own operations. |
| B.2 | Targets to reduce indirect emissions | Targets to reduce emissions produced by the use of organizations product or services. |
| B.3 | Targets by different types of GHG | Targets on GHG emissions set by types of GHG emissions. |
| B.4 | Targets by country of operation | Targets on GHG emissions set by countries in which the organization operates. |
| B.5 | Targets by sources of emissions | Targets given by organization's activities, products or services. |
| B.6 | Voluntary targets | Targets on GHG emissions that were set by the organization itself and not driven by other external organizations' requirement. |
| B.7 | Targets driven by external organizations | Targets on GHG emissions set to meet other external organizations' requirement. |

C- Actions

| | | |
|------|---|--|
| | Internal actions | Actions to tackle GHG emissions set by the organization itself and applied internally. |
| C.1 | Use of new technologies | New technologies to tackle GCC. |
| C.2 | Redesigning products/process/services | Redesigning products/process/services to tackle GHG emissions. |
| C.3 | GHG certifications | Examples of certifications are ISO 14064 and ISO 14065. |
| C.4 | Waste disposal | Monitoring of waste during the production process or at the end of the product life cycle. |
| C.5 | Energy conservation | Reductions on energy consumption. |
| C.6 | Use of renewable energy | Use of energy from renewable sources such as wind and solar. |
| C.7 | Energy and fuel efficiency | Energy and fuel efficiency in order to tackle GHG emissions. |
| C.8 | Refrigeration and air-conditioning improvements | Improvements to reduce GHG emissions. |
| C.9 | Travel reductions | Reduction of travels made for instance by managers and employees. |
| C.10 | Logistic improvements | Improvements to reduce GHG emissions. |
| C.11 | Use of alternative types of transport | Examples of alternative types of transports are hybrid or electric cars. |
| C.12 | Management programme and strategies to reduce global warming | Implementation of internal strategies or management programmes to tackle GHG emissions. |
| C.13 | Performance against internal and external benchmarking | Examples of possible benchmarking could be regard to emissions levels and actions to tackle GHG emissions. |
| C.14 | Board level responsibility | Specific area and/or personal responsible for GCC issues. |
| C.15 | Employees incentives to activities related to global warming | Example of employees incentives is award actions to reduce GCC. |
| C.16 | Employee training | Training employees on GCC issues. |
| C.17 | Internal emissions trading | Emissions trading to negotiate emissions internally to the organization. |
| | External actions | Actions to tackle GHG emissions set in partnership with external individuals or organizations. |
| C.18 | Supply chain involvement | Involvement of supply chain on the process to tackle GHG emissions. |
| C.19 | Consumer training | Consumer training on GCC issues. |
| C.20 | Research sponsorship | Financing researches on GCC issues. |
| C.21 | Partnerships with external organizations | Partnerships to tackle GHG emissions. |
| C.22 | Carbon sequestration | Reservoir to remove carbon emissions removing from the atmosphere. |
| C.23 | Carbon offset | Purchase of carbon credits to compensate emissions. |

D- Instrument of environmental policy

| | | |
|-------------|---|---|
| D.1 | Emissions trading | Emissions limits are set in form of permits that are distributed to entities. Entities should produce emissions at a level equal to permit allowances. The permits may or may not be traded between entities. |
| D.2 | Clean development mechanism | A country or entity that has to achieve emissions limits implements a project to reduce GHG emissions or enhance sinks in another country with no national commitment to emissions reductions. The emissions reductions achieved could be shared between countries or entirely transferred to the investor. |
| D.3 | Joint implementation | A country or entity that has to achieve emissions limits may implement a project to reduce GHG emissions or enhance sinks in another country set to emissions reductions. The emissions reductions achieved could be shared between countries or entirely transferred to the investor country. |
| D.4 | Non-tradable permits | Limit organizations' GHG emissions by setting emissions permits. These permits cannot be traded. |
| D.5 | Technology or performance standards | Regulations set GHG emissions limits for products or processes. |
| D.6 | Product ban | Prohibit the use of a specific product (for example incandescent light bulbs). |
| D.7 | Direct governmental spending and investments | It refers to direct government expenditure in research and development (R&D) to tackle GHG emissions or to enhance GHG sinks. |
| D.8 | Emissions taxes | Charges fixed tax per unit of GHG or CO ₂ e emitted. |
| D.9 | Subsidies and financial incentives | Direct payments to entities or tax reduction are allocated by governments in order to encourage practices that reduce GHG emissions. |
| D.10 | Deposit refund | It requires a commodity which will be refund when the entity implements a specific action to limit GHG emissions. |
| D.11 | Voluntary agreements | Agreements set voluntarily to avoid further regulation. Those agreements could be set between organizations and governments, industry or other stakeholders. |
| D.12 | Other instruments | Organization involvement in other type of instrument of environmental policy not mentioned previously. |

E- Antecedents of responses to institutional pressures

| | | |
|-------------|--|---|
| | Cause | Why is the organization being pressured to conform to institutional rules or expectations? |
| E.1 | Legitimacy or social fitness | Social acceptability of actions. |
| E.2 | Efficiency or economic fitness | Organizational efficiency. |
| | Constituents | Who is exerting institutional pressures on the organization? |
| E.3 | Multiplicity of constituent demands | The existence of multiple institutional constituents means that organizations could face incompatible and competing institutional pressures. |
| E.4 | Dependence on institutional constituents | Organizations will tend to defy or manipulate institutional pressures when their level of dependence with institutional constituents is low and acquiesce otherwise. |
| | Content | To what norms or requirements are the organization being pressured to conform? |
| E.5 | Consistency with organizational goals | Organizations will tend to defy or manipulate institutional pressures when their level of dependence with institutional constituents is low. |
| E.6 | Discretionary constraints imposed on the organization | A high level of constrain could motivate organizations to avoid, defy and/or manipulate institutional pressures. Organizations will tend acquiesce to institutional pressures when the degree of constrain is low. |
| | Control | How or by what means are the institutional pressures being exerted? |
| E.7 | Legal coercion or enforcement | Organizations options to conform, resist or manipulate institutional pressures will vary depending to the degree of legal coercion. As an illustration, organizations tend to acquiesce when the degree of legal coercion is high. |
| E.8 | Voluntary diffusion of norms | Organizations options to conform, resist or manipulate institutional pressures will vary depending to the degree to when these pressures are supported by society. For example, organizations will tend to acquiesce and/or compromise to institutional pressures when these pressures are supported by society and well diffused through out it. |
| | Context | What is the environmental context within which institutional pressures are being exerted? |
| E.9 | Environmental uncertainty | Uncertainty refers to the extent to which future events can be predicted. Given organizations will normally tend to opt for stability, when there is high degree of uncertainty, organizations will tend to choose acquiesce, compromise or avoidance strategies. |
| E.10 | Environmental interconnectedness | Interconnectedness refers to the degree to when relationship exist between occupants in an institutional field. Organizations will be more likely to adopt acquiesce and conformity strategies when the environment is highly interconnected. |

F- Responses to institutional pressures

| | | |
|-------------|------------------|---|
| | Acquiescence | Complying with institutional pressures. |
| F.1 | Habit | Following invisible, taken-for-granted norms |
| F.2 | Imitate | Mimicking institutional models |
| F.3 | Comply | Obedying rules and accepting norms |
| | Compromise | It is the border between compliance and resistance. This sort of response leads to balancing, pacifying or bargaining regard to discrepancies between institutional pressures and organizational internal objectives. |
| F.4 | Balance | Balancing the expectations of multiple constituents |
| F.5 | Pacify | Placating and accommodating institutional elements |
| F.6 | Bargain | Negotiating with institutional stakeholders |
| | Avoid | Attempt to avoid the future need to conform to external pressures. |
| F.7 | Conceal | Disguising nonconformity |
| F.8 | Buffer | Loosing institutional attachments |
| F.9 | Escape | Changing goals, activities, or domains |
| | Defy | Opposition to institutional pressures. |
| F.10 | Dismiss | Ignoring explicit norms and values |
| F.11 | Challenge | Contesting rules and requirements |
| F.12 | Attack | Assaulting the sources of institutional pressure |
| | Manipulative | Change or exert power on the content of institutional pressures or on institutional constituents |
| F.13 | Co-opt | Importing influential constituents |
| F.14 | Influence | Shaping values and criteria |
| F.15 | Control | Dominating institutional constituents and process |

Appendix 13: Pair wise comparison

Legend:

| | |
|---|---|
| √ | Evidence of this disclosure category |
| | No evidence of this disclosure category |

Check list:

| | | SHELL | CHEVRON | BARCLAYS | HBOS | FORD | HONDA |
|-----|--|-------|---------|----------|------|------|-------|
| | EMISSIONS | | | | | | |
| a.1 | Direct emissions | √ | √ | √ | √ | √ | √ |
| a.2 | Indirect emissions | √ | | | √ | √ | √ |
| a.3 | Supply chain emissions | | | | | | √ |
| a.4 | Direct GHG emissions | √ | √ | √ | √ | √ | √ |
| a.5 | Indirect GHG emissions | √ | √ | | | √ | √ |
| a.6 | Other GHG and Climate Change Potential | | | | | | |
| a.7 | Emissions by origin country | √ | √ | √ | √ | √ | √ |
| a.8 | Emissions by sources | | √ | √ | √ | √ | √ |
| a.9 | Other indicators on GCC | √ | | √ | √ | √ | √ |
| | TARGETS | | | | | | |
| b.1 | Targets to reduce direct emissions | √ | √ | √ | √ | √ | √ |
| b.2 | Targets to reduce indirect emissions | √ | | | | √ | √ |
| b.3 | Targets by different types of GHG | √ | | | | √ | √ |
| b.4 | Targets by country of operation | | | √ | | √ | |
| b.5 | Targets by sources of emissions | | | √ | √ | √ | √ |
| b.6 | Voluntary targets | √ | √ | √ | √ | √ | √ |
| b.7 | Targets driven by external organizations | √ | | √ | | √ | |

| | | SHELL | CHEVRON | BARCLAYS | HBOS | FORD | HONDA |
|--|--|-------|---------|----------|------|------|-------|
| ACTIONS | | | | | | | |
| Internal Actions | | | | | | | |
| c.1 | Use of new technologies | √ | √ | √ | | √ | √ |
| c.2 | Redesigning products/process/services | √ | √ | | | √ | √ |
| c.3 | GHG certifications | | | | | | |
| c.4 | Waste disposal | √ | | | | √ | √ |
| c.5 | Energy conservation | | √ | √ | √ | √ | √ |
| c.6 | Use of renewable energy | | √ | √ | √ | √ | |
| c.7 | Energy and fuel efficiency | √ | √ | √ | √ | √ | √ |
| c.8 | Refrigeration and air-conditioning improvements | | | √ | √ | √ | √ |
| c.9 | Travel reductions | | | √ | √ | | |
| c.10 | Logistic improvements | | | √ | | √ | √ |
| c.11 | Use of alternative types of transport | | | √ | | | |
| c.12 | Management programme and strategies to reduce global warming | √ | √ | | √ | √ | √ |
| c.13 | Performance against internal and external benchmarking | | √ | | | √ | |
| c.14 | Board level responsibility | √ | √ | √ | √ | √ | |
| c.15 | Employees incentives to activities related to global warming | | | | | | |
| c.16 | Employee training | | | | | | √ |
| c.17 | Internal emissions trading | √ | | | | | |
| External Actions | | | | | | | |
| c.18 | Supply chain involvement | | | √ | √ | √ | √ |
| c.19 | Consumer training | | | | | √ | |
| c.20 | Research sponsorship | | √ | | | √ | |
| c.21 | Partnerships with external organizations | √ | √ | √ | √ | √ | |
| c.22 | Carbon sequestration | √ | √ | | | √ | |
| c.23 | Carbon offset | | | | | | |
| INSTRUMENTS OF ENVIRONMENTAL POLICY | | | | | | | |
| d.1 | Emissions trading | √ | √ | √ | | √ | |
| d.2 | Clean development mechanism | | | | | | |
| d.3 | Joint implementation | | | | | | |

| | | SHELL | CHEVRON | BARCLAYS | HBOS | FORD | HONDA |
|------|--|-------|---------|----------|------|------|-------|
| d.4 | Non-tradable permits | | | | | | |
| d.5 | Technology or performance standards | | | | | √ | √ |
| d.6 | Product ban | | | | | | |
| d.7 | Direct governmental spending and investments | | | | | | |
| d.8 | Emissions taxes | | | | | | |
| d.9 | Subsidies and financial incentives | | | | | | |
| d.10 | Deposit refund | | | | | | |
| d.11 | Voluntary agreements | | | | | √ | |
| d.12 | Other instruments | | | | | √ | |

ANTECEDENTS OF RESPONSES TO INSTITUTIONAL PRESSURES

Cause

| | | | | | | | |
|-----|--------------------------------|---|---|---|---|---|--|
| e.1 | Legitimacy or social fitness | | | | | | |
| e.2 | Efficiency or economic fitness | √ | √ | √ | √ | √ | |

Constituents

| | | | | | | | |
|-----|--|---|---|---|---|---|---|
| e.3 | Multiplicity of constituent demands | √ | √ | √ | √ | √ | √ |
| e.4 | Dependence on institutional constituents | | | | | √ | √ |

Content

| | | | | | | | |
|-----|---|---|---|---|---|---|---|
| e.5 | Consistency with organizational goals | √ | √ | √ | √ | | |
| e.6 | Discretionary constraints imposed on the organization | √ | √ | | | √ | √ |

Control

| | | | | | | | |
|-----|-------------------------------|---|---|---|---|---|---|
| e.7 | Legal coercion or enforcement | √ | √ | | | √ | √ |
| e.8 | Voluntary diffusion of norms | √ | √ | √ | √ | √ | |

Context

| | | | | | | | |
|------|----------------------------------|---|---|---|---|---|---|
| e.9 | Environmental uncertainty | √ | √ | √ | √ | √ | √ |
| e.10 | Environmental interconnectedness | | | √ | √ | | |

RESPONSES TO INSTITUTIONAL PRESSURES

Acquiescence

| | | | | | | | |
|-----|---------|---|---|---|---|---|---|
| f.1 | Habit | | | | | | |
| f.2 | Imitate | | | | | | |
| f.3 | Comply | √ | √ | √ | √ | √ | √ |

| | | SHELL | CHEVRON | BARCLAYS | HBOS | FORD | HONDA |
|---------------------|-----------|-------|---------|----------|------|------|-------|
| Compromise | | | | | | | |
| f.4 | Balance | | | | | √ | |
| f.5 | Pacify | √ | √ | | | | |
| f.6 | Bargain | | | | | | |
| Avoid | | | | | | | |
| f.6 | Conceal | | | | | | |
| f.7 | Buffer | | | | | | |
| f.8 | Escape | | | | | | |
| Defy | | | | | | | |
| f.9 | Dismiss | | | | | | |
| f.10 | Challenge | √ | √ | √ | | √ | |
| f.11 | Attack | | √ | | √ | | |
| Manipulative | | | | | | | |
| f.12 | Co-opt | | | | | | |
| f.13 | Influence | | √ | | | | |
| f.14 | Control | | | | | | |

