

The Impact of Mandatory Reporting Requirements on Discretionary Environmental Disclosure: The Case of the National Greenhouse and Energy Reporting (NGER) Act 2007 and the Clean Energy Act 2011

Author:

Mia, Parvez

Publication Date:

2014

DOI:

<https://doi.org/10.26190/unsworks/17010>

License:

<https://creativecommons.org/licenses/by-nc-nd/3.0/au/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/53819> in <https://unsworks.unsw.edu.au> on 2024-04-28

The Impact of Mandatory Reporting Requirements on Discretionary Environmental Disclosure: The Case of the National Greenhouse and Energy Reporting (NGER) Act 2007 and the Clean Energy Act 2011

By

Parvez Mia

A thesis submitted
in fulfilment of the requirements
for the degree of Master of Philosophy.

UNSW



School of Business
July 2014

PLEASE TYPE**THE UNIVERSITY OF NEW SOUTH WALES
Thesis/Dissertation Sheet**

Surname or Family name: Mia

First name: Parvez

Other name/s:

Abbreviation for degree as given in the University calendar: MPhil

School: School of Business

Faculty: Economics and Management

Title: The Impact of Mandatory Reporting Requirements on
Discretionary Environmental Disclosure: The Case of the National
Greenhouse and Energy Reporting (NGER) Act 2007 and the
Clean Energy Act 2011

Abstract 350 words maximum: (PLEASE TYPE)

While there is broad scientific agreement (IPCC, 2013) that climate change poses a serious threat to the health of our planet, changing the corporate practices, which increase greenhouse gas (GHG) emissions, has proven more difficult. Following the introduction of the Kyoto Protocol (1997), multinational corporations began to increase the volume of environmental disclosures in their annual reports (Kolk, 2008; KPMG, 2008). According to legitimacy theory, companies provide more environmental information when their legitimacy is under threat (Lindblom 1994; Deegan 2002). In order to test legitimacy theory, this study asks: "What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?" To answer the central question, a comparative case study was undertaken on the impact of the mandatory reporting requirements of the *National Greenhouse and Energy Reporting [NGER] Act 2007* and the *Clean Energy Act 2011* on discretionary corporate annual reporting practices, by utilising a quantitative content analysis methodology and paired *t*-tests.

The first stage of the study measured the number of environmental and GHG- specific words in the corporate annual reports of 71 public listed companies before and after the *NGER Act* and found that environmental and GHG-related information increased significantly ($p < 0.05$ respectively). The second stage of the study measured the number of environmental and GHG-specific words in the corporate annual reports of 45 public listed companies before and after the introduction of the *Clean Energy Act* and also found a significant increase ($P < 0.05$ respectively). In addition, this study identified that GHG-specific information, rose by 177 per cent after the *NGER Act* and by 51 per cent after the *Clean Energy Act 2012*. Lastly, a disclosure index was developed, which found that the number of companies providing GHG specific disclosures also increased following both pieces of legislation. Therefore, this study finds that mandatory GHG reporting requirements increased the volume of discretionary corporate environmental and carbon-related disclosures. This does not necessarily translate into a reduction in carbon emissions, but it does add weight to the theory that companies will legitimate their activities by increasing their discretionary environmental disclosures in a shifting regulatory policy context.

Declaration relating to disposition of project thesis/dissertation

I hereby grant to the University of New South Wales or its agents the right to archive and to make available my thesis or dissertation in whole or in part in the University libraries in all forms of media, now or here after known, subject to the provisions of the Copyright Act 1968. I retain all property rights, such as patent rights. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

I also authorise University Microfilms to use the 350 word abstract of my thesis in Dissertation Abstracts International (this is applicable to doctoral theses only).

.....
Signature.....
Witness.....
Date

The University recognises that there may be exceptional circumstances requiring restrictions on copying or conditions on use. Requests for restriction for a period of up to 2 years must be made in writing. Requests for a longer period of restriction may be considered in exceptional circumstances and require the approval of the Dean of Graduate Research.

FOR OFFICE USE ONLY

Date of completion of requirements for Award:

THIS SHEET IS TO BE GLUED TO THE INSIDE FRONT COVER OF THE THESIS

Copyright Statement

I hereby grant the University of New South Wales or its agents the right to archive and to make available my thesis or dissertation in whole or part in the University libraries in all forms of media, now or here after known, subject to the provisions of the Copyright Act 1968. I retain all proprietary rights, such as patent rights.

I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation. I have either used no substantial portions of copyright material in my thesis or I have obtained permission to use copyright material; where permission has not been granted I have applied/will apply for a partial restriction of the digital copy of my thesis or dissertation.

Parvez Mia
UNSW, Australia

Authenticity Statement

I certify that the Library deposit digital copy is a direct equivalent of the final officially approved version of my thesis. No emendation of content has occurred and if there are any minor variations in formatting, they are the result of the conversion to digital format.

Parvez Mia
UNSW, Australia

Originality Statement

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the projects design and conception or in style, presentation and linguistic expression is acknowledged.

Parvez Mia
UNSW, Australia

ABSTRACT

There is broad scientific agreement (IPCC, 2013) that climate change poses a serious threat to the health of every living organisms on our planet. Greenhouse gas (GHG) emissions are primarily responsible for climate change (Canadell et.al., 2007), and economic activities have led to the rapid growth of GHG emissions (Downie and Stubbs, 2013). Kyoto Protocol was introduced in 1997 to reduce this emission and following the introduction of this protocol, multinational corporations began to increase the volume of environmental disclosures in their annual reports (Kolk, 2008; KPMG, 2008). According to legitimacy theory, companies provide more environmental information when their legitimacy is under threat (Lindblom 1994; Deegan 2002). In order to test legitimacy theory, this study asks: “What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?” To answer the central question, a comparative case study was undertaken on the impact of the mandatory reporting requirements of the *National Greenhouse and Energy Reporting* [NGER] *Act 2007* and the *Clean Energy Act 2011* on discretionary corporate annual reporting practices, by utilising a quantitative content analysis methodology and paired *t*-tests.

Study measured the number of environmental and GHG-specific words in the corporate annual reports of sampled companies before and after the *NGER Act* and *Clean Energy Act*, and found that environmental and GHG-related information increased significantly after each piece of legislation. Moreover, a disclosure index was developed, which shows that the number of companies providing GHG-specific disclosures increased following both pieces of legislation. Therefore, this study finds that mandatory GHG reporting requirements increased the volume of discretionary

corporate environmental and carbon-related disclosures. This does not necessarily translate into a reduction in carbon emissions, but it does add weight to the theory that companies will legitimate their activities by increasing their discretionary environmental disclosures in a shifting regulatory policy context. The findings of this study provide new evidence on the impact of GHG regulatory legislation on accounting disclosure behaviour. Moreover, this research contributes to the limited research literature on carbon emission reporting, to date, as no prior study of this kind has been undertaken in Australia.

Table of Contents

LIST OF TABLES	vii
LIST OF ACRONYMS	viii
ACKNOWLEDGEMENTS	ix
CHAPTER 1: INTRODUCTION	1
1.1 SCOPE OF THE RESEARCH	1
1.2 ENVIRONMENTAL CONTEXT	2
1.3 POLICY RESPONSES TO MITIGATE CARBON EMISSIONS.....	4
1.4 AUSTRALIAN POLICY TO MITIGATE CARBON EMISSIONS	9
1.5 THE PROBLEM STATEMENT	13
1.5.1 RESEARCH QUESTIONS AND HYPOTHESES	14
1.5.2 KEY DEFINITIONS.....	15
1.6 SIGNIFICANCE AND JUSTIFICATION OF THE RESEARCH	17
1.7 STRUCTURE OF THE THESIS	19
CHAPTER 2: LITERATURE REVIEW, THEORETICAL OVERVIEW AND HYPOTHESES DEVELOPMENT.....	21
2.1 INTRODUCTION	21
2.2 ENVIRONMENTAL ACCOUNTING AND REPORTING	22
2.3 THE RISE OF ENVIRONMENTAL REPORTING	23
2.4 CARBON AND GREENHOUSE GAS ACCOUNTING	28
2.5 CARBON DISCLOSURE	29

2.6 THE THEORETICAL FRAMEWORK FOR THIS STUDY	32
2.6.1 STAKEHOLDER THEORY	35
2.6.2 LEGITIMACY THEORY.....	38
2.7 THE GAPS IN THE LITERATURE AND THE KEY RESEARCH QUESTIONS AND HYPOTHESES	42
2.8 CONCLUSION	44
CHAPTER 3: RESEARCH DESIGN AND METHOD	46
3.1 INTRODUCTION	46
3.2 SAMPLE SELECTION PROCEDURE	46
3.3 CONTENT ANALYSIS	49
3.3.1 THE ANNUAL REPORT AS A MEDIUM OF DISCLOSURE	52
3.3.2 A TAXONOMY OF CORPORATE ENVIRONMENTAL DISCLOSURE	54
3.3.3 DATA COLLECTION AND MEASUREMENT	57
3.3.4 THE DISCLOSURE INDEX.....	58
3.4 RELIABILITY OF CONTENT ANALYSIS	59
3.5 ADVANTAGES AND DISADVANTAGES OF CONTENT ANALYSIS	62
3.6: STATISTICAL ANALYSIS	63
3.7 CONCLUSION:.....	64
CHAPTER 4: DATA ANALYSIS AND RESEARCH FINDINGS	66
4.1 INTRODUCTION	66
4.2 HYPOTHESES TESTING	66

4.2.1 HYPOTHESIS 1 (H1): ENVIRONMENTAL DISCLOSURE AND THE <i>NGER ACT 2007</i>	68
4.2.2 HYPOTHESIS 2 (H2): GHG SPECIFIC DISCLOSURE AND THE <i>NGER ACT 2007</i>	71
4.2.3 HYPOTHESIS 3 (H3): ENVIRONMENTAL DISCLOSURE AND THE <i>CLEAN ENERGY ACT 2011</i> :.....	75
4.2.4 HYPOTHESIS 4 (H4): GHG-SPECIFIC DISCLOSURE AND THE <i>CLEAN ENERGY ACT 2011</i>	78
4.2.5 SUMMARY OF TEST RESULTS FOR HYPOTHESES 1-4	80
4.3 ANALYSIS OF THE DISCLOSURE INDEX.....	81
4.4 THE CHANGE IN DISCLOSURE BEHAVIOUR.....	86
4.5 CONCLUSION	87
CHAPTER 5: DISCUSSION AND CONCLUSION	89
5.1 INTRODUCTION:	89
5.2 SUMMARY OF RESEARCH FINDINGS AND DISCUSSION	89
5.3 IMPLICATIONS OF THE RESEARCH.....	94
5.3.1 THEORETICAL IMPLICATIONS OF THE RESEARCH	94
5.3.2 PRACTICAL IMPLICATIONS OF THE RESEARCH	95
5.4 LIMITATION OF THE STUDY	96
5.5 SUGGESTIONS FOR FUTURE RESEARCH.....	99
5.6 CONCLUSION	100

REFERENCE LIST	102
APPENDIX I: List of Sample Companies	117
APPENDIX II: Disclosure Checklist (Index)	118

LIST OF TABLES

Table 1: Tests of Normality	68
Table 2: Summary Statistics for Environmental Words before and after NGER Act 2007.....	69
Table 3: Paired Samples Test for Environmental Words before and after NGER Act 2007.....	71
Table 4: Summary Statistics for GHG Words before and after NGER Act 2007.....	72
Table 5: Paired Samples Test for GHG Words before and after NGER Act 2007.....	74
Table 6: Summary Statistics for Environmental words before and after Clean Energy Act 2011	75
Table 7: Paired Samples Test for Environmental Words before and after Clean Energy Act 2011	77
Table 8: Summary Statistics for GHG words before and after Clean Energy Act 2011	78
Table 9: Paired Samples Test for GHG words before and after Clean Energy Act 2011	79
Table 10: Disclosure index and the number of companies which provided each item in the years 2006/2009 and 2009/2013	82

LIST OF ACRONYMS

ASX	Australian Securities Exchange
AUETS	Australian Emission Trading Scheme
CPRS	Carbon Pollution Reduction Scheme
CSIRO	Commonwealth Scientific and Industrial Research Organisation
ENV WORD 06	Environment related words in 2006
ENV WORD 09	Environment related words in 2009
ENV WORD 13	Environment related words in 2013
GHG WORD 06	GHG Specific Word in 2006
GHG WORD 09	GHG Specific Word in 2009
GHG WORD 13	GHG Specific Word in 2013
ETS	Emission Trading Scheme
EU	European Union
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel on Climate Change
LEPID	Liabe Entities Public Information Database
LEPID	Liabe Entities Public Information Database
NGER	National Greenhouse and Energy Reporting
OECD	Organisation for Economic Co-operation and Development
SPSS	Statistical Package for Social Science
UK CCP	UK climate Change Programme
UN	United Nation
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

ACKNOWLEDGEMENTS

First of all, I am thankful to my creator almighty Allah who has blessed me in many ways and gave me the opportunity to meet some very special people who are part of my life and helped me to come so far.

I would like to express my heartiest and most sincere gratitude to my supervisors Dr. Nelia Hyndman-Rizk and Mr John Niven for all the time, cooperation and effort that they have put into this project to help me. They have given me time, patient council and encouragement. Without their careful guidance, endless support, constructive feedback and above all encouragement it would be virtually impossible to complete this research project. It has been a great pleasure working with both of them. I would also like to convey my sincere appreciation to Prof. Kerry Jacobs and Dr Frances Miley who have also given me time, helpful suggestions and encouragement. I am also grateful to my thesis examiners Prof. Charl De Villiers and A/P Sumit Lodhia for providing their valuable recommendation before the final submission.

I am grateful to the School of Business at UNSW@ADFA for their generous financial support to continue my research. I would also like to include all of my friends, colleagues and seniors at UNSW who made my last two years of stay here memorably comfortable and enjoyable. I can never forget their pleasant behaviour and helpful attitude. Hence, I take the opportunity to convey my heartiest thank to them for such nice friendship, affection and cooperation.

Finally, I want to express my profound love, respect and gratefulness to my parents, wife and cute little baby (Ahmed). Without their endless affection, sacrifices and inspirations, I could never be at this stage. Therefore, I humbly dedicate my thesis to them.

CHAPTER 1: INTRODUCTION

1.1 SCOPE OF THE RESEARCH

Climate change is one of the greatest problems of the 21st century. US Secretary of State John Kerry called it as the "the world's largest weapon of mass destruction"(AFP Jakarta, 2014). Concentration of greenhouse gases (GHG) in the atmosphere are primarily responsible for this climate change (Freedman & Jaggi, 2004; Prado-Lorenzo et al., 2009). While there is broad agreement that climate change poses a serious threat to the health of our planet, changing the corporate practices which contribute to GHG emissions has proven more difficult. After the establishment of the Kyoto Protocol (1997), many multinational companies started to acknowledge the consequence of GHG emissions, while many major oil and automotive companies started to adopt a proactive position towards climate change as reaction to increasing regulatory and public pressure (Kolk & Levy, 2003; Kolk, 2008). Companies also started to provide more climate change related disclosures (KPMG, 2008, 2013). This study examines the impact of mandatory disclosure requirements on discretionary environmental and GHG disclosures in Australian corporations, following the implementation of two key pieces of legislation, as a comparative case study: the *National Greenhouse Energy Reporting [NGER] Act 2007* and the *Clean Energy Act 2011*. The first Act requires companies, which produce 25,000 tonnes of CO₂-equivalent (CO₂-e), to report their GHG emissions to the Clean Energy Regulator and this information is accessible by the public. The second Act requires companies to reduce their emissions or pay tax if they emit more than 25,000 tonnes of GHG. These two pieces of legislation disclose the environmental performance of Australian companies, especially high GHG emitters, and holds them financially responsible for excessive emissions. This can damage companies' reputation and hurt their bottom line. They may face a regulatory burden from government,

pressure from environmental NGOs and boycotts from customers, which might put a firm's operation in danger. In this situation, many lead investors would reassess and perhaps downgrade the valuation of the shares or even in some cases they will divert their investment (see Kendall, 2014).

As such, these legislative events have the potential to call their legitimacy into question. According to legitimacy theory (Suchman, 1995; Deegan et al., 2002; Tilling & Tilt, 2010), these companies will provide more environmental information following the introduction of mandatory reporting requirements, in order to legitimise their operations. In order to test legitimacy theory, this study asks: *“What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?”*

1.2 ENVIRONMENTAL CONTEXT

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) found that man-made air, land and water pollution threatens environmental sustainability and contributes to global warming, which has a harmful effect on both human health and species diversity (CSIRO, 2011). It is predicted that a large proportion of global biodiversity will be extinct before the end of this century due to climate change (Bellard et al., 2012). GHG emission is primarily responsible for global warming and economic activities significantly contributed to these emissions (Peters et al., 2011). While, there is increased concern about the urgency of controlling GHG emissions, it is policy change, which is necessary both locally and globally to reduce carbon emissions.

Industries can make a major contribution to economic development and the mitigation of poverty. However, their activities are also responsible for GHG emissions.

Carbon dioxide (CO₂)¹, a major contributor to greenhouse gas, is one of the main pollutants present in the air. This CO₂ is mainly responsible for global warming and climate change (Freedman & Jaggi, 2004; *National Geographic*, 2012). Global warming is seriously damaging to the environment. For example, Nema et al. (2012) reported that:

The industrial and automobile pollution is depleting the ozone layer leading to global warming; the increasing temperatures are making the glaciers melt and lead to natural calamities like floods taking many human lives now and then. (Nema et al., 2012, p. 2334).

Emissions of CO₂ have increased significantly in the atmosphere since the Industrial Revolution. Upstill stated that:

The atmospheric concentration of CO₂ has risen to 389.6 ppm in 2010 from a level of less than 280 ppm before the Industrial Revolution. Annual global CO₂ emissions grew from near zero to 33.4 billion tonnes during this period. (Upstill, 2012, p. 1).

In urban Australia, industrial pollution is one of the main sources of air pollution (Kjellstrom, et al., 2002). Carbon dioxide (CO₂) was Australia's most common greenhouse gas in 2007, accounting for 75 per cent of national net emissions (Australian Government: Department of Climate Change, 2009). Carbon emissions which lead to global warming raises the sea level; it brings drought in tropical regions near the equator, increases hurricanes, tornadoes and floods and causes the spread of diseases. The consequences are serious and have the potential to bring "tremendous unrest in the world", according to Bose (2010, p. 16)

The United Nations Environment Programme (UNEP) reported that industries consume 37 per cent of the world's energy and emitted 50 per cent of the world's CO₂,

¹ CO₂ is one type of greenhouse gas

90 per cent of the world's SO₂² and nearly all of its toxic chemicals (UNEP, 2001). Moreover, industrial activities are using up natural resources, many of which are not renewable, and have an impact on biodiversity. Corporations have hardly been concerned about environmental degradation and have not been forced to take responsibility. If the financial impact of corporate environmental damage is considered, it is actually huge. A major study by the United Nations (UN) found that the world's 3,000 biggest firms caused US\$2.2tn worth of natural environmental damage, which is not included in the corporate financial statement and if those companies had to pay the financial damage, it would wipe out more than one-third of their profits (Jowit, 2010; Simms, 2010). No one paid for the use, loss and damage to the environment, which leads to increased global warming and the rapid loss of freshwater, fisheries and fertile soils. In 2006, BP and Shell's reported profit was £25bn, whereas the social and environmental cost of their carbon emissions was £46.5bn, which was not included in their annual report (Simms, 2010). This indicates a clear picture of the corporate impact on environmental degradation. To mitigate this degradation, policies have been developed around the world.

1.3 POLICY RESPONSES TO MITIGATE CARBON EMISSIONS

Government and business policies in Western countries favour free market economics in order to ensure continued economic growth. Under such a system, social and economic problems are resolved through the invisible hand of the market economy, without government intervention. However, several high-profile environmental disasters, such as the Bhopal Disaster (1984) Chernobyl (1986), the Alaska oil spill

² SO₂ sulphur dioxide is a gas. It affects human health when it is breathed in. It irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest.

(1989) and the Deepwater Horizon oil spill (2010), galvanised public environmental attention and recently climate change has emerged as a key contemporary environmental issue (Roper, 2012, p. 70). Carbon emissions are the leading cause of global warming, with scientists working for the Intergovernmental Panel on Climate Change (IPCC) finding that the increase in GHG emissions from human activities is responsible for climate change (IPCC, 2001, 2013). Based on long-term observation, the IPCC identified human activities as being responsible for more than half of the increase in global average temperature from 1950 to 2010 (IPCC, 2013, p. 60). Climate change can lead to a rise in sea levels and a warming earth will lead to many ecological and economic consequences. Thus, the importance of tackling GHG emissions has received utmost attention internationally, from community interest groups, business and government (Kolk & Levy, 2001; Kolk & Pinkse, 2004; Cowan & Deegan, 2011). The IPCC has suggested that unless a 50 per cent reduction of GHG emissions is achieved by 2015 (using 2000 as the base year), then the earth's temperature might jump from 2⁰C to 2.4⁰C by 2050 (IPCC, 2007a).

Whilst some may question whether government should step in to develop a policy that attempts to reduce carbon emissions and regulates corporate activities, the alternative would appear to leave business to self-regulate in this area. However, it can also be seen that government and several business organisations have been working together to tackle carbon emissions. Indeed, several countries (including France, whose objective is for 25 per cent reduction, and Germany, setting a target for 40 per cent reduction from 1990 levels of GHG by 2020) have set targets to reduce GHG emissions (Stern, 2006). Several policies, such as the clean development mechanism and an international tax on emissions, have been developed at supranational and national level to mitigate GHG emissions (IPCC, 2001) The world's ten largest economies (Brazil,

China, France, Germany, India, Italy, Japan, Russia, Britain and America) have already committed to reduce emissions and have their own national GHG abatement policy to tackle GHG emissions (Stern, 2006).

National GHG abatement policy instruments are used at the national level to limit emissions. A country might have regulatory instruments where the rules implemented by government, for example, can ban certain products and set the technology or performance standards. Another policy instrument is a market-based instrument, where it can directly change organisational costs and benefits and provide incentives to reduce GHG emissions. A market-based instrument, for example, may require organisations to pay for their emissions. The IPCC (2007b) focused on four types of market-based policy instruments (emission taxes, tradable permits, subsidies and financial incentives and deposit refund schemes), which have been used so far to limit GHG emission. There is also a way to reduce GHG emission through voluntary agreements. The main objective of this agreement is to avoid further regulation of GHG emissions. The outcome of the national GHG abatement policy instruments to limit GHG emissions varies from country to country, due to transaction costs, monitoring and enforcement, administrative costs and other socio-economic outcomes (IPCC, 2001).

At the international level, countries together can form a group to limit world GHG emissions. One such agreement at the international level is the Kyoto Protocol. The United Nations has been concerned with the potential impact of GHG emissions since the 1970s. In 1988 the IPCC was established and all countries received an invitation to participate in this body. The IPCC is arguably the world's most authoritative body of climate change scientists. However, it has been difficult to limit GHG emissions, as policy changes related to GHG emissions also affect a country's economic and political interests. Most of development activities involve the use of fossil fuels and

deforestation. Moreover, most of the world's most powerful companies are in the fossil fuel sector (Kolk & Levy, 2003; Grubb, 2005). As was predictable, many multinational companies initially opposed international efforts and regulations to control GHG emissions (Kolk & Levy, 2001; Jeswani et al., 2008; Kolk, 2008). Energy incentive companies even formed lobby groups to undermine the impact of GHG emissions, so as to prevent the introduction of regulations (Greenpeace, 1998; Rankin et al., 2011). Hence, coordinated international action to limit GHG emissions has not been implemented, despite several attempts.

Despite these obstacles, some countries, including those in the Organisation for Economic Co-operation and Development (OECD), took action to fight GHG emissions. These countries' effort resulted in the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. The primary objective of UNFCCC was to stabilise GHG emissions in the atmosphere and prevent the dangerous effects of climate change. However, there was no legally binding contract under UNFCCC to limit GHG emissions. In 1997, the Kyoto Protocol was established, which required parties to commit to a 5 per cent reduction in GHG emissions from 2008 to 2012 and to a further 18 per cent reduction in GHG emissions from 2013 to 2020, as compared to 1990 emission levels (Freedman & Jaggi, 2005; UNFCCC, 2012).

The Kyoto Protocol undeniably is the most important international agreement to address the problem of GHG emissions at the international level. This Protocol established legally binding emissions targets for industrialised countries (UN, 2012). By 2001, 186 countries ratified and signed the Kyoto Protocol to reduce GHG emissions. The Kyoto Protocol entered into force on 18 November 2004 (UN, 2012). Under the Kyoto Protocol, the major industrial nations were together required to reduce GHG emission by 5.2 per cent from 2008 to 2012, as compared to 1990 emissions levels.

Adaptation to the Kyoto Protocol motivated countries to develop their own regulations and new requirements. So far, in tandem with the Kyoto Protocol, 90 countries covering over 80 per cent of global emissions have made international pledges to limit their emissions under the UNFCCC (Australian Government: Department of Environment, 2014).

A major outcome of the Kyoto Protocol was the Emission-Trading Scheme (EU ETS) adopted by the European Union (EU) in 2005. Under the Kyoto Protocol, the EU was required to reduce emissions by 8 per cent from 2008 to 2012, compared to emission levels in 1990. This is the world's largest cap and trade system for carbon emissions. The EU set emission limits on utilities and the operation of large industrial emitters within European Union (Jeswani et al., 2008). Any company which exceeds the limit receives a fine for its excess emissions. The EU also has a monitoring mechanism to check the Kyoto target. Every year EU members are required to report their level of GHG emissions to the EU commission (Commission of the European Communities, 2006).

Although the United Kingdom (UK) is part of the EU and participates in EU ETS, the UK has its own separate policy and target to reduce GHG emissions. The UK is required to reduce GHG emission by 12.5 per cent under the Kyoto Protocol from 2008 to 2012, compared to 1990s levels. The UK also set up their own target to reduce GHG emissions by 20 per cent by 2010 (DEFRA, 2008). The UK has set up the UK Climate Change Programme (UK CCP) to deal with GHG emissions and progress is monitored by international and national organisations. The UNFCCC and the EU are the international monitoring bodies, whereas at the national level, the Sustainable Energy Policy Network (SEPN), monitors the reduction of GHG emissions. The UK also passed the *Climate Change Act* in 2008 to tackle GHG emissions. Under this Act, the

UK aims to reduce carbon emissions by at least 80 per cent by 2050, as compared to emissions at the 1990s level.

1.4 AUSTRALIAN POLICY TO MITIGATE CARBON EMISSIONS

Though Australia played an active role in developing Kyoto Protocol, but did not ratify the Protocol until December 2007. In 2008, Australia implemented the Kyoto Protocol and developed a national policy to reduce carbon emissions (Haque & Deegan, 2010). Climate change mitigation is the dominant theme in the Australian public policy debate (Akter & Bennett, 2011; Perry et al., 2013). Australian average temperature has rose by 0.9⁰C since 1910 and according to the Garnaut (2008) review, it is expected that Australia's annual average temperature could increase by 2⁰C by 2030 and 5⁰C by 2100 compare to the base year (1990). This review also gathered and summarised other potential damage that Australia might face due to the excessive GHG emissions. Some of these are:

- Decreases in annual average rainfall.
- Category 3–5 storms will increase in intensity by 60 per cent by 2030 and 140 per cent by 2070.
- The number of days per year above 35⁰C for 2030, 2070, and 2100 in all capital cities will increase.
- The bushfire seasons will start earlier, end slightly later, and generally be more intense.

This could have a devastating impact on Australia by affecting the economy, the environment and public health (Akter & Bennett, 2011). Despite the potentially deleterious environmental and economic impact of GHG emissions, it is hard for

Australia to make a commitment to reduce GHG emissions, because Australia's economy is highly dependent on fossil fuels. The Howard government refused to ratify the Kyoto Protocol, which have cost Australia approximately A\$4 billion worth of economic activity per year (Maraseni et al., 2009, p. 592). When the Rudd government came to power in November 2007, it ratified the Kyoto Protocol in December 2007 (Australian Government: Department of Environment, 2014). After the ratification of Kyoto Protocol, the Australian government moved forward with its Australian Emission Trading Scheme (AUETS) and planned to implement comprehensive climate change strategies, which included GHG mitigation (Maraseni et al., 2009, p. 592) and planned to reduce GHG emissions by up to 15 per cent by 2020 and by 60 per cent by 2050 compared to 2000 levels (Australian Government: Department of Climate Change, 2008a).

The Australian government introduced the *National Greenhouse and Energy Reporting Act* in 2007, which was to underpin the Carbon Pollution Reduction Scheme (CPRS) / Emission Trading Scheme (ETS). This Act established the legislative framework for the NGER scheme, which is a national reporting framework for certain³ Australian companies to report greenhouse gas emissions, greenhouse gas projects, energy consumption and production. The first measurement period for this Act ran from 1 July 2008 until 30 June 2009. The objectives of this Act were to:

1. underpin the introduction of an emissions trading scheme in the future;
2. inform government policy formulation and the Australian public; and
3. meet Australia's international reporting obligations etc.

³At the facility level threshold limit is 25 kilotonnes or 25,000 tonnes and at corporate group level 50 kilotonnes of CO₂-equivalent (CO₂-e). Companies with any facilities or corporate group level emitting more than this threshold is liable to report their GHG emission and energy consumption related information to the Clean Energy Regulator under the *NGER Act* 2007 (Australian Government: Clean Energy Regulator, 2012a).

The government's Green Paper on the CPRS outlined the government initial plan to introduce an ETS (Australian Government: Department of Climate Change, 2008b). The Government White Paper contributed to designing proposed Australian Emission Trading Scheme (AUETS) (Australian Government: Department of Climate Change, 2008a). However, business groups were concerned for carbon price rather than threat of climate change and planet's future (Lodhia & Martin, 2012, p.140). The ETS or CPRS faced opposition from the energy lobby, as they argued that if they have to pay for emissions, their industries would lose their competitive advantage (Pearse, 2009). Consequently, the CPRS was revised, but the revised CPRS was rejected by the federal Green Party and many conservation groups and the legislation did not pass in the parliament (Rankin et al., 2011, p. 1040).

The government then set up a multi-party climate change committee and a separate business roundtable to develop a GHG emissions reduction policy, with the aim of introducing a carbon price in 2012 (Coorey, 2010). However, due to the slow development of global emissions control efforts and the political difficulty of gaining Senate approval for this scheme, the former Rudd government deferred the CPRS (Parliament of Australia, 2010).

When the Gillard government came to power in June 2010, it started to work towards the introduction of a carbon price. In 2012, the Gillard government introduced a price on carbon to support the transition to a low carbon economy. Federal government passed the *Clean Energy Act* in 2011 to set up the carbon pricing mechanism and to provide industry assistance programs (Parliament of Australia, 2011). The carbon pricing mechanism started on 1 July 2012 to deal with climate change. The mechanism is administered by the Clean Energy Regulator. The objects of this Act are as follows:

- 1) Maintain the Australian obligation to the Climate Change Convention and the Kyoto Protocol;
- 2) Support the development of an effective global response to climate change, consistent with Australia's national interest in ensuring that average global temperatures increase by not more than 2⁰Celsius above pre-industrial levels;
- 3) Take action directed towards meeting Australia's long-term target of reducing Australia's net greenhouse gas emissions to 80 per cent below 2000 levels by 2050; and
- 4) Put a price on greenhouse gas emissions in a way that: encourages investment in clean energy; and supports jobs and competitiveness in the economy; and supports Australia's economic growth while reducing pollution.

The *Clean Energy Act 2011* and the *NGER Act 2007* have legislated to regulate a carbon price (Australian Government: Clean Energy Regulator, 2012b). They apply to Australia's biggest polluters who have to report on and pay a price for their carbon pollution. The price is fixed each year for the first three years, starting at A\$23 a tonne in 2012–2013. Then from 2015–2016, the price will be set by the market. Australian companies are allowed to emit 25,000 tonnes of carbon without any cost. The federal government is charging A\$23 per tonne for emission which exceed the threshold limit of 25,000 from 1 July 2012 (Deloitte, 2012). The aim of this tax is to create incentives for industries to reduce emissions and to invest in cleaner energy.

The Australian government first introduced the *NGER Act 2007*, which requires certain corporations to report their greenhouse gas emissions, energy production, and consumption and other information specified under the Act to the Clean Energy

Regulator. Disclosing GHG emissions was not mandatory before this legislation. This legislation creates a situation that forces the company to report their emissions to the government. This information then becomes available to the public. So, corporate performance in regards to GHG emissions becomes visible to the public, which potentially places corporations in an unfavourable situation in society. Subsequently, the *Clean Energy Act 2011* introduced a carbon price, which placed an extra burden on the top 500 GHG emitters. Both of these pieces of legislation generate extra economic, social and legislative pressures for top emitters, which were not there previously. These changes also have resulted in increased attention by investors and financial institutions on the potential risk of climate change (PricewaterhouseCoopers, 2009). If a firm poorly manages its GHG emissions related risk, it may lose market share and fail to increase shareholder wealth. Moreover, if the firm cannot change their operational strategy to suit a lower carbon economy, its legitimacy could be under threat. On the other hand, almost half of the surveyed CEOs think that responding to the climate change issue would advantage the corporation's positive image in the mind of stakeholders (PricewaterhouseCoopers, 2010).

1.5 THE PROBLEM STATEMENT

Corporate managers and accountants can respond to the threat of climate change by providing voluntary or mandatory disclosures of environmental information, or by increasing both (Dillard et al., 2005; Jones, 2010). Moreover, Deegan and Rankin and other researchers theorise, in accordance with legitimacy theory, that when corporate activities have an undesirable impact on the environment, corporate management provides additional disclosures to re-establish their credentials with the community or alternatively to avert community attention from the adverse environmental outcomes of

the company (see Deegan & Rankin, 1996; Suchman, 1995; Deegan et al., 2002; Tilling & Tilt, 2010). Environmental reporting can, therefore, be a corporate strategy to maintain public relations when considerable harm to the environment has occurred, which undermines the legitimacy of the company. In order to test whether legitimacy theory can explain corporate environmental disclosure practices, this study examines the impact of mandatory reporting requirements on the voluntary environmental and GHG disclosure practices of top corporate emitters, following the implementation of two key pieces of legislation: the *National Greenhouse Energy Reporting [NGER] Act 2007* and the *Clean Energy Act 2011*.

1.5.1 RESEARCH QUESTIONS AND HYPOTHESES

This study asks the following central question: *“What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?”*

In order to answer the central question, this study tests the following four research hypotheses on the relationship between mandatory reporting requirements and discretionary environmental disclosure practices:

Hypothesis 1 (H1): *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007.*

Hypothesis 2 (H2): *There will be an increase in the volume of GHG specific disclosures in annual reports after the implementation of NGER Act 2007.*

Hypothesis 3 (H3): *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

Hypothesis 4 (H4): *There will be an increase in the volume of GHG specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

To answer the central question and test the research hypotheses, a comparative case study was undertaken on the impact of the *NGER Act 2007* and the *Clean Energy Act 2011* on corporate annual reporting practices, by utilising a quantitative content analysis methodology and paired *t*-tests. This study measured the volume of environmental and greenhouse gas (GHG) disclosures in the corporate annual reports of 71 companies before and after the introduction of these two key pieces of legislation. The sample means were compared using a paired *t*-test for each piece of legislation, in order to measure whether an increase in environmental and GHG disclosure occurred. In the final phase of the study, a GHG disclosure index (see Appendix II) was developed to determine the type of GHG specific disclosures reported in corporate annual reports and which types of information were the most common amongst the companies sampled. The findings of the disclosure index provided further evidence on the impact of mandatory GHG reporting requirements on discretionary corporate environmental, in order to answer the central question, as presented in Chapter Four and Chapter Five.

1.5.2 KEY DEFINITIONS

The following definitions of the key terms and concepts were applied in this study:

Annual report: a document prepared by the corporation under the *Corporation Act 2001* and the Australian Securities Exchange (ASX) listing rule. This report is intended to give shareholders and other interested people information about the company's activities and financial performance. Many companies provide voluntary information along with mandatory information in this report. Companies prepare this report every financial year (ASIC, 2014).

Environmental disclosure: any environment-related information such as information related to biodiversity, pollution and climate change provided by the company or a third party (Deegan & Gordon, 1996, Prado-Lorenzo et al., 2009). Companies may provide their environmental disclosures in their annual report, sustainability report or websites. For this study, environmental disclosure within the annual reports was considered.

Mandatory disclosure: those disclosures required by any authoritative and regulatory bodies, such as government regulations, accounting standards or the stock exchange, which are considered to be mandatory.

Voluntary disclosure: the provision of information by a company's management beyond the requirements of government regulations, accounting standards, the stock exchange or the Securities and Exchange Commission rules, where the information is believed to be relevant to the decision-making of users of the company's annual reports.

Greenhouse gas (GHG): a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. Human activities including burning fossil fuels for energy, land clearing and agriculture have increased the amount of greenhouse gas in the atmosphere. There are six main greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride (CSIRO, 2011).

These greenhouse gases are considered to be mainly responsible for climate change and its related risks. In the literature, greenhouse gas emissions are often interchangeably used with carbon emissions.

1.6 SIGNIFICANCE AND JUSTIFICATION OF THE RESEARCH

As a result of climate change, business organisations are facing a two-stage problem. Firstly, they are emitting a considerable amount of GHG emissions and are facing public and regulatory pressure to curtail these emissions. Secondly, the deleterious impact of climate change events may result in damage to corporate assets or even cause businesses to shut down. Many investors look at the climate change risk that a corporation may face in a low carbon economy. In fact, many corporations view climate change as being an important consideration for their investment, planning, product development and brand management. For example, a group of 17 American and international foundations have committed to divest their funds which is close to US\$2 billion from fossil fuels to the new energy economy and they are also calling others to follow (Kendall, 2014). Risk of climate change not only affects the firms profitability (bottom line) but also threatens their survival and accountability (CERES, 2002; Haque & Deegan, 2010).

Despite the urgency of addressing the carbon problem, the response from accounting academics has been weak, with many failing to recognise the urgency of addressing the issue (Bebbington & Larrinaga-Gonzalez, 2008; Engels, 2009; MacKenzie, 2009; Warwick & Ng, 2012). There are a large number of studies in the environmental reporting area, but very limited research is available on GHG specific disclosure practices. Moreover, there is a very limited number of event studies related to climate change or carbon related disclosures. However, some past studies (Patten, 1992;

Deegan et al., 2002; Coetzee & van Staden, 2011) used particular environmental incidents to investigate whether accounting disclosure responded to any of those events. Their findings suggest that accounting responded to those particular events by providing additional disclosures. Hence, it can be reasonably argued that accounting will provide additional disclosures when social and environmental phenomenon becomes visible to investors, the public and other stakeholders. It is obvious that climate change issues create a greater concern for the companies, public, investors and other stakeholders. The introduction of the *NGER Act 2007* and the *Clean Energy Act 2011* made corporate carbon emissions a key issue for society, investors, stakeholders and government. Thus, it is anticipated that corporations will provide more environmental, in particular GHG specific information as a result of the introduction of mandatory reporting requirements.

This study aimed to obtain some empirical evidence about the corporate response to mandatory GHG reporting requirements by examining corporate annual disclosures before and after these two pieces of legislation were introduced. Most of the prior studies had specific focus on particular industry or big corporation. Big corporations are politically visible but not all of them are big polluters. But corporations with poor environmental performance (such as emitting high GHG emission) will ultimately face the regulatory burden and greater legitimacy crisis. So, this study focuses on highly polluting companies regardless of their industry classification and size. Moreover, prior studies focus on an event which was tie with one particular company or industry. This study used an event which affected hundreds of companies from diverse industries. The findings of this study were intended to provide a broader base of evidence about accounting disclosure behaviour and the impact of GHG regulatory legislation. Moreover, demand and pressure for climate change related information are increasing from a wide range of stakeholder groups including society, customers, investors and

regulatory bodies (Hoffman, 2006; Global Reporting Initiative & KPMG, 2007; Bebbington & González, 2008; Kolk & Pinkse, 2007). The findings of this study would be able to answer questions about whether companies are providing additional information to their stakeholders and what would be the significance of this change. This research was also undertaken to provide information related to setting accounting standards for policy makers in Australia in order to understand whether mandatory GHG-specific disclosure in annual reports was needed. To date, no prior study of this kind has been undertaken either in Australia or elsewhere. Hence, this research contributes to the limited research literature on carbon emission reporting.

1.7 STRUCTURE OF THE THESIS

The remaining chapters in this thesis are organised as follows:

Chapter 2: Literature Review, Theoretical Overview and Hypotheses

Development. This provides an overview of prior studies in the area of corporate environmental and GHG specific disclosure. Particular attention is paid to carbon emission related disclosure, as the current study has a very specific focus in this area. This chapter also presents the theoretical foundation for this study by drawing on legitimacy theory and stakeholder theory, in order to explain the corporate motivation on discretionary disclosure practices. Based on gaps in the literature and discussion of theoretical approaches, four research hypotheses are presented in this chapter. A GHG specific disclosure checklist is developed for further analysis of selected companies' annual report. This analysis would help in understanding the type of GHG specific disclosures reported in corporate annual reports and which types of information are the most common amongst the companies sampled. The findings will provide additional evidence in order to answer the central question.

Chapter 3: Research Design and Method: This chapter proceeds with the sample selection procedure. 71 companies' annual reports are analysed before and after the *NGER Act 2007* and annual reports of 45 companies are examined before and after the *Clean Energy Act 2011*. Data were collected using content analysis. The process of data collection and the measurement system are outlined in this chapter. The requirements of content analysis and the reliability and validity of content analysis are also discussed. An overview of statistical analysis is also provided and the robustness of paired *t*-tests is outlined, as the most appropriate approach for testing the research hypotheses.

Chapter 4: Data Analysis and Findings: This chapter analyses the collected sample data to test the hypotheses developed in Chapters 1 and 2. The level of environmental and GHG specific disclosures is examined before and after the two key pieces of legislation in the years 2006, 2009 and 2013, using statistical analysis and paired *t*-tests to measure the significance of the level of disclosure before and after the case study pieces of legislation. The results of the disclosure checklist are also presented in this chapter.

Chapter 5: Discussion and Conclusion: This final chapter summarises the findings and answers the central question, followed by the theoretical and practical implications of the research. This study has several limitations, which are also addressed in this chapter. This chapter finishes by providing some recommendations for a further potential research agenda in this area.

CHAPTER 2: LITERATURE REVIEW, THEORETICAL OVERVIEW AND HYPOTHESES DEVELOPMENT

2.1 INTRODUCTION

Issues of global warming and "the carbon tax" are hot topics and have made constant news headlines in Australian newspapers over the last decade. While the public is well aware of these issues, before 2007 there was no legal requirement to disclose emissions information or the level of corporate emissions. But, the introduction of the *NGER Act 2007* and *Clean Energy Act 2011* disclosed which corporations were heavy emitters to the public and boosted public concern about the level of GHG emissions. As a result, a legitimacy gap became clear and widened between corporations and the community. The existing literature shows that when legitimacy gap arises due to some events, corporations reacted strategically to these events in order to close the gap. Empirical research shows that more environmental disclosures are available following major environmental event or disasters (Patten, 1992, 2002a; Deegan, et al., 2000; Cho, 2009).

This chapter reviews the literature on environmental reporting and GHG reporting processes. The chapter starts by defining environmental accounting and reporting. A review of Australian and international literature related to environmental disclosure is provided in section 2.3. This study specifically focuses on GHG emissions related disclosure legislation. This is followed by a review of the empirical research that examines Australian, and to a lesser extent, international carbon disclosure. Stakeholder theory and legitimacy theory are introduced as the framework for analysing corporate disclosure practices in this study.

2.2 ENVIRONMENTAL ACCOUNTING AND REPORTING

A large amount of research has taken in the area of environmental accounting and reporting since the 1970s (Gray, 2001; Owen, 2008). Some researchers (see Gray, 2001; Dillard et al., 2005; Burritt, & Saka, 2006; De Beer & Friend, 2006; Gale, 2006a, 2006b; Jasch, 2006; Staniskis & Stasiskiene, 2006; Burritt et al., 2009) have tried to find out how to internalise externalities (also called environmental management accounting – EMA), whereas, others looked for the corporate motivations behind environmental disclosure, and types of positive and negative environmental information and the level of environmental disclosure reported by various corporations in different countries (see Hogner, 1982; Freeman, 1984; Guthrie & Parker, 1989; Patten, 1992; Suchman, 1995; Deegan & Gordon, 1996; Deegan & Rankin, 1996; Burritt, 1997; O'Donovan, 2002; Deegan, 2002; Tilling, 2004; Parker, 2005; Solomon, 2005; Freedman & Jaggi, 2005; Boesso & Kumar, 2009; Jones & Solomon, 2010; Spence et al., 2010; Mahadeo et al., 2011; Coetzee & van Staden, 2011). However, it is very hard to define what constitutes environmental reporting, as very often different researchers define different items as constituting environmental information in their environmental accounting and reporting research.

According to the Australian Institute of Environmental Accounting (2011), Environment accounting is “the practice of accounting for all the contributing factors that result in an impact on the environment”. Unlike financial accounting, environmental accounting is not confined to financial information or monetary value (Mathews, 1993). Rather, environmental accounting-related information could be financial or non-financial. Mathews (1997) defined environmental accounting as the extension of traditional accounting, which provides information about the prevention or reduction of pollution.

Environmental accounting can also be described as preparing and providing environment-related information for corporate stakeholders which is also called environmental reporting. Environmental reporting may include any information about the environment (Deegan & Gordon, 1996, p. 187). Environmental disclosure or environmental reporting is a process of disclosing corporate environmental performance to its stakeholders (Lodhia, 2006, p. 75). So, environmental reporting could be defined as providing monetary and non-monetary environmental information to the corporate stakeholders through a medium, such as annual reports. Environmental disclosure may include, but not limited to: pollution, emissions, recycling, waste management, global warming and climate change-related information.

2.3 THE RISE OF ENVIRONMENTAL REPORTING

It is still unclear when corporations started to report their environmental information. An historical analysis of existing literature shows that social and environmental accounting became an active research field after 1970 (Gray & Bebbington, 2001, p. 559). However, social and environmental reporting in companies' annual reports can be traced back from the 1960's (Guthrie & Parker, 1989; Deegan & Gordon, 1996). It is also apparent from prior research that environmental and ethical issues very often were embedded within social reporting. Social, environmental and ethical disclosures continued to increase in 1980s, but environmental issues started to gain prominence in the 1990s (Eugénio, 2009, p. 15), leading many companies to focus more on environmental issues (Adams, 2004; Gray & Laughlin, 2012). Moreover, corporate activities may lead to environmental damage which may reduce public trust. In this situation, companies are expected to improve their environmental performance and disclose environmental information to the public (Schaltegger & Burritt, 2000). These

days, the public are interested in environmental issues and this growing concern influences business organisations to understand the importance of providing environmental information (Buniamin, 2012). In addition, environmental information is deemed necessary to investors (Epstein & Freedman, 1994; Tilt, 1994). This information is important for the decision-making process to identify the effects and risks associated with environmental issues (Buniamin, 2012, p. 117). Thus, environmental reporting plays an important role in maintaining good relations with the public and in helping investors make better decisions. Researchers have studied annual reports and other reporting mediums to understand the way organisations disseminate environmental information to manage the pressure of various stakeholders and to legitimise corporate actions (Guthrie & Parker, 1990; Deegan & Rankin, 1996; Burritt, 1997; Deegan et al., 2002). This research is ongoing at a national and international level and this study aims to contribute to the development of knowledge in this area.

When companies' environmental disclosure started to increase significantly, researchers started to more closely investigate environmental disclosure practices and the contributing factors, including which sorts of mandatory and/or voluntary corporate environmental information were included in annual reports, for example: strategies, current actions and future plans for managing impacts on biodiversity, total direct and indirect greenhouse gas emissions by weight etc. Most of the research in environmental accounting focuses on the types of environmental information companies are reporting (Deegan & Gordon, 1996; Newson & Deegan, 2002; Jose & Lee, 2007; Sen, 2011), the extent and volume of environmental information (Williams, 1999; Solomon & Lewis, 2002; Brammer & Pavelin, 2008; Buniamin, 2012) and whether the extent and volume of reporting information is affected by factors, such as company size, industry membership, economic performance, culture, governance and the country of domicile or

origin (Ingram & Frazier, 1980; Patten, 1992; Hackston & Milne, 1996; Gray et al., 2001; Hughes et al., 2001; Chau & Gray, 2002; Haniffa, & Cooke, 2005; Jenkins & Yakovleva, 2006; Smith et al., 2007; Aerts et al., 2008; Branco & Rodrigues, 2008; Buniamin, 2012). A number of researchers have explored the attitudes of different groups towards environmental concerns and environmental reporting. These groups include accountants (Gray et al., 1995; Jaggi & Zhao, 1996; Lodhia, 2003; Kuasirikun, 2005), NGOs (Deegan & Gordon, 1996; O'Dwyer et al., 2005; Belal & Roberts, 2010), shareholders (De Villiers & van Staden, 2010), and managers (Jaggi & Zhao, 1996; Cormier et al., 2004; Belal & Owen, 2007). Other studies have examined the factors, which motivate management or corporations to provide environmental disclosure (Deegan, 2002; Deegan et al., 2002; Belal & Momin, 2009). Several researchers have also explored the relationship between environmental performance and environmental disclosure (Ingram & Frazier, 1980; Patten, 2002b; Clarkson, et al., 2008; Cowan & Deegan, 2011).

The extent and volume of environmental disclosure was limited in the early stages. One of the early studies conducted by Wiseman (1982) studied the quality and accuracy of environmental disclosure made by 26 firms in environmentally sensitive industries in their corporate annual reports. Their findings indicate that environmental disclosures are limited and are not reflection of the firms' true environmental performance. However, after that number of companies provided environmental information has increased. Prior research also showed that environmental information has increased in corporate annual report after a particular event or incident. Patten, (1992) investigated volume of environmental information of 21 petroleum companies annual reports before and after the Alaskan oil spill and identified that amount of environmental information by these companies significantly increased after the Alaskan

oil spill. Studies in Australian context also found that corporations increased volume of environmental information following an environmental event. Deegan and Rankin (1996), for example, investigated environmental reporting practice by 20 Australian companies. They discovered that companies that were prosecuted by the New South Wales and Victorian Environmental Protection Authorities were provided significantly more environmental information in their annual report. Their findings also suggest that environmental prosecution-related information increased significantly. Deegan, et al. (2000) examined the environmental disclosure in annual report by Australian companies after four environment-related incidents: the Exxon Valdez and Bhopal disasters; the Moura Mine disaster in Queensland; an oil spill caused by the Iron Baron, off the coast of Tasmania; and the Kirki oil spill off the coast of Western Australia. The findings indicated that sample firms operating in the affected industries disclosed more environmental information following the incident than prior to the incidents. They (Deegan, et al., 2000) argued that annual reports were used as means of changing community perceptions about their operations and as means of legitimizing their ongoing existence.

Sometimes corporations provide environmental information to comply with legal requirements (Deegan, 2000; Mobus, 2005) and industry specifications (Deegan. & Blomquist, 2006). Mobus (2005) study found that to response the regulatory threat corporate manager uses environmental disclosure to minimise the legitimacy crisis. Indeed, there may be several motivational factors influencing a company to provide more environmental information (Deegan, 2002). Public pressure and environmental legislation are the two of them. Early research as well as recent research has shown that the public are concerned about corporate environmental performance. The public demand for a cleaner environment, along with environmental legislation has forced

companies to improve their environmental performance (Wiseman, 1982; Eugénio, et al., 2010; Buniamin, 2012). Corporations acknowledged that they need to interact with the society for their long term sustainability. Their activities have to be in-line with society's norms and values. Otherwise, corporations might lose the legitimacy to run their business in the society. Moreover, being responsible to society and managing the impact on the environmental may add value to the company. Consequently, many companies adopted environmental management and accounting systems and increased the amount of their environmental disclosures (Guthrie & Parker, 1989; Gray, et al., 1995a).

Researchers (Cho & Patten, 2007; Guidry & Patten, 2012) also argued, however, that corporations use environmental disclosure to prove their legitimacy to the community. Past and recent studies (Frost, 2007; Jose & Lee, 2007; Chen & Bouvain, 2009; KPMG 2013) showed that the number of companies providing environmental disclosure has increased all over the world. Almost 93 percent of world 250 largest companies now provide social and environmental information (KPMG, 2013). Corporations use environmental information as a way to respond the environmental concerns of their stakeholders (Buniamin, 2012). So, it is expected that corporations will discuss more about more recent and critical environmental issues, in particular carbon emission. Looking into this issue will be valuable addition to the current limited carbon emission literature.

Prior studies (Prado-Lorenzo et al., 2009) have shown that companies extend the scope of environmental information by including forests, the protection of the ozone layer, climate change, water, energy and natural resources, biodiversity in their annual reports. However, the climate change issue received much more attention and generated special expectations (Prado-Lorenzo et al., 2009). Moreover, it is apparent from recent

research (Prado-Lorenzo et al., 2009; McCright & Dunlap, 2011; Tranter, 2011) that climate change in particular received overwhelming attention from world leaders, national and international organisation (UN), researchers, corporations and the public. Over the last few years, carbon pollution has become a hot topic in many disciplines, including environmental science (Kar et al., 2012), engineering (Zhou et al., 2010), geography (Knight, 2011), public health (Kjellstrom, et al., 2002; Beelen et al., 2008; Kjellstrom, & Weaver, 2009) and accounting (Engels, 2009; MacKenzie, 2009), and it is receiving ongoing attention within the research community. The scientific consensus is that the consequences of uncontrolled carbon emissions could be devastating (IPCC, 2007a). Therefore, it is imperative to tackle GHG emissions at both the individual and corporate levels, as well as the national and international levels. Fortunately, several policies and legislations have been developed to mitigate carbon emissions. These can influence to provide more environmental information (Frost, 2007; Da Silva Monteiro & Aibar-Guzmán, 2010). It is expected that companies will provide more environmental and GHG specific disclosure after the introduction of mandatory GHG reporting related legislation, a key question this study addresses. We will now look more closely at the prior studies on GHG specific disclosure.

2.4 CARBON AND GREENHOUSE GAS ACCOUNTING

Carbon or greenhouse gases accounting is part of environmental accounting (Guenther & Stechemesser, 2012, p. 17). There is no agreed definition which currently exists for carbon accounting (Guenther & Stechemesser, 2012, p. 17). By undertaking an extensive systematic literature review within several disciplines, Guenther and Stechemesser (2012) developed the following key definition of carbon accounting:

Carbon Accounting comprises the recognition, the nonmonetary and monetary evaluation and the monitoring of greenhouse gas emissions on all levels of the value chain and the recognition, evaluation and monitoring of the effects of these emissions on the carbon cycle of ecosystems. (p. 19).

Currently, there is no local or international accounting standard for Australian companies concerning accounting for the carbon tax and disclosure (ACCA, 2010; Hamidi-Ravari, 2012). A feature of carbon taxes overseas, such as in Europe and New Zealand, has been the development of a carbon emissions trading scheme (ETS)⁴, and a variety of acceptable accounting approaches have emerged from applying the basic principles of accounting to carbon emission issues (ACCA, 2010). Research suggests that the plethora of accounting treatments that have developed overseas creates a comparability problem for actual and potential users of financial reporting information and corporate performance does not appear to be linked to carbon emissions or a company's carbon disclosure (ACCA, 2010). Lack of comparability complicates measuring corporate environmental performance and investment decision-making.

2.5 CARBON DISCLOSURE

Disclosure of carbon emissions is important to assess the business risk and to judge corporate environmental performance. Public pressure and investor demand for GHG-specific information is high (UNEP, 2013). Few researchers (Haque & Deegan, 2010; Rankin et al., 2011; Pellegrino & Lodhia, 2012) have particularly examined the corporate GHG emissions disclosures, whereas there are large numbers of studies available on environmental reporting. Reporting GHG emissions information in corporate annual report is voluntary and still in its early stage. However, it is expected that companies will provide more GHG emission-related disclosure in the future due to

⁴ETS is a scheme that creates a market for emission rights by limiting the total amount of emissions. Market participants then buy and sell rights to emit greenhouse gases (in this case CO₂).

several global policies and due to public pressure. The Kyoto Protocol, along with some national policy⁵, set a limit for carbon emissions, which forces companies to reduce their emissions level. Many companies may need to create or modify their production to reduce emissions and for that reason firms require creative thinking, planning, retooling and the redesigning of their manufacturing processes (Freedman & Jaggi, 2005). Thus, following the Kyoto Protocol GHG-specific disclosure has attracted more public attention (Rankin et al., 2011). However, carbon emissions-related disclosure is comparatively new for Australian companies, as compared to the United Kingdom (UK), Denmark and other European countries. Furthermore, Australian companies are far behind their counter parts in Europe with regards to reporting emissions related risk (Cowan & Deegan, 2011, p. 410). So, it is commonly agreed that it is important for Australian companies to increase the level of their communication and reporting to stakeholders (PricewaterhouseCoopers, 2009). So far, however, a limited number of studies have been done on the level of carbon disclosure amongst Australian companies and most of these studies were undertaken before the actual regulation such as *NGER Act 2007* and *Clean Energy Act 2011* being in place (Cowan & Deegan, 2011, p. 410). For example, Haque and Deegan (2010) examined five public listed Australian companies between 1992 and 2007 and found that the climate change-related corporate governance disclosure of these companies increased due to public pressure and global policy. Cowan and Deegan (2011, p. 410) concluded that there was “an increasing trend in voluntary emission disclosure by Australian companies as the public and political debate intensifies, although the extent and quality of the disclosure is questioned”.

Public pressure, national and international policies have an impact on carbon disclosure. Regulatory threat to control carbon emission can influence corporations to

⁵Australia had a Carbon Pollution Reduction Scheme which is now called the Carbon Tax. The European Union has an EU ETS policy to reduce carbon emission.

change or restructure their business activities. For example, regulatory pressure and environmental groups promoted European firms to invest in technology such as wind power to reduce GHG emission (Kolk & Levy, 2003). Freedman and Jaggi (2005) findings suggested that global policy had influenced the level of disclosure. They compared the pollution and GHG-specific disclosure made by the world largest public companies from 2000 to 2002, including both Kyoto Protocol-ratified countries and non-Kyoto-ratified countries, and found that companies domiciled in Kyoto Protocol-ratified countries had higher levels of GHG specific disclosure. Freedman and Jaggi (2011) subsequently conducted the same study with a larger sample size and found the same result. Similarly Prado-Lorenzo et al. (2009) found that a company disclosed more GHG-specific information when it belonged to a country that ratified Kyoto Protocol. Clarkson et al. (2008) explored the relationship between corporate environmental performance, including performance indicators of GHG emissions and environmental disclosure for US firms in high polluting industries and found that companies with poor environmental performance made a soft claim of environmental commitment. Simnett and Nugent (2007) undertook a study to understand the current levels of carbon emissions related disclosure and associated assurance in Australia. They collected data from annual reports in 2005, before the introduction of the *NGER Act* and the *Clean Energy Act*. They found that less than 10 per cent of Australian listed companies' mentioned GHG-specific information in their annual reports. Only seven companies out of 1485 listed companies included a full carbon disclosure in their annual report. Therefore, it can be concluded that before the introduction of the *NGER Act* and the *Clean Energy Act*, companies hardly provided carbon emissions disclosure.

There are not many studies, however, which have been undertaken since the introduction of the *NGER* legislation in 2007. Perera and Jubb (2010) did relate their

study to the NGER legislation identifying whether there was a relationship between corporate voluntary carbon disclosure made in annual and sustainability reports and carbon emissions reporting to the Commonwealth Government of Australia. They find no association between the level of emissions and the amount of GHG emissions-related disclosure. Consequently, they concluded that companies did not bother to provide information on negative externalities and were reluctant to use disclosure techniques to minimise these negative externalities. However, their study did not explore whether the level of GHG-specific information increased after the *NGER Act* and the *Clean Energy Act*, which is a gap this study aims to fill.

2.6 THE THEORETICAL FRAMEWORK FOR THIS STUDY

The dominant theoretical framework underpinning research on environmental and GHG reporting has been legitimacy theory (Hogner, 1982; Guthrie & Parker, 1989; Kaplan & Ruland, 1991; Suchman, 1995; Deegan, 2002; O'Donovan, 2002; Tilling, 2004) and stakeholder theory (Roberts, 1992; Solomon, 2005). According to legitimacy theory, the purpose of providing social and environmental information is to legitimise the activities undertaken by corporations. Stakeholder theory assumes that corporations have an obligation to provide relevant information to their stakeholders. These theories (legitimacy and stakeholder) have been used to explain corporate motivation for environmental disclosure and to predict and explain what influences management to provide certain types of environmental information.

While many researchers (Cowan & Deegan, 2011; Rankin et al., 2011) found that the amount of environmental disclosure and the number of companies providing environmental disclosures has increased over the decades, their quality and usefulness is still in doubt. A theory is, therefore, required to explain the motivation behind corporate

environmental reporting in a scientific manner. However, so far there is no universally accepted theoretical framework for environmental reporting in the accounting field. Several theoretical perspectives have been discussed in the existing literature to explain the motivation for voluntary environmental disclosures (Gray. et al., 1995a; Eugénio, 2009). Among others, political economy theories, institutional theories, agency and signalling theories, legitimacy and stakeholder theories have been put forward.

Gray et al. (1995a, p. 50) classified the theoretical studies into three broad categories: decision-usefulness studies, economics-based studies and political economic studies. The decision-usefulness studies can be overlapped with the economics-based studies and political economy studies (Gray et al., 1995). The basic argument for decision-usefulness studies is that environmental information is useful to the users for their investment decisions. In this case, researchers identify the types of useful information and the relative importance of that information, for example, asking an analyst, bankers and others to rank the various type of accounting information in their annual reports in order of their perceived importance. Studies have suggested that environmental information is important (Epstein & Freedman, 1994; Deegan & Rankin, 1997). Other studies under the decision usefulness theories focus on whether environmental information has any value to capital markets (Blacconiere & Northcut, 1997; Aerts et al., 2008; Jacobs et al., 2010). This approach looks at the usefulness of environmental information to financial participants. As a result, decision-usefulness studies received some criticism (Gray et al., 1995a, p. 51) argued that corporate social and environmental responsibility is not prompted predominantly “by a concern with the needs, wants and whims of financial participants”. Nonetheless, they acknowledged that, even though decision-usefulness studies are miss-specified and under-theorized, their related literature had an important influence on raising the visibility of

environmental reporting and led to the emergence of economic theories such as Positive Accounting Theory (Gray et al., 1995a, p. 51)

Positive Accounting Theory (PAT) is an expression of neo-classical economic theory. The objective of PAT is to describe, explain and predict the accounting practices of managers (Watts & Zimmerman, 1986). However, this theory assumes that material self-interest or gain is the basis for all economic activities. Therefore, in PAT, self-interest (opportunistic behaviour) is the reason for the selection of accounting methods and techniques, as well as policy decisions. Friedman (1962) argued that a company's primary responsibility is to maximise its profit by using its resources. Hence, managers will only disclose environmental information when it increases their interests (Ness & Mirza, 1991). However, economic interest may not necessarily be the only influential factor behind environmental disclosure. Mia and Mamun (2011) investigated several Australian companies' social and environmental information during the global financial crisis (GFC). They found that companies which were unable to make a profit during the GFC did not stop or reduce the level of their social and environmental disclosures. Therefore, it can be argued that the use of a PAT framework has little to offer for understanding the practice of environmental disclosure.

To understand the practice of environmental disclosure, stakeholder theory and legitimacy theory are widely used. Gray et al. (1995a, p. 52) argued that these two theories should be seen as "overlapping" theories, rather than competing theories. Both of these theories draw on political economic theory and consider not only the economic self-interest and wealth-maximisation of the corporation, but also the political, social and institutional framework within which the economic activities take place (Gray et al., 1995a, p. 51). Managers may provide environmental disclosure to meet the demand of some powerful stakeholders. Likewise, society can also influence the ability of the

corporation to access resources. So, corporations need to develop a positive perception of their business activities in order to be able to run their business. Thus, corporations can use environmental disclosure to legitimise or justify their activities to society in order to access the resources. This thesis will discuss the stakeholder theory to understand the imminent relationship between a corporation and its stakeholders before discussing about legitimacy theory. Discussion of stakeholder theory will help to understand the applicability of legitimacy theory over stakeholder theory.

2.6.1 STAKEHOLDER THEORY

Stakeholder theory is one of the most popular theories in the corporate environmental accounting and reporting literature. Friedman (1962) argued that a corporation's primary objective is to maximise its owners' wealth. At that time, shareholders were considered to be the sole or main stakeholder to whom management needed to be accountable. Later on, the definition of stakeholders became wider to include: "persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity" (Donaldson and Preston, 1995, p. 67). What is more, Hill (2000), a leading corporate law expert, urged that only considering shareholders is inadequate today and can result in a disjunction between law and reality (Hill, 2000). Likewise, Clarkson (1995, p. 106) defined stakeholders as "...persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, or future". Therefore, stakeholders can be shareholders, lenders, employees, government, community and more. There is so far no definite agreement on who are the stakeholders as the term stakeholder means "many different things to many different people" (Phillips et al., 2003, p. 479).

Stakeholder theory has two branches: the ethical (normative) branch and the managerial (positive) branch (Donaldson and Preston, 1995; Deegan, 2002). The ethical branch of stakeholder theory holds the idea that corporations should consider the interest of all stakeholders, even if those stakeholders do not help the organisation to maximise its wealth. This branch proposes that a corporation has an obligation to treat all stakeholders evenly (Gibson, 2000). The problem with this branch of stakeholder theory is that it is prescriptive in nature. It just says what should be done, rather than explaining or predicting what is happening and why it is happening. It does not have a “direct role in predicting managerial behaviour” (Deegan, 2002, p. 294). Therefore, this theory is unable to explain the existence and motivation for corporate environmental disclosure.

The managerial branch of stakeholder theory by comparison attempts to predict managers’ behaviours. This theory focuses on managing particular stakeholder groups (Deegan, 2002). The managerial branch acknowledges that stakeholders have direct or indirect control over the resources, which are crucial to corporations. This control determines the level of a stakeholders’ power. They can exercise their power in the form of their command over limited resources (finance, labour), access to influential media, ability to legislate against the company, or their ability to influence the consumption of the organisation’s goods and services’ (Deegan, 2006, p. 299). Therefore, the company provides voluntary disclosure in a way that satisfies the stakeholders’ demands (Ullmann, 1985). It indicates that corporations provide environmental disclosure as a corporate strategic response rather than through a “commitment to corporate responsibility and accountability” (Parker, 2005, p. 294). These disclosures mainly address the demand of important or economically powerful stakeholders (Ullmann, 1985; Deegan, 2002; Parker, 2005). Therefore, Parker (2005, p. 294) argued that: “Both

of these rationales for disclosure appeal to corporate self-interest”. Stakeholder theory stands virtually unopposed when “managers should attend to stakeholders as a means to achieving other organizational goals such as profit or shareholder wealth maximization” (Phillips et al., 2003, p. 479).

In a corporation, managers are one of the most significant and influential constituencies and they are likely to practice “opportunistic and self-aggrandizing behaviour” (Donaldson & Preston, 1995, p. 86, cited in Williamson, 1985). Management has the incentive and power to select whose interest they need to serve (Deegan, 2002). So, it can be argued that management can technically avoid some stakeholders’ interest and fulfil others who are considered to be more important. Management will provide information to those who are beneficial to the organisation. Thus, environmental information will be disclosed only if it benefits the company or some stakeholders who care about the environment (such as environmental NGOs, ethical investors etc.) and they can heavily influence the organisation to do so.

Under the stakeholder theory, it is understandable that corporate responses are controlled and limited by some powerful stakeholders. There are confusions among the researchers to decide who should be stakeholders. Some researchers (Sternberg, 1999; Jensen, 2010) do not consider the environment as a corporate stakeholder. Whereas, according to Freeman (2010, p. 25), a stakeholder is anything influencing or influenced by the corporation. Moreover, stakeholder theory has a problem in that it creates confusion itself (Gray. et al., 1995a; Deegan, 2002). It systematically “subverts rather than support both social and business responsibility” (Sternberg, 1999, p. 7). The role of managers within the stakeholder framework described in the literature is also contradictory (Donaldson & Preston, 1995, p. 86).

The discussion above indicates that the managerial branch of stakeholder theory ultimately tells the way corporation manages its particular economic powerful stakeholders. Managers give their attention to those stakeholders who benefit the organisation. This theory does not consider the issue that society as a whole can influence the organisations existence. If the organisations activities are not within the society's expectation, organisations existence might come under threat. Society as a whole may also have influence on the development of rules and regulation which may require companies to provide information.

2.6.2 LEGITIMACY THEORY

Managerial stakeholder theory explains corporate environmental disclosure from a socio-economic lens; whereas organisational legitimacy theory considers the socio-political framework. Legitimacy theory relies on the notion that “there is a social contract between an organisation and the society in which it operates” (Guthrie et al., 2006, p. 256). This theory considers the social norms, values, customs, beliefs and attitudes to understand corporate disclosure behaviours.

It is frequently argued that law is often reflective of societal norms and values. Yet, the concept of legitimacy is not confined to the terms legal or illegal. Some of the society's expectations are shaped by the law, which can be described as an explicit expectation or legal requirement. However, there are also non-legislative societal exceptions which can be described as implicit expectation. As such, society's expectation of legitimacy could be explicit or implicit. Suchman (1995, p. 574) defined legitimacy as a “generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”. “Legitimacy can be considered as similar in nature to

an asset, perhaps somewhat like money, a resource an organisation requires in order to operate. Certain actions and events increase that legitimacy and others decrease it” (Tilling, 2004, p. 4).

Legitimacy theory, like stakeholders theory, derives from political economy. This theory is the most cited theory in the corporate environmental disclosure literature (Tilling, 2004; Cowan & Deegan, 2011; Ienciu, 2013). Tilling (2004, p. 3) believes that legitimacy theory is a powerful mechanism to understand voluntary environmental disclosure made by corporations. Many researchers (Deegan & Rankin, 1996; Tilling, 2004; Cho, 2009; Cowan & Deegan, 2011; Ienciu, 2013) adopted legitimacy theory to explain the practice of social and environmental disclosures. Branco et al. (2008, p. 137) argued that:

Social legitimacy comes from the theoretical assumption that companies are embedded in the social environment in which they operate, and that their performance and expectations are affected by the environment. The company's success, even survival, is determined by this interface.

Legitimacy theory posits that if an organisation's adopted values are commensurate with its society's own value system, then an organisation can continue to exist within that society (Gray et al., 1996; Branco et al., 2008). It is imperative, therefore, that corporations must act within the framework of socially acceptable behaviour. Corporations consistently need to convince the public that their activities are harmonious with society's values. Thus, it can be argued that an organisation's activities and behaviour need to be in line with society's expectations; otherwise, a legitimacy gap will arise. For example, situations like industrial conflict, social and environmental incidents, or fraudulent or unethical management behaviour may put corporate legitimacy under threat (Branco et al., 2008, p. 138).

Corporations may also lose their legitimacy even when their operations have not changed. According to O'Donovan (2002, p. 348), this can happen due to the changes in social awareness, the influence of media, pressure from lobby groups and pressure from regulatory or institutional sources. Corporations may also lose their legitimacy when new information is disseminated to the relevant public (Milne & Patten, 2002). In this situation, corporate operations may be still running the same way for some time, but its relevant public were not aware of the information. Furthermore, it may have been also difficult to obtain information that is now easily accessible to the public with some help from government. When this information is readily available to the public, corporations need to close any actual or potential legitimacy gaps. This study examines one such situation when social awareness changed due to the publicly available information and companies had to adapt their operations in response. The *NGER Act* disseminates the corporate environmental performance in regards to carbon emissions by forcing the companies to report their GHG emission. The *Clean Energy Act*, likewise, puts a spotlight on the major polluters by forcing them to pay a price for their carbon emission. These two pieces of legislation place the major GHG emitters in front of the public eye.

Corporations use various strategies, such as public disclosure, to close their legitimacy gap with the public (Lindblom, 1994). Corporate environmental disclosure, for instance, is seen as one of the public disclosure tools used by corporations to maintain or reclaim their legitimacy. According to Lang and Lundholm (1993), the annual report is the primary communication medium used to legitimate corporate activity. Corporate environmental performance has become an important issue and the public expect corporate response. Organisations will provide information voluntarily about some activities if it is perceived that the information is important to society (Guthrie et al., 2006). Environmental issues, specially GHG-specific legislation

impelled companies to be more environmentally friendly. This pressure may even force the companies to change their business activities and, in some cases, their business structure, because, under the *Clean Energy Act*, for example, a company needs to reduce their emissions or pay taxes for their emission. Under the Kyoto Protocol (2012), 37 industrialised countries and the EU are going to reduce GHG emissions by at least 18 per cent below 1990 levels in the eight-year period from 2013 to 2020 (UNFCCC, 2012). So, a carbon-constrained economy is expected in the future. Emissions could create a financial burden (carbon price), reduce competitive advantages and increase regularity threats. There is also the pressure from NGOs, activists, government and the community to improve corporate environmental performances continuously increasing. Thus, corporations today face a legitimacy threat.

In order to continue business operations in a carbon-constrained economy, it is indispensable to reduce emission, and it is vital to inform society about corporate emissions and activities to be legitimate in the society. It is possible that corporations may improve their environmental performance through a reduction of GHG emissions due to the NGER legislation and carbon tax, and annual reports can be used to inform the public and government. This attempt might improve their legitimacy. There are many empirical studies that have provided useful evidence of corporations using environmental disclosures to mitigate the gap or legitimate their action. For example, Deegan and Rankin (1996) found that corporations that were prosecuted for poor environmental performance provided greater quantities of environmental information. Corporations that had questionable environmental performance, provided higher level of environmental disclosures (Li et al., 1997). Corporations that faced negative publicity for some environmental incidents, for example oil spill or leak, had more environmental information following the incident (Patten, 1992; Patten, 2002a; Coetzee & van Staden,

2011; Cowan & Deegan, 2011). The *NGER Act 2007* and the *Clean Energy Act 2011* may lead a corporate legitimacy crisis which will influence corporations to improve their environmental performance and reduce their legitimacy gap with the public. Annual report can be used as a very common medium for reporting environmental information to change societal perceptions of a corporation to maintain legitimacy. Thus, this thesis suggests that after the *NGER Act* and *Clean Energy Act*, corporations will provide more environmental and GHG disclosures in their annual report to legitimise their activities.

2.7 THE GAPS IN THE LITERATURE AND THE KEY RESEARCH QUESTIONS AND HYPOTHESES

It is evident from the literature review that there is a very limited number of studies, particularly in the Australian context, that explore corporate GHG-specific disclosures. Moreover, no other study has examined the impact of the two pieces of legislation on corporate discretionary environmental and GHG disclosures within the annual reports to date – the previous study was before their introduction. Therefore, this study can contribute to the limited literature on GHG disclosure.

The *NGER Act 2007* introduced a single national reporting framework for GHG for Australian companies. Companies are now required to disclose their emissions to the Greenhouse and Energy Reporting Office (Australian Government: Department of Environment, 2013). This reported information is accessible by the public. One of the objectives of this piece of legislation is to underpin the introduction of a carbon pricing mechanism. This represents a changing operating environment for companies. Another objective for this legislation is to inform the Australian public about corporate greenhouse gas emission. Hence, it can be assumed that the *NGER Act* requirements

will initially generate a legitimacy gap between the community and the corporations in Australia. It can be argued, therefore, that the availability of GHG emission information to the public will force the corporations to improve their environmental performance. In response, corporation will provide more emission disclosure to reduce the legitimacy gap.

In addition, the *Clean Energy Act* planned to use the reported information to charge the top GHG emitters from 2013 onwards. Government wanted to put the financial burden through the carbon pricing on the top emitters to discourage corporate emissions. As such, it can be expected that corporations have taken several initiatives to reduce their emissions. There are some early indications of reduction of GHG emission in the first 15 months of the carbon tax's operation (Maher, 2014). But this reduction was very marginal given that the Liberal Party will likely revoke the carbon tax legislation. However, this will be difficult to prove and beyond the scope of this study.

This study argues that a corporation that perceives a legitimacy threat from the *NGER Act* and *Clean Energy Act* will increase the volume of environmental disclosure and, specifically, GHG emission-related information. This study, therefore, examines the volume of environmental and GHG disclosures before and after the *NGER Act* and *Clean Energy Act*. Only a small number of studies are available, particularly in the Australian context that has explored corporate GHG- specific disclosures. Simnett and Nugent (2007) found that before the NGER legislation, less than 10 per cent of companies had GHG-specific information in their annual reports. A discussion of policy responses to mitigate carbon emissions in section 1.3 and the literature review of carbon disclosure in section 2.5 suggest that public pressure and policies to mitigate carbon emissions have an influence on GHG specific disclosure.

Having outlined the gaps in the literature, this study asks the following central question: *What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosures practices?*. Drawing on legitimacy theory, this study hypothesises there will be an increase in environmental and GHG disclosures after the *NGER Act* and the *Clean Energy Act* and tests:

Hypothesis 1 (H1): *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007.*

Hypothesis 2 (H2): *There will be an increase in the volume of GHG specific disclosures in annual reports after the implementation of NGER Act 2007.*

Hypothesis 3 (H3): *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011*

Hypothesis 4 (H4): *There will be an increase in the volume of GHG specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

2.8 CONCLUSION

From the discussion so far, it may be surmised that corporate environmental disclosure has increased over the years. There is community pressure, investor demand, and now legal requirements for this disclosure. The literature also shows that a particular environmental event, such as an oil spill or punishment for poor environmental performance, influences companies to provide further environmental disclosures. However, due to the seriousness of climate change, carbon emissions received a great deal of attention from local and global communities. Policies have been introduced by national and supranational bodies to fight against climate change by reducing carbon emissions. The *NGER Act* and *Clean Energy Act* were enacted in Australia to promote

GHG reduction. These new pieces of legislation pose a threat to corporate legitimacy. It is expected that corporations will respond to this pressure by providing additional voluntary environmental disclosures in order to reduce their legitimacy gap. Thus, this study asks: *What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?* To answer the central question, this study conducts a comparative case study of two pieces of legislations and tests four research hypotheses.

CHAPTER 3: RESEARCH DESIGN AND METHOD

3.1 INTRODUCTION

The theoretical overview described how legitimacy theory will be the theoretical lens, through which this study seeks to understand the changing pattern of corporate environmental disclosures following a case study with two pieces of legislation: the *NGER Act 2007* and the *Clean Energy Act 2011*. This study hypothesises that corporations will provide more environmental and GHG-specific disclosures to close the legitimacy gap with the public. In order to test this hypothesis, this thesis adopted a comparative case study research design and undertook content analysis to measure the volume of environmental and GHG disclosures in the corporate annual reports (see Appendix I for the full list of companies). Firstly, this thesis investigates and measures the volume of corporate voluntary environmental and GHG disclosures following the introduction of the *NGER Act 2007* and, secondly, following the *Clean Energy Act 2011*. The results are then tested using a paired *t*-test, to see if there is a statistically significant increase in the volume of both environmental and GHG specific information in the annual reports of the selected companies following the two pieces of legislation. This chapter starts with the sample selection procedures, followed by a detailed discussion of the content analysis technique. The disclosure medium, data measurement and capturing processes are also discussed. A brief overview of the statistical methods used in this study is also provided.

3.2 SAMPLE SELECTION PROCEDURE

A principle behind sampling is to draw a reasonable inference about a population. However, accounting literature is generally silent on the issue of “population identification, stratification, homogeneity and sample bias” (Gray, R. et al., 1995b, p.

87). Social and environmental reporting research using content analysis as a technique very often takes some large companies or particular industry groups or a particular company as the sample, rather than attempting to draw a sample which is representative of the population (see, for example, Guthrie & Parker, 1990; Gray et al., 1995b; Deegan et al., 2002; Haque & Deegan, 2010). It is also popular in social and environmental reporting research to select companies with a specific purpose in mind. Islam and Islam (2011), for example, selected a multinational company to understand its environmental disclosure behaviour after an environmental incident. Some other studies also purposely chose their sample based on a particular environmental event (see: Patten, 2002b; Cowan & Deegan, 2011; Rankin et al., 2011). Likewise, this study used a purposive sampling technique, in order to obtain knowledge about the selected companies' behaviour with regards to their environmental disclosure practices. This study selected Australian ASX listed companies, which are required to report their emissions level under the *NGER Act 2007* and which are potentially liable for the 2013 carbon price under the *Clean Energy Act 2011*. Therefore, this sampling technique may not be representative sample of the total population of public listed companies.

The objective of this research is to determine and compare the level of corporate discretionary environmental and GHG-specific disclosure before and after the mandatory disclosure requirement. However, not all Australian companies are subject to the *NGER Act 2007* and *Clean Energy Act 2011*. The *NGER Act 2007* requires large carbon emitters or energy consumers to report their GHG emissions and energy consumption to the Australian government. At the facility level, the threshold for GHG emission is 25 kilotonnes of CO₂-equivalent, or 100 terajoules of energy production or consumption (Australian Government: Clean Energy Regulator, 2012a).

The first reporting period commenced on 1 July 2008 (Rankin et al., 2011, p. 1040). From this round of reporting, it is possible to determine the emission level of Australian companies. The *NGER Act 2007* along with the *Clean Energy Act 2011* regulates the carbon pricing mechanism. Carbon pricing mechanism applies to Australia's largest GHG emitters also known as "liable entities" (Australian Government: Clean Energy Regulator, 2012b). Liable entities have to report under the *NGER Act* on the extent of their emissions specific information. Liable entities operate facilities that exceeded the threshold of at least 25,000 tonnes of carbon dioxide equivalent (CO₂-e) emissions each year, from July 2012 onwards had to pay a carbon price. The mechanism covers approximately 60 per cent of Australia's carbon emissions. In October 2012, the Clean Energy Regulator (2012)⁶ identified 316 companies liable to pay the carbon tax in 2013, based on their emissions. The Clean Energy Regulator maintains a database called the Liable Entities Public Information Database (LEPID). This study uses this database as the total population of companies for this research. The following criteria were used to select the sample companies for this study from amongst the total of 316 companies:

1. The companies were listed on the Australian Stock Exchange in the years 2006, 2009 and 2013.
2. The annual reports for the selected years need to be available on companies' website or the Connect 4 database⁷.

The years 2006, 2009 and 2013 were selected as the sample years for this study, on the basis that 2006 reflects the baseline year prior to the commencement of the

⁶ The Clean Energy Regulator is the Australian Government body responsible for administering NGER and Clean Energy legislations that will reduce carbon emissions and increase the use of clean energy(Australian Government: Clean Energy Regulator, 2012b).

⁷ Connect4 comprises a collection of specialised databases providing documents and customised reports such as annual report relating to companies listed on the Australian Stock Exchange (ASX).

NGER Act, while 2009 was selected as a proxy for the year after the commencement of the *NGER Act* in 2007. The year 2009, also represents the baseline year prior to the introduction of the *Clean Energy Act*, while 2013 was selected to represent the year after the introduction of the price on carbon. Based on this selection criteria and by cross checking those companies listed on both LEPID and the ASX, 77 companies were found to be listed in 2006, 2009 and 2013. These 77 companies' annual reports for 2006 and 2009 were downloaded from their respective websites and /or the connect4 database.

Due to the time restriction for this study, not all these 77 companies' annual reports were available after the *Clean Energy Act*. The annual reports included are those of companies whose audited annual reports were available on their respective websites or on the Connect4 database on 31 October 2013. Although all these 77 companies were listed in 2013, only 55 companies annual reports were available in that year, subsequently, a smaller sample size was included in the paired *t*-test for the years 2009 and 2013.

The sample companies were drawn from a variety of industry groups, including the material, utilities, energy, bank and insurance, retail, transport, food and beverage, medical and telecommunication sectors. Thus, in terms of sampling, this study is more unique than other studies. It should be noted that, however, that most of the sampled companies were from the material industry sector.

3.3 CONTENT ANALYSIS

After accessing the selected companies' annual reports, environmental and GHG-specific data were collected using content analysis methodology. Bryman and Bell

(2011, p. 289) described content analysis as “an approach to the analysis of documents and texts (which may be printed or visual) that seeks to quantify content in terms or predetermined categories and is a systematic and replicable manner”. The Colorado State University (2013) defined content analysis as a research methodology that examines words or phrases within a wide range of texts. Abbott and Monsen (1979) argued that identifying the presence or absence of a particular event or key word in a document is the simplest form of content analysis. According to Krippendorff (2012, p. 21) content analysis is “a method of classifying the text (or content) of a piece of written work into various categories on the basis of selection criteria”. Likewise, Weber (1990) defined content analysis as a system, which “classifies textual material, reducing it to more relevant, manageable bits of data” (Weber, 1990, p. 5). In summary, content analysis is an analytical method, which analyses the content of message, communication or report. This technique is used in various fields ranging from sociology to political science, ethnography and cultural studies, marketing and media studies and many other fields. The field of corporate social and environmental accounting research overwhelmingly uses this technique to investigate social and environmental reporting (Gray, et al., 1995b; Tilling & Tilt, 2010). What is more, content analysis is the most common research method used to assess corporate social and environmental disclosure (Milne & Adler, 1999; Steenkamp & Northcott, 2007). Several prior studies in the corporate environmental reporting area have used the content analysis technique as their research methodology (see for example: Guthrie & Parker, 1990; Gray et al., 1995a; Deegan & Rankin, 1997; Clarkson, et al., 2008; ACCA, 2010; Belal et al., 2010; Cowan & Deegan, 2011; Mia & Mamun, 2011). Buniamin (2012, p. 120) regarded content analysis method as the “most suitable method to explore the environmental information in the annual report”. Thus, the use of this technique suited this study.

To build on these prior studies, this study also applied a content analysis methodology in order to gather and analyse environmental data from the sample annual reports. In particular, this study investigated the volume and type of environmental and GHG-specific disclosures provided by the sample corporations in their annual reports. Content analysis is an appropriate technique to investigate a subject when a researcher depends on documentary evidence and when there is a large volume of material, which needs to be analysed, provided that a systematic approach will be followed in order to code and classify the data (Holsti, 1969). This study used a large amount of documentary evidence; in total: 208 annual reports over a three-year period.

However, there were some requirements, which needed to be considered prior to proceeding with content analysis. Gray et al. (1995b, pp. 81-83) developed the following prerequisites for effective content analysis:

1. the definition of the things to be analysed;
2. the location of the disclosure or the source of information; and
3. the data measuring and capturing process.

In content analysis, firstly, it is important to identify what needs to be researched. The definition of what needs to be analysed should be precise and unique (Gray, et al., 1995b). The inclusion and exclusion of categories and sub-categories needs to be done with developed and applied rules. Secondly, the location or the sources of the environmental disclosure needs to define. While environmental information can be found in annual reports, sustainability reports, websites, press notices and magazines, the majority of studies used annual reports as the principal source of information (Gray, et al., 1995b, p. 82). Many studies considered the annual reports as the sole or major source of corporate environmental information. Therefore, this study also used annual

report as the source of environmental information. There is further discussion about the disclosure medium later in this chapter in section 3.3.2. Thirdly, it is essential to determine how to capture the data after confirming the source of the information. Data measurement could be based on the number of pages, number of sentences, number of words, percentage of pages and percentage of total disclosure (Gray et al., 1995b; Unerman, 2000). Gray et al. (1995b, p. 84) argued that “words have the advantage of lending themselves to more exclusive analysis (are categorized more easily) and have the pragmatic advantage that databases may be scanned for specified words”. Therefore, the number of words was used in this study to measure the volume of environmental information.

3.3.1 THE ANNUAL REPORT AS A MEDIUM OF DISCLOSURE

Information can be obtained from various types of documents. In content analysis, one of the important steps is to select the source document to collect information from (Krippendorff, 2012). However, it is very difficult to decide which documents to use to explore social and environmental information, as companies produce a number of documents to communicate environmental issues with their stakeholders. These documents include, but are not limited to annual reports, stand-alone social and environmental reports, websites, brochures, pamphlets, advertising, product packaging and labelling, employee training programme and conference proceedings. It creates an issue of which corporate disclosure media should be used. Tilt (1994) and Li et al. (1997) used a number of documents such as: annual reports, quarterly reports, advertisements, product labelling information forms and press releases. Yet, it is almost impossible to identify all the corporate communication mediums and capture environmental information from those mediums. Hence, majority of the social and

environmental literature uses annual report as the source of environmental information (Gray et al., 1995b; Buniamin, 2012).

Although relying on information provided in the annual report can limit the study (Cowan & Deegan, 2011), the importance of annual reports as the source of environmental information cannot be undermined for several reasons. Annual reports are widespread and are a popular means of communication to stakeholders and they have high credibility (Guthrie & Parker, 1990). Annual reports are used by a number of stakeholders as the sole source of certain information (Deegan & Rankin 1997). No other corporate communication medium has the as much legitimacy and influence as the annual report (Adams & Harte, 1998; Buhr, 1998). The annual report is produced on a regular basis by all public listed companies, hence making comparisons reasonably easy. The annual report is also a major medium for the company to promote itself and when environmental information is included alongside financial information, it may indicate the relative importance of financial information. Many studies consider the annual report as the sole or major source of corporate environmental information for the reasons above (see for example: Guthrie & Parker, 1989, 1990; Buhr, 1998; Moneva & Llana, 2000; Tilt, 2001; O'Donovan, 2002; Buniamin, 2012).

Prior studies noted that the annual report is a significant source of environmental information for users (Gray et al., 1995b; Deegan & Rankin, 1997; Tilt, 2001). Deegan and Rankin's (1997) research substantiated that environmental information is material for decision-making for a range of users. Their survey ascertained that the annual report is the most significant source of environmental information. According to Unerman , annual reports were most frequently used in 17 out of the 25 studies surveyed, as the sole source of environmental information (Unerman, 2000).

The above discussion clearly shows the significance of the annual report as a source of environmental information. Therefore, this study uses annual report as the sole source of environmental information. It is acknowledged that some companies now produce separate sustainability reports, where they provide their environmental information. So, just using annual reports as the sole source of environmental information may not represent the companies' total amount of environmental disclosure. However, a number of companies in this study (such as Kagara Ltd, Focus Minerals Ltd) did not produce any separate sustainability reports during the research period. Moreover, some companies are inconsistent in producing sustainability report. Iluka Resources Limited, for example, produced a sustainability report in 2006, but did not produce one in 2009. In contrast, public listed companies produce annual report every year. As this study compared the same companies' disclosure level before and after two particular events, comparable and consistent information source was indispensable. As such using any other report or communication medium other than annual reports for this study would result in incomplete data and inconsistent content analysis. The annual report is also more accessible for research purposes, as it is publicly available. Thus, the use of annual reports for this study provided the most robust results.

3.3.2 A TAXONOMY OF CORPORATE ENVIRONMENTAL DISCLOSURE

Prior to measuring and capturing the data, for good content analysis it is necessary to provide a definition of the phenomenon that is under examination. Firstly, two major themes were identified to meet the research objectives. These are environmental disclosure and GHG specific disclosure. GHG disclosure can be considered a subset of environmental disclosures. Secondly, environmental information and GHG information were defined based on prior studies (see these studies for details: Patten, 1992, 2002b;

Deegan & Gordon, 1996; Kolk et al., 2008; Stanny & Ely, 2008; Belal et al., 2010; Cowan & Deegan, 2011) and also based on the G4 Sustainability Reporting Guidelines of Global Reporting Initiative⁸. Accordingly, this study deemed the following to be environmental information:

1. Information related to environmental policy;
2. Environmental auditing;
3. Business activities including product impact on the environment;
4. Environmental breaches and environmental awards;
5. Pollution control in the conduct of business operations including capital, operations and research and development expenditures for pollution abatement;
6. Statements indicating that the company's operations are non-polluting or that they are in compliance with pollution laws and regulations (including the *NGER Act* and *Clean Energy Act*);
7. Statements indicating that pollution from operations has been or will be reduced;
8. Prevention or repair to the environment resulting from pollution, emissions to land, air or water;
9. Conservation of natural resources, such as recycling glass, metals, oil, water paper and use of other recycling materials;
10. Efficient use of materials;

⁸ The Global Reporting Initiative (GRI) is a leading organization in the sustainability field that promotes the use of sustainability reporting.

11. Supporting anti-litter campaigns, donating environmental NGO and preventing waste; and

12. Information related to the carbon price or emission trading scheme.

Furthermore, some key search terms were developed so that it becomes easy to capture data from digital annual reports. The key search terms used for environmental disclosures in this study were as follows: *Environment, Emission, Carbon, CO₂, Climate, Climate change, Ecological, Greenhouse, Renewable energy, Water, Sustainability, Recycling, , Global Warming, Kyoto Protocol, , CSR, Clean, Clean energy, Green (energy), Exploration, Provision for site restoration, Decommission and rehabilitate, Triple-bottom-line, Pollution, NGER, Carbon Pollution Reduction Scheme (CPRS), Emission Trading Scheme (ETS).*

After capturing the environmental information, the GHG-specific information was collected. The criteria used to gather the GHG-specific information from annual reports was as follows:

1. Stated or discuss any information about GHG /Carbon emissions /emission trading scheme, carbon pricing mechanism;
2. Provided information related to NGER legislation, *Clean Energy Act* and carbon tax;
3. Discussed action to reduce GHG emissions⁹;
4. Information about fuel efficiency, energy efficiency and renewable energy;

⁹ Action could be, but not limited to, the use of new technologies, redesigning products/process/services, GHG certifications, energy conservation (consumption reductions), the use of renewable energy, energy and fuel efficiency, refrigeration and air-conditioning improvements, transport use: travel reductions, the use of alternative types of transport (such as hybrid or electric cars), management programme and strategies to reduce global warming, supply chain involvement, consumer training, research sponsorship, partnerships with external organizations, carbon offset and emission trading.

5. Statements indicating that the company's operations are non-polluting or that they are in compliance with pollution laws and regulations (including the NGER, Carbon Tax).

Relevant search terms were also identified to look for GHG-specific information from digital annual reports. The search terms for GHG disclosures were as follows: *Emissions, Carbon, CO₂ Climate, Climate Change, Ecological, Greenhouse, Renewable energy, Recycling, , Global Warming, Kyoto Protocol, , CSR, Clean / Green (energy), Triple-bottom-line, pollution, NGER, Carbon Pollution Reduction Scheme (CPRS), Emission Trading Scheme (ETS).*

3.3.3 DATA COLLECTION AND MEASUREMENT

In content analysis research, the researcher needs to determine how to measure data. Studies which use content analysis are required to quantify and categorise environmental disclosure. Researchers can choose to measure the number of disclosure items or the amount of disclosures. Research related to measuring the number of disclosure items mainly focuses on whether particular items are mentioned or not and the frequency of mentioning those items (see for example: Ernst and Ernst, 1976; Patten, 2002b). Thus researchers must first develop a disclosure index and search for items included in that index. For each item disclosed in the annual report, the corporation receives 1, or for no disclosure the company receives 0. Then the scores are added together to establish the rating for the corporation. This study has developed a disclosure index to identify types of GHG specific information was disclosed by the selected companies in their annual reports and what information is more common among selected companies. A details discussion of the disclosure index is provided in section 3.3.4.

A researcher can also calculate the amount of information disclosed for a particular theme. Environmental information and GHG specific information are the two main themes for this study. It is necessary to choose the basic unit of measurement to calculate the amount of disclosure for these two themes. This measurement unit could be the number of words, number of sentences, number of pages or the percentage of pages of the total disclosure (Unerman, 2000, p. 668). Each of these measurement units have their own advantages and disadvantages (Gray, et al., 1995b, p. 84). However, this study used words as the measurement unit. Words have several benefits as a measurement unit, as specific words can be easily searched in the database. Words are also better to measure the actual volume of disclosures (Deegan & Gordon, 1996). Nonetheless, words have some limitations. Words alone cannot provide any meaning until they become a sentence. So, the use of disaggregated words may have issues of meaning. However, these limitations are only persisting when words are used to record raw data (data directly recorded from annual reports). The construction of sentences can easily solve these problems. Sentences can produce a proper meaning and interpretation, which can assist to identify whether particular information in the annual reports is environmental information or not. Hence, sentences are used as a recording unit for this study, while words are used as a unit of measurement following the Cowan and Deegan (2011). Though the number of words was the unit of measurement, whole sentences and very often, whole paragraphs have been read in this study, in order to confirm whether the information that was measured was environmental and GHG- specific information.

3.3.4 THE DISCLOSURE INDEX

The ultimate objective of the *NGER Act 2007* and the *Clean Energy Act 2011* is to reduce carbon emissions. Therefore, after studying the volume of environmental and

GHG-specific disclosures, this study also explored the types of GHG-specific information disclosed by selected Australian public listed companies. For example, how many companies stated the total amount of GHG emissions in 2009 in their annual report? This can be tested by developing an appropriate disclosure checklist. Many prior studies developed and used a disclosure checklist to see whether particular information was disclosed in corporate annual report (see for example: Gray et al., 1995b; Haniffa & Cooke, 2005; Van der Laan Smith et al., 2005; KPMG, 2008; Rowe, 2010). This study also adopted a similar strategy to check the type of information disclosed by the selected companies. Hence, a GHG disclosure checklist was developed (see Appendix II). The GHG specific disclosure checklist measures the number of items disclosed by a company or the number of companies disclosed a particular item from this checklist and provides them with a score by using a binary code of 0 and 1. If a company discloses an item then it receives 1, otherwise 0. There were 13 items listed in the checklist. If 30 companies disclosed a particular item from the disclosure index, then that item received a score of 30 (1×30).

3.4 RELIABILITY OF CONTENT ANALYSIS

Reliability indicates whether the collected data are reliable or not for a particular study. Reliability is an important issue in content analysis. However, there is no universal framework to measure reliability (Rust & Cooil, 1994). Hence, different researchers use different reliability criteria for their studies to justify their choice. Reliability is “fundamentally concerned with the issues of consistency of measure” (Bryman & Bell, 2011, p. 157). A study is reliable when repeatedly using the same technique on the same data can produce the same conclusion. Krippendorff (1980) identified three ways to check reliability issues. These are *stability*, *reproducibility* and *accuracy*.

Stability means that the coder consistently classified the same data in the same way over time. Krippendorff (1980, p. 130) defined stability as “the degree to which a process is invariant or unchanging over time”. Stability can be seen when a coder processes the same data in two different times and received same result. A researcher or same individual rereads re-categories or re-analyses the same texts or data set after some time interval. Stability is achieved when coding differences are insignificant from the first coding to the second or third coding. In the context of this study which used annual reports, the same coder can perform a test and re-test by applying the same procedures consistently. The coder can use the same annual report after a time interval. When the difference is insignificant for the two sets of data, then it can be assumed that stability has been achieved. However, differences sometimes can exist due to carelessness, ambiguities in test or the role of coding (Krippendorff, 2012; Colorado State University, 2013). For this study, the author performed a test and re-tested for five sets of annual reports for 2006 as well as for 2009. The re-test was performed three weeks after the first test. There was no significant difference observed between two sets of results. However, stability is the weakest form of reliability; thus it is insufficient to use this as the sole criterion for reliability of the content analysis process (Krippendorff, 1980). So, this study also uses the replicability measurement.

Replicability is a stronger measure of reliability compare to stability and is a minimum reliability standard for content analysis (Krippendorff, 1980; Weber, 1990). Many authors claim that it is necessary to use multiple coders to do the coding to achieve replicability (Weber, 1990; Krippendorff, 2012). For the replicability, two or more independent coders try to reproduce the results independently applying the same recording instruction from the same data set. When the results of two independent coders are the same or no significant difference exists, then the content analysis

technique can be assumed to be reliable. In the context of environmental reporting content analysis studies, two or more independent coders can choose the same annual report and follow the same data recording instruction to come up with their result independently.

A reproducibility test was conducted for this study through two coders. First coder was researcher himself and coded the data from seven 2006 and 2009 annual reports. The volume of environmental information and GHG-specific information was recorded. The first coder then sent the same seven 2006 and 2009 annual reports to the second coder and specified which data need to be recorded and how it should be recorded. After that, the second coder, who is a university lecturer, record the volume of environmental information and GHG specific information from the same data source by following the first coder's instruction. Later on, the collected data sets for environmental information and GHG-specific information from both the first and second coders were checked. Milne and Adler (1999, p. 239) urged that coefficient of agreement is the simplest measure of reliability. Holsti's formula (Holsti, 1969, p. 140) of coefficient of reliability is:

$$Reliability = 2M / (N1 + N2)$$

M is the number of cases coders is agreed. *N1* is the number of cases the first coder coded and *N2* is the number of cases the second coder coded. Using the above formula to calculate the inter coder reliability gives the result of 87 per cent agreement. Setting an acceptable level of reliability is a problem (Holsti, 1969, p. 142). However, some studies considered more than 80 per cent an acceptable level (see for example, Hackston & Milne, 1996; Milne & Adler, 1999).

Accuracy is another reliability test. This is the strongest reliability test (Krippendorff, 2012). Accuracy compares the preset standard with coder performance. According to Milne and Adler (1999, p. 239), “accuracy measure of reliability involves assessing coding performance against a predetermined standard set by a panel of experts, or known from previous experiments and studies”. This can be done when objective standards are readily available. Hence, accuracy is hardly used in reliability assessment (Krippendorff, 1980; Weber, 1990). Therefore, most of the studies used replicability to test reliability. This study takes the stability and replicability measurement to test the reliability.

3.5 ADVANTAGES AND DISADVANTAGES OF CONTENT ANALYSIS

The content analysis methodology offers several advantages to researchers. It helps to quantify the text content. This method is simple and clear and can be repeated by other researchers (Bryman & Bell, 2011). This method is relatively easy to use in a longitudinal analysis. This method can allow for both quantitative and qualitative operation; looks directly at communication via texts; can be used to interpret texts; provides insight into complex models of human thought and language use (Bryman & Bell, 2011; Colorado State University, 2013). However, this method has some limitation too. It can be expensive and labour intensive when a human coding system is used (Gray. et al., 1995b) . It can also be extremely time consuming, subject to increased error and often disregards the context that produced the text and can be difficult to automate or computerize (Colorado State University, 2013). There are some other drawback discussed by several authors (Jose & Lee, 2007; Bryman & Bell, 2011; Krippendorff, 2012). For instance, the choosing of categories or defining the scope of environmental information could be very subjective. Moreover, this method is

inherently reductive, particularly when dealing with complex texts. However, this study used texts from corporate annual reports, which are not considered to be complex in the context of their use. Corporations use annual reports to communicate information to their stakeholders. Messages conveyed through annual reports to stakeholders normally are readable and are not limited to a selected group of language experts. Collecting some of environmental information could be challenging but certainly, that does not necessitate language experts to lift up environmental information. In order to counter the tendency for content analysis to be reductive, it is the job of the researcher to offer a meaningful analysis and interpretation of the data and to place the research findings into a context, when drawing the final conclusions for the study.

3.6 STATISTICAL ANALYSIS

The data was firstly collected, coded and entered into excel. Once all of the data was complete it was then imported into SPSS (Statistical Package for Social Science) for interpretation and in order to perform statistical tests. The first step is to establish an appropriate statistical test for a particular set of data. Selecting a statistical test depends on several factors, such as whether data sets are paired or not, the collected data meets the normality assumption or not. When data is normally distributed, parametric statistics are appropriate (Keller, 2005). Researchers need to use non-parametric statistics when data is not normally distributed. This study had paired sample data. The differences between the paired data were calculated and normality tests were conducted. Tests of normality were conducted by using the Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk test in order to check whether the collected data was normally distributed.

Preliminary tests showed that the data did not meet the assumption of normality. In this case, the researcher can make the data normal or use non-parametric test. This

study normalised the data by removing the extreme outliers and pairing the sample data for each year collected. Consequently, a paired sample *t*-test was selected as the most robust statistical test for the paired data (Keller, 2005). The following four hypotheses were tested:

Hypothesis 1 (H1): *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007.*

Hypothesis 2 (H2): *There will be an increase in the volume of GHG specific disclosures in annual reports after the implementation of NGER Act 2007.*

Hypothesis 3 (H3): *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

Hypothesis 4 (H4): *There will be an increase in the volume of GHG specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

Firstly, statistical analysis was performed to measure whether there was an increase in the volume of environmental and GHG disclosures after the *NGER Act* was introduced and then, a paired *t*-test was performed to measure whether this increase was significant. Secondly, the same procedure was applied to measure the volume of environmental and GHG disclosures after the *Clean Energy Act*. The results are presented in Chapter Four, Data Analysis.

3.7 CONCLUSION:

This study examined the annual reports of 71 high GHG emitting Australian firms in order to determine the impact of two key pieces of legislation, the *NGER Act 2007* and the *Clean Energy Act 2011*, to answer the central question: *what is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and*

GHG disclosure practices? This chapter outlined how the comparative case study research design was applied and also set the parameters for the approach to quantitative content analysis, as well for the statistical procedures used in this study. In the first stage of the research design, the selected companies' annual reports were the source of the environmental information measured in this study. Sentences were used as a recording unit, while words were used as a unit of measurement. A reliability test for the collected data was performed. In the second stage of the research design, the data was imported into SPSS and paired *t*-tests were performed on the four research hypotheses to measure whether a statistically significant increase in environmental and GHG disclosures had occurred in the sample annual reports following the introduction of the two pieces of legislation. In the final stage of the research design, a disclosure index was developed to measure the type of GHG information disclosed in the annual reports.

CHAPTER 4: DATA ANALYSIS AND RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter presents the data analysis and results of the paired *t*-tests and GHG disclosure checklist. Building on legitimacy theory, this study tests four research hypotheses, using paired *t*-tests, to determine whether the sample companies provided more environmental and GHG-related information in their annual reports after the introduction of the *NGER Act 2007* and *Clean Energy Act 2011*,. Additionally, a GHG-specific checklist was developed to determine the number of companies, which provided particular GHG-specific items in their annual reports and which information was the most common. The first part of the chapter tests the hypotheses, the second part summarises the test results and the last part presents the findings from the disclosure index.

4.2 HYPOTHESES TESTING

To answer the central research question (*What is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosure practices?*), the researcher developed four research hypotheses (H1-4), as outlined in Chapters 1, 2 and 3, which tested whether the volume of environmental and GHG disclosures increased after the introduction of the *NGER Act 2007* and the *Clean Energy Act 2011*. The first step was to establish the level of disclosure prior to the introduction of each Act and the second step was to compare this with the level of disclosure after the introduction of each Act. The third step was to determine if a difference can be measured and if this difference is statistically significant. The final step was to determine if the difference supports or negates the research hypothesis.

The paired samples *t*-test procedure can be used to test if there is a significant difference in a measured characteristic between two time points, using paired data (Healey, 2011). This study undertook four paired *t*-tests to determine whether there was any significant increase in the amount of environmental and GHG disclosure after the *NGER Act* and the *Clean Energy Act*. For each paired *t*-test, there was paired data from before and after the legislation was introduced. Before conducting the paired *t*-test, the difference score for each paired data set was tested to see if the data fulfilled the normality assumption.

If the sample size was large ($n > 30$), the *t*-test could provide a robust result assuming the data meets the normality assumption. However, if there were extreme outliers in the sample differences then the paired *t*-test will not be a suitable statistical test to use (Weiss & Weiss, 2012).

After taking out the extreme outliers, there were 71 companies related to The *NGER* legislation and environmental disclosure, 53 companies related to *NGER* legislation and GHG disclosure, 45 companies related to *Clean Energy Act* and environmental disclosure, and 39 companies related to *Clean Energy Act* and GHG disclosure, which were included in the paired sample data for the four paired *t*-tests used for hypotheses 1-4, outlined below in sections 4.2.1-4.2.4. The box plot and Q-Q plot did not find any extreme outliers within these groups of 71, 53, 45 and 39 companies. As such, normality tests were conducted on these four data sets. It is essential to meet the normality assumption for collected data in order to perform a paired *t*-test. The normality tests used in this study were the Kolmogorov-Smirnov (K-S) test and the Shapiro-Wilk test. If the *p*-value of the test scored greater than 0.05 ($p > 0.05$), then the selected data could be assumed to be normally distributed.

Table 1: Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Data Set 1: Env Word Diff (2009-2006)	.074	71	.200[*]	.979	71	.283
Data Set 2: GHG Word Diff (2009-2006)	.106	53	.198	.964	53	.111
Data Set 3: Env Word Diff (2013-2009)	.122	45	.093	.956	45	.084
Data Set 4: GHG Word Diff (2013-2009)	.119	39	.176	.960	39	.174

Table 1 shows the significant value of the Kolmogorov-Smirnov test and Shapiro-Wilk test for the four data sets. Kolmogorov-Smirnov test found a p -value of 0.20, 0.198, 0.093 and 0.176 respectively for data sets 1-4. In the Kolmogorov-Smirnov test, each data set had p -value greater than 0.05, which confirmed that the data sets met the normality assumption. The Shapiro-Wilk test also found a p -value greater than 0.05 for data sets 1-4. Thus, the assumption that the difference scores are distributed normally is met in all four cases.

4.2.1 HYPOTHESIS 1 (H1): ENVIRONMENTAL DISCLOSURE AND THE *NGER ACT 2007*

Environmental and GHG data was collected from 77 companies' annual reports before and after the *NGER Act* in the years 2006 and 2009. The differences in the number of words before and after the Act were calculated. The box plot and Q-Q plot based on the difference scores showed some evidence of extreme outliers, which might cause the data to be skewed. After taking out six extreme outliers from 77 companies, the sample differences of environmental words showed no severe outliers. So, finally 71 companies

were selected for inclusion in the paired t-test for research hypothesis 1 (H1: *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007*). The summary statistics in Table 2 show that some 71 companies in total disclosed 43,391 environment related words in 2006 (before the NGER legislation). A word count was also conducted for the same companies in 2009 (after the NGER legislation). The result shows that the total number of words disclosed by the same companies in 2009 was 58,205. Hence, the number of environment related words increased by 14,814 words, or by approximately 34 per cent, after the implementation of the *NGER Act*. In 2006, the minimum number of environmental words disclosed was 13 and in 2009, the minimum number of environmental words disclosed was 61 by a single company. The maximum number of words provided by a particular company in 2006 was 3,002 and in 2009 was 3,165.

Table 2: Summary Statistics for Environmental Words before and after NGER Act 2007						
	N	Min	Max	Sum	Mean	Std. Deviation
Data Set 1a: Env Word Yr 2006	71	13	3015	43391	611.14	660.649
Data Set 1b: Env Word Yr 2009	71	61	3226	58205	819.78	694.955

As shown in Table 2, the mean number of words of environmental disclosure was 611 (rounded) in 2006, with a standard deviation of 660 (rounded). The mean number of words of environmental disclosure was 820 (rounded) in 2009, with a standard deviation of 695 (rounded). The average number of environmental words was higher, therefore, after the *NGER Act* than before the Act. This indicates that the number of environmental words increased between 2006 and 2009. A paired *t*-test was then performed to measure whether the increase was statistically significant or not.

4.2.1.1 The results of the paired samples t-test for Hypothesis 1:

The first step was to establish a null hypothesis. If there is no real difference in the level of environmental disclosure before and after the *NGER Act*, then the mean difference μ_D is zero. Thus the null hypothesis is:

*$H_0: \mu_D = 0$ (there is no difference in number of environmental disclosure before and after the *NGER* legislation)*

Secondly, if there is a real difference (in this case an increase) in the level of environmental disclosure before and after the *NGER Act*, then the mean μ_D will be higher than zero. Thus the alternative hypothesis is:

*$H_a: \mu_D > 0$ (i.e. a significant increase in the number of environmental words after the *NGER Act* than before the Act).*

This researcher hypothesised that the number of environmental words would be higher after the implementation of *NGER Act* than before the implementation of this Act. If the *p*-value of the paired samples *t*-test was less than 0.05 ($p < 0.05$), the null hypothesis could be rejected. In a comparison of the number of environment related words in annual reports of 71 companies, the average environment related words were higher after the implementation of the *NGER Act* (mean = 819.7, *s* = 694.9) than before the implementation of the *NGER Act* (mean = 611.1, *s* = 660.6). Table 3 presents the result of the paired samples *t*-test and showed the mean difference 209 (rounded) with a standard deviation of 517 (rounded). The result shows that the increase in environment related words after the *NGER Act* was statistically significant, $t(70) = 3.40$, $p = 0.001$. The one-tailed *p*-value of the paired *t*-test was 0.001, which is less than 0.05, indicating a high degree of statistical significance. The 95 per cent confidence interval (CI) for the mean difference was [86, 331], which does not contain the value 0.

Table 3: Paired Samples T-Test for Environmental Words before and after NGER Act 2007							
Paired Differences					t	df	Sig. (one tail)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
208.647	516.8620	61.3402	86.308	330.987	3.401	70	.0005

Given that the confidence interval for the paired t -test does not contain the value 0 and the p -value is less than 0.05, the null hypothesis can be rejected and it is concluded that there was a significant increase in mean environmental disclosures between 2006 and 2009. With 95 per cent confidence, this study finds that the increase in environmental disclosure is between 86 words and 331 words. This result suggests that there was a significant rise in environmental disclosures following the *NGER Act 2007*. Thus, it can be concluded that the results of the paired t -test support Hypothesis 1 (H1: *There was an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007*).

4.2.2 HYPOTHESIS 2 (H2): GHG SPECIFIC DISCLOSURE AND THE NGER ACT 2007

The second research hypothesis ($H2$) states: *there will be an increase in the volume of GHG-specific disclosures in annual reports after the implementation of NGER Act 2007*. The annual reports of 71 companies were analysed to collect environmental information before and after the NGER legislation. The analysis shows, however, that out of these 71 companies, 27 companies in 2006 and 54 companies in 2009 provided

GHG-specific information. This shows that that 76 per cent of the selected companies provided GHG-specific disclosures in 2009, whereas only 38 per cent of the selected companies provided GHG specific disclosures in 2006. However, 16 companies did not provide any GHG specific disclosure in 2006 and in 2009. Thus, these 16 companies and two extreme outliers were removed from the sample before proceeding with further statistical analysis.

Table 4: Summary Statistics for GHG Words before and after NGER Act 2007						
	N	Min	Max	Sum	Mean	Std. Deviation
Data Set 2a: GHG Word 2006	53	0	1199	6,812	128.53	251.000
Data Set 2b: GHG Word 2009	53	0	1804	18,841	355.49	328.069

Table 4 shows the summary statistics for 53 companies in 2006 and 2009. 6,812 GHG-specific words were reported in 2006, while 18,841 GHG specific words were reported in 2009. Therefore, the number of GHG-specific words was increased by almost 177 per cent, or 12,029 words.

The mean for the number of GHG words was 128 (rounded), with a standard deviation of 251 (rounded) in 2006 and approximately 355 (rounded), with a standard deviation of 328 (rounded) in 2009. On average, GHG words increased by 227 words after the *NGER Act* than before this Act. It shows that a considerable increase in GHG specific words from 2006 to 2009 and the number of companies which provided such information also increased. A paired *t*-test was then conducted to see whether there was a statistically significant increase in the volume of GHG-related information after the implementation of the *NGER Act*.

4.2.2.1 The results of the paired samples t-test for hypothesis 2:

The first step was to establish a null hypothesis. The mean difference μ_D would be equal to zero if there was no real increase in the level of GHG-specific disclosure after *NGER Act*. Thus the null hypothesis is:

$H_0: \mu_D = 0$ (there is no increase in the number of GHG-specific disclosures after the implementation of *NGER* legislation)

The second step was to establish the alternative hypothesis. If there was an increase in the number of GHG-specific disclosure after the *NGER Act*, then a mean μ_D would be greater than zero. Thus, the alternative hypothesis is:

$H_a: \mu_D > 0$ (there is a significant increase in the number of GHG-specific disclosure after the *NGER Act*).

This researcher hypothesised that the number of GHG-specific words would be higher after the implementation of *NGER Act* than before the implementation of this act. If the *p*-value of the paired samples *t*-test was less than 0.05 ($p < 0.05$), the null hypothesis could be rejected. In a comparison of the number of GHG-specific words in annual reports of 53 companies, the average GHG-specific words were higher after the implementation of the *NGER Act* (mean = 355.5, *s* = 328.1) than before the implementation of the *NGER Act* (mean = 128.5, *s* = 251). Table 5 shows the results of the paired samples *t*-test, which found that the mean difference was 227 (rounded) and the standard deviation was 226 (rounded). The paired samples *t*-test shows that an increase in GHG specific words occurred after the *NGER Act* and this increase was statistically significant, $t(52) = 7.29, p = 0.000$. The one-tailed *p*-value of the paired *t*-test is less than 0.05, indicating again a high degree of statistical significance. The 95 per cent CI for the mean difference indicates that the average number of GHG specific

words after the *NGER Act* was between 164.42 lower and 289.49 higher than before the Act. The paired *t*-test results suggest that there was a statistically significant increase in the number of GHG-related disclosures between 2006 and 2009. Therefore, the test results provide sufficient evidence to support research hypothesis 2 (H2: *There was an increase in the volume of GHG-specific disclosures in annual reports after the implementation of NGER Act 2007*).

Table 5: Paired Samples T-Test for GHG Words before and after NGER Act 2007							
Paired Differences					t	df	Sig. (one-tail)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
226.962	226.877	31.16	164.427	289.497	7.283	52	.000

In summary, the number of environmental as well as GHG-specific words significantly increased after the introduction of the *NGER Act 2007*. The study then tested to see if there is also a statistically significant increase in environmental and GHG-specific disclosure subsequent to the *Clean Energy Act 2011*.

4.2.3 HYPOTHESIS 3 (H3): ENVIRONMENTAL DISCLOSURE AND THE *CLEAN ENERGY ACT 2011*:

The annual reports of 45¹⁰ companies were analysed before and after the *Clean Energy Act* in 2009 and 2013 to test research hypothesis 3 (H3: *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011*).

The summary statistics in Table 6 show that in 2009, the selected 45 companies provided 35,197 words of environmental information in total. The minimum and maximum number of environmental words provided by a company was 61 and 3,041 respectively. In 2013, as shown in Table 6, the summary statistics for environmental information illustrate that the number of environmental words increased. In that year, 45 companies together disclosed 40,471 words of environmental information in total and that was almost 15 per cent higher than in 2009. The minimum and maximum number of words provided by a company was 50 and 3,827 respectively.

Table 6: Summary Statistics for Environmental words before and after <i>Clean Energy Act 2011</i>						
	N	Min	Max	Sum	Mean	Std. Deviation
Data Set 3a: Env Words 2009	45	61.0	3041.0	35197	782.156	716.6941
Data Set 3b: Env Words 2013	45	50.0	3827.0	40471	899.356	854.1905

¹⁰ As discussed in Chapter Three, although all 77 companies were listed in the ASX, only 55 companies' annual reports were publicly available during the research period. However, ten companies were removed from the sample to balance the data for both years surveyed, which made the data normally distributed. Finally, 45 companies' annual reports from 2009 and 2013 were analysed to test the third hypothesis

The mean number of environmental words was 782 (rounded) in 2009, with a standard deviation of 716 (rounded), while the mean number of environmental words was roughly 899 (rounded) in 2013, with a standard deviation of 854 (rounded). Therefore, the average number of words was higher after the *Clean Energy Act* was introduced in 2013 than before this Act was introduced in 2009. Overall, the volume of environmental words showed an upward trend. A paired t-test was performed to measure the statistical significance of this change.

4.2.3.1 The results of the paired samples t-test for Hypothesis 3

The first step was to establish the null hypothesis. If there was no real difference in the level of environmental disclosure between 2009 and 2013 (before after the *Clean Energy Act*), then the mean difference μ_D would be zero. Thus the null hypothesis is:

$H_0: \mu_D = 0$ (there is no difference in number of environmental disclosure before and after the Clean Energy Act).

The second step was to establish the alternate hypothesis. If there was a real difference (i.e. an increase) in the volume of environmental disclosure between 2009 and 2013, then the mean μ_D would be greater than zero. Thus the alternative hypothesis is:

$H_a: \mu_D > 0$ (there is a significant increase in the number of environmental words after the Clean Energy Act than before the Act).

This researcher hypothesised that the number of environmental words would be higher after the introduction of *Clean Energy Act* than before the introduction of this Act. In a comparison of the number of environmental words of 45 companies, the average environmental disclosure level was higher after the introduction of *Clean*

Energy Act (mean = 899.36, s = 854.19) than before the introduction of *Clean Energy Act* (mean = 782.16, s = 716.69). The result of the paired sample *t*-test shows (see Table 7) that the mean increased by 117 (rounded), with a standard deviation of 408 (rounded).

Table 7: Paired Samples T-Test for Environmental Words before and after <i>Clean Energy Act 2011</i>							
Paired Differences					t	df	Sig. (one tail)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
117.2000	408.2502	60.8584	-5.4519	239.8519	1.926	44	.0305

The one-tailed *p*-value of the test was 0.03 which is less than 0.05. The 95 per cent CI for mean difference was [-5.45, 239.85]. Based on the results in Table 7, the null hypothesis can be rejected. The paired sample *t*-test showed that this increase in environmental words was statistically significant, $t(44) = 1.926$, $p=0.03$. The 95 per cent CI indicates that the average number of environmental disclosure after the *Clean Energy Act* was between -5.45 words lower and 239.85 words higher than before this act. Thus, this study provides sufficient evidence to conclude that there is a significant increase in environmental words after the *Clean Energy Act*, which supports Hypothesis 3 (H3: *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011*).

4.2.4 HYPOTHESIS 4 (H4): GHG-SPECIFIC DISCLOSURE AND THE *CLEAN ENERGY ACT 2011*

The fourth research hypothesis for this study was: *(H4): There will be an increase in the volume of GHG-specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.* The annual reports of 45 companies were analysed to collect environmental information before and after the *Clean Energy Act 2011*. The analysis showed that, out of these 45 companies, around 31 companies in 2009 and 37 companies in 2013 provided GHG-specific information. However, six companies did not provide any GHG disclosure in either 2009 or 2013. Thus, these six companies were removed from the sample before proceeding with further statistical analysis. Finally, to test H4, the summary statistics were analysed and a paired *t*-test was conducted for a total of 39 companies.

The summary statistics in Table 8 show that the total number of GHG-specific information for the 39 sample companies was 9,294 words in 2009 and 13,988 words in 2013. Thus, GHG-specific information was increased by approximately 51 per cent or 4,694 words from 2009 to 2013. The mean words for GHG specific disclosures was nearly 238 (rounded), with a standard deviation of 240 (rounded) in 2009, while the mean number of GHG specific words was almost 358 (rounded), with a standard deviation of 240, in 2013. So, the average number of GHG specific words increased by 120 words.

Table 8: Summary Statistics for GHG words before and after <i>Clean Energy Act 2011</i>						
	N	Mini	Max	Sum	Mean	Std. Deviation
Data Set 4a: GHG Word 2009	39	0	1000	9294	238.31	240.766
Data Set 4b: GHG Word 2013	39	0	1606	13988	358.67	393.867

The minimum number of GHG-specific words disclosed by any particular company was 0 in both years. However, the maximum number of GHG specific words increased from 2009 to 2013. In 2009, the maximum number of GHG specific words was 1,000, while in 2013 that number rose to 1,606. A sample paired *t*-test was run to determine if the increase in the total number of GHG words after the *Clean Energy Act* was statistically significant.

4.2.4.1 The results of the paired samples *t*-test for hypothesis 4:

The first step for the paired *t*-test was to establish the null hypothesis:

H₀: $\mu_D = 0$ (there is no difference in number of GHG-specific disclosure between before and after the Clean Energy Act 2011)

The second step for the paired *t*-test was to establish the alternate hypothesis:

H_a: $\mu_D > 0$ (there is a significant increase in the number of GHG-specific disclosures after the Clean Energy Act 2011).

Table 9: Paired Samples T-Test for GHG words before and after <i>Clean Energy Act</i> 2011							
Paired Differences					t	df	Sig. (one-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
120.359	273.250	43.755	31.782	208.936	2.751	38	.0045

Table 9 shows the results of the paired *t*-test. If the *p*-value of the paired sample *t*-test is less than 0.05 ($p < 0.05$), then the null hypothesis could be rejected. In a comparison of the number of GHG-specific words in annual reports of 39 companies, the average number of GHG-specific words was higher after the implementation of the

Clean Energy Act (mean = 358.67, s = 393.87) than before the implementation of the *Clean Energy Act* (mean = 238.31, s = 240.77). Table 9 shows the results of the paired sample *t*-test, which found that the mean difference was 120 (rounded) and the standard deviation was 273 (rounded). The paired samples *t*-test shows that the increase in GHG-specific words after the *Clean Energy Act* was statistically significant, $t(38) = 2.75$, $p = 0.004$. The *p*-value of the test was less than 0.05, indicating a high degree of statistical significance. The 95 per cent CI for mean the difference was [31, 208], which does not contain the value 0. Since the mean is higher after the *Clean Energy Act* was introduced than the mean before the *Clean Energy Act* was introduced, this study is 95 per cent confident the increase in the number of GHG specific words is between 31 and 208. Thus, it can be concluded that there is a statistically significant increase in the volume of GHG specific disclosure after the *Clean Energy Act* and thus, hypothesis 4 (H4) can be supported.

4.2.5 SUMMARY OF TEST RESULTS FOR HYPOTHESES 1-4

The first two paired *t*-tests demonstrated that the volume of environmental and GHG-specific disclosure has increased significantly after the *NGER Act 2007*. The last two paired *t*-test results show that the number of environmental and GHG specific words in corporate annual report also increased after the *Clean Energy Act 2011*. As the *NGER Act 2007* requires mandatory GHG reporting and the *Clean Energy Act* is also underpinned by the *NGER Act*, the results of the hypotheses testing indicates that mandatory GHG reporting requirements have a positive influence on discretionary corporate environmental and GHG disclosures practices.

4.3 ANALYSIS OF THE DISCLOSURE INDEX.

After examining the level of environmental and GHG-specific disclosures prior to, and following, the implementation of the *NGER Act 2007* and the *Clean Energy Act 2011*, this study explored the types of GHG specific information reported by the sampled companies. This analysis will help to understand the type of GHG specific disclosures reported in corporate annual reports and which types of information were the most common. Annual reports were the sole source of disclosures for the purposes of this analysis. The GHG information-related disclosure checklist was developed to see whether selected companies disclosed in their annual reports some or all of the particular GHG-specific information listed in the checklist. There are 13 items in the checklist (see Appendix II). Table 10 presents the summary statistics of the checklist. As outlined in the previous chapter, for every checklist item, if it was disclosed in the annual report it was scored as 1 or as 0¹¹ if not disclosed.

Fifty-three companies reported GHG specific information in 2006 or 2009. The annual report was examined to identify the disclosure index-listed information. The summary results are presented in Table 10. If all 53 companies provided all the index items, then the maximum possible score would be 689 each year (13 items by each company x 53 companies). The analysis shows that 53 companies scored only 41 points in 2006 and 176 points in 2009. The total score increased by 135 or 329 per cent. Each company disclosed 0.77 items on average in 2006, which is relatively low. However, in 2009 each company on average provided 3.3 items. During 2006, disclosure range was 0–10, and in 2009, it ranged 4–37. This indicates that GHG-specific information related to the legislation became prominent after the *NGER Act* and the *Clean Energy Act*.

¹¹ For example, a mention of NGER received the score of 2 in 2006 and a score of 37 in 2009, which means in 2006, 2 companies mentioned NGER in 2006 in their annual report while 37 companies did the same in 2009.

Table 10 outlines the number of companies which provided each of the disclosure items in the years 2006 (before the *NGER Act*) and 2009 (after the *NGER Act*). It can be seen that out of 53 companies, only 2 companies mentioned the NGER legislation in their annual reports and just one of them discussed it in 2006.

Table 10: Disclosure index and the number of companies which provided each item in the years 2006/2009 and 2009/2013							
Checklist Items	YR 06	YR 09	% Change		YR 09	YR13	% Change
	N=53	N=53			N=39	N=39	
Mention of NGER	2	37	1750.00%		25	26	4.00%
Discussion of NGER Act	1	21	2000.00%		12	12	0.00%
Pressure for Action to reduce GHG	3	14	366.67%		8	2	-75.00%
Statement of concern about GHG	3	10	233.33%		3	3	0.00%
Statement about reducing GHG	7	10	42.86%		7	10	42.86%
Mention of current year GHG emission (amount)	2	9	350.00%		4	9	125.00%
Comparative figure of GHG emission by year (amount)	2	6	200.00%		3	6	100.00%
Past reduction of GHG (amount)	2	4	200.00%		1	4	300.00%
Current reduction of GHG (amount)	6	6	0.00%		1	8	700.00%
Future reduction target (amount)	0	5	-		3	5	66.67%
Action to reduce GHG emission	10	24	140.00%		15	20	33.33%
Mention of CPRS/CT/ETS	3	21	600.00%		13	15	15.38%
Details of CPRS/ETS	0	9	-		4	8	100.00%
Total Score	41	176	329.27%		99	128	29.29%

During 2009, around 37 companies' mentioned the *NGER Act* and twenty-one more of them provided detailed information about the NGER legislation. This indicates a remarkable increase of number of companies who have mentioned or discussed about the NGER legislation in their annual report after the implementation of this legislation. In 2006, only three companies reported that they felt pressured to take action to reduce GHG emissions and this number rose dramatically in 2009 when 14 companies reported the same. Three companies stated their concern about GHG emissions in 2006, while this number moved up to 10 in 2009. The number of companies which made a commitment to reduce GHG emission was seven and 10 in 2006 and 2009 respectively. In 2006, six companies provided their current amount of GHG emissions, while 15 companies provided the same information in 2009. There were two companies who provided comparative figures in 2006 and this number increased almost threefold in 2009. In 2006, two companies provided the amount of past GHG emissions reductions and six companies stated the amount of their current GHG emissions reductions. In 2009, four companies reported the amount of their past GHG emissions reduction and six companies disclosed their current level of GHG emissions reduction. There were no companies in 2006 which stated a future reduction target. However, six companies in 2009 stated a future GHG reduction target. Around 14 companies stated their action plan to reduce GHG emissions and this number doubled (24 companies) in 2009. Three companies mentioned the CPRS or carbon tax in 2006 and this number jumped sharply in 2009. In 2009, around 21 companies mention it. No company discussed the CPRS/ETS in 2006, but in 2009, 11 companies discussed the CPRS or ETS.

Details of the CPRS and future reduction target in 2006 received the lowest score (0) as no companies disclosed any information about these two items before the NGER legislation. On the other hand, action to reduce GHG emission received the highest

score in the same year, which means 10 companies stated this item in their annual report before the NGER legislation. In 2009, past reductions of GHG emissions received the lowest score, 4, as only 4 companies mentioned it after the NGER legislation. In this year, mention of NGER received the highest score (37) which indicates 37 companies mentioned in their annual report after the NGER legislation.

However, although the companies were not required to provide this information in their annual report, they did so. This is clear evidence that more corporations provided event-related information especially when that event might cost their legitimacy. It is obvious that the *NGER Act* made corporate emission visible to the public which created a bad image of high-emitting corporations that may threaten their legitimacy. In this case, corporations can defend or maintain their legitimacy by undertaking some activities to reduce GHG emission (Tilling, 2004). This study found that after the *NGER Act*, the number of companies that reported their activities to reduce GHG emission increased by 140 per cent, from 10 in 2006 to 24 in 2009. Table 10 shows that for each of the index listed item, more companies reported these items after the NGER legislation than before the legislation.

The disclosure index items were also analysed before and after the *Clean Energy Act 2011*. The analysis shows (see Table 10) that 39 companies disclosed selected GHG-specific items in their annual reports in 2009 and 2013. If all the 39 companies provided all the index items, then the maximum possible score would be 507 each year (13 items by each company x 39 companies). The analysis shows that 39 companies scored 99 in 2006 and 128 in 2009. The total score increased by 29. Each company disclosed 2.5 items on average in 2009. In 2013, each company on average provided 3.3 items. The checklist items scores ranged from 1 to 25 in 2009 and 2 to 26 in 2013.

After the introduction of the *Clean Energy Act*, around 25 companies mentioned the NGER legislation and half of these companies provided more or somewhat detailed information about the NGER legislation. There was not much change regarding the *NGER Act* from 2009 to 2013. Only one more company mentioned the *NGER Act* in 2013. Moreover, 2013 sees the number of companies discussing the *NGER Act* remained the same as in 2009. In 2009, 8 companies stated they were pressured to reduce GHG emissions, whereas only 2 companies said the same thing in 2013. Three companies stated that they were concerned about GHG emissions in both 2009 and 2013. The upward trend can be seen over the period for the companies who mentioned they were reducing or intended to reduce their GHG emissions. Almost 7 companies in 2009 stated that they would reduce their GHG emissions and this number increased by 43 per cent (from 7 to 10 companies) in 2013.

There were four companies in 2006 that disclosed their total amount of current-year GHG emissions. In 2013, this number rose to 9. Around 3 companies in 2009 and 6 companies in 2013 provided a comparative (year by year) figure of GHG emissions. In 2009, only a company and in 2013, around 4 companies mentioned their past GHG emissions reduction level. Only one company mentioned their current reduction level in 2009 and this number increased to 8 in 2013. In 2009 around 3, and in 2013 some 5, companies set and reported their future target to reduce GHG emissions. The number of companies that took the initiative to reduce GHG emissions increased over the period. Based on the annual report analysis, it is concluded that around 15 companies actually took action to reduce GHG emissions in 2009 and this number grew by 33 per cent in 2013 to 20. Around 13 companies mentioned the carbon tax in 2009 and 15 in 2013. In 2009, around 4 companies reported details of the carbon tax and this number doubled in 2013. Around 13 companies supplied details of the carbon tax in year 2013.

In 2009, past and current year GHG reduction items received the lowest score just 1, which means that only one company disclosed this information before the *Clean Energy Act*. Mention of NGER received the highest score (25) which indicates 25 companies mentioned the NGER after the *Clean Energy Act*. In 2013, pressure for action to reduce GHG received the lowest score of (2), as only 2 companies reported this item. In contrast, mention of NGER received the highest score of (26) which indicates 26 companies mentioned the *NGER Act* after the *Clean Energy Act* in their annual report in 2013.

4.4 THE CHANGE IN DISCLOSURE BEHAVIOUR

This study compared the total reported GHG emissions of 53 companies against the total reported environmental information by the same companies. The results showed that GHG information occupied around 19 per cent of environmental information before the *NGER Act*, and this doubled to 38 per cent after this legislation. These figures indicate that more and more GHG-specific information was embedded into the environmental disclosure in annual reports after the NGER legislation. The analysis also shows that both environmental and GHG specific disclosure increased significantly. However, due to the *NGER Act 2007*, the rate is higher for GHG specific disclosures, which increased by around 66 per cent from 2006 to 2009, than for generic environmental disclosures, which increased by 34 per cent from 2006 to 2009.

In 2009 (before the *Clean Energy Act*), GHG-specific information occupied around 39 per cent of environmental information and this increased to 44.22 per cent in 2013. These figures indicate that more and more GHG-specific information was embedded in annual reports after the *Clean Energy Act 2011*. The summary statistic shows that both environmental and GHG-specific disclosures increased from 2009 to

2013 and paired *t*-tests suggest that this increase is significant. and When the 39 companies GHG-specific disclosure was compared with the same 39 companies environment-related disclosures, it shows that the increase in environmental disclosures was 14 per cent, from 2009 to 2013, while GHG-specific disclosure rose by 51 per cent during the same period. These findings indicate that after the *Clean Energy Act 2011* the rate of increase in GHG information was much higher than for generic environmental information. This pattern indicates that companies focused on environmental disclosure after both these pieces of legislation were passed, indicating high involvement in GHG-specific information.

4.5 CONCLUSION

This chapter performed data analysis to test four research hypotheses (H1-4), which were developed in Chapters 2 and 3. Summary statistics and paired *t*-tests were conducted to support or negate each hypothesis. The first step was to test H1: *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007*. The summary statistics showed that the number of environmental words increased from 2006 to 2009 and the paired *t*-test confirmed that the increase was statistically significant. The second step tested H2: *There will be an increase in the volume of GHG specific disclosures in annual reports after the implementation of NGER Act 2007*. The summary statistics showed that the number of GHG disclosures increased after the NGER legislation, while the paired *t*-test indicated that there was a significant rise in the volume of GHG-specific disclosure between 2006 and 2009.

The third and fourth research hypotheses were related to the *Clean Energy Act* and environmental and GHG specific disclosures. The third step was to test H3: *There*

will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011. The summary statistics revealed that the volume of environmental disclosures increased and this increase was significant at the 5 per cent level. The fourth step tested H4: *There will be an increase in the volume of GHG specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.* The summary statistics found that the number of GHG information reported in 2013 was greater than in 2009. The paired t-test results confirmed that this was a statistically significant increase. The fifth and final step in the data analysis was to examine the disclosure index. The analysis revealed that more companies disclosed GHG information after both pieces of legislation. Almost all of the checklist items received higher scores following the introduction of mandatory reporting requirements. The results of the five step data analysis process provide a clear answer to the central question of this study: mandatory reporting legislation *increases* the volume of voluntary environmental and GHG specific disclosures.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 INTRODUCTION:

This study examined the impact of mandatory reporting requirements on discretionary environmental and GHG specific disclosure practices, an area in which limited information is currently available (Hopwood, 2009; Haque & Deegan, 2010). This chapter summarises the research findings and then discusses the theoretical and practical implications of this study. The chapter then provides a limitation statement and concludes with a set of recommendations for future research directions in the area of environmental accounting.

5.2 SUMMARY OF RESEARCH FINDINGS AND DISCUSSION

This study investigated the level of voluntary corporate environmental and GHG-specific disclosure before and after two case study pieces of legislation: the *National Greenhouse and Energy Reporting Act 2007* and the *Clean Energy Act 2011*. From 2008, under the *NGER Act*, if a facility of a company exceeds 25 kilotonnes¹² or a company exceeds 50 kilotonnes of CO₂ equivalent (CO₂-e) emission are required to report the level of their GHG emissions to the Clean Energy Regulator. This information is then made available to the public the following year. The Clean Energy Regulator is also responsible for administering the carbon emission reduction legislation. Under the *Clean Energy Act 2011*, the top 500 emitters are liable to pay a carbon price¹³ from July 2013, if they exceed the GHG emission threshold limit by more than 25,000 tonnes; this creates a financial burden for companies, which may lead

¹² At the corporate group level, this threshold is 50 kilotonnes.

¹³ There has been ongoing discussion that the Abbott government wants to repeal the so-called “carbon tax” (Griffiths, 2013)

them to revise their business as usual activities. Companies are not required, however, to report their environmental and GHG-specific disclosures in their annual reports. Therefore, this study asked the following central question: *what is the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosures practices?*

In order to answer the central question, this study undertook a comparative case study of corporate annual reports before and after the introduction of the *National Greenhouse Energy Reporting (NGER) Act 2007* and the *Clean Energy Act 2011*, to determine their impact on voluntary reporting practices. Drawing on legitimacy theory (Lindblom, 1994; Deegan, 2002) this study argues that the threat of regulatory action and the new public visibility of corporate environmental performance poses a threat to corporate legitimacy. Thus, in order to legitimise their environmental practices, this predicts that corporations would increase the volume of their environmental and GHG disclosures in their annual reports, following the introduction of mandatory reporting requirements. To test the legitimacy theory, four research hypotheses were developed in Chapters Two and Three and tested in Chapter Four:

Hypothesis 1 (H1): *There will be an increase in the volume of environmental disclosures in annual reports following the implementation of the NGER Act 2007.*

Hypothesis 2 (H2): *There will be an increase in the volume of GHG-specific disclosures in annual reports after the implementation of NGER Act 2007.*

Hypothesis 3 (H3): *There will be an increase in the volume of environmental disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

Hypothesis 4 (H4): *There will be an increase in the volume of GHG-specific disclosures in annual reports following the introduction of the Clean Energy Act 2011.*

To test the four research hypotheses (H1-H4), the annual reports of a total of 71 Australian public listed companies were analysed from the years 2006, 2009 and 2013, using firstly, content analysis and, secondly, statistical analysis. The paired sample data was imported into SPSS and summary statistics were generated and then each hypothesis was tested using a paired *t*-test. This chapter firstly summarises the results, then discusses the theoretical and practical implication of the findings.

This study examined the environmental and GHG-specific disclosure practices before and after the *NGER Act 2007*. Environmental and GHG-specific information was collected from annual reports using content analysis before and after each of these pieces of legislations. Statistical analysis was then conducted and a paired *t*-test was completed for hypotheses 1 and 2 using the sample data. The results were presented in Chapter Four in sections 4.2.1 and 4.2.2.

The summary statistics show that the total number of environmental and GHG-specific words after the NGER legislation was much higher than the number of environmental- and GHG-specific words reported before the NGER legislation. The findings of the paired *t*-test for hypothesis 1 found that the volume of corporate environmental disclosure within the annual report of the sample companies increased significantly, $t(70) = 3.40, p = 0.0005$, after the implementation of the *NGER Act 2007*. The findings of the paired *t*-test for hypothesis 2 found that after the implementation of the *NGER Act 2007*, the volume of corporate GHG-specific disclosure within the annual report of the sample companies increased significantly, $t(52) = 7.29, p = 0.000$.

The study, therefore, supports hypotheses 1 and 2 and finds that companies increased the volume of their voluntary environmental and GHG-specific disclosures after mandating legislation was introduced. These results also support prior research,

which identified a significantly high level of voluntary environmental disclosure amongst companies that had experienced negative environmental events, or a threat to their legitimacy, or the publication of environmental information that may be perceived as negative (see for example: Deegan & Rankin, 1996; Deegan et al., 2000; Deegan et al., 2002; Cowan & Deegan, 2011; Rankin et al., 2011).

The second stage of this study examined the volume of environmental- and GHG-specific disclosures before and after the *Clean Energy Act 2011*. The summary statistics and the results of the paired *t*-tests for hypotheses 3 and 4 were presented in Chapter 4 in sections 4.2.3 and 4.2.4. The summary statistics indicated that the total number of environmental words after *Clean Energy Act 2011* was much higher than the number of environmental words reported before the Act was introduced. The paired *t*-test identified a significant increase $t(44) = 1.926, p = 0.03$, in the volume of environmental disclosure in the annual reports of the sample companies after the introduction of the *Clean Energy Act 2011*.

The statistical analysis showed that the total volume of GHG specific disclosures increased after the *Clean Energy Act 2011*. The paired *t*-test results showed that this increase was statistically significant for hypothesis four, $t(38) = 2.75, p = 0.004$. These findings are consistent with prior research that found corporate GHG disclosures increased after the legislative events (Cowan & Deegan, 2011; Rankin et al., 2011).

Based on the results of the hypotheses testing, this study finds that environmental and GHG-specific disclosures increased after both the *NGER Act* and *Clean Energy Act*. Therefore, the impact of mandatory GHG reporting requirements on discretionary corporate environmental and GHG disclosures practices is positive. Thus, the answer to

the central question of this study is that mandatory reporting requirements result in an increase in voluntary environmental and GHG disclosures.

Furthermore, an interesting pattern emerged. After the introduction of the two case-study pieces of legislation, GHG-specific information became more prominent and occupied a greater proportion of the environmental information overall. For example, the analysis showed (see section 4.4) that before the *NGER Act 2007*; only 19 per cent of environmental information was related to GHG-specific disclosures. After this legislation was introduced, GHG-specific information doubled in volume to account for 38 per cent of the total environmental information. A similar pattern was also discernable after the introduction of the *Clean Energy Act 2011* (see section 4.4). This indicates that companies had increasingly provided GHG-specific information rather than generic environmental information following the introduction of mandatory GHG reporting requirements.

To confirm the key findings, a GHG disclosure index was developed (see Appendix II for the complete index and see section 4.3 for the discussion). In this index, some items were related to the *NGER Act*, while other items related to the *Clean Energy Act*. In the case of *NGER Act*, this index identified, for example, how many companies provided information of their current-year GHG emission in their annual report and how many companies stated their intention to reduce their GHG emissions. The analysis shows that before the legislation, only two companies out of 53 companies reported their total GHG emission. After the legislation was introduced, 9 companies reported their total GHG emission in their annual report. In terms of reporting activities to reduce GHG emission, only 10 companies reported their activities to reduce GHG emission before the *NGER Act*. After the legislation was introduced, this number changed drastically and 20 companies reported the same item. The index also identified that

before these two pieces of legislation a very limited number of companies provided GHG-specific information. On the other hand, the study found that the number of companies providing GHG-specific information after the legislation skyrocketed. For example, out of 71 selected companies, only 38 per cent provided GHG-specific disclosure before the NGER legislation, while this percentage doubled to 76 per cent after the NGER legislation. Thus, the findings of the disclosure index corroborate with the paired t-test results, to provide further evidence that mandatory GHG reporting legislation has increased the volume of voluntary GHG-specific disclosures in the annual reports of Australian companies.

5.3 IMPLICATIONS OF THE RESEARCH

5.3.1 THEORETICAL IMPLICATIONS OF THE RESEARCH

This study supports prior research and argues that legitimacy theory convincingly explains corporate voluntary environmental disclosure practices (Suchman, 1995; Buhr, 1998; Deegan et al., 2002; Mobus, 2005; Tilling & Tilt, 2010; Mahadeo et al., 2011). Australian companies are not required to report GHG-specific information in their annual reports (Cotter et al., 2011). However, the *NGER Act* does require companies to report GHG-specific information to the responsible government body and this reported information is made publicly accessible in the following year. This is the mechanism through which corporate GHG emission performance is disseminated to the public. Consequently, corporations' reputations could be damaged. Legitimacy theory posits that corporations would tend to increase their environmental disclosures to legitimise their activities (Deegan & Rankin, 1996; Li et al., 1997; Patten, 2002b). The findings of this study support this premise. It can be concluded that the sample companies increased

their voluntary environmental information and GHG-specific information, in particular, following the threat to their legitimacy that mandatory reporting requirements posed.

5.3.2 PRACTICAL AND POLICY IMPLICATIONS OF THE RESEARCH

The test results for hypotheses 1 and 3 showed a statistically significant growth in environmental disclosures after both the *NGER Act 2007* and the *Clean Energy Act 2011*. The test results for hypotheses 2 and 4, likewise, showed that GHG disclosures increased significantly after the *NGER Act 2007* and *Clean Energy Act 2011*. The comparative analysis of environmental disclosures and GHG disclosures shows that after the NGER legislation, GHG-specific disclosures made up a greater percentage of the overall increase in environmental disclosures. The same pattern occurred too after the implementation of the *Clean Energy Act*. This suggests that the two pieces of GHG-specific legislation resulted in a change in the content of environmental disclosures in corporate annual reports during the test period, with a significant increase in the amount of GHG-specific disclosures. Finally, the analysis of the disclosure index showed that more companies specifically mentioned the two pieces of legislation and GHG-specific information after the implementation of each piece of legislation. In light of the research evidence, as indicated in section 5.2, the answer to the central question of this study is that mandatory GHG reporting legislation results in an increase in the volume of voluntary environmental disclosures as a strategy by companies to counter their legitimacy crisis. As a result, it can be concluded that the NGER and Clean Energy legislation influenced the selected companies to provide more environmental and, in particular, GHG specific disclosures. Thus, mandatory environmental reporting legislation is a good policy intervention to change the reporting practices of companies. This finding can be helpful for policy makers in order to control the water and land

pollution, which results from corporate activities. It can be inferred from the findings that GHG specific legislation enhances public awareness regarding corporate performance in relation to carbon emissions. This awareness shapes the pattern of corporate environmental disclosures. For example, this research identified that extensive focus was given to GHG related information by the selected companies.

Though this study finds that overall reporting practices have increased, there are several companies that nonetheless did not bother to supply the GHG specific information even after the *NGER Act 2007* and *Clean Energy Act 2011*. Reporting requirements serves the accountability of environmental performance (Lodhia & Martin, 2012). Moreover, a very limited number of companies reported their past GHG emission reduction or future reduction target. By considering the importance of GHG-specific information, if regulators ask the companies to provide such information in their annual reports, this may enhance the credibility of such information. If GHG information within annual reports is regulated, then society would be better informed about corporate emissions-related performance. Legal requirements to provide GHG information would also force all companies to provide GHG-specific disclosure in their annual reports.

5.4 LIMITATION OF THE STUDY

While the findings of this study have certain theoretical and practical implications, there are also some limitations, which need to be addressed. The first limitation is sample size. The selected sample companies were purposefully selected. This study chose only the top listed GHG emitters who were potentially liable for the carbon tax. This selection may not represent the total corporate population and, as such, the findings cannot be generalised. Another problem with the sample size was that it was not

possible to use the same sample size to test all four hypotheses. For the first hypothesis 71 companies were selected in 2006 and 2009 (before and after the NGER legislation). However, around 22 companies' annual reports were not possible to analyse after the *Clean Energy Act*, due to the time restriction of this research. Therefore, a smaller sample of 55 companies, were selected to test the hypotheses related to the *Clean Energy Act 2011*. Furthermore, these sample size (77 and 55) was further reduced to 71 and 45 respectively so that the data would fulfil the normality assumption for the paired *t*-test for hypotheses 1-4. Some companies were also taken out before testing the second and fourth hypotheses, as they did not report any GHG information, resulting in a final sample size of 53 and 39 respectively.

The second limitation is the timeline for the study: 2006-2013. The chosen timeline relates to the introduction of the two pieces of legislation in question, but is otherwise arbitrary. Discussion of both pieces of legislation continued at the government level and in the media for several years before their implementation. Thus, there could be GHG-specific information reported in annual reports before this legislation, but this was beyond the scope of this study.

The third limitation is that the *Australian Corporation Act 2001* (s. 299 [1] (f)) requires environmental regulation disclosure to be provided in the director's section of the annual report. However, in many cases, distinguishing mandatory and voluntary disclosures were hard to determine. In that situation, this study assumed that all the environmental information was voluntary. Environmental information, for example on exploration, or rehabilitation as required by AASB or IASB, reported under the notes to account, was not included in this study.

The fourth limitation is the annual reports used as the source of environmental information for this study. Many companies now produce and provide sustainability and other forms of environmental reports, besides annual reports. Thus, the sole use of annual reports in this study, ignores other disclosure instruments that may be used by corporations to provide environmental disclosures (Gray et al., 1995a; Unerman, 2000). However, the importance of annual reports to communicate with stakeholders cannot be ignored; rather it is argued that annual reports are an important source of information. Moreover, the majority of prior environmental disclosure related studies use annual report as the disclosure instrument (Gray et al., 1995b; Buniamin, 2012). In addition, annual reports make the comparison between years easier to undertake and, hence, an appropriate choice for this study.

The fifth limitation is the disclosure index, which was developed to capture the types of GHG-specific information provided. The items listed in the disclosure index related to the *NGER Act 2007* and *Clean Energy Act 2011*. However, the index only was able to collect very limited types of GHG-specific information. But the *NGER Act* actually requires many types of GHG-specific information, including energy production and consumption, which were not capture through this index. There is also a limitation with the disclosure scoring system. This study used equally weighted scores for each index item. For example, a particular item in the index received a score of 1 if any company mentioned it, without considering the extent of discussion or explanation. Some other studies provided weighted scores which depend on the extent of information. If a company provided details about some index item and also mentioned quantitative information, where relevant, they may receive a score of 2 or 3. However, it can be argued that a simple scoring system (1 for presence and 0 for absence) needs a

lower degree of judgement and is more reliable than a complicated (weighted) scoring system (Milne & Adler, 1999).

The sixth and final limitation was in collecting and separating environmental information from social information. There were cases where social and environmental information were together and whole sentences were indicating both the social and environmental aspect. For example, some companies stated: “We are committed to improve our social and environmental performance”. If a word count is done, it showed there are ten words in this sentence, but not all these words can be classified as environmental words. To be consistent and avoid complication, all ten words were classified as environmental words. Sometimes, some information was mentioned more than once. As this study looked into the volume of environmental information rather than the type of environmental information, all the environmental words were counted, regardless of how many times such information was mentioned.

5.5 SUGGESTIONS FOR FUTURE RESEARCH

There are many opportunities to expand or replicate this study. Many countries, such as Britain, Canada and Denmark require companies to provide environmental, in particular, GHG-specific information in their corporate annual reports. Similar studies could be conducted into those countries. This study used a small sample size, however, a future study could undertake a study with a larger sample size, which would help to generalise the findings.

This study found that mandatory reporting requirements were an impetus to provide more voluntary environmental disclosures. However, it would be hard to confirm the reason for this increase with great confidence, without asking corporate

management themselves, as they have power and control over the reported information. So, a future study might interview corporate managers to identify the prime drivers for disclosing environmental information in their annual reports and to determine the extent to which legislation influenced their environmental disclosure practices.

This study found that corporate environmental disclosure increased following the introduction of GHG-specific legislation, in the case of Australian corporations. Nevertheless, this study is unable to determine whether corporate environmental performance has actually improved, or whether GHG emissions were reduced, following the introduction of mandatory reporting legislation. So, it is recommended that future researchers examine corporate environmental performance after the implementation of the *NGER Act 2007* and the *Clean Energy Act 2011*, to determine if harmful GHG emissions were reduced.

Many companies are now producing sustainability reports, where they provide the details of their environmental performance. Future research should examine all the major corporate communication mediums, such as: annual reports, the internet and sustainability reports. This will provide a more comprehensive result and nuanced understanding of the level of corporate environmental disclosure.

5.6 CONCLUSION

Legitimacy theory posits that corporations will provide more environmental disclosures in response to an environmental event, which has a negative impact on their corporate image. GHG is important in keeping the Earth's surface warm and to sustain life. However, excessive emissions of GHG are primarily responsible for climate change and this change poses a serious threat to the environment and to public health. Thus, heavy

GHG emitters (who emit more than the threshold) are now the target of regulatory threat, environmental groups and public outrage. Consequently, the Australian government implemented two key pieces of legislation, the *NGER Act 2007* and the *Clean Energy Act 2011*, to restrict the GHG emissions of top corporate emitters. These two pieces of environmental legislation damaged the image of many Australian companies by disclosing their poor environmental performance to the public. Moreover, these two pieces of legislation will force heavy emitters to reduce their carbon emissions or bear a financial burden. So, there is an explicit (legal) and implicit (public interest) legitimacy threat to top emitting corporations. The key finding of this study is that mandatory GHG reporting requirements had a positive impact on discretionary corporate environmental disclosures and increased the volume of environmental and GHG-specific disclosures. However, this key finding does not necessarily translate into a reduction in carbon emissions, but it does add weight to the theory that companies will legitimate their activities by increasing their discretionary environmental disclosures in a shifting regulatory policy context.

REFERENCE LIST

- Abbott, W.F., & Monsen, R. J. (1979). On the measurement of corporate social responsibility: self-reported disclosures as a method of measuring corporate social involvement. *Academy of Management Journal*, 22(3), 501-515.
- ACCA (Association of Chartered Certified Accountants) (2010). Accounting for carbon. Retrieved 5 September 2012
<http://www.accaglobal.com/content/dam/acca/global/PDF-technical/environmental-publications/rr-122-001.pdf>
- Adams, C. A. (2004). The ethical, social and environmental reporting-performance portrayal gap. *Accounting, Auditing & Accountability Journal*, 17(5), 731-757.
- Adams, C. A., & Harte, G. (1998). The changing portrayal of the employment of women in British banks' and retail companies' corporate annual reports. *Accounting, Organizations and Society*, 23(8), 781-812.
- Aerts, W., Cormier, D., & Magnan, M. (2008). Corporate environmental disclosure, financial markets and the media: an international perspective. *Ecological Economics*, 64(3), 643-659.
- AFP Jakarta. (2014). World must act on climate change, *The daily Star*. Retrieved on 17 feb 2014 from <http://www.thedailystar.net/world-must-act-on-climate-change-11732>
- Akter, S., & Bennett, J. (2011). Household perceptions of climate change and preferences for mitigation action: the case of the carbon pollution reduction scheme in Australia. *Climatic Change*, 109(3-4), 417-436.
- Australian Government: Clean Energy Regulator. (2012a). National greenhouse and energy reporting. Retrieved 15 March, 2013, from <http://www.cleanenergyregulator.gov.au/National-Greenhouse-and-Energy-Reporting/steps-for-reporting-corporations/NGER-reporting-step-1/Pages/default.aspx>.
- Australian Government: Clean Energy Regulator. (2012b). Carbon pricing mechanism: Guide to carbon price liability under the Clean Energy Act 2011. Retrieved 15 December, 2012, from <http://www.cleanenergyregulator.gov.au>.
- Australian Government: Department of Environment. (2013). Australian government - Department of Environment. Cited 10 June 2013 in <http://www.Climatechange.Gov.Au/climate-change/greenhouse-gas-measurement/national-greenhouse-and-energy-reporting>.
- Australian Government: Department of Environment. (2014). Australian government - department of environment: Kyoto protocol, cited 10 feb 2014 from <http://www.Climatechange.Gov.Au/international/negotiations/history-negotiations/kyoto-protocol>.
- Australian Government: Department of Climate Change (2008a). Carbon pollution reduction scheme. White paper. Retrieved 10 April, 2013 from <http://pandora.nla.gov.au/pan/102841/20090728-0000/www.climatechange.gov.au/whitepaper/report/index.html>

- Australian Government: Department of Climate Change. (2008b). Carbon pollution reduction scheme: Green Paper. Retrieved 10 November, 2013, from <http://www.aacb.org.au/files/Greenpaper%20Fed%20Govt%20Summary%2008.pdf>.
- Australian Government: Department of Climate Change. (2009). National inventory report 2007, volume 1; National Greenhouse Gas Inventory May 2009.
- Australian Institute of Environmental Accounting (2011). Extract retrieved 5 November, 2013 from <http://environmentalaccounting.org.au/>.
- Bebbington, J., & Larrinaga-Gonzalez, C. (2008). Carbon trading: accounting and reporting issues. *European Accounting Review*, 17(4), 697-717.
- Beelen, R., Hoek, G., Van Den Brandt, P.A., Goldbohm, R.A., Fischer, P., Schouten, L.J., Brunekreef, B. (2008). Long-term effects of traffic-related air pollution on mortality in a Dutch cohort (NLCS-Air study). *Environmental Health Perspectives*, 116(2), 196.
- Belal, A.R., & Momin, M. (2009). Corporate social reporting (CSR) in emerging economies: a review and future direction. *Research in Accounting in Emerging Economies*, 9, 119-143.
- Belal, A.R., & Owen, D.L. (2007). The views of corporate managers on the current state of, and future prospects for, social reporting in Bangladesh: an engagement-based study. *Accounting, Auditing & Accountability Journal*, 20(3), 472-494.
- Belal, A.R., & Roberts, R.W. (2010). Stakeholders' perceptions of corporate social reporting in Bangladesh. *Journal of business ethics*, 97(2), 311-324.
- Belal, A.R., Kabir, M.R., Cooper, S., Dey, P., Khan, N.A., Rahman, T., & Ali, M. (2010). Corporate environmental and climate change disclosures: empirical evidence from Bangladesh. *Research in Accounting in Emerging Economies*, 10, 145-167.
- Bellard, C., Bertelsmeier, C., Leadley, P., Thuiller, W., & Courchamp, F. (2012). Impacts of climate change on the future of biodiversity. *Ecology letters*, 15(4), 365-377.
- Blacconiere, W. G., & Northcut, W. D. (1997). Environmental information and market reactions to environmental legislation. *Journal of Accounting, Auditing & Finance*, 12(2), 149-178.
- Boesso, G., & Kumar, K. (2009). Stakeholder prioritization and reporting: Evidence from Italy and the US. In *Accounting Forum*, 33, (2), 162-175.
- Bose, B. (2010). Global warming: energy, environmental pollution, and the impact of power electronics. *Industrial Electronics Magazine, IEEE*, 4(1), 6-17.
- Brammer, S., & Pavelin, S. (2008). Factors influencing the quality of corporate environmental disclosure. *Business Strategy and the Environment*, 17(2), 120-136.
- Branco, M.C., & Rodrigues, L.L. (2008). Factors influencing social responsibility disclosure by Portuguese companies. *Journal of Business Ethics*, 83(4), 685-701.

- Branco, M. C., Eugénio, T., & Ribeiro, J. (2008). Environmental disclosure in response to public perception of environmental threats: The case of co-incineration in Portugal. *Journal of Communication Management*, 12(2), 136-151.
- Bryman, A., & Bell, E. (2011). *Business research methods* (3rd ed. United States): Oxford University Press.
- Buhr, N. (1998). Environmental performance, legislation and annual report disclosure: the case of acid rain and Falconbridge. *Accounting, Auditing & Accountability Journal*, 11(2), 163-190.
- Buniamin, S. (2012). The quantity and quality of environmental reporting in annual report of public listed companies in Malaysia. *Issues in Social and Environmental Accounting*, 4(2), 115-135.
- Burritt, R. L. (1997). Environmental disclosures in annual reports of Australian gold and copper mining companies with activities in Papua New Guinea and/or Indonesia. Working/Technical paper, Australian National University, Resource Management in Asia-Pacific Project
- Burritt, R.L., & Saka, C. (2006). Environmental management accounting applications and eco-efficiency: case studies from Japan. *Journal of Cleaner Production*, 14(14), 1262-1275.
- Burritt, R.L., Herzig, C., & Tadeo, B.D. (2009). Environmental management accounting for cleaner production: the case of a Philippine rice mill. *Journal of Cleaner Production*, 17(4), 431-439.
- Canadell, J. G., Le Quéré, C., Raupach, M. R., Field, C. B., Buitenhuis, E. T., Ciais, P., ... & Marland, G. (2007). Contributions to accelerating atmospheric CO₂ growth from economic activity, carbon intensity, and efficiency of natural sinks. *Proceedings of the national academy of sciences*, 104(47), 18866-18870.
- CERES (2002). Value at risk: climate change and the future of governance. Retrieved 2 July 2013, from <https://www.Ceres.Org/resources/reports/value-at-risk-climate-change-and-the-future-2002>.
- Chau, G.K., & Gray, S.J. (2002). Ownership structure and corporate voluntary disclosure in Hong Kong and Singapore. *The International Journal of Accounting*, 37(2), 247-265.
- Chen, S., & Bouvain, P. (2009). Is corporate responsibility converging? A comparison of corporate responsibility reporting in the USA, UK, Australia, and Germany. *Journal of Business Ethics*, 87(1), 299-317.
- Cho, C. H, & Patten, D.M. (2007). The role of environmental disclosures as tools of legitimacy: a research note. *Accounting, Organizations and Society*, 32(7), 639-647.
- Cho, C. H. (2009). Legitimation strategies used in response to environmental disaster: a French case study of total SA's Erika and AZF incidents. *European Accounting Review*, 18(1), 33-62.
- Clarkson, M. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of management review*, 20(1), 92-117.

- Clarkson, P.M., Li, Y., Richardson, G.D., & Vasvari, F.P. (2008). Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis. *Accounting, Organizations and Society*, 33(4), 303-327.
- Clean Energy Regulator. (2012). Liable entities public information database. Retrieved 25 October, 2012, from <http://www.cleanenergyregulator.gov.au/Carbon-Pricing-Mechanism/Liable-Entities-Public-Information-Database/Pages/default.aspx>
- Coetzee, C. M., & Van Staden, C. J. (2011, December). Disclosure responses to mining accidents: South African evidence. *Accounting forum* 35(4), 232-246.
- Colorado State University. (2013). Information retrieved 28 September 2013 from <http://writing.Colostate.Edu/guides/guide.Cfm?Guideid=61>.
- Commission of the European Communities. (2006). Fourth national communication from the European Community under the UN Framework Convention on Climate Change (UNFCCC). Retrieved 17 June 2013 from <http://unfccc.int/resource/docs/natc/eunce4add.pdf>.
- Coorey, P. (2010), "Business top brass join talks on climate", The Sydney Morning Herald, 7 October, Accessed on 12 October 2012 from <http://www.smh.com.au/environment/business-top-brass-join-talks-on-climate-20101006-167wx.html>
- Cormier, D., Gordon, I.M., & Magnan, M. (2004). Corporate environmental disclosure: contrasting management's perceptions with reality. *Journal of business ethics*, 49(2), 143-165.
- Cotter, J., Najah, M., & Wang, S. S. (2011). Standardized reporting of climate change information in australia. *Sustainability accounting, management and policy journal*, 2(2), 294-321.
- Cowan, S., & Deegan, C. (2011). Corporate disclosure reactions to Australia's first national emission reporting scheme. *Accounting & Finance*, 51(2), 409-436.
- CSIRO (Commonwealth Scientific and Industrial Research Organisation) (2011).. Retrieved 24 July, 2013, from <http://www.csiro.au/Outcomes/Climate/Reducing-GHG/PollutionOverview.aspx>
- Da Silva Monteiro, S. M., & Aibar-Guzmán, B. (2010). Determinants of environmental disclosure in the annual reports of large companies operating in portugal. *Corporate Social Responsibility and Environmental Management*, 17(4), 185-204.
- De Beer, P., & Friend, F. (2006). Environmental accounting: a management tool for enhancing corporate environmental and economic performance. *Ecological Economics*, 58(3), 548-560.
- De Villiers, C., & van Staden, C.J. (2010). Shareholders' requirements for corporate environmental disclosures: a cross country comparison. *The British Accounting Review*, 42(4), 227-240.
- Deegan, C. (2000). *Financial accounting theory*: McGraw-Hill Book Company, Sydney.
- Deegan, C. (2002). Introduction: The legitimising effect of social and environmental disclosures—a theoretical foundation. *Accounting, Auditing & Accountability Journal*, 15(3), 282-311.

- Deegan, C. (2006). *Financial accounting theory* (2nd edn.). Sydney: McGraw Hill Book Company,.
- Deegan, C. & Blomquist, C. (2006). Stakeholder influence on corporate reporting: an exploration of the interaction between WWF-Australia and the Australian minerals industry. *Accounting, Organizations and Society*, 31(4), 343-372.
- Deegan, C. & Gordon, B. (1996). A study of the environmental disclosure practices of Australian corporations. *Accounting and Business Research*, 26(3), 187-199.
- Deegan, C. & Rankin, M. (1996). Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the environmental protection authority. *Accounting, Auditing & Accountability Journal*, 9(2), 50-67.
- Deegan, C. & Rankin, M. (1997). The materiality of environmental information to users of annual reports. *Accounting, Auditing & Accountability Journal*, 10(4), 562-583.
- Deegan, C., Rankin, M., & Tobin, J. (2002). An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 312-343.
- Deegan, C., Rankin, M., & Voght, P. (2000). Firms' disclosure reactions to major social incidents: Australian evidence. *Accounting Forum*, 24(1), 101-130.
- Deegan, C., Rankin, M., & Tobin, J. (2002). An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 312-343.
- DEFRA (Department for Environment, Food and Rural Affairs) (2008). UK climate change programme: Annual report to Parliament, July 2008, available from national archives.
- Deloitte. (2012). The carbon price accounting for carbon. Retrieved 5 September 2012 http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Services/Climate%20change%20and%20sustainability/Deloitte_Australia_Accountingforcarbon_2012.pdf.
- Dillard, J., Brown, D., & Marshall, R. S. (2005). An environmentally enlightened accounting. *Accounting Forum*, 29(1), 77-101.
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management Review*, 20(1), 65-91.
- Downie, J., & Stubbs, W. (2013). Evaluation of Australian companies' scope 3 greenhouse gas emissions assessments. *Journal of Cleaner Production*, 56, 156-163.
- Engels, A. (2009). The European emissions trading scheme: an exploratory study of how companies learn to account for carbon. *Accounting, Organizations and Society*, 34(3-4), 488-498.
- Epstein, M. J., & Freedman, M. (1994). Social disclosure and the individual investor. *Accounting, Auditing & Accountability Journal*, 7(4), 94-109.

- Ernst and Ernst. (1976). *Social responsibility disclosure*. Cleveland, OH: Ernst and Ernst,
- Eugénio, C.P. (2009). *Social and environmental accounting: a case study on a Portuguese cement company*. Instituto Superior de Ciências do Trabalho e da Empresa, .
- Eugénio, T., Lourenço, I. C., & Morais, A. I. (2010). Recent developments in social and environmental accounting research. *Social Responsibility Journal*, 6(2), 286-305.
- Freeman, R. E. (1984). *Strategic management: a stakeholder approach*. Boston: Pitman.
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge University Press.
- Freedman, M., & Jaggi, B. (2004). Carbon dioxide emissions and disclosures by electric utilities. *Advances in Public Interest Accounting*, 10, 105-129.
- Freedman, M., & 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(3), 215-232.
- Freedman, M., & Jaggi, B. (2011). Global warming disclosures: Impact of Kyoto Protocol across countries. *Journal of International Financial Management & Accounting*, 22(1), 46-90.
- Friedman, M. (1962). *Capitalism and freedom*. Chicago: University of Chicago Press.
- Frost, G.R. (2007). The introduction of mandatory environmental reporting guidelines: Australian evidence. *Abacus*, 43(2), 190-216.
- Gale, R. (2006a). Environmental management accounting as a reflexive modernization strategy in cleaner production. *Journal of Cleaner Production*, 14(14), 1228-1236.
- Gale, R. (2006b). Environmental costs at a Canadian paper mill: a case study of environmental management accounting (EMA). *Journal of Cleaner Production*, 14(14), 1237-1251.
- Garnaut, R. (2008). The garnaut climate change review. *Global Environmental Change*, 13, 1-5.
- Gibson, K. (2000). The moral basis of stakeholder theory. *Journal of business ethics*, 26(3), 245-257.
- Gray, R. (2001). Thirty years of social accounting, reporting and auditing: What (if anything) have we learnt? *Business Ethics: A European Review*, 10(1), 9-15.
- Gray, R., & Bebbington, J. (2001). *Accounting for the environment*. SAGE Publications Limited, London.
- Gray, R., & Laughlin, R. (2012). It was 20 years ago today: Sgt Pepper, accounting, auditing & accountability journal, green accounting and the blue meanies. *Accounting, Auditing & Accountability Journal*, 25(2), 228-255.

- Gray, R., Kouhy, R., & Lavers, S. (1995a). Corporate social and environmental reporting. A review of the literature and a longitudinal study of UK disclosure. *Accounting, Auditing & Accountability Journal*, 8(2), 47-77.
- Gray, R., Kouhy, R., & Lavers, S. (1995b). Constructing a research database of social and environmental reporting by uk companies. *Accounting, Auditing & Accountability Journal*, 8(2), 78-101.
- Gray, R., Owen, D., & Adams, C. A.. (1996). *Accounting and accountability: Changes and challenges in corporate social and environmental reporting*: Prentice Hall: Hemel, Hempstead.
- Gray, R., Javad, M., Power, D.M., & Sinclair, C.D. (2001). Social and environmental disclosure and corporate characteristics: a research note and extension. *Journal of Business Finance & Accounting*, 28(3-4), 327-356.
- Gray, R., Walters, D., Bebbington, J., & Thompson, I. (1995). The greening of enterprise: an exploration of the (non) role of environmental accounting and environmental accountants in organizational change. *Critical Perspectives on Accounting*, 6(3), 211-239.
- Greenpeace. (1998). The oil industry and climate change. Greenpeace International, August 1998, Amsterdam, the Netherlands.
- Griffiths, E. (2013). Abbott government begins process to repeal carbon tax; says pressure on Labor to honour mandate, *ABC News*. Retrieved from <http://www.abc.net.au/news/2013-09-09/abbott-carbon-tax/4945330>
- Grubb, M. (2005). The climate change challenge: Scientific evidence and implications: 1-21. *London: The Carbon Trust*.
- Guenther, E., & Stechemesser, K. (2012). Carbon accounting: a systematic literature review. *Journal of Cleaner Production*.
- Guidry, R. P., & Patten, D. M. (2012). Voluntary disclosure theory and financial control variables: An assessment of recent environmental disclosure research. *Accounting Forum*, 36(2), 81-90.
- Guthrie, J., & Parker, L.D. (1989). Corporate social reporting: a rebuttal of legitimacy theory. *Accounting and Business Research*, 19(76), 343-352.
- Guthrie, J., & Parker, L.D. (1990). Corporate social disclosure practice: a comparative international analysis. *Advances in Public Interest Accounting*, 3(2), 159-176.
- Guthrie, J., Petty, R., & Ricceri, F. (2006). The voluntary reporting of intellectual capital: comparing evidence from hong Kong and Australia. *Journal of Intellectual Capital*, 7(2), 254-271.
- Hackston, D., & Milne, M.J. (1996). Some determinants of social and environmental disclosures in New Zealand companies. *Accounting, Auditing & Accountability Journal*, 9(1), 77-108.
- Hamidi-Ravari, A. (2012). AASB staff paper–possible financial reporting implications of the fixed price phase of the carbon pricing mechanism for emitter entities. Retrieved 5 September 2012
http://www.aasb.gov.au/admin/file/content102/c3/Staff_paper_July_2012.pdf

- Haniffa, R.M., & Cooke, T.E. (2005). The impact of culture and governance on corporate social reporting. *Journal of Accounting and Public Policy*, 24(5), 391-430.
- Haniffa, R.M., & Cooke, T.E. (2005). The impact of culture and governance on corporate social reporting. *Journal of Accounting and Public Policy*, 24(5), 391-430.
- Haque, S., & Deegan, C. (2010). Corporate climate change-related governance practices and related disclosures: evidence from Australia. *Australian Accounting Review*, 20(4), 317-333.
- Healey, J. F. (2011). *Statistics: a tool for social research*. Cengage Learning.
- Hill, J. (2000). Visions and revisions of the shareholder. *The American Journal of Comparative Law*, 48, 39-79.
- Hogner, R.H. (1982). Corporate social reporting: eight decades of development at US Steel. *Research in Corporate Social Performance and Policy*, 4, 243-250.
- Holsti, O.R. (1969). *Content analysis for the social sciences and humanities*. Reading: Addison-Wesley.
- Hopwood, A.G. (2009). Accounting and the environment. *Accounting, Organizations and Society*, 34(3-4), 433-439.
- Hughes, S.B., Anderson, A., & Golden, S. (2001). Corporate environmental disclosures: are they useful in determining environmental performance? *Journal of Accounting and Public Policy*, 20(3), 217-240.
- Ienciu, Ionel-Alin. (2013). Environmental disclosure of romanian listed entities. *Research in Accounting in Emerging Economies*, 13, 235-254.
- Ingram, R.W., & Frazier, K.B. (1980). Environmental performance and corporate disclosure. *Journal of Accounting Research*, 18(2), 614-622.
- IPCC (Intergovernmental Panel on Climate Change) (2001). *Climate change 2001: mitigation*. Cambridge: Cambridge University Press.
- IPCC (Intergovernmental Panel on Climate Change) (2007a). *Climate change 2007: impacts, adaptation and vulnerability*. New York: IPCC.
- IPCC (Intergovernmental Panel on Climate Change) (2007b). *Climate change 2007: mitigation of climate change*. Cambridge: Cambridge University Press.
- IPCC (Intergovernmental Panel on Climate Change) (2013). *IPCC fifth assessment report: the physical science basis*. New York: IPCC.
- Islam, M.A., & Islam, M.A. (2011). Environmental incidents in a developing country and corporate environmental disclosures: a study of a multinational gas company. *Society and Business Review*, 6(3), 229-248.
- Jacobs, B. W, Singhal, V. R, & Subramanian, R. (2010). An empirical investigation of environmental performance and the market value of the firm. *Journal of Operations Management*, 28(5), 430-441.
- Jaggi, B., & Zhao, R. (1996). Environmental performance and reporting: perceptions of managers and accounting professionals in Hong Kong. *The International Journal of Accounting*, 31(3), 333-346.

- Jasch, C. (2006). Environmental management accounting (EMA) as the next step in the evolution of management accounting. *Journal of Cleaner Production*, 14(14), 1190-1193.
- Jenkins, H., & Yakovleva, N. (2006). Corporate social responsibility in the mining industry: exploring trends in social and environmental disclosure. *Journal of Cleaner Production*, 14(3), 271-284.
- Jensen, M. C. (2010). Value maximization, stakeholder theory, and the corporate objective function. *Journal of Applied Corporate Finance*, 22(1), 32-42.
- Jeswani, H. K., Wehrmeyer, W., & Mulugetta, Y. (2008). How warm is the corporate response to climate change? Evidence from Pakistan and the UK. *Business Strategy and the Environment*, 17(1), 46-60.
- Jones, M. J. (2010, June). Accounting for the environment: Towards a theoretical perspective for environmental accounting and reporting. In *Accounting Forum*, 34 (2), 123-138.
- Jones, M. J., & Solomon, J. F. (2010). Social and environmental report assurance: some interview evidence. In *Accounting Forum*, 34 (1) 20-31.
- Jose, A., & Lee, S.M. (2007). Environmental reporting of global corporations: a content analysis based on website disclosures. *Journal of business ethics*, 72(4), 307-321.
- Jowit, J. (2010). "World's top firms cause \$2.2tn of environmental damage, report estimates". *The Guardian*. Retrieved 13 August, 2013, from <http://www.guardian.co.uk/environment/2010/feb/18/worlds-top-firms-environmental-damage/print>
- Kaplan, S.E., & Ruland, R.G. (1991). Positive theory, rationality and accounting regulation. *Critical Perspectives on Accounting*, 2(4), 361-374.
- Kar, A., Rehman, I.H., Burney, J., Puppala, S.P., Suresh, R., Singh, L., . . . Ramanathan, V. (2012). Real-time assessment of black carbon pollution in Indian households due to traditional and improved biomass cookstoves. *Environmental science & technology*, 46(5), 2993-3000.
- Keller, G. (2011). *Statistics for management and economics* (9ed). Cengage Learning, USA.
- Kendall, R. (2014). Foundations give fossil-fuel divestment billion dollar boost. Retrieved 20 February, 2014, from <http://ethicalinvestor.com.au/foundations-give-fossil-fuel-divestment-billion-dollar-boost/>
- Kjellstrom, T.E., & Weaver, H.J. (2009). Climate change and health: impacts, vulnerability, adaptation and mitigation. *New South Wales Public Health Bulletin*, 20(2), 5-9.
- Kjellstrom, T.E., Neller, A., & Simpson, R.W. (2002). Air pollution and its health impacts: the changing panorama. *Medical Journal of Australia*, 177(11/12), 604-608.
- Knight, E.R.W. (2011). The economic geography of European carbon market trading. *Journal of Economic Geography*, 11(5), 817-841.

- Kolk, A. (2008). Sustainability, accountability and corporate governance: Exploring multinationals' reporting practices. *Business Strategy and the Environment*, 17(1), 1-15.
- Kolk, A., & Levy, D. (2001). Winds of change: corporate strategy, climate change and oil multinationals. *European Management Journal*, 19(5), 501-509.
- Kolk, A., & Levy, D. (2003). Multinationals and global climate change: Issues for the automotive and oil industries. *Research in Global Strategic Management*, 9, 171-193.
- Kolk, A., & Pinkse, J. (2004). Market strategies for climate change. *European management journal*, 22(3), 304-314.
- Kolk, A., Levy, D., & Pinkse, Jonatan (2008). Corporate responses in an emerging climate regime: the institutionalization and commensuration of carbon disclosure. *European Accounting Review*, 17(4), 719-745.
- KPMG. (2008). KPMG international survey of corporate responsibility reporting 2008. KPMG, Amsterdam, The Netherlands.
- KPMG. (2013). KPMG international survey of corporate responsibility reporting 2013. KPMG International.
- Krippendorff, K. (1980). *Content analysis: aAn introduction to its methodology*. Newbury Park, CA: Sage Publications, Incorporated,.
- Krippendorff, K. (2012). *Content analysis: An introduction to its methodology*: Sage Publications, Incorporated.
- Kuasirikun, N. (2005). Attitudes to the development and implementation of social and environmental accounting in Thailand. *Critical Perspectives on Accounting*, 16(8), 1035-1057.
- Lang, M., & Lundholm, R. (1993). Cross-sectional determinants of analyst ratings of corporate disclosures. *Journal of accounting research*, 31(2), 246-271.
- Li, Y., Richardson, G. D., & Thornton, D. B. (1997). Corporate disclosure of environmental liability information: theory and evidence. *Contemporary Accounting Research*, 14(3), 435-474.
- Lindblom, C. K. (1994). The implications of organisational legitimacy for corporate social performance and disclosur,. Paper presented at the Critical Perspectives on Accounting Conference, New York.
- Lodhia, S. (2003). Accountants' responses to the environmental agenda in a developing nation: an initial and exploratory study on Fiji. *Critical Perspectives on Accounting*, 14(7), 715-737.
- Lodhia, S. (2006). Corporate perceptions of web-based environmental communication: an exploratory study into companies in the Australian minerals industry. *Journal of Accounting & Organizational Change*, 2(1), 74-88.
- Lodhia, S., & Martin, N. (2011). Stakeholder responses to the national greenhouse and energy reporting act: an agenda setting perspective. *Accounting, Auditing & Accountability Journal*, 25(1), 126-145.
- MacKenzie, D. (2009). Making things the same: gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society*, 34(3), 440-455.

- Mahadeo, J. D., Oogarah-Hanuman, V., & Soobaroyen, T. (2011). Changes in social and environmental reporting practices in an emerging economy (2004–2007): Exploring the relevance of stakeholder and legitimacy theories. In *Accounting Forum*, 35 (3), 158-175.
- Maher, S. (2014, 5 February 2014). Billions in tax but only 0.3pc fall in carbon emissions *The Australian*, Retrieved 5 February, 2014, from <http://www.theaustralian.com.au/national-affairs/policy/billions-in-tax-but-only-03pc-fall-in-carbon-emissions/story-e6frg6xf-1226818073028#>
- Maraseni, T. N., Maroulis, J., & Cockfield, G. (2009). An analysis of australia's carbon pollution reduction scheme. *International Journal of Environmental Studies*, 66(5), 591-603.
- Mathews, M. R. (1993). *Socially responsible accounting*, London: Chapman & Hall.
- Mathews, M. R. (1997). Twenty-five years of social and environmental accounting research: is there a silver jubilee to celebrate? *Accounting, Auditing & Accountability Journal*, 10(4), 481-531.
- McCright, Aaron M, & Dunlap, R.E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *The Sociological Quarterly*, 52(2), 155-194.
- Mia, P., & Mamun, A.A. (2011). Corporate social disclosure during the global financial crisis. *International Journal of Economics and Finance*, 3(6), 174-187.
- Milne, M. J, & Adler, R. W. (1999). Exploring the reliability of social and environmental disclosures content analysis. *Accounting, Auditing & Accountability Journal*, 12(2), 237-256.
- Milne, M. J, & Patten, D. M. (2002). Securing organizational legitimacy: An experimental decision case examining the impact of environmental disclosures. *Accounting, Auditing & Accountability Journal*, 15(3), 372-405.
- Mobus, J. L. (2005). Mandatory environmental disclosures in a legitimacy theory context. *Accounting, Auditing & Accountability Journal*, 18(4), 492-517.
- Moneva, J. M, & Llenda, F. (2000). Environmental disclosures in the annual reports of large companies in Spain. *European Accounting Review*, 9(1), 7-29.
- National Geographic (2012). Air pollution. Retrieved 27 October, 2012, from <http://environment.nationalgeographic.com.au/environment/global-warming/pollution-overview/>
- Nema, P., Nema, S., & Roy, P. (2012). An overview of global climate changing in current scenario and mitigation action. *Renewable and Sustainable Energy Reviews*, 16(4), 2329-2336.
- Ness, K. E, & Mirza, AM. (1991). Corporate social disclosure: A note on a test of agency theory. *The British Accounting Review*, 23(3), 211-217.
- Newson, M., & Deegan, C. (2002). Global expectations and their association with corporate social disclosure practices in Australia, Singapore, and South Korea. *The International Journal of Accounting*, 37(2), 183-213.
- O'Dwyer, B., Unerman, J., & Bradley, J. (2005). Perceptions on the emergence and future development of corporate social disclosure in Ireland: engaging the voices

- of non-governmental organisations. *Accounting, Auditing & Accountability Journal*, 18(1), 14-43.
- O'Donovan, G. (2002). Environmental disclosures in the annual report: extending the applicability and predictive power of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 344-371.
- Owen, D. (2008). Chronicles of wasted time? A personal reflection on the current state of, and future prospects for, social and environmental accounting research. *Accounting, Auditing & Accountability Journal*, 21(2), 240-267.
- Parker, L.D. (2005). Social and environmental accountability research: a view from the commentary box. *Accounting, Auditing & Accountability Journal*, 18(6), 842-860.
- Parliament of Australia. (2010). Australian government response to climate change: Carbon pollution reduction scheme, Retrieved 20 July, 2013, from http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/ClimateChange/Governance/Domestic/national/cprs
- Parliament of Australia (2011). Australian Parliament: Clean Energy Act, 2011 available at <http://www.Comlaw.Gov.Au/details/c2011a00131>.
- Patten, D.M. (1992). Intra-industry environmental disclosures in response to the Alaskan oil spill: a note on legitimacy theory. *Accounting, Organizations and Society*, 17(5), 471-475.
- Patten, D. M. (2002a). Media exposure, public policy pressure, and environmental disclosure: an examination of the impact of tri data availability. *Accounting Forum*, 26 (2), 152-171.
- Patten, D.M. (2002b). The relation between environmental performance and environmental disclosure: a research note. *Accounting, Organizations and Society*, 27(8), 763-773.
- Pearse, G. (2009). *Quarry vision: coal, climate change and the end of the resources boom*. *Quarterly Essay*, (33), 1-122.
- Pellegrino, C, & Lodhia, S. (2012). Climate change accounting and the Australian mining industry: exploring the links between corporate disclosure and the generation of legitimacy. *Journal of Cleaner Production*, 36, 68-82.
- Perera, L, & Jubb, C. (2010). Voluntary disclosures by national greenhouse energy act-affected listed companies. Research paper, School of Accounting, Economics and Finance, Deakin University, Wollongong.
- Perry, N, Rosewarne, S, & White, G. (2013). Clean energy policy: taxing carbon and the illusion of the equity objective. *Ecological Economics*, 90, 104-113.
- Peters, G. P., Marland, G., Quéré C. Le, Boden, T., Canadell, J. G., & Raupach, M. R. (2011). Rapid growth in co2 emissions after the 2008-2009 global financial crisis. *Nature Climate Change*, 2(1), 2-4.
- Phillips, R., Freeman, E. R., & Wicks, A. C. (2003). What stakeholder theory is not. *Business Ethics Quarterly*, 13(4), 479-502.

- Prado-Lorenzo, J.M., , Luis, R.D., Isabel, G.A., & Isabel-María, G.S. (2009). Factors influencing the disclosure of greenhouse gas emissions in companies world-wide. *Management Decision*, 47(7), 1133-1157.
- PricewaterhouseCoopers (2009). Carbon ready...or not: A survey of australian business leaders' preparedness for the carbon-constrained economy and the carbon pollution reduction scheme. Accessed 11 February 2013
<http://www.Pwc.Com.Au/consulting/assets/publications/carbon-ready-jun09.pdf>.
- PricewaterhouseCoopers. (2010). Pricewaterhousecoopers 13th annual global survey, January 2010.
- Rankin, M, Windsor, C., & Wahyuni, D. (2011). An investigation of voluntary corporate greenhouse gas emissions reporting in a market governance system: Australian evidence. *Accounting, Auditing & Accountability Journal*, 24(8), 1037-1070.
- Roberts, R.W. (1992). Determinants of corporate social responsibility disclosure: an application of stakeholder theory. *Accounting, Organizations and Society*, 17(6), 595-612.
- Roper, J. (2012). Environmental risk, sustainability discourses, and public relations. *Public Relations Inquiry*, 1(1), 69-87.
- Rowe, A. L. (2010). Corporate kangaroos' and dragons' sustainability disclosures: a comparative analysis. Paper presented at the 6th Asia Pacific Interdisciplinary Research in Accounting Conference, 11 to 13 July 2010, University New South Wales, Sydney, Australia .
- Rust, R. T, & Cooil, B. (1994). Reliability measures for qualitative data: theory and implications. *Journal of Marketing Research*, 31 (1), 1-14.
- Schaltegger, S, & Burritt, R. L. (2000). *Contemporary environmental accounting: issues, concepts and practice*. :Greenleaf Publishing.
- Sen, M. (2011). Corporate environmental disclosure practices in India. *Journal of Applied Accounting Research* 12(2), 139-156.
- Simms, A. (2010). "The price of environmental destruction? There is none". *The Guardian*. Retrieved 13 August, 2013, from
<http://www.guardian.co.uk/environment/2010/feb/18/price-of-environmental-destruction>
- Simnett, R., & Nugent, M. (2007). Developing an assurance standard for carbon emissions disclosures. *Australian Accounting Review*, 17(42), 37-47.
- Smith, M., Yahya, K., & Amiruddin, A.M. (2007). Environmental disclosure and performance reporting in Malaysia. *Asian Review of Accounting*, 15(2), 185-199.
- Solomon, A., & Lewis, L. (2002). Incentives and disincentives for corporate environmental disclosure. *Business Strategy and the Environment*, 11(3), 154-169.
- Spence, C., Husillos, J., & Correa-Ruiz, C. (2010). Cargo cult science and the death of politics: a critical review of social and environmental accounting research. *Critical Perspectives on Accounting*, 21(1), 76-89.

- Staniskis, J.K., & Stasiskiene, Z. (2006). Environmental management accounting in Lithuania: exploratory study of current practices, opportunities and strategic intents. *Journal of Cleaner Production*, 14(14), 1252-1261.
- Stanny, E., & Ely, K. (2008). Corporate environmental disclosures about the effects of climate change. *Corporate Social Responsibility and Environmental Management*, 15(6), 338-348.
- Steenkamp, N., & Northcott, D. (2007). Content analysis in accounting research: the practical challenges. *Australian Accounting Review*, 17(43), 12-25.
- Stern, N. (2006). *Review on the economics of climate change*. London: HM Treasury.
- Sternberg, E. (1999). The stakeholder concept: a mistaken doctrine. *Foundation for Business Responsibilities*, Issue Paper 4.
- Suchman, M. C. (1995). Managing legitimacy: strategic and institutional approaches. *Academy of Management Review*, 20(3), 571-610.
- Tilling, M.V. (2004). Some thoughts on legitimacy theory in social and environmental accounting. *Social and Environmental Accountability Journal*, 24(2), 3-7.
- Tilling, M. V. & Tilt, Carol A. (2010). The edge of legitimacy: voluntary social and environmental reporting in rothmans' 1956-1999 annual reports. *Accounting, Auditing & Accountability Journal*, 23(1), 55-81.
- Tilt, C. A. (1994). The influence of external pressure groups on corporate social disclosure: Some empirical evidence. *Accounting, Auditing & Accountability Journal*, 7(4), 47-72.
- Tilt, C. A. (2001). The content and disclosure of Australian corporate environmental policies. *Accounting, Auditing & Accountability Journal*, 14(2), 190-212.
- Tranter, B. (2011). Political divisions over climate change and environmental issues in Australia. *Environmental Politics*, 20(1), 78-96.
- Ullmann, A. A. (1985). Data in search of a theory: a critical examination of the relationships among social performance, social disclosure, and economic performance of US firms. *Academy of management review*, 10(3), 540-557.
- UN (United Nations) (2012). Global agreement: UNFCCC and Kyoto Protocol. Retrieved 8 November, 2013, from <http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-negotiations/the-un-climate-change-convention-and-the-kyoto-protocol>.
- UNEP (2001). State of the environment –South Asia and the Pacific, Retrieved 2 October, 2013, from http://www.rrcap.ait.asia/pub/soe/sa_part2_3.pdf
- UNEP (2013). Portfolio carbon: Measuring, disclosing and managing the carbon intensity of investments and investment portfolios, available at http://www.unepfi.org/fileadmin/climatechange/UNEP_FI_Investor_Briefing_Portfolio_Carbon.pdf
- Unerman, J. (2000). Methodological issues-reflections on quantification in corporate social reporting content analysis. *Accounting, Auditing & Accountability Journal*, 13(5), 667-681.
- UNFCCC (United Nations Framework Convention on Climate Change) (2012). Doha amendment to the Kyoto Protocol to the United Nations Framework Convention.

Retrieved from:

https://unfccc.int/kyoto_protocol/doha_amendment/items/7362.php.

- Upstill, G. (2012). *R&D management challenges in CCS*. Paper presented at the R&D Management Conference, Grenoble, France.
- Van der Laan Smith, J, Adhikari, A, & Tondkar, R. H. (2005). Exploring differences in social disclosures internationally: a stakeholder perspective. *Journal of Accounting and Public Policy*, 24(2), 123-151.
- Warwick, P., & Ng, C. (2012). The 'cost' of climate change: how carbon emissions allowances are accounted for amongst European Union companies. *Australian Accounting Review*, 22(1), 54-67.
- Watts, R., & Zimmerman, J. (1986). Positive accounting theory.
- Weber, R.P. (1990). *Basic content analysis*. : Sage.
- Weiss, N. A, & Weiss, C. A. (2012). *Introductory statistics*. 9th edition: Pearson Education.
- Williams, S.M. (1999). Voluntary environmental and social accounting disclosure practices in the Asia-Pacific region: An international empirical test of political economy theory. *The International Journal of Accounting*, 34(2), 209-238.
- Wiseman, J. (1982). An evaluation of environmental disclosures made in corporate annual reports. *Accounting, Organizations and Society*, 7(1), 53-63.
- Zhou, X., James, G., Liebman, A., Dong, Z.Y., & Ziser, C. (2010). Partial carbon permits allocation of potential emission trading scheme in Australian electricity market. *Power Systems, IEEE Transactions on*, 25(1), 543-553.

APPENDIX I: List of Sample Companies

Aditya Birla Minerals Ltd	Mount Gibson Iron Limited
AGL Energy Limited	National Australia Bank Limited
Amalgamated Holdings Limited	NavigatoR Resources Limited
Amcor Limited	Newcrest Mining Limited
AMP Limited	Norton Gold Fields Limited
Australia and New Zealand Banking Group Ltd	Nufarm Ltd
Automotive Holdings Group Limited	Orica Limited
BHP Billiton Limited	Origin Energy Limited
BlueScope Steel Limited	OZ Minerals Limited
Boral Limited	Panoramic Resources (Sally) Limited
Brickworks Ltd	Penrice Soda Holdings Limited
Caltex Australia Limited	Perilya Limited
Coca-Cola Amatil Limited	Ramsay Health Care Limited
Commonwealth Bank of Australia	Regional Express Holdings Ltd
CSL Limited	Regis Resources Limited
CSR Limited	Resolute Mining Limited
Downer EDI Limited	Ridley Corporation Limited
Elders Ltd	Santos LTD
Energy Developments Limited	Saracen Mineral Holdings
Envestra Limited	Sonic Healthcare Limited
Evolution Mining Limited	St Barbara Limited
Fairfax Media Limited	Straits Resources Limited
Focus Minerals Ltd	Suncorp Group Limited
Fortescue Metals Group Ltd	Super Retail Group Limited
Goodman Fielder Limited	Telstra Corporation Limited
GRAINCORP LIMITED	Toll Holdings Limited
Grange Resources Limited	Transfield Services Limited
Harvey Norman Holdings Limited	Transpacific Industries Group Ltd
Iluka Resources Limited	Virgin Australia Holdings Ltd
Incitec Pivot Limited	Warrnambool Cheese & Butter Factory Company Holdings Ltd
Independence Group NL	WESFARMERS LIMITED
Kagara Ltd	Western Areas NL
LEIGHTON HOLDINGS LIMITED	Westpac Banking Corporation
Lindsay Australia Limited	WOODSIDE PETROLEUM LTD.
Macquarie Group Limited	Woolworths Ltd
Metcash Limited	

APPENDIX II: Disclosure Checklist (Index)

Checklist Items	
Items Name	Description
Mention of NGER	If a company mention about National Greenhouse and Energy Reporting (NGER) Act or legislation
Discussion of <i>NGER Act</i>	If a company provided details about NGER rather than just mentioning it.
Pressure for Action to reduce GHG	If a company reported that it has felt pressure or they have force to reduce GHG emission
Statement of concern about GHG	If a company stated that it concern or worried about its GHG emission and / or its impact
Statement about reducing GHG	If any company mention that they are committed or planning to reduce their GHG emission
Mention of current year GHG emission (amount)	If any company provided the numerical figure of their reported year's (current financial year) GHG emission
Comparative figure of GHG emission by year (amount)	If a company provided the past and present comparative figure of total GHG emission
Past reduction of GHG (amount)	If a company stated how much GHG emission it has reduced in past financial years in terms of percentages or total amount.
Current reduction of GHG (amount)	If a company stated how much GHG emission it has reduced in current financial year compare to past financial years in terms of percentages or total amount
Future reduction target (amount)	If a company reported its future GHG reduction target in terms of percentages or total amount
Action to reduce GHG emission	If a company reported their past and current activates to reduce GHG emission. For example, it could be that companies are looking into clean energy or invest in advance technology to reduce emission
Mention of CPRS/CT/ETS	If any company mention about carbon tax, carbon price, emission trading or Clean Energy Act
Details of CPRS/ETS	If any company not only mention about carbon tax, carbon price, emission trading or <i>Clean Energy Act</i> but also provided a bit details about those terms.