Analysis of Carbon Neutrality Programmes in the International Market

by

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Thesis

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Abstract

Carbon Neutrality is a new concept that lacks a broadly accepted definition. There are diverse definitions and many different carbon neutrality programmes available in the market. The availability of so many diverse definitions and programmes can create confusion about what consumers are buying and whether or not it is of a reasonable level of quality.

This thesis's aim was to analyse a selection of programmes from the Carbon Neutrality market to gain a greater understanding of content, process, and criteria that comprise carbon programmes. As there was a lack of literature available on Carbon Neutrality; this thesis developed a series of criteria that were developed from a literature review of the broader literature of environmental. The literature review focused on potential market failures, environmental reporting and eco-labels, which identified issues such as information asymmetry, lack of transparency, and adverse selection. Of the Carbon Neutrality service providers asked to participate in this thesis, the majority declined, as a result two were analysed; The Carbon Neutral Company, and CarbonZero.

The analysis showed that the programmes use many, but not all, of the criteria identified by this thesis as necessary to provide accurate and comprehensive Carbon Neutral accreditation. The programmes varied in their definitions of what is Carbon Neutrality. This was illustrated by which sections of their programmes were voluntary and which were mandatory. This thesis came to the conclusion that as an undeveloped market there are issues around what should be included in a programme. The criteria developed by this thesis also have the potential to be used for analysing environmental reporting standards and eco-labels. Furthermore methods of communicating a programme's content and the outcome of CN accreditation varied, exhibiting both positive and negative aspects addressing issues such as information asymmetry and adverse selection.

Key Words: Carbon, Neutrality, Market failures

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Tables and Figures

1.0 Introduction

Climate change is an important issue facing the world today, and has given rise to organisations like the International Panel on Climate Change (IPCC) which is dedicated to reviewing the science of climate change and its impacts.

In the *Climate Change 2007: Synthesis Report Summary for Policy Makers* (2007; 2) the IPCC states that warming of the climate system is unequivocal and that regional changes are affecting natural systems. There is the potential for many negative impacts to occur because the global climate changing as a result of anthropogenic Greenhouse Gas (GHG) emissions being released in to the atmosphere. Furthermore the IPCC (2007; 5) states that '*Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004'*. Increasing emissions need to be addressed to avoid risk of severe impacts stemming from climate change. Kelly and Kolstad (2001; 153) revisit the 'Malthusian spectre' stating that '*there are two ways to damage the global environment: directly GHGs and indirectly emitting GHGs by generating more people'*. This emphasises the need for GHG abatement, which will need to increase in light of increasing population growth. Coasian theory (Daly and Farley, 2004; 177) would dictate that the production of GHGs would be reduced until the marginal benefit of production would equal the marginal cost to the planet. However due to the global nature of climate change and the fact that many vulnerable developing production systems and economies are reliant on GHG producing technologies, restricting GHG production is difficult without causing negative side effects. According to Coasian theory the high transaction cost of reducing GHGs would require government intervention; this has led to the formation of the Kyoto protocol. The Kyoto protocol, was adopted in 1997, led to binding targets for 37 industrialised countries (UNFCCC, 2008). This allows the trade of GHG emission reductions and removals between Kyoto signatory countries. In response to this, and independently, voluntary carbon trading markets have developed both regionally and nationally (European and Chicago Markets).

In 2006 the Oxford University (Oxford university press (2006) word of the year was carbon neutral. It was defined as follows:

'Being carbon neutral involves calculating your total climate-damaging carbon emissions, reducing them where possible, and then balancing your remaining emissions, often by purchasing a carbon offset: paying to plant new trees or investing in "green" technologies such as solar and wind power'.

Leguet and Bellassen (2007; 2) define a carbon footprint as a certain amount of gaseous emissions that are relevant to climate change and associated with human production or consumption activities. They interpret Carbon Neutrality (CN) as the state when actual emissions are equivalent to compensated emissions.
The Total Environment Centre (TEC) (2007; 2) describe CN as:

> '*Carbon neutrality does not mean emissions have been negated entirely by offsite measures; it represents a higher quality of action by changing business-as-usual behavior as the bulk of the response to global warming'.*

These definitions illustrate differences between the understandings of what CN is exactly. The Oxford dictionary's '*reducing emissions where possible'* and TEC's mandate for reducing emissions instead of offsetting them entirely show an important aspect of CN; that of reducing emissions. Rather than solely offsetting the emissions of an organization seeking CN, reducing emissions shows a commitment to addressing the issue of climate change rather than buying the appearance of being green through offsets. The definition of a carbon footprint as '*human production or consumption activities'* details another point, that of what boundaries encompass an organization's emissions. CN accreditation organizations need to clearly define how boundaries apply to a reporting organization's footprint. Life cycle emissions of products, and emissions produced by subsidiaries are two examples of how an organization's emissions may not be readily apparent, or easily calculable.

As illustrated by the three different definitions of CN listed above - the first provided by a dictionary, the second from academia, and the third from industry- there is great diversity in how the term is used. This has implications for consumers seeking to

purchase CN as the quality of the CN they purchase depends on the definition used by the programme of CN purchased.
Trexler and Kosloff (2006) state that no commonly accepted standards for what CN is exist, however the World Resource Institute GHG protocol and the ISO 14064 series provide methods for measuring, reducing, and mitigating (through offsets) carbon emissions. These are the three basic steps a CN programme would typically carry out to achieve CN. The inconsistencies and fragmentation of definitions and requirements used by CN programmes means that the programmes cannot easily be compared and is therefore cause for consumers to be wary with their spending in the burgeoning CN market. This situation has the potential to stunt the CN market's growth.

Gillenwater *et al.* (2007) postulate that the uncertainty produced by the host of independent 'programmes' operating in a vacuum without common standards also has the potential to discredit market-based environmental policies as a means of addressing climate change. Market-based mechanisms such as CN programmes are an important tool to reduce the environmental damage caused by industrialized society. There needs to be standardization and control where there is evidence of market failures or where it is apparent that the mechanism is inefficient. Gillenwater *et al.* (2007) identify information asymmetry, transparency and accreditation rigor as problems that similarly exist within the development of product programmes for, amongst other sectors, organic foods and sustainable forest products. These problems can create further consumer distrust and need to be addressed to ensure that the market provides comprehensive and accurate programmes.

Market accreditation processes with comprehensive criteria and quality assurance may be more costly than cheaper options that may have weaker criteria and assurance. Consumers will want to pay the least amount for high quality programmes. This may lead to the price being dictated by demand, thereby discouraging high quality and cost accreditation programmes through the propagation of low cost programmes and scarcity of adequate information. Consumers need information on the quality and content of CN programmes in order to make a clear and informed choice. This needs to be both market-wide and within individual programmes to allow consumers to make comparisons. It must also ensure that poorer programmes within the CN market do not misrepresent themselves at the cost of higher quality programmes.

Where buyers cannot easily evaluate the quality of a good or service, there is a clear need for quality assurance mechanisms. Without such mechanisms, competitive pressures force sellers to minimize quality and limit transparency in order to mislead consumers as to the quality of their programme. Gillenwater *et al.* (2007) state that this situation will result in bad projects driving good projects out of the market, leading to what is called a 'market for lemons'. This shows a need for mechanisms within the market that clearly differentiate between low and high quality programmes.

Harris (2007) identifies the issue that customer preference for benefits additional to CN such as sustainable development and conservation also accounts for the high prices sometimes observed, forcing these co-benefits out of the market, although offsets (as part of CN accreditation) can provide sustainable development and conservation at little extra cost.

Internally reducing GHG emissions as part of CN accreditation can be seen as a costly co-benefit. In some cases, reducing reporting organization's GHG emissions is more costly than offsetting them. This can lead to a situation in which an organisation only offsets their emissions, and does not reduce their actual output of GHGs. Depending on the definition of CN being used, emissions reductions as part of the accreditation process may be mandatory. Identifying the programmes that require reductions from the ones that do not is important to allow accurate consumer choice. It could even be argued that CN without emissions reductions is not true CN as it does not show a commitment to reducing emissions.

Despite market uncertainty a wide range of businesses are still looking at becoming carbon neutral, either to gain a larger market share by selling a green product or to avoid negative impacts related to future regulation in this carbon constrained world. Ensuring consumers are assured a degree of confidence, legitimacy, and security, will lead to an increase in market security for CN. This thesis aims to gain an understanding of the CN market though a literature review, developing criteria for analysing a programme's quality, and an analysis of available CN programmes with the goal of providing examples of points of convergence in the criteria and processes used in carbon neutral certification.

2.0 Methodology

2.1 Research question

What does the literature on accreditation and certification suggest are vital elements for consumer assurance programmes, and to what extent do the two Carbon Neutrality programmes examined meet these standards?

2.2 Aim and Objectives

This thesis aimed to increase understanding of the CN market through an analysis of CN certification programmes. To achieve this; two case studies were carried out that analysed CN programmes. It was initially decided upon to examine three programmes for this thesis; however, only two participated, for reasons which are discussed later It may have been the letter attached to the e-mail could have been off putting to programme providers; the letter is listed in Appendix 2.

The criteria used in the case studies were based on a survey of the literature on environmental standards, consumer information, information asymmetry, assurance, and corporate transparency. The analysis focused on the content of CN programmes and how they provide accuracy and quality to the reporting organisations that purchase them.

The following objectives were identified to achieve this thesis's aim:

A. To gather the available literature relevant to the quality and accuracy of programmes of CN, with the goal of identifying potential market failures, differences, and common criteria and processes.
B. To create a 'best practice' check list of criteria for analysing CN programmes;
C. To use the 'best practice' criteria to assess two CN programmes;
D. To analyse the data to from the assessment of the CN programmes to identify the pros and cons of the selected programmes;
E. To use the findings of the analysis in light of the broader literature gathered by this study to make observations and suggestions for the growing CN market

2.3 Methods

The methodology for this thesis was based on Nilsson *et al.* (2004) study on European eco-labels. This thesis used the Nilsson *et al.* method of identifying programmes available in the market through literature reviews and online newspaper searches. Although Nilsson *et al.* used interviews with industry experts to identify programmes and gain a more in-depth understanding of eco-labels; this aspect of their methodology was omitted due to time constraints. Instead, this thesis relied on detailed research carried out through the literature review to provide an in-depth understanding of the market and content of CN programmes. This aimed to bypass the need to carry out interviews with programme providers to gain a greater understanding of CN programmes.

Rather than basing the study on consumer expectations of a programme's content (as Nilsson *et al.* did) this thesis analysed the literature on qualitative aspects of programmes and what potential market failures may affect them. Consumer expectations were not included. This is because the CN market is new and consumer knowledge of the concept and processes involved in CN seems to be low due to the concept's relative newness and the complexity involved in the CN accreditation process.

A literature review was chosen because it uses information developed by a wide range of experts to address the certification and accreditation issues. This aids analysis by providing diverse and in-depth view points and assessments carried out at an academic level. Extracting from the literature both the positive and negative aspects of environmental accounting, reporting, and eco-labelling allowed this thesis to gather common aspects of similar studies to apply them to CN programmes. This was also done because there appears to be a dearth of studies on CN certification programmes.

The literature review enabled this thesis to identify a series of criteria that could be used to analyse programmes of CN available in the market. These criteria were laid out to address each stage of CN accreditation: inventory measurement, emission reductions, offsets, and third party verification as well as broader controls like stakeholder dialogue that have been identified in the literature review. This

perspective allows the thesis's analysis to focus on a broader range of issues rather than the basic framework of a CN programme.

CN is a complex idea, as are market failures, environmental accounting and reporting, and eco-labels: all of which were researched in the literature review section of this thesis. Complex ideas need a complex analysis that addresses their inter-connected and multi-faceted nature. This is why this thesis chose to use a qualitative research methodology based on the use of criteria extracted from the available literature. This allows a more in depth review of a small section of a new market.

2.4 Theoretical framework

This thesis is based on the view of Stern (2008; 1) that GHG emissions are externalities and represent the biggest market failure the world has seen, and that the externality of GHG emissions needs to be addressed by both market based and governmental tools. Carbon Neutrality can be an effective tool to enable businesses or other organisations to reduce and offset their GHG emissions.

This thesis is based on the view that climate change is one of the biggest issues facing mankind. Studies carried out by the International Panel on Climate Change (IPCC) (2007; 53) have found that '*anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change*'. To prevent any such impacts, change needs to be effected in the form of both policies but broader societal change in behaviour and consumption practices. This thesis agrees with the IPCC (2007; 45) that '*with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades'*. Current policies and behaviour are not sustainable and are leading to an increase in emissions.

Stronger and more numerous tools need to be implemented in both the policy and business arenas to slow the increase in emissions. The IPCC (2007; 56) states that the '*capacity to adapt and mitigate is dependent on socio-economic and environmental circumstances and the availability of information and technology'*. Processes need to be implemented where incentives for reductions of GHGs are going to be effective, and have a broad impact. Policies such as putting a price on carbon and trading it, along with offsetting are important steps in this process, from which CN is the logical

next step. Therefore the aim of thesis is to increase understanding of the CN market as this is a key area in a broader swath of tools aimed at reducing human impacts on the climate.

There are few studies on the quality of CN programmes as the CN market (and concept) are relatively new. As a result there are differing definitions of what CN is and a lack of standardisation of programmes available in the market. This has lead to variability in the content and application of these programmes. Although regional accreditation programmes may have mitigated this to a degree, there are still issues for areas not covered by regional agreements or for purchasing programmes across regional boundaries. The global nature of the market means that purchasing of programmes can occur in different regions and some CN programmes even have offices in different regions. Therefore this thesis set its scope at an international level rather than a local one.

This thesis is also predicated on the view that reductions in GHG emissions are an important part of Carbon Neutrality. Making emissions reductions is an important part of changing behaviour from consuming unnecessary amounts, and by changing an organisations business practice. This has flow on effects in changing an organisation's practices and behaviour and by sending market signals through purchasing preference that low carbon products are preferable.

3.0 Literature review

Market information between producers and consumers is asymmetric in the carbon neutrality (CN) market. The methods, criteria, quality, and comprehensiveness of the CN processes are not always available to the consumer and involve a lot of complex information, which may not be readily understandable to the layperson. To become well informed, consumers would need to research the quality of the product, but to do this they would have to:

- Be able to afford the time and money spent searching;
- Have information that is readily available and understandable;
- Find information that is reliable and not misleading.

Not all consumers have the time, knowledge, or access to the information to incur these search costs. Regulations or incentives for the producers to produce higher quality product is one solution. Third party auditing (and certification) and quality labels have been used as alternatives in certain other markets, such as timber (e.g. the Forest Stewardship Council) and fisheries (e.g. The Marine Stewardship Council's Certification; Forest and Bird's "Best Fish Guide"). This section of the thesis aims to study the relevant literature about environmental labelling and/or certification of goods as well as assurances, motivations for purchasing accreditation, and solutions for market failures in the environmental goods and services markets.

3.1 Actors and the nature of the demand for CN

In the market for environmental standards there are a series of actors consisting of: consumers; producers; providers of standards or eco-labels (government, NGO, producer accord, consumer group etc); and third party auditors, and potential regulators who may step in.

Okereke (2007; 475) states that motivations are regarded as those factors that closely relate to the innate concern of business for profit and comparative advantage. Drivers are considered to be the factors that are rooted in wider societal pressures and concern for the environment. Motivations for a corporation seeking CN accreditation is an important aspect as it denotes whether or not the organisation is committed to reducing their GHG footprint or solely interested in increasing market share.

Okereke (2007; 480) lists motivations for corporate action on climate change:

1. *Profit;*
2. *Fiduciary obligations: The nature of fiduciary obligation is that a party places trust and confidence on another, and subsequently expects the party to which confidence has been given (the fiduciary) to act on behalf and in the best interest of the party by exercising their professional expertise and discretion;*
3. *Competition for credibility and subsequently for leverage in climate policy development circles;*
4. *Potential business loss or risk stemming from inaction against climate change; and*
5. *Ethical considerations.*

The following are examples of drivers for corporate action on climate change as identified by Okereke (2007; 282):

1. *Energy prices: industrialized countries rely upon energy to power their economy; rising energy prices as a result of climate change will likely impact a company's performance. Thus, from a corporation's (as well as the individual's) perspective, there is a need to act on climate change or at least implement some energy efficiency measures.*
2. *Market shifts: a consumer driven shift in the market towards more climate-friendly companies cannot be ignored without potentially losing some market share. Therefore, a company must adjust its practices accordingly or else risk losing business;*
3. *Regulation and government directives: present and future regulations are a main driver for action;*
4. *Investor pressure: The pressure from shareholders to reveal GHG impact assessment reports could signal a wider social change which acknowledges the relevance of climate change to all aspects of our lives and calls for action on its mitigation; and*
5. *Technological change: while this may not be a driver, it is a provider of change that improves the ability to change. Amongst other things, technological change can provide economic gains in the reduction of production costs and improved efficiency and the reduction in cost and development of climate friendly technology.*

Darnall (2003; 482) states that motivations are the formal and informal forces exerted on organisations by institutions on which they are dependent. Such pressures include: regulatory forces; market pressures such as mandates on suppliers and demands from customers; cultural and social expectations, and; mimicry, which is actions taken by organisations to model themselves on other enterprises. Organisations must respond to external influences if they are to retain a competitive advantage in the market. This can involve reacting to stakeholders demands or responding to governmental pressure to avoid legislative restrictions being imposed.

Le Grand (1995; 1) lists motivations that could be applied to producers choosing to provide (or adhere to) programmes:

- *Altruism: for purely moral purposes;*
- *Self interest: Market share, which can include product differentiation; and*
- *Passive recipients: Or to ensure that other businesses do not gain an advantage over them by adopting these programmes.*

Motivation can also drive an organisation to bow to forces within or outside of the market and seek to become accredited through environmental reporting, and thus reap the benefits which will be in part tied to their motivation.

3.2 Types of programmes or quality assurance identified

Methods of environmental certification can address a wide range of environmental practices, such as: production methods, resource efficiency, environmental management systems, offsetting pollution, and pollution abatement, among other things. The focus of environmental certification can differ between industry and company.

While comprehensive programmes can be effective, they can be useless if adherence is not assured. Some methods available to ensure adherence to certification programmes are: incentives or reciprocity, reputation mechanisms, legislation (standards and liability), auditing, and third party reporting. Each provides varying levels of detail and effectiveness, and is unlikely to be applicable over all industries and environmental issues. Popular programmes for certification are available widely in the market, a well known example being the ISO series of standards.

3.3 Environmental standards

The main methods of environmental certification addressed by this thesis are eco-labels, quality assurance, third party assessment, and auditing, reporting. By reviewing these methods the potential failures and strengths of the environmental certification markets can be examined.

3.4 Eco-labels

Banerjee and Solomon (2003) describe the purpose of eco-labels as making relevant environmental information about a product available to the appropriate consumers through the product label. This disclosure is a method of providing information to consumers to allow them to make an informed decision on the nature of the product. By influencing consumer choice, labels influence producer behavior towards being increasingly environmentally friendly in an attempt to increase their market share. Also, by providing information (if accurate and readily understandable) to the consumer, the disclosure partially addresses the market failure of information asymmetry on a good's environmental qualifications. The data must be comprehensive and accurate, as misleading data will distort the market.

The reputation mechanism can influence the consumer's perceptions of the efficacy of eco-labels. Graafland and Smid (2004; 283) argue that because these labels make it easier for stakeholders to identify the actions of the company, labelling will enhance the working of the reputation mechanism as well and allow market segmentation. If, however, there is an abundance of eco-labels in the market, consumer distrust of this method can develop.

Truffer *et al.* (2001; 888) provide four different definitions of what eco-labels can consist of:

- *Eco-labels are an investment in the quality of a product or service which states that it has been produced using a sustainable practice or environmentally friendly materials;*
- *Eco-labels are information providers that enable uninvolved consumers to make informed decisions in the messy environment of a deregulated market, where there is a need for higher-aggregated information and guidance;*
- *An eco-label is a differentiator: providing a distinctive symbol revealing differences between more sustainable and less sustainable practices, which consumers might have been aware of but which they could not identify in the market; and*
- *Eco-labels can represent an ideal such as sustainability and therefore ensure that the criteria on which this ideal is based are inherent in the production of the good or service.*

Summing up the different categories, eco-labels provide information allowing consumers to avoid transaction costs, and make informed decisions, and bypass the market failure of information asymmetry. This allows goods to be differentiated, enabling consumer preference for environmentally friendly goods to be accurately expressed. As such, the label needs to be comprehensive and accurate as well as being viewed as trustworthy.
Truffer *et al.* (2001; 889) explain that the potential market share of an eco-label depends on whether the label is easily recognized as a trustworthy indicator by the relevant consumer segments.
Recognition and consumer trust can be achieved through accountability and transparency, both of which are related to the nature of the information provided to the consumers. If the label does not provide the necessary information, then there is an increased chance that it will not differentiate itself from other goods or labels in the market.

Transparency in the label's accreditation criteria and assessment processes are very important factors which restrict labels from being misleading, thereby enhancing accountability. If transparency is not assured, then a market could develop with poor

eco-labels providing an incentive for unscrupulous producers to use labels that do not require environmentally sound practices. Not only does this reduce the incentive for positive environmental practice, but it also creates distrust by the consumers which will ultimately reduce the amount of potential market share of all eco-labels.

Truffer *et al.* (2001; 891) identify accountability as an important factor that depends on the ability of the labeling organization to guarantee that the necessary criteria have been applied to the product in a transparent and objective manner. The criteria for which the eco-label is awarded needs to be clearly stated and credible, otherwise the claims of being environmental friendly can be challenged, thereby damaging the reputation of the label. Nilsson *et al.* (2004; 517) assert that credibility tools are needed to build a positive reputation on the quality assurance aspect of the label. This can consist of tools such as third party accreditation or verification of the eco-label claims, as well as governmental standards enshrined in legislation. These tools must be readily understandable by the consumer and able to be differentiated from other, potentially false claims, in order to be effective.

Truffer *et al.* (2001; 889) maintain that consumer behavior will also depend on the applicability of the label for producers and consumers. The result of the assessment will depend crucially on its completeness, i.e. the environmental impacts selected for comparison and the applied minimum standards. As there are many different eco-labels for many different environmental issues, there is a chance that by not addressing the issue most thought about by consumers, label providers will fail to corner a section of the market. Poor, incomplete or low minimum standards will also fail to gain an effective share of the market. A label must address relevant problems in an effective manner: failure to do so will result in a low market share.

Other potential failures are identified by Bruce and Laoiya (2007; 276-277):

1. *The free rider problem: A distortion in the market in relation to the demand for eco-labels by consumers who do not buy the eco-labeled product, but benefit from the environmental gains of other products achieving specific environmental standards;*
2. *Over investment in pollution abatement and reduction of investment in the environment: either the label requires too much or too little abatement which causes the market to become inefficient or the environmental standard to become too low; and*
3. *Transparency and variability of the labels claims: if the eco-label is unverifiable then the consumer cannot effectively choose their preference;*

All of these potential failures identify issues that a label needs to address. They identify gaps between the product's perceived and actual environmental performance and the ability of consumers and producers to maneuver in the market.

Graafland and Smid (2004; 257) state that another current issue with eco-labels is whether a label can represent an 'ideal' like sustainability (or Carbon Neutrality). The static usage and application of an unresponsive eco-label only evaluates products as they exist in the marketplace today, and on publicly known technologies. Because CN can be described as having an evolving definition, or as being an ongoing goal rather than a set series of practices, using an eco-label would be misleading. Furthermore, evolving definitions or differing definitions lead towards different programmes claiming to represent the same thing, in effect 'apples being compared with oranges'. Again, the CN process can be misleading if the differences between the process and the perceptions of the buyers are not addressed. Tradeoffs between these views need to be dealt with carefully. Bruce and Laroiya (2007; 890) state that neither sticking to scientific process only, nor opportunistically following customer perceptions will provide a satisfying answer. An eco-label must communicate its information accurately, reaching a balance between sound science and the understanding of consumers.

Despite the potential failures, Bruce and Laroiya (2007; 891) state that eco-labels still have a place in the market. Labels have been most successful in complex product sectors like sustainable wood products, and organic food, which were developed in a joint effort uniting representatives of the environmentally motivated firms and environmental NGOs.

3.5 Auditing, accounting and reporting

Increasingly stakeholders of firms are demanding environmental audits and reporting along with financial reports. This is part of a wider move towards environmental responsibility in corporations.

Auditing and reporting can consist of reviewing a firm's environmental record and management practices and providing a report to inform stakeholders. This can be measured against a baseline standard or provide a benchmark for future improvement with each annual report. Adams (2004) states that a good report should be transparent and represent a genuine attempt to provide an account which covers negative as well as positive aspects of all material impacts.

Gray (2000; 248) states that an environmental or social report might be thought of as seeking to satisfy *either* the intentions of management *or* the demands of accountability. A report can provide stakeholders with the relevant information allowing them to make decisions on a firm's practice or present the firm in a favorable light to stakeholders. It is important to ensure that reports are accountable, and that there are checks in place to ensure this. In his article Gray (2000; 248) defines audit as meaning the attestation to some characteristic(s) of a report (i.e. the financial accounting meaning) but notes other meanings such as investigative or taking-the-pulse audits. In the case of CN, an audit attests to a series of steps leading to accreditation. Generally this would involve; measurement of emissions, reductions of emissions, offsetting of emissions, and verification and marketing.

Adams (2004; 732) defines accountability as the "giving of an account" encompassing both the "account" itself and the process followed in providing that account to stakeholders. CN is the accounting of a firm's GHG emissions and the methods through they are reduced and offset by a firm. Brown and Fraser (2006; 108) describe accountability, in its core sense, as meaning 'being called to account for one's actions'

and that accounting itself helps to make things account-*able*. It is important for these firms to also be accountable and provide detailed reports on the CN process. Adams (2004; 732) assert that to be accountable, reports need to demonstrate corporate acceptance of ethical, social and environmental responsibilities. Such acceptance can be demonstrated through a clear statement of values with corresponding objectives and quantified targets with expected achievement dates. A report should then be published tracking progress towards these targets. Targets without reports do not provide evidence of any gains or practices, rendering the statement of commitment to environmental responsibility empty.

Ball *et al.* (2000; 2) indentifies a similar problem: that in the absence of clearly laid down standards of performance the environmental management system itself becomes the only available, and auditable, 'fact'. This can lead to poor performers giving the illusion of good performance through high annual gains. It is important, therefore, to show the detail of the management system to stakeholders. In the case of CN this would be the programme of CN or the process of CN accreditation that a reporting organisation processed through.

The information provided by auditing and reporting is the most important aspect of environmentally informed programmes and labeling. There are various ways in which a false reputation for environmentalism can be built by misinformation, a situation that has led to the term 'green wash'. Ball *et al.* (2000; 6) also refer to disclosure of results of corporate environmental reporting as an issue. This is where corporations will only present information favorable to their image from an environmental audit. Incomplete reporting can be viewed as a form of 'green wash' relying on the information asymmetry between the firm and the market stakeholders.

Ball *et al.* (2000; 4) state that reporting on environmental management standards can have a determinedly managerialist focus and can place more emphasis on the systems that a company has in place to monitor and control environmental performance than on the control of that performance itself. This could manifest itself in the CN market as non disclosure of a CN programme, no reports on an organisation's accreditation process, or no reports on an organisation's GHG reduction performance.

Ball *et al.* (2000; 6) identify another form of misinforming through reporting as giving primacy to internal constituencies. This, due to the fact that the information needs of internal and external readers are fundamentally different, leads to irrelevant, misleading, or uninformative, material being provided. Tools must be in place to ensure that a CN programme addresses external stakeholders' needs as well as internal ones. Managerial capture, leading to the provision of incomplete information, is a major auditing and reporting issue. O'Dwyera and Owen (2005) warn that firms may only collect and disseminate information if it is deemed appropriate to advance the corporate image, rather than seeking true transparency and accountability to stakeholders. A CN programme must be designed to prevent this from happening.

To aid information relevance in the reporting process, solutions such as stakeholder involvement need to be provided throughout the report. Stakeholders informing report content can also aid comparisons between programmes if they both allow this, improving overall market transparency. O'Dwyera and Owen (2005; 209) opine that stakeholder involvement in environmental reporting is a main requirement for accountability, as it allows the assurance process to enlighten, inform, and enable criticism and substantive change. Such stakeholder involvement shows honesty and a more substantial commitment to reducing environmental impacts, which if reported well through a comprehensive programme, should increase market share and popularity.

3.6 Quality assurance and third party assessment

Assurance is an important aspect of the process through which a firm's environmental status is reported on. It often involves a third party reviewing one or all of the following aspects of a firm's work: its environmental report; management practices; pollution output or resource consumption report. Such a report usually aims to assure a stakeholder group of its quality, comprehensiveness, and lack of bias.

Mishra *et al.* (1998; 280) suggest that any form of quality assurance program directed at customers is of limited value unless the supplier can ensure that the promised quality will actually be delivered. Thus, there needs to be an assurance further than just the existence of management processes that are in place to assure environmental practices. The outcomes of these management practices need to be documented and reported on to prove that they are not 'green wash'.

An issue identified by Dando and Swift (2003; 197) is independence as a critical element of credible assurance. An assurance provider must be able to show that they are not influenced through financial (or other) relations by the reporting organisation. Checks and requirements need to be present in a CN programme to ensure this. Furthermore O'Dwyera and Owen (2005; 209) warn that if assurance practices are designed to bring stakeholder inquiry to an end they can potentially fail to provide a basis for rational deliberation among organisations and their stakeholders. Assurance practices need to be more than quality checks; they need to communicate their subject matter to stakeholders. Failure to do this can lead to situations where increased assurance does not equal increased accountability or transparency, thus assurance can fall prey to market failure.

O'Dwyera and Owen (2005; 209) identify other problems faced when comparing quality assurance programs. These are the major inconsistencies regarding the subject matter addressed. It is important that what is assured is uniform; if the subject of an assurance procedure differs significantly from the norm, such differences need to be identified for stakeholders to avoid the assurance statement becoming misleading.

3.7 Market failures and the nature of Carbon Neutrality as a good or service

Market information which details the quality of a product is an important aspect in determining a consumer's choice. Transparency and information asymmetry are the main market failures which impede this, although there are disclosure methods that can be used to negate them. Vining and Weimer (1988; 282) list examples of information disclosure that can be found in almost all areas of public policy:

- *labelling requirements (such as energy efficiency ratings for appliances and mileage ratings for automobiles),*
- *mandatory disclosure rules (as applied to insurance and real estate contracts),*
- *minimum quality standards for inputs (specification of materials in building codes and certification requirements for health professionals)*
- *outputs (crash standards for automobile bumpers),*
- *limitations on buyers (drugs by prescription and minimum age of legal purchase for alcohol), and*
- *outright prohibitions (bans on substances such as Laetrile).*

This can be inefficient when the cost of ensuring compliance outweighs the benefit i.e. auditing or testing is costly, or difficult.

3.8 Quality

Azzone *et al.* (1997; 700) maintain that it is essential in any environmental report that the document remains relevant, reliable, comprehensible and comparable. They go on to state that these criteria are required for the document's success. The author of a CN report must therefore be able to show that these criteria have been achieved, through implementing controls during the CN accreditation process.

Relevance refers to, in the case of CN, what emissions are relevant to the organisation and therefore what boundaries are used in the assessment of the GHG inventory. A report must provide information that is relevant to stakeholders as well. If a report does not provide this information it is less useful and does not provide stakeholders with information that will enable them to make informed decisions. Furthermore, it will not provide the reporting organisation with a good reputation for honesty.

Comprehensible reports enable stakeholders and other interested parties use of the reports by using understandable terms and providing definitions and explanations where necessary. If a report is not readily understandable, that could have an impact on the consumer perception of the quality of the environmental report. A report that is difficult to understand can be seen as intentionally misleading or could lead to indifference due to a lack of understanding as to what it represents.

Azzone *et al.* (1997; 700) list independent verification as the best means of instilling confidence and demonstrating to the intended audience that an environmental report is both reliable and credible. Independent verification is important as it shows the reliability of a report, but the verifier must be independent. An independent verifier allows consumers and other stakeholders to see that a CN report is of a certain standard without having to see sensitive information that proves this. Independence shows that there are no other financial or other connections between the reporting organization and the verifier that could influence the outcome of the report.

Azzone *et al.* (1997; 700) identify that comparability relates to both successive reports from the same company over time and to reports from separate companies at the same time. Reports need to be compared to historical reports and to credible historical baselines of GHG emissions. This shows progress and allows further comparisons to be made which show a reporting organization's reductions projects success or failure. Comparisons between organizations' can also help stakeholders identify industry leaders.

3.9 Information asymmetry

Graafland and Smid (2004; 272) describe information asymmetry as a situation which allows the better-informed party to exploit the less informed party by manipulating the quantity, quality or price in a way that is not easily detectable to the less informed party. In the case of environmental market programmes it can consist of:

- The process of accreditation;
- Criteria used in accreditation;
- What is revealed through accreditation;
- The weighting given to certain criteria;
- The environmental quality of the good;
- Other unique characteristics the good may possess.

Market failure due to the public and private nature of information is frequently relevant to analysis of information asymmetry because it helps determine the extent to which private market arrangements will arise to eliminate inefficiency. For instance, information about the structural characteristics of a specific house is effectively a private good (the original purchaser of the information has little incentive to pass it along to other potential buyers), so we see engineers and architects selling their services as inspectors for prospective purchasers. In contrast, Vining and Weimer (1988; 282) state that information about the relative quality of repair services tends to be a public good and therefore is rarely sold by private agents.

Vining and Weimer (1988; 285-286) list the following categories as factors that help determine whether information asymmetry is likely to lead to serious market failure:

1. *The effectiveness of any information gathering strategy, other things equal, generally depends on the variance in the quality of units of a good (heterogeneity) and the frequency with which consumers make purchases.*
2. *The potential cost of information asymmetry to consumers depends on the extent to which they perceive the full price of the good, including imputed costs of harm from use.*
3. *The cost of searching for candidate purchases and the full price determine how expensive and potentially beneficial it is for consumers to gather information.*

Another form of information asymmetry is how consumers ascertain the quality of the good purchased. This knowledge can be gained in a number of ways that are summarised by (Vining and Weimer, 1988; 285) in the categorisation of goods into the following three groups:

- *Search goods: if consumers can determine its quality prior to purchase*
- *Experience goods: if consumers can determine its quality after purchase*
- *Post experience goods: it is difficult or impossible to determine quality after purchase*

Alternatively, benefiting through another group's research or usage is a way to subscribe to or to free ride the information searching process. For example *Consumer* magazine in New Zealand regularly tests goods for quality and publishes their results.

3.10 Reputation

De Boer (2003; 256) describes reputation as an informal way to manage relationships by developing a state in which an organization is held in high regard and trusted by other parties because of its fair and honest business practices. It is a method by which a corporation can gain market share through: positive brand recognition; assurance of the quality of the product; and / or service in terms of the relationship between the consumer and supplier or between the supplier and producer of a product or service.

Graafland and Smid (2004; 272) postulate that because of the spread of information and the watchdog function of the media and Non Governmental Organisations (NGO), companies are forced to uphold a good reputation. This might reduce market imperfections caused by lack of information. However, if the nature of the information on the product is not readily available, it is rendered useless, and can be used by companies whose environmental practices are poor.

Graafland and Smid, (2004; 272) state that the reputation mechanism only works well if the following conditions are met:

1. *The strength of the reputation mechanism depends on the availability of the information about the past performance of the company. The more information is available, the more transparent is the company's performance. The transparency depends on factors that are both external and internal to the company. An important external factor is the intertwined role of the media, and NGOs*
2. *A good reputation only pays off in the future. If the company is especially interested in short term profits, the company has less incentives to build up a good reputation, because the company may have to sacrifice short term costs to get a better reputation that will lead to long term profits*
3. *Reciprocity: the reputation mechanism is more effective if a good reputation is collectively rewarded and a bad reputation collectively punished. This depends on the reactions of various types of stakeholders on the labour, goods and capital market.*

Graafland and Smid (2004; 279) affirm that if all conditions for the reputation mechanism are met, companies will have a strong incentive to reduce information

market failures by pursuing an active environmental reporting policy, increasing transparency offered by companies. This increase will reinforce the reputation mechanism, because it increases access of the media, NGOs, and other market actors to information about the environmental performance of the company and therefore enables these parties to put more pressure on companies to improve their reputation. This feedback mechanism may therefore result in movement towards stronger reputation mechanisms and growing transparency of companies.

Informative advertising can play an important role in reducing information asymmetry. Generally speaking, informative advertising can be effective when consumers correctly believe that producers have a stake in maintaining reputations for providing reliable information. A producer who invests heavily in developing a brand name with a favorable reputation is more likely to provide accurate and useful information than an unknown firm selling a new product.

3.11 Adverse selection

When producers do not have a stake in maintaining a good reputation, and marginal cost is higher for higher quality, a 'market for lemons' problem may arise. Vining and Weimer (1988; 289) states that consumers perceive a full price based on average quality so that producers of lower than average quality goods can make a profit and survive in the market. In the extreme, producers offer only goods of low quality – only 'lemons' are offered.

Producers and consumers often turn to third parties to help remedy information asymmetry problems. Certification services, agents, subscription services, and loss control by insurers are the most common market responses that arise.

3.12 Transparency

Florini (1999; 4) describes transparency as a process by which information about existing and historic conditions, decisions, and actions are made available, visible and understandable. Transparency is used to negate market information failures, such as information asymmetry. It allows citizens, markets, or governments to hold others accountable for their practices and performance. Florini (1999; 5) states that transparency is, on a basic level, the provision of information to allow effective choice.

It can be defined as the release of relevant and comprehensive information by institutions to stakeholders and the public relevant to those institutions.
CN programmes need to ensure that they release relevant and comprehensive information on the accreditation process of their programmes for each reporting organisation.
This information needs to allow stakeholders to make decisions based on a reporting organisations choices and performance relevant to the CN programmes content. To ensure that stakeholders can make informed decisions.

Bushman *et al. (*2001; 2) lists the following corporate transparency measurement categories:

1. *Measures of the quality of corporate reporting; including the intensity, measurement principles, timeliness, and credibility (i.e. audit quality),*
2. *Measures of the intensity of private information acquisition, the knowledge base and comprehensiveness of information gathered and the prevalence of factors that may affect this, and*
3. *Measures of the quality of information dissemination; the information must be understandable and easy to access.*

Florini (1999; 6) states that transparency can only work well if two conditions are met. First the targets of the calls for transparency are able and willing to provide the requisite information. CN programmes need to provide information relevant to stakeholders where possible and acknowledge when they cannot. Secondly the recipients of the information are able to use it to evaluate the provider of the information according to some accepted standard of behavior. Information provided to stakeholders must therefore be understandable and accurate, and allow stakeholders to make informed decisions on reporting organisation's accreditation.
Increased transparency is hard to achieve. It often requires power to induce disclosure, either by coercion, regulation, or by providing incentives. Florini (1999; 3) states that organizations would be disinclined to provide such information as it can reduce their market share through the disclosure of unenvironmental practices. Commercially sensitive information is another reason for organizations to avoid transparency.

If companies do not provide information about their performance, it is much more difficult for NGOs and market actors to get informed about the economic and social effects of the company. Graafland and Smid (2004; 277) state that for this reason, external stakeholders often demand that companies be transparent. Companies that are not transparent come under suspicion of hiding negative consequences of their operations. Therefore CN programmes need to facilitate transparency to avoid the negative effects associated with suspicion of unenvironmental operation.

4.0 Case Studies

The following section details the case studies on the Carbon Neutrality (CN) programmes for the research section of this thesis. Detailed below is a brief outline of the process involved in accreditation for each programme and the data gathered from the analysis of the two CN programmes that were objects of study for this thesis. The data consists of the findings extracted from the criteria put together by this thesis and aims to analyse whether or not the programmes address potential market failures and provide quality assurance checks. The criteria are listed in appendix 1, the results for each CN accreditation organisation in the tables in the relevant sections.

4.1 Carbon Neutral Company, Case study

On Tuesday the 17th of February 2009, as part of the execution of the research section of this thesis, a phone call was placed to the UK office of the Carbon Neutral Company (CNC). Through talking to an employee of the company I was informed that as the CNC was a for profit organisation they would not have the time to participate in the thesis actively. I was also informed that the programme was completely available online on their internet site; www.carbonneutral.com for public viewing.

The document published on the CNC website marketed as their programme for certification of CN was the Carbon Neutral Protocol (CNP). Other sources of information on the programme include;

- the Carbon Report 2006-2007 (Published for the CNC with an independent assurance report by a third party organisation),
- the ISO 14064-1 (which is listed in Annex F of the CNP as an informative document), and
- the CNC website

The CNP provides *'its own group scheme as follows:*

1. *The CarbonNeutral Company organizes climate change assessment/ monitoring system;*
2. *The CarbonNeutral Company co-ordinates emission reduction plans;*
3. *The CarbonNeutral Company co-ordinates the development of a carbon offset plan;*
4. *The CarbonNeutral Company sources and allocates carbon credits, as required to offset the emissions specified in the offset plan;*
5. *The CarbonNeutral Company organizes verification procedures for all organizations within the group;*
6. *The CarbonNeutral Company provides use of CarbonNeutral logos and communications package;*
7. *The CarbonNeutral Company organizes registration on the CarbonNeutral Register.'*

(CNP, 2007; 4)

The steps listed above are detailed in the CNP and analysed against this thesis's criteria below.

4.2 CarbonZero, Case Study

For the week of the 16th- 21st of February, to execute the research section of this thesis the author travelled to Landcare Research in Lincoln New Zealand to review the CarbonZero carbon neutrality programme. It should be noted that the travel and accommodation costs were paid for by Landcare research.

CarbonZero granted the author access to the documents provided to the organisations seeking certification of carbon neutrality under their programme. These are listed online, but the access is restricted and requires a password.

The documents available online consisted of documents covering the measurement, management, mitigation steps, factor application and usage, programme requirements, templates for a summary reporting, a inventory report and a document about preparing for verification, among others detailing the steps required for certification.

It took three and a half days to fully review against the assessment criteria used in this thesis, all of these documents.

The main documents detail the requirements for the main steps of measurement, management, mitigation, certification and third party verification, then the marketing aspect of using their carbon neutrality brand. The organisations seeking carbon neutrality are required to measure and manage emissions themselves and have the option of CarbonZero purchasing the offsets in the mitigate phase(if they do not take up this offer a verifier must, in the verification process, ensure that the offsets meet CarbonZero's programme).

4.3 Stakeholder dialogue

Stakeholder dialogue refers to the interaction between the provider of the programme of CN, the reporting organisation purchasing CN, and any other parties who have a legitimate stake in, or relationship with the first two parties and their actions. CN programmes need tools in place to ensure that information is communicated clearly, this can include disclosure of:

- The content of the CN provider's programme,
- Disclosure of the choices and actions made by reporting organisations, and
- Performance of reporting organisations against the programme's criteria.

Furthermore, allowing stakeholders to have input into the programme's content, for instance input on industry inventory boundaries or information disclosure. All of these tools aid stakeholder knowledge of the CN accreditation process and the practices of reporting organisations.

The criteria used to assess stakeholder dialogue by this thesis are laid out in Table 1 and 2.

Table 1 Carbon Zero Stakeholder Dialogue

Section	Questions	Is the required criterion present	References and comments	Further comments
Stakeholder dialogue	Within the programme what mechanisms are in place for addressing stakeholder issues, feedback, and input?	Yes	Certified organisations must state in their report that there is a complaints register. Scope three emissions '*that are deemed to be relevant by the industry sector or consensus of reasonable members of the public'* (*Measure 1* CZ005A, 2008;7)	Independent Advisory Group of industry and government experts provides advice to CarbonZero
	Are there any mechanisms through which External stakeholder dialogue is present? Is this dialogue ongoing (within the reporting period and between reports)?	Yes	Certified organisations must state in their report that there is a complaints register.	
	Are accountability and transparency controls in place to ensure stakeholders are provided with clear and non misleading data?	Yes	The third party verification process and *Summary of Certification* Report provide controls to ensure that non misleading data is produced.	
	Are there information disclosure policies present in the programme?	Yes	The certification summary is designed to provide as much information on the GHG emissions of the organisation without breaching commercial sensitivity	
	Is a contact person provided within the organisation being assessed and within the programme certifier's organisation?	Yes	This is required to be stated in the *Summary of Certification* document.	
	Is the content of the programme which is used to certify organisations made available to the public? If so how?	No	Made available to clients through internet log in, not available to the general public	
	Are all the assessment criteria stated clearly in a manner through which stakeholders can easily understand them?	Yes		

	Are external drivers (legislation, industry initiatives) influencing the companies decision making required to be stated in the report?	Yes	*'You now need to produce... A list or diagram describing any legal, financial, environmental, or operational responsibilities of the company with respect to their operations or services'* (*Summary of Certification* CZ036,2008; 10)

Table 2 Carbon Neutral Company Stakeholder Dialogue

Section	Questions	Is the required criterion present	References and comments	Further comments
Stakeholder dialogue	Within the programme what mechanisms are in place for addressing stakeholder issues, feedback, and input?	Yes	'*Independent advisory group considers suggestions made by users and other stakeholders and makes recommendations to the Carbon Neutral Company for changes to the Carbon Neutral Protocol'* (CNP, 2007; IV).	The Independent advisory group (as of 2008) has at least two clients of the Carbon Neutral Company on its board
	Are there any mechanisms through which external stakeholder dialogue is present? Is this dialogue ongoing (within the reporting period and between reports)?	No	No mechanisms were stated	
	Are there accountability and transparency controls are in place to ensure stakeholders are provided with clear and non misleading data?	Yes	The offset register provides detailed information on the offsets used in the accreditation process.	The brand assigned to the company details the level of carbon neutrality the organisation achieved i.e. Carbon Neutral organisation, product, or event.
	Are there information disclosure policies present in the programme?	Yes	The status of the organizations' reduction action plan for the emissions management phase of the certification must be reported. No detail is given as to how they are to be made available.	
	Is a contact person provided within the organisation being assessed and within the programme certifier's organisation?	Yes/ guideline	In the reduction action plan format (CNP, 2007; 23), which is an informative template.	
	Is the content of the programme which is used to certify organisations made available to	Yes	Through the Carbon Neutral company's website	

	the public? If so how?			
	Are all the assessment criteria stated clearly in a manner through which stakeholders can easily understand them?	Yes	In Annex A of the CNP the boundaries for the organisations emissions inventory and for the emission inventory for emissions that are required to be offset, differ. This could lead to confusion.	Also the use of 'informative standards' under Annex F of the CNP could lead to confusion as there are no clear standards as to how these are applied, and the extent to which their application is reported.
	Are external drivers (legislation, industry initiatives) influencing the company's decision making required to be stated in the report?	No		

4.4 Comparability and consistency

Comparability is important for comparisons to be made between and within reporting organisations. Consistency enables reproducible results, and ensures that comparisons are carried out according to standard methodologies. Emissions inventories need tools in place to ensure comparability and consistency; and will allow accurate comparisons to be made between annual inventories and between inventories of different reporting organisations. The criteria and results are stated in Tables 3 and 4.

Table 3 CarbonZero Comparability and Consistency

Section	Questions	Is the required criterion present	References and comments	Further comments
Comparability and consistency	Are emissions required to be listed in CO2 equivalent (CO2e)?	Yes		
	Are regular reporting time periods set? Is the report period clearly stated in the report?	Yes	Reports are to be annual	The report period is stated in the *Verification report*
	Are consistent and comparable methodologies and processes used to calculate and report the emissions removals and sinks present in the organisation?	Yes	All calculations are carried out on CZ's *E-Manage* online calculator	Factors not provided by CZ on *E-manage* must have '*the methodology including all assumptions, calculations, and the source and justification of emission factors used'* (*Measure 1* CZ005A, 2008; 20).
	Are reasons required to be stated for changes in reporting format, style, scope etc?	Yes	'*Organisations are required to notify the CarbonZero programme of any matters... that may mean that the organisation no longer complies with the relevant programme'* (*Systems and Controls* CZ007, 2008;13) Checks '*to ensure its consistency*	Manual calculations, data transformations and methodologies including sources and justifications of emission factors etc. must be documented and made available for audit (*Measure 1* CZ005A, 2008; 20)

			with the programme requirements' (*Preparing for the Verification Audit* CZ047, 2008; 1) will be carried out as part of the verification process.	
	Are historical performance initiatives (internal emission reductions) noted and gains quantified against a baseline?	Yes	*'GHG emissions reduction report against last year's plan-Brief summary of what was achieved'* (*Summary of Certification* CZ036 2008; 2). The first reporting period is used	Reporting on the GHG reductions initiatives against a baseline is also required in the inventory report (*GHG inventory report* CZ013A, 2008; 13)

Table 4 Carbon Neutral Company Comparability and Consistency

Section	Questions	Is the required criterion present	References and Further comments
Comparability and consistency	Are emissions required to be listed in CO2 equivalent (CO2e)?	Yes	This is a requirement of the ISO 14064-1
	Are regular reporting time periods set? Is the report period clearly stated in the report?	Yes/ guideline	Regular reporting periods are recommended as a guideline on page 7 of the CNP
	Are consistent and comparable methodologies and processes used to calculate and report the emissions removals and sinks present in the organisation?	Yes	This would be required by the ISO 14064-1. Any changes would need to be stated. The ISO (2006; 12) requires management procedures that ensure consistency with the intended use of the GHG inventory.
	Are reasons required to be stated for changes in reporting format, style, scope etc?	Yes	The scope of emissions to be offset is uniform, as stated in Annex A (CNP, 2007; 17). According to the ISO (referenced in CNP) changes in quantification methodology have to be mentioned. Changes in emission factors must be explained as well as a change of base year (ISO 14064-1, 2006; 10-11).
	Are historical performance initiatives (internal emission reductions) noted and gains quantified against a baseline?	Yes	GHG reduction plans are required to be updated no more than every 3 years (CNP, 2007; 8), requirements for a baseline are not explicitly stated

4.5 Clarity and definitions of key words

Clarity and definitions of key word are important to facilitate understanding and transparency of the CN programme. A CN programme needs to implement tools to enable external stakeholders and reporting organisations to understand the accreditation process and the complex mechanisms involved in it. Key methods of achieving this are;

- Glossaries or indexes
- Emission factor sources, relevance, and date, and
- Performance measures

The criteria and the results of the analysis are listed under Table 5 and 6.

Table 5 CarbonZero Clarity and Definition of key words

Section	Questions	Is the required criterion present	References and Further comments
Clarity and definitions of key words	Is a glossary or annex required to be provided, one that details definitions of all relevant and vital phrases, words and technical details?	no	In text explanations where necessary including foot notes, no glossary, most text is in plain easy to understand English
	Are any performance standards (i.e. emissions reductions) stated for future reports, and is success or failure against these standards stated?	Yes	Emission reductions requirements are stated in the *Manage* document, emission gains and losses are required to be reported in the verification report
	Are the emissions calculations factors involved in methodologies clearly defined and stated, including their source and date? This includes:	Yes	CZ uses the *E-manage* online calculator tool, and states factor sources online: www.carbonzero.co.nz/steps/measure.asp. '*We regularly review the conversion factors that we use to ensure they are up to date'* (*Summary for Clients* CZ024B, 2008; 3) Factors not provided by CZ on *E-manage* must have '*the methodology including all assumptions, calculations, and the source and justification of*

			emission factors used' (*Measure* 1 CZ005A, 2008; 20).
	Data calculations	Yes	
	Emission ratios	Yes	
	Activity data	Yes	
	Emissions estimates	Yes	

Table 6 Carbon Neutral Company Clarity and Definition of key words

Section	Questions	Is the required criterion present	References and comments	Further comments
Clarity and definitions of key words	Is a glossary or annex required to be provided, one that details definitions of all relevant and vital phrases, words and technical details?	Yes	There is a brief Terms and Definitions section in the Introduction section	
	Are any performance standards (i.e. emissions reductions) stated for future reports, and is success or failure against these standards stated?	no	GHG reduction plans are required to be updated no more than every 3 years (CNP, 2007; 8), but there is no clause specifying publication for stakeholder viewing	
	Are the emissions calculations factors involved in methodologies clearly defined and stated, including their source and date? This includes:		Sources are not stated, Activity data used to calculate emissions to be offset must not be older than 24 months (CNP, 2007; 7). The Edinburgh Centre for Carbon Management carries out assessments in Europe (www.carbonneutral.com/pages/becomingcarbonneutral.asp)	*'The organisation shall select or develop GHG emission and removal factors that; are from a recognised origin...are current at the time of quantification'* (ISO 14064-1, 2007; 9)
	Data calculations	no		
	Emission ratios	no		
	Activity data	no		
	Emissions estimates	no		

4.6 Comprehensiveness

Comprehensiveness of a CN programme aids comparisons and quality of accreditation by ensuring that all the relevant information is included in the accreditation process. To ensure CN accreditation is comprehensive programme providers need to

- Detail the width and breadth of data included in the accreditation process
- Record historical emissions for future comparisons
- Ensure a high level of detail in which the reporting organisation is reported on, and
- Show choices made by the reporting organisation affecting the outcome of the accreditation process

The criteria and results used to analyse this are listed in Tables 7 and 8.

Table 7 CarbonZero Comprehensiveness

Section	Questions	Is the required criterion present	References and Further comments
Comprehensiveness	Are the choices, for the organisation being certified, on the content of the report and its level of assessment made clear, and are the reasons given for the decisions made?	Yes	CZ also uses labels to state the method of certification. While choices are not stated the summary of certification requires reporting organisations to state emission exclusions and inclusions, as well as other areas where choices were made.
	Is the scope (what sources of emissions) of emissions covered stated, and are non Kyoto GHG emissions covered?	Yes	Scope is clearly stated in the *Measure* 1 CZ005A (2008) document and covers Non Kyoto emissions as well
	Are the calculation methodologies used to determine emissions estimates and inventory content required to be stated?	Yes	All calculations are carried out in E-manage online calculator. *'All calculations will need to be detailed in a spreadsheet, and reported in the GHG inventory report along with the* E-manage *outputs'* (*Measure* 1 CZ005A, 2008; 7)
	Are historical emissions stated, where are they available?	Yes	In the inventory report, summary report, and verification report
	Is a list of facilities and sites included, with their emission	Yes	*'A list of all physical locations owned or part owned'* (*Measure*

	allocations?		1 CZ005A, 2008; 6). Also financial records may be consulted to ensure relevant structures are not left out (*Measure* 1 CZ005A, 2008; 7)
	Is information provided on the cause of changes that did not trigger a recalculation?	Yes	If the verifier finds a major non conformance, a recalculation is required. This is defined as a *'non conforming aspect of the emissions inventory which may be material to a stakeholder*' (*Preparing for the Verification Audit* CZ047, 2008;3)

Table 8 Carbon Neutral Company Comprehensiveness

Section	Questions	Is the required criteria present	References and Further comments
Comprehensiveness	Are the choices, for the organisation being certified, on the content of the report and its level of assessment made clear, and are the reasons given for the decisions made?	Yes	Their choices are listed in the *'Application of the Carbon Neutral Protocol'* (CNP, 2007; 4) section, the entire programme is also listed online for further perusal
	Is scope (what sources of emissions) of emissions covered stated, and are non Kyoto GHG emissions covered?	Yes	This is stated in Annex A.1 and Annex F of the Carbon Neutral Protocol. No non Kyoto GHG are mentioned.
	Are the calculation methodologies used to determine emissions estimates and inventory content required to be stated?	no	Under the ISO 14064-1 '*the organisation shall select and use quantification methodologies that will reasonably minimise uncertainty and yield accurate, consistent and reproducible results... The organisation shall explain its selection of quantification methodologies... the organisation shall explain any changes'* (ISO 14064-1, 2006; 9) *'In Europe, we organise carbon emissions assessments (Carbon Assessment) in association with our independent science advisors at the Edinburgh Centre for Carbon Management'* (www.carbonneutral.com/pages/becomingcarbonneutral.asp)
	Are historical emissions stated, where available?	no	
	Is a list of facilities and sites included, with their emission allocations?	Yes	Under the ISO 14064-1 (2006; 10) '*the organisation shall document the following...separately at facility and organisation levels'*, this applies to GHG emissions and removals.
	Is information provided on the cause of changes that did not trigger a recalculation?	Yes	Under the ISO 14064-1 (2006; 9-10) Changes in quantification methodology and emission factors changes require explanation

4.7 Managing inventory quality and accuracy

An emissions inventory is an important step in the CN process; CN programmes must ensure that it is representative of a reporting organisation's emissions. Inventory quality draws on concepts like comprehensiveness, and relevance to ensure that the aggregation, calculation of data, and processes used to develop a reporting organisation's GHG inventory are of a sufficient level of quality. CN programme providers need to ensure that tools that affect the following outcomes are used in their programme:

- Comprehensive data collection and retention
- Relevant and accurate quantification methodologies
- Comprehensive data quality control, including emission factors and calculations
- Avoiding errors and omissions, and
- Detailed data rechecking procedures

The criteria and results for this thesis's analysis of inventory quality and accuracy are listed in Tables 9 and 10.

Table 1 CabronZero Inventory Quality and Accuracy

Section	Questions	Is the required criterion present	References and comments	Further comments
Inventory quality and accuracy	Are data collection procedures present that allow the same data to be efficiently collected in future years?	Yes/ guideline	'*Once all data has been centralised, data quality control checks should be implemented to ensure its robustness'* (*Manage 1* CZ005A, 2008; 16)	*'A data process map must be developed for all data used in the GHG inventory'* (*Manage 1* CZ005A, 2008; 16)
	Are procedures in place that document and archive relevant GHG inventory records, and methodologies?	Yes/ guideline	'*Process for document retention and record keeping should be established'* (*Manage 1* CZ005A, 2008; 16)	'*Between GHG reporting periods it is strongly recommended that internal audits are constructed to ensure that record keeping processes are active and accurate and measurement equipment is calibrated'* (*Manage 1* CZ005A, 2008; 16)
	Are procedures in place that investigate systemic bias or other characteristics (errors and omission) that could affect inventory quality	Yes	Both *de minimus* and materiality checks are in place to check materiality to stakeholders, inventory percentage, and omissions due to size and difficulty of retrieval of data. These are described in the *Manage 1* CZ005A (2008) document	Assumptions are required to be stated in the report, *'all calculations performed outside of* E-manage *must be documented and exhibit a clear audit trail from the data used in* E-manage, *back to the data source. This will be a core area of focus during the verification'* (*Manage 1* CZ005A, 2008; 20)
	Does quality management cover any additional, but relevant, data used to estimate emissions intensity or other ratios or equations?	Yes	The estimates ratios and equations are all covered and checked against the materiality and *de minimus* thresholds under the verification process	Furthermore *'where manual calculations or other data estimates or transformations are made, the methodology including all assumptions, calculations and the source and justification of emission factors used, must be documented and made available for the audit. The precautionary principle must be applied'* (*Manage 1* CZ005A, 2008; 20)

	Does the programme ensure the selection of quantification methodologies, including GHG activity data and GHG emission and removal factors that are consistent with their intended use?	Yes	Emission factors are provided by CarbonZero and are contained in *E-manage*, and are updated regularly and selected from a series of internationally recognised sources. *'E-Manage is independently verified against ISO 14064-1 for its calculation methodology and reporting'* (http://www.carbonzero.co.nz/help.asp)	*' Where manual Calculations or other data estimations or transformations are made, the methodology including all assumptions, calculations, and the source and justification of emission factors used, must be documented and made available for the audit. The precautionary principle must be applied'* (*Measure 1* CZ005A, 2008; 20) '*The verifier will examine your GHG management system to ensure...that calculation methodologies are appropriate'* (*Preparing for the Verification Audit* CZ047, 2008; 1)
	Are all calculation, activity and emission data processes from recognised sources that ensure accuracy?	Yes	The main sources of emission factors are International Panel on Climate Change, Ministry for Environment, Department for the environment food and rural affairs (England and Whales), Department of climate change (Australia), and the EPA (America) '*The CarbonZero programme reviews and updates the GHG emissions factors used by the calculators and E-Manage annually'* (http://www.carbonzero.co.nz/help.asp).	CarbonZero programme and *CEMARS GHG Factors Methods* (2008), and the *Summary for Clients* CZ024B (2008) document further describe methods used to ensure emissions factor accuracy.
	What triggers are in place for rechecking data?	Yes	In the verification process there are three areas of error magnitude identified in the *Preparing for Verification Audit* CZ047 (2008) document.	
	Are checking procedures in place for errors and omissions in the following areas:		All checking shall be carried out by independent auditors in the verification process.	

	Comprehensive data gathering methods?	Yes		
	Data source and input quality and accuracy?	Yes	*'An organisation must establish and maintain GHG information procedures to ensure that the inventory is prepared in a robust and accurate manner'* (*Measure 1* CZ005A, 2008; 15)	*'Once all the data has been centralised, data quality control checks should be implemented to ensure its robustness'* (*Measure 1* CZ005A, 2008; 16)
	Data documentation procedures?	Yes/ guideline	*'A data process map must be developed for all data used'* (*Measure 1* CZ005A, 2008; 15)	*'Between GHG reports it is strongly recommended that internal audits are constructed to ensure that record keeping processes are active and accurate and that measurement equipment is calibrated'* (*Measure 1* CZ005A, 2008; 16)
	Calculations for emission estimates, ratios, and activity data?	Yes	*'All calculations performed outside of E-manage must be documented... This will be a core area of focus during verification'* (*Measure 1* CZ005A, 2008; 20)	*'Assumptions will be documented and made available to the verifier'* (*Measure 1* CZ005A, 2008; 19)

Table 10 Carbon Neutral Company Inventory Quality and Accuracy

Section	Questions	Is the required criterion present	References and Further comments
Inventory quality and accuracy	Are data collection procedures present that allow the same data to be efficiently collected in future years?	Yes/ guideline	*'Guidelines for quantification and monitoring...establish a regular process to repeat data collection and assess changes over time relative to a benchmark or starting point'* (CNP, 2007; 6)
	Are procedures in place that document and archive relevant GHG inventory records, and methodologies?	Yes/ guideline	*'Document and archive relevant GHG inventory records, including information management activities.… The organisation shall establish and maintain procedures for document retention and record keeping'* (ISO 14064-1, 2006; 12)
	Are procedures in place that investigate systemic bias or other characteristics (errors and omission) that could affect inventory quality	Yes/ guideline	'*Be aware of the uncertainties and variability associated with quantifying emission from alternative types of data...keep a clear record of all the assumptions and calculations used in the quantification of emissions'* (CNP, 2007, pg 6)
	Does quality management cover any additional, but relevant, data used to estimate emissions intensity or other ratios or equations?	Yes/ guideline	*'Guidelines for quantification and monitoring...keep a clear record of all the assumptions and calculations used in the quantification of emissions'* (CNP, 2007; 6)
	Does the programme ensure the selection of quantification methodologies, including GHG activity data and GHG emission and removal factors, is this consistent with their intended use?	Yes/ guideline	CNP states in Annex A '*quantify GHG emissions according to the guidelines given in the relevant publication, see Annex F'* (CNP, 2007; 17). This document is the ISO 14064-1. '*The organisation shall select and use quantification methodologies that will reasonably minimise uncertainty and yield accurate, consistent and reproducible results*' (ISO 14064-1, 2006; 9) This also applies to emission factors and activity data
	Do all calculation, activity and emission data processes from recognised sources that ensure accuracy?	No	Sources not stated,
	What triggers are in place for the rechecking of data?	Yes	'*The organisation shall explain any changes to GHG emission or removal factors previously used by the organisation and, where appropriate, recalculate the base year GHG inventory'* (ISO 14064-1, 2006; 10)

	Are rechecking procedures in place for errors and omissions in the following areas:		Organisations are required to '*identify and address errors and omissions'* (ISO 14064-1, 2006; 12)
	Comprehensive data gathering methods?	no	
	Data source and input quality and accuracy?	no	
	Data documentation procedures?	no	
	Calculations for emission estimates, ratios, and activity data?	no	

4.8 Materiality

Materiality refers to the inclusion of information that is determined as relevant by stakeholders, and the build up of errors and omissions in emissions inventories. Materiality checks are a key part of ensuring a GHG inventory contains accurate and relevant information. CN programmes need to ensure that there is a minimum of errors, and therefore needs checks for;

- Stakeholder relevance
- Omissions of data
- A threshold for data inclusion is clearly communicated, and
- Checks to avoid the aggregation of errors and omissions

The criteria and the results of the analysis are listed under Tables 11 and 12.

Table 11 CarbonZero Materiality

Section	Questions	Is the required criterion present	References and comments	Further comments
Materiality	Are there checks in place to identify whether information either relevant to stakeholders or that influences stakeholder (either internal or external) decision making is included in the report?	Yes	*de minimus* threshold: must be summed equal or less than 1% (the sum of which must not exceed 5% of total emissions) of an organisation's emissions inventory	' *for the programme an* de minimus *source of emissions is a emission source which will not be material to any stakeholders and/or where an individual source of emissions will be less than 1% of the organisations GHG inventory'* (*Measure 1* CZ005A, 2008; 14)
	Are there, at each stage of the assessment, tests to ensure materiality is dealt with?	No	Materiality checks are carried out in the verification process by the verifier, reporting organisation's are encouraged to carry out their own checks as well.	'*Major non conformance: a major non conformance aspect of the emission's inventory which may be material (error or misstatement) to a stakeholder. Close out of the corrective actions, and resubmission of the amended inventory documentation is required before an assurance statement can be released'* (*Preparing for Verification Audit* CZ047, 2008; 3)
	Is a materiality threshold established in the report for vital information? Are these checks made at multiple levels (i.e. factory to organisation)?	Yes	The materiality threshold is 5%, any checks are carried out by the independent auditing organisation	

	Are there any other checks in place to avoid the aggregation of errors?	Yes	The assessment carried out by the verifier will include: *'ensuring the organisations boundaries are correctly defined, that emission sources are correctly identified, that excluded sources are identified and justified, that calculation methodologies are appropriate, that correct data unit transactions have been preformed, and that the correct emission conversion factors have been applied'* (*Preparing for Verification Audit* CZ047, 2008; 2)

Table 12 Carbon Neutral Company Materiality

Section	Questions	Is the required criterion present	References and Further comments
materiality	Are there checks in place to identify whether information either relevant to stakeholders or that influences stakeholder (either internal or external) decision making is included in the report?	No	However feedback suggestions are put forth through the independent advisory group to the Carbon Neutral Company
	Are there, at each stage of the assessment, tests to ensure materiality is dealt with?	Yes	Under the ISO 14064-1 (2007; 12) checks for errors and omissions are required to be carried out under information management procedures
	Is a materiality threshold established in the report for vital information? Are these checks made at multiple levels (i.e. factory to organisation)?	No	
	Are there any other checks in place to avoid the aggregation of errors?	No	

4.9 Base line and year establishment

Baseline and year emissions are important for comparisons of inventories and for the calculation of emission reductions. They show a reporting organisation's initial emissions inventory allowing future comparisons, and provide a base line against which emission reduction projects can be measured against. Therefore it is important to ensure that they are representative and accurate. CN programmes should include:

- The base year needs to be representative of an organisation's emissions
- Set at a relevant time
- Type of base year
- Availability of data used to calculate base year
- Recalculation threshold, and
- Statement of base year in future reports

The criteria and the results of the analysis are listed under Tables 13 and 14.

Table 13 CarbonZero Baseline and Year Establishment

Section	Questions	Is the required criterion present	References and Further comments
Baseline and year establishment	Are there policies are in place to ensure baseline data availability, reliability and the minimisation of limitations?	Yes	The baseline must be provided in the report and is checked during the verification process, all data used for the calculation of the baseline must be provided
	Is quantification of base year GHG emissions and removals carried out using data representative of the organisations activity? What policies are in place to ensure this?	Yes	General quality management standards are stated throughout the measurement section of the programme, and are checked during the verification process
	Does base year data consist of single year data, a multiyear average or rolling average?	Yes	'*The first 12 month period measured becomes the base year against which your future emissions reductions may be reported'* (*Measure 1* CZ005A, 2008; 5)

	Is a base year recalculation threshold established?	No	Not explicitly stated, Although it should be noted that *'in the case of acquisition emissions should be reported from the date that operational control is gained'* (*Measure 1* CZ005A, 2008; 5)
	Is a statement of the original base year emissions stated in all future reports?	Yes	

Table 14 Carbon Neutral Company Baseline and Year Establishment

Section	Questions	Is the required criterion present	References and Further comments
Baseline and year establishment	What policies are in place to ensure baseline data availability, reliability and the minimisation of limitations?	No	*'The organisation... Shall select a base year for which verifiable GHG emissions or removal data are available'* (ISO 14064-1, 2006; 11)
	Is quantification of base year GHG emissions and removals carried out using data representative of the organisations activity? What policies are in place to ensure this?	Yes/ guideline	*'All organisations should undertake GHG assessments annually. Progress is assessed relative to benchmarks or reference points and the relevance of benchmarks is assessed every two years'* (CNP, 2007; 7)
	Does base year data consist of single year data, a multiyear average or rolling average?	No	Not stated, the ISO 14064-1 gives multiple choices for this criteria
	Is a base year recalculation threshold established?	No	*'The organisation may change its base year, but shall explain any change to the base year'* (ISO 14064-1, 2006; 11)
	Is a statement of the original base year emissions stated in all future reports?	No	

4.10 Boundaries for assessment

Boundaries determine what parts of a reporting organisation are to be quantified in the emissions inventory. Detailing boundaries in a clear and comprehensive manner shows rigour in the programme and allows stakeholders to make decisions based on what boundaries are set for reporting organisations. To ensure boundaries are comprehensive and inform stakeholders the following aspects should be required:

- Emissions included in the inventory based on their relationship to the reporting organisation; controlled by, related to, and affected by the organisation,
- A statement of the boundary and the reasoning behind it, and
- Mention of any deviations from boundary by the reporting organisation.

The criteria and results are listed under Tables 15 and 16.

Table 15 CarbonZero Boundaries for Assessment

Section	Questions	Is the required criterion present	References and comments	Further comments
boundaries for assessment (organisational versus facility)	Does the programme show that it has identified and measured GHG sources, sinks, and reservoirs that are:		Approach is organisational	CZ states in the *Preparing for the Verification Audit* document that the assessment will include: '*ensuring the organisational boundaries are correctly defined, that emission sources have been correctly identified'* (*Preparing for Verification Audit* CZ047, 2008; 1).
	Controlled by the organisation?	Yes	As applies to organisational control	'*The boundary that you define for your GHG emissions inventory will include all the business units and operations that constitute the trading entity seeking certification'* (*Measure 1* CZ005A, 2008; 4)
	Related to the organisation?	Yes	As applies to organisational control	'*Where an organisation has ownership interest in entities but not on operational control, those interests must be disclosed in the GHG report'* (*Measure 1* CZ005A, 2008; 5).
	Affected by the organisation?	Yes	As applies to organisational control	
	A statement of the boundary establishments reasoning and context, including the boundary selection methodology that is used?	Yes	'*Organisation, operation, and supply chain or LCA charts as required, showing business units or business activities that were measured, with those that were measured and offset in green, and those that were measured but excluded from the offset in yellow'* (*Summary of Certification* CZ036, 2008; 1)	'*Consolidation approach: operational control (state if otherwise)'* (*Summary of Certification* CZ036, 2008; 2)

	Detail the context and reason behind any deviations from the boundary methodology?	Yes	*'Programme will consider applications for financial control or equity share where compelling reasons exist… ensure that the inventory is a true and fair representation...in the view of a reasonable member of the public and other stakeholders'* (*Measure 1* CZ005A, 2008; 5)

Table 16 Carbon Neutral Company Boundaries for Assessment

Section	Questions	Is the required criterion present	References and Further comments
boundaries for assessment (organisational versus facility)	Does the programme show that it has identified and measured GHG sources, sinks, and reservoirs that are:		
	Controlled by the organisation?	Yes	*'All sites owned or under direct management control'* (CNP, 2007; 17)
	Related to the organisation?	no	
	Affected by the organisation?	no	
	A statement of the boundary establishments reasoning and context, including the boundary selection methodology that is used?	Yes	The Boundary is set in Annex A and F of the CNP
	Detail the context and reason behind any deviations from the boundary methodology?	Yes	According to the ISO 14064-1; Yes, however this is not stated in the Carbon Neutral Protocol

4.11 Operational boundaries

The operational boundary identifies the GHG emission sources that fall within the organisational boundaries. It is important that all the relevant sources of emissions are included in an inventory to ensure its comprehensiveness. To achieve this emissions inventories need to cover the:

- Scope of emissions included in the inventory
- Emission sources and types of emissions
- Breakdown of emissions in to business units, or facility level
- A clear definition of scope three emissions
- Reporting of omissions and exclusions, and
- Reporting organisation justification for deviations from boundaries

The criteria and the results of the analysis are listed under Tables 17 and 18.

Table 17 CarbonZero Operational Boundaries

Section	Questions	Is the required criterion present	References and comments	Further comments
Operational Boundaries	Are all scope 1, 2, and 3 emissions clearly reported on in CO_2 e?	Yes	*'All gases must be accounted for individually and reported in metric tonnes, and as CO2 equivalents'* (*Measure 1* CZ005A, 2008; 7)	
	Are all emissions included in the inventory reported in an easy to understand manner, detailing sources, and emission types?	Yes	In online inventory management programme: *E-manage*, and in *GHG Inventory Report* CZ013A (2008)	
	Are the scope 1, 2, and 3 emissions data broken down, i.e. into facility level or business units to allow transparency?	Yes	Emissions are broken down in the GHG inventory report; according to standards stated in *GHG inventory Report* CZ013A (2008)	'*Where an organisation has interest in entities...disclosure must include...a summary of the entity emission generating activities'* (*Measure 1* CZ005A, 2008; 5)
	For scope 2 emissions; are energy usage source and emission ratio(s) recorded?	Yes	*'Emission factors used by the programme maybe released upon application'* (*GHG Inventory Report* CZ013A,2008; 17)	
	Are the criteria used to define the scope 3 emissions included in the report?	No	'*The following Scope 3 emissions are required to be reported: Air Travel, other public transport, freight couriers, business taxi transport, leased vehicles, reimbursed staff business travel, waste to landfill'* (*Measure 1* CZ005A, 2008; 7)	*'Any other scope 3 emissions that are deemed relevant by the industry sector or consensus of reasonable members of the public'* (*Measure 1* CZ005A, 2008; 7)
	Are all the scope 1and 2 emissions measured within the organisations organisational boundaries, are omissions or exclusions reported?	Yes		
	If the report departs from the programme's basic emissions assessment criteria and procedures does it provide a statement justifying this departure from those criteria and procedures?	Yes	*'This consideration will seek to ensure that the inventory is a true and fair representation of the organisation in the view of a reasonable member of the public, and other stakeholders'* (*Measure 1* CZ005A, 2008; 50)	

Table 18 Carbon Neutral Company Operational Boundaries

Section	Questions	Is the required criterion present	References and Further comments	Comments
Operational Boundaries	Are all scope 1, 2, and 3 emissions clearly reported on in CO_2 e?	Yes	*'The Organisation shall use tonnes as the unit of measure and shall convert the quantity of each type of GHG to tonnes of CO2e using appropriate Global Warming Potential'* (ISO 14064-1, 2006; 8)	Annex A of the CarbonNeutral Protocol references the ISO 14064-1 as an informative document, the ISO requires emissions to be reported in CO^2e
	Are all emissions included in the inventory laid out in an easy to understand manner, detailing sources, and emission types?	No	Not stated	
	Are the scope 1, 2, and 3 data broken down, i.e. into facility level etc. to allow transparency?	not stated	*'The organisation shall document the following, where quantified in accordance with clause 4, separately at facility and organisation levels: direct GHG emissions for each GHG; GHG removals; other indirect GHG emissions; direct Co2 emissions from the combustion of biomass'* (ISO 14064-1, 2006; 10)	*'Be clear and transparent about the scope of the assessment'* (CNP, 2007; 6) is a guideline
	For scope 2 emissions; are energy usage source and emission ratio(s) recorded?	No	Not stated, however the ECCM carries the inventory calculations so it is possible that they have a record of each source and ratio	*'Keep a clear record of all the assumptions and calculations used in the quantification of emissions'* (CNP, 2007; 6)
	Are the criteria used to define the scope 3 emissions included in the report?	Yes	Scope for emissions to be offset stated in Annex A, scope of assessment is based on the informative use of the ISO 14064-1	
	Are all the scope 1and 2 emissions measured within the organisations organisational boundaries?	Yes	Within the Boundaries set in Annex A '*all sites owned or controlled'* (CNP, 2007; 17)	
	If the report departs from the programme's basic emissions assessment criteria and procedures does it provide a statement justifying this departure from those criteria and procedures?	Yes	This is covered by the ISO 14064-1 (2006; 9-11) however the ISO is used as an informative document by the CNP	

4.12 Sinks, reductions, and removals

Sinks, reductions, and removals are the reductions in emissions made by reporting organisations as part of achieving CN status. The purpose of sinks, reductions, and removals is to change behaviour and show price signals through changes in the reporting organisation's business practice. To ensure that sinks, reductions, and removals reflect actual reductions in GHG emissions programme of CN need to ensure that

- Reductions are part of the accreditation process
- The reductions use emission factors (or calculation data) that are derived from a recognisable source, up to date, and
- Reductions are calculated against a relevant baseline
- Calculation uncertainty issues are addressed and are reproducible
- Project methods are stated for reductions, removals, or sinks including site data, technical information, or any other information relevant to the project, and
- The comparison of the reductions against the baseline are stated

The criteria and the results of the analysis are listed under Table 19 and 20.

Table 19 CarbonZero Sinks, Reductions, and Removals

Section	Questions	Is the required criterion present	References and comments	Further comments
Sinks, Reductions and Removals	Are GHG reductions required to achieve the CN certification?	Yes	The CZ Manage (2008) document details requirements for reductions to be made. Reductions are reported on in the Summary of Certification CZ036 (2008) document	
	If applicable, are GHG emission reduction or removal factors used that;			
	Are derived from a recognised source?	Yes	*'Where GHG emissions calculations are undertaken outside of E-Manage, the calculation methodology, including the emission conversion factors and their derivation, must be provided'* (*GHG Factors and Methods: Summary for Clients* CZ024B, 2008; 12) *'users should select factors that have the minimum amount of assumptions associated with them whenever possible'* (*GHG Factors and Methods: Summary for Clients* CZ024B, 2008; 6)	CZ *'draws on data for calculating emission factors from a variety of sources…the programme seeks to align emission factors with international best practice'* (*GHG Factor Methods: Summary for Clients* CZ024B, 2008; 11)
	Are current at the time of quantification and are calculated against a baseline?	Yes	*'Emission reductions must be based on a valid comparison of consecutive inventories'* (*Manage*, 2008; 7)	CZ *'regularly reviews the conversion factors that we use to ensure they are kept up to date'* (*GHG Factor Methods: Summary for Clients* CZ024B, 2008; 3).
	Take account of the quantification uncertainty and are calculated in a manner intended to yield accurate and reproducible results?	Yes	The reductions are based on year to year comparisons	*'All calculations performed outside of E-manage must be documented and exhibit a clear audit trail...this will be a area of focus during verification'* (*Measure 1* CZ005A, 2008; 20)

	Do GHG emission sinks, reductions and removals state:			
	The baseline level of emissions?	Yes	*' The calculation of your emissions reductions must be based on a valid comparison of consecutive inventories i.e. Using comparable boundaries, scopes, and time periods'* (*Manage*, 2008; 7)	
	The method of sink, removal or reduction including: site, time period of implementation, predicted and actual reduction, any technical data related to the reduction, and provider of reduction technology, service etc. (if applicable)?	Yes	*'Specific requirements of the programmes for the management plans are as follows; A commitment to manage and reduce emissions, set reduction targets and dates, a management plan, and to monitor and report against targets and target dates'* (*Manage 1*, 2008; 2). *'Emission reduction commitments (enter up to 5 of the main emission reduction plans with targets'* (*Summary of Certification* CZ036, 2008; 2). *'The calculation of your emissions reductions must be based on a valid comparison of consecutive inventories .i.e. using comparable boundaries scopes, and time periods'* (*Manage*, 2008; 7)	*'Rationale for targets must be given and should relate to relevant national, regional, sector or group emission reduction policies or initiatives' targets set must be SMART; Specific, Measurable, Achievable, Realistic, Time-constrained'* (*Manage* , 2008; 8)
	Calculations of the amount GHG emissions reduced since the baseline?	Yes	*'GHG reductions report against last year's plan – Brief summary of what was achieved'* (*Summary of Certification* CZ036, 2008; 2)	

Table 20 CarboNeutral Company Sinks, Reductions, and Removals

Section	Questions	Is the required criterion present	References and Further comments	Comments
Sinks, Reductions, and Removals	Are GHG reductions required to achieve the CN certification?	Yes	A reduction plan is required (the carbon report 2006-2007(2007; 3) *'While the achievement of an absolute reduction cannot be mandated; they are required to develop a reduction plan'*	*'All organisations should undertake GHG assessments annually. Progress is assessed relative to benchmarks or reference points and the relevance of benchmarks is assessed every two years'* (CNP, 2007; 7)
	If applicable, are GHG emission reduction or removal factors used that;			
	Are derived from a recognised source?	Yes	The Carbon Report 2006-2007 (2007; 3) states that the ECCM has personnel possessing the skills to *'assess the emissions from activities within those boundaries using appropriate emissions factors*.'	The ISO requires emissions removal and reduction factors that *'are derived from a recognised origin, are appropriate for the GHG source or sink concerned, are current in the time of quantification'* (ISO 14064-1, 2006; 9)
	Are current at the time of quantification and are calculated against a baseline?	Yes/ guideline	Annex E (informative) reduction action plan format (CNP, 2007; 23) requires calculated emissions to be stated	
	Take account of the quantification uncertainty and are calculated in a manner intended to yield accurate and reproducible results?	Yes /guideline	Take in to account '*quantification uncertainty and are calculated in a manner intended to yield accurate and reproducible results'* (ISO 14064-1, 2006; 10)	

	Do GHG emission sinks, reductions and removals state:			
	The baseline level of emissions?	Yes /guideline	Annex E of the CNP (2007; 23) requires calculated emissions, breakdown of emissions and the assessment period to be stated	
	The method of sink removal or reduction including: site, time period of implementation, predicted and actual reduction, any technical data related to the reduction, and provider of reduction technology, service etc. (if applicable)?	Yes /guideline	The reduction template (Annex E (informative) Reduction action plan format) requires: Contact, CarbonNeutral account manager, assessment period, calculated emissions (tCO2), breakdown of emissions reduction target, timeline, progress	
	Calculations of the amount GHG emissions reduced since the baseline?	No	Annex E requires calculated emissions, and targets, but no performance against the targets.	

4.13 Offsets and Additionality

Offsets allow a reporting organisation's GHG emissions to be reduced to zero; therefore it is important that they be of a sufficient level of quality to ensure the validity of any CN claims. Offsets generally consist of projects which remove GHG emissions from the atmosphere or prevent emissions from being released. They must be able to show that the emissions savings are different from a business as usual scenario; this is called additionality. To ensure the quality of offsets, and the communication of said quality, CN programmes need to:

- Provide accredited offsets by appropriate organisations
- Show that the offset is on a recognised offset register
- The offset has been retired
- State the year, type of offset, and
- The amount of GHG emissions offset

The criteria and the results of the analysis are listed under Table s 21 and 22.

Table 21 CarbonZero Offsets and Additionality

Section	Questions	Is the required criterion present	References and Further comments
Offsets and Additionality	Is the following data required:		
	An emission offset accreditation statement including a statement that the GHG offsets is listed in an appropriate GHG registry, and that the offset has been retired?	Yes	CZ uses a limited amount of offset types, information on offsets is provided online on www.carbonzero.co.nz/steps/mitigate.asp.
	Type of accreditation: Gold standard/ Kyoto: CDM, JI?	Yes	Acceptable credits are limited to certain types, non accepted credits must be approved by Carbon Zero
	Year of offset credit approval?	Yes	
	An assurance of permanence offsets GHG removal or reduction	Yes	
	Total amount of GHG emissions removed by offset?	Yes	
	A statement of offset type (i.e. wind)?	Yes	In the inventory report, summary report, and verification report

Table 22 CarboNeutral Company Offsets and Additionality

Section	Questions	Is the required criterion present	References and Further comments
Offsets and Additionality	Is the following data required:		Relevant sections to Offset Quality are Annexes B, C, D and Tables 1,2,3,4 as well as the Requirements for offsetting (CNP, 2008; 10-11)
	An emission offset accreditation statement including a statement that the GHG offsets is listed in an appropriate GHG registry, and that the offset has been retired?	Yes	All of these requirements are supplied on the online Offset register
	Type of accreditation: Gold standard/ Kyoto: CDM, JI?	Yes	
	Year of offset credit approval?	Yes	
	An assurance of permanence offsets GHG removal or reduction	Yes	
	Total amount of GHG emissions removed by offset?	Yes	
	A statement of offset type (i.e. wind)?	Yes	

4.14 Third party/ internal verification

Verification ensures that an emissions inventory is an accurate and a fair reproduction of a reporting organisation's emissions. Verification will also ensure that they have passed through every step of CN accreditation according to the CN programme's requirements. To ensure that a reporting organisation has processed though the accreditation process, and that the reporting organisation's performance is communicated; CN programmes need to

- Require third party verification
- State what is verified
- State omission and inclusion of any relevant information
- Report on data gathering methodologies, calculations, inventory quality controls, and materiality checks
- Provide a inventory report, and
- Verify bias checks

The criteria and the results of the analysis are listed under Tables 23 and 24.

Table 23 CarbonZero Third Party Verification

Section	Questions	Is the required criterion present	References and comments	Further comments
Third Party/ Internal verification	Is there a requirement for the report to be either third party or internally verified? Is this clearly communicated to stakeholders?	Yes, third party	Reporting organisations are required to be audited by a third party. This is detailed in the *Preparing for Verification Audit* CZ047 (2008) document, and is communicated in the *Summary of Certification* CZ036 (2008) document.	
	Is a verification section required stating which sections are verified and which are omitted from verification (if any)?	Yes	*'The certification claim you are seeking determines the objectives and scope for the verification'* (*Systems and Controls* CZ007, 2008; 11).	
	Is the omission and inclusion of information relevant to the GHG inventory, emissions removals and sinks, and other emissions (non Kyoto GHG's) stated?	Yes	Reporting organisations are required to state: emission exclusions, and a chart detailing business units that are included and excluded. *Summary of Certification* CZ036 (2008).	
	Is the organisation required to report on the presence of any reporting and data gathering methodologies, inventory data quality controls, and materiality checks?	Yes	*'The verifier will examine the steps of data collection and transformation from facility source to corporate report. The review will also look at the process, procedures, and methods used to manage that data. This assessment aims to identify any procedures or controls that lack sufficient detail to ensure accuracy and consistency, or that could increase uncertainty or introduce errors into the final results'* (*Preparation for the Verification Audit* CZ047, 2008; 2)	Materiality is checked by verifier, in the inventory report it also states that *'all GHG calculations were calculated using the programme calculation tools'* (*GHG Inventory Report* CZ013A, 2008; 12)
	Is appropriate documentation of all the relevant data used in the organisation reports provided?	Yes	A GHG inventory is required to be published on *E-manage* with appropriate reference material, and it is advisable to document data collection processes to ensure that the inventory can be effectively reproduced in subsequent years by different staff.	

	Is a GHG inventory report required? And is this checked as part of the verification process?	Yes	Data paths are checked in the verification process, and the data used in the inventory is available online on *E-manage.*
	Are bias checks required to be verified?	n/a	Bias checks are carried out by verifier

Table 24 Carbon Neutral Company Third Party Verification

Section	Questions	Is the required criterion present	References and comments	Further comments
Third Party/ Internal verification	Is there a requirement for the report to be either third party or internally verified? Is this clearly communicated to stakeholders?	Yes/ guideline	*'The CarbonNeutral Company organises verification procedures for all organisations within the group'* (CNP, 2007; 4). *'Verification statement by any ISO 14001 accredited auditor, or CNP accredited auditor will be accepted'* (CNP, 2007; 4)	*'It is recommended that all large organisations and publically quoted companies obtain independent verification of accuracy, scope of emissions, level of assurance of their assessment/ monitoring system within two years of starting a CarbonNeutral initiative'* (CNP, 2007; 7)
	Is a verification section required stating which sections are verified and which are omitted from verification (if any)?	No		
	Is the omission and inclusion of information relevant to the GHG inventory, emissions removals and sinks, and other emissions (non Kyoto GHG's) stated?	Not stated		

	Is the verification organisation required to report on the presence of any reporting and data gathering methodologies, inventory data quality controls, and materiality checks?	Not Stated		
	Is appropriate documentation of all the relevant data used in the organisation reports provided?	Yes/ guideline	As a guideline; *' Keep a clear record of all the assumptions and calculations used in the quantification of emissions'* (CNP, 2008; 6)	
	Is a GHG inventory report required? And is this checked as part of the verification process?	Yes/ guideline	*'It is recommended that all large organisations and publically quoted companies obtain independent verification of accuracy, scope of emissions, level of assurance of their assessment/ monitoring system within two years of starting a CarbonNeutral initiative'* (CNP, 2007; 7)	*'Organisations undertaking CarbonNeutral Initiatives shall provide an accurate description of the type of CarbonNeutral Initiative being under taken, according to the applications listed in Annex A'* (CNP, 2007; 15)
	Are bias checks required to be verified?	Not Stated		

4.15 Assurance provider programmes credibility and impartiality

An assurance provider must be shown to be independent and qualified to carry out verification of the reporting organisation. Otherwise any reports produced will lose credibility and may have a negative impact on the firm's reputation if found out. To ensure that an assurance provider supplies a fair and accurate service, CN programme providers need to ensure that:

- They provide proof of experience and expertise
- They show that they are independent of the reporting organisation they are assessing

The criteria and the results of the analysis are listed under Tables 25 and 26.

Table 25 CarbonZero Assurance Provider Standards

Section	Questions	Is the required criterion present	References and Further comments
Assurance provider standards : credibility and impartiality	Is proof of expertise and experience required for verifiers?	Yes	Assurance providers are selected by reporting organisations from a pool of verifiers chosen by CarbonZero. '*To be authorised, verifiers must complete the CarbonZero programme training course, pass an examination and be observed undertaking a verification'* (www.carbonzero.co.nz/about/auditors.asp)
	Is the assessment of certification carried out by an independent third party, whose independence is assured?	Yes	All assurance providers are approved by CarbonZero, and are monitored for each report they carry out.
	Does the verification organisation provide a statement of independence, including a financial independence statement including future and past relations with the reporting organisation?	No	*'On a related matter, a verifier is unable to provide verification services to an organisation to which they have provided consulting services in the previous two years'* (CZ047 Preparing for the verification audit, 2008; 4)

Table 26 Carbon Neutral Company Assurance Provider Standards

Section	Questions	Is the required criterion present	References and Further comments
Assurance provider standards: credibility and impartiality	Is proof of expertise and experience required for verifiers?	Yes	*'Independent verification by auditors accredited to award either ISO 9001 or ISO 14001, or EMAS is acceptable'* (CNP, 2007; 7)
	Is the assessment of certification carried out by an independent third party, whose independence is assured?	No	Citification carried out by CNC, Verification by *'any ISO 14001 accredited auditor, or CNP accredited auditor*' (CNP. 2007; 4)
	Does the verification organisation provide a statement of independence, including a financial independence statement including future and past relations with the reporting organisation?	No	

4.16 Assurance statement

An assurance statement is published by an assurance provider and attests to the content and accuracy of a reporting organisation's achievement of CN. An assurance statement also serves as a communication tool for the content of the accreditation process as carried out by the reporting organisation; what choices they made, and the results of emission inventories, reductions, and offsets. An assurance statement is not just a key quality management tool, but a key communication tool. That provides a wide range of information relating to:

- The level of assurance provided
- Verification statement
- A break down of the emissions inventory
- Information on the reporting organisation
- Reductions made, and
- The report time period

The criteria and the results of the analysis are listed under Tables 27 and 28

Table 2 CarbonZero Assurance Statement

Section	Questions	Is the required criterion present	References and Further comments
Assurance statement	Is the following information provided in a assurance statement in the Carbon Neutrality report;		All of the requirements are covered by CZ's *'Summary of Certification'* (2008) document.
	Organisational information (i.e. number of sites, employees, net sales, products sold, nature of ownership, number of countries operated in etc.)?	Yes	
	Purpose and objectives of the report in the context of the organisation's GHG policies, strategies or programmes and applicable GHG programme?	Yes	
	Data and information to be included in the report? Historical information i.e. changes in structure? Report parameters; the scope and boundaries? Period for which the report is valid?	Yes	
	Relative contextual information informing the organisation's practice: legislation, related reporting frameworks, standards, and guidelines related to GHG emissions and reductions?	Yes	
	A list of GHG assertions, including a statement of GHG emission reductions and removal enhancements stated in tonnes of CO_2e?	Yes	
	A statement describing whether the GHG assertion has been validated or verified, including the type of validation or verification and level of assurance achieved?	Yes	
	Describe the level of assurance pursued, including if different levels of assurance that were available?	Yes	
	A statement of the aggregate GHG emissions and/ or removals by GHG sources sinks and reservoirs for the GHG project that are controlled by the project proponent, stated in tonnes of CO2e, for the relevant time period (e.g. annual, cumulative to date, total)?	Yes	

	A statement of the aggregate GHG emissions and/ or removals by GHG sources, sinks and reservoirs for the baseline scenario, stated in tonnes of CO_2e for the relevant time period?	Yes
	A general description of the criteria, procedures or good practice guidance used as a basis for the calculation of project GHG emission reductions and removal enhancements?	n/a
	The date of the report and time period covered?	Yes

Table 28 Carbon Neutral Company Assurance Statement

Section	Questions	Is the required criterion present	References and Further comments
Assurance statement	Is the following information provided in a assurance statement in the Carbon Neutrality report;	No	Aside from the use of branding, an assurance statement is not required, *'The operator shall publish and maintain through annual updates accurate data about CarbonNeutral Initiatives on the public CarbonNeutral register, specifically:* *Organisations undertaking CarbonNeutral Initiatives and type of CarbonNeutral initiative,* *Status of offset instruments (contracted, pending, delivered or cancelled),* *Description of each project used to supply GHG offset instruments'* (CNP, 2007; 15)
	Organisational information (i.e. number of sites, employees, net sales, products sold, nature of ownership, number of countries operated in etc.)?	n/a	
	Purpose and objectives of the report in the context of the organisations GHG policies, strategies or programmes and applicable GHG programme?	n/a	
	Data and information to be included in the report? Historical information i.e. changes in structure? Report parameters; the scope and boundaries? Period for which the report is valid?	n/a	
	Relative contextual information informing the organisation's practice: legislation, related reporting frameworks, standards, and guidelines related to GHG emissions and reductions?	n/a	
	A list of GHG assertions, including a statement of GHG emission reductions and removal enhancements stated in tonnes of CO_2e?	n/a	
	A statement describing whether the GHG assertion has been validated or verified, including the type of validation or verification and level of assurance achieved?	n/a	

	Describe the level of assurance pursued, including if different levels of assurance that were available?	n/a
	A statement of the aggregate GHG emissions and/ or removals by GHG sources sinks and reservoirs for the GHG project that are controlled by the project proponent, stated in tonnes of CO2e, for the relevant time period (e.g. annual, cumulative to date, total)?	n/a
	A statement of the aggregate GHG emissions and/ or removals by GHG sources, sinks and reservoirs for the baseline scenario, stated in tonnes of CO_2e for the relevant time period?	n/a
	A general description of the criteria, procedures or good practice guidance used as a basis for the calculation of project GHG emission reductions and removal enhancements?	n/a
	The date of the report and time period covered?	n/a

5.0 Analysis

Both CarbonZero (CZ) and the Carbon Neutral Company's (CNC) CarbonNeutral Protocol (CNP) adhered to a majority of the Criteria set out by this thesis. Following is an analysis of the criteria they did or did not adhere to and the implications. The theory informing environmental reporting for Carbon Neutrality is further examined in the Discussion section. All the results are laid out in tables in the previous section of this thesis.

5.1 Stakeholder dialogue

Stakeholder dialogue refers to the interaction between the programme provider and the reporting organisation, or between the reporting organisation and the groups and individuals who have a stake in their actions. Stakeholders can be consumers, shareholders, or any other party with a stake in the actions of an organisation.

Stakeholder dialogue provides transparency for an organisations actions and decision making; this allows stakeholders to make decisions about their own interactions with the organisation. It is important for programmes of CN to engage in stakeholder dialogue to ensure stakeholder concerns are taken into account, and that their business practice is transparent. This ensures that organisations are held accountable for their actions and choices. The results of the stakeholder dialogue criteria analysis are detailed in Tables 1 and 2 in the results section.

5.2 Stakeholder input, and issues and feedback tools

Stakeholder feedback allows issues to be raised with a programme provider. This allows changes to be made in the programme's content; ensuring that sections that lack rigor are dealt with. It is important that stakeholders have input in to a programme's content, as this ensures a CN programme addresses a reporting organisation's (and their stakeholders) needs.

CZ requires each reporting organisation to provide a complaints register. It allows stakeholders to voice concerns over the content of the CN report and provides reporting organisations an opportunity to adjust to stakeholder needs. The CZ also allows stakeholder input in emission scope; *'any other scope three emissions that are deemed relevant by the industry sector or consensus of reasonable members of the public'* (*Measure* CZ005A, 2008; 7).

The CNC does not have a complaints register but does provide for stakeholder input through its Independent Advisory Group (IAG) (www.carbonneutral.com/pages/independentadvisorygroup.asp). The IAG provides an avenue for stakeholder views to be put forth on the content of the CNP. It also keeps the CNP up to date with international developments associated with CN. The CNP requires two of the board members to be clients of the CNC. CZ also has an advisory group (www.carbonzero.co.nz/about/panel.asp) which provides advice on policy and to scrutinise the CZ programme. The CZ advisory group does not require stakeholders to be members; it is made up of experts from both government and industry.

Independent Advisory Groups are a useful tool for ensuring credibility, as they show a programmes commitment to improving themselves through external input. Reports on CN programmes carried out by these independent advisory groups should be published for stakeholder perusal, because transparency of the findings and evidence of improvements show that the programme providers are addressing issues and reacting to stakeholder opinion.

While both programmes have tools which facilitate input from clients and industry experts, neither has mechanisms in place for input from the broader public. Although the CZ programme may allow for scope 3 emissions to be determined through public consensus, neither programme makes allowances for input on their programmes content or reporting style from the general public. As a programme can be seen as a tool that communicates to stakeholders a reporting organisation's CN status, the content or reporting style should reflect stakeholder's needs.

5.3 Transparency and accountability to stakeholders

It is important to disclose information to stakeholders on the CN accreditation process that a reporting organisation has progressed through. This includes decisions they have made on the content of the accreditation process such as: accreditation reports detailing their inventories, choice of offsets, emissions inclusions and exclusions, as well as any external influences like government policy. Choices on aspects of CN accreditation like offsets are important to stakeholders as they can lead to substandard levels of CN. For instance poor quality offsets can mean that an organization's carbon neutrality status can be false. Without quality offsets showing material emission reductions or removals, CN would be impossible to achieve.

The online publishing of the CNP offset register provides transparency on the quality and state of carbon offsets used by reporting organizations (www.carbonneutral.com/cnregistry/projectsearch.asp). This online register allows stakeholders to observe the quality of the offsets themselves, and is a good tool for transparency. The CZ provides information on the offsets it uses online. This includes; type of offset, links to its verifiers, amounts of CO_2 offset, and what schemes is it accredited under (www.carbonzero.co.nz/steps/mitigate.asp). It is important to disclose information on offsets to allow stakeholders to view the comprehensiveness of this intrinsic aspect of CN. Both programmes do this to an acceptable degree.

The CNP provides very basic case studies of their clients that briefly state the CNCs involvement and the steps taken by the reporting organisation. The CNP involves many choices for accreditation and uses the ISO 14064-1 as an informative document for establishing inventories. This shows a need to disclose reporting organisation's accreditation process to inform stakeholders of the choices made during the accreditation process. The brief case studies do not do this. Although their programme's content is available to the public, without showing the choices made during the accreditation process a stakeholder will have difficulty determining the quality of the CN accreditation. CZ publishes online summaries of the accreditation

process detailing the steps taken by reporting organisations who achieve certification. These summaries detail; reductions, emission inventories, boundary outlines, offsets, threshold of materiality and certificate status. This provides transparency allowing the stakeholders to see the detail of the accreditation process. The level of detail allows stakeholders to make judgements on the choices and content of the certification. This is important because the CZ programme is not available to the public.

The CZ programme requires reporting of external influences such as legislation; *'you must prepare a GHG emissions management plan that includes: Objectives with rationale linked to national regional sector, or group climate changes policy or initiatives'* (*Manage 1* CZ005A, 2008; 8). This allows stakeholders to see the external influences and shows external factors that affected the reporting organisation's choices. The CNP does not require reporting of legislation and external influences. By stating its external influences, a reporting organisation allows stakeholders to make decisions based upon the motivations and drivers that influence the reporting organization's decisions.

5.4 Clarity to stakeholders and programme availability

The CNP is published online for stakeholder perusal, certain sections of its content are not laid out in an easily understandable manner and could potentially mislead stakeholders. The content of their programme refers to a number of informative standards (CNP, 2007; 24). One of these is the ISO 14064-1, used in quantifying GHG emissions. The variability inherent in the use of the ISO and other standards as guidelines can lead to uncertainty as to what each reporting organisation reports. The CZ programme is not published for external stakeholder consumption, but it is very comprehensive and detailed, and is quite clear as to what is involved at each step. The programme is made available to clients; however a stakeholder will not be able to make a decision based upon its content, as they cannot view it.

Both the CNP and CZ imperfectly communicate their programme's content. The CZ does not provide access to external stakeholders, and the CNP may be misleading to

people unfamiliar with the ISO14064-1. For a CN programme to be effective it needs to be clear and written in a manner that is understandable for stakeholders. Publishing a programme online provides transparency to stakeholders as to what a reporting organisation must do to achieve carbon neutral status. But, if the programme is unclear or too ambiguous this transparency is lessened or completely negated as the stakeholder no longer has any benefit from reading it.

Accreditation through international organisations is one way to bypass these issues, although the degree to which this provides assurance to the stakeholder as to the quality of the programme is unclear. This is because what a regional or international standard assures needs to be analysed. The analysis would need to discover whether the regional or international standard assures appropriate sections of CN programmes, and that it does it to a sufficient level of quality. Both the CNP and CZ adhere to international and regional standards.

5.5 Comparability and consistency

Comparability and consistency ensure that reporting organisations follow a process that is uniform and allows comparisons over time and between reporting organisations. This is important because consistency ensures that reports can be compared. Deviations could make future reports misleading. To mitigate this, explanations for changes in the reporting process need to be stated. Comparisons allow reports to be compared; this allows changes in a reporting organisation's practice to be observed. The results of the comparability and consistency criteria analysis are detailed in Tables 3 and 4 in the results section.

5.6 Regular reporting

It is difficult to require a regular reporting period for carbon neutrality, as a reporting organisation may decide to purchase their CN accreditation from another organisation

or to not renew their certification. Both the CNP and the CZ programmes advise regular reporting, but do not require it.

5.7 CO^2 equivalent

Both Programmes require emissions to be reported in CO_2 equivalent (CO_2e); this is assuming the CNP adheres to the ISO 14064-1 requirement that all emissions are reported in CO_2e (the ISO is listed as an informative document by the CNC). A failure to report emissions in CO_2e could lead to confusion for stakeholders who do not know the global warming potential of individual GHGs. This would also make comparisons difficult.

5.8 Reductions

CZ requires reductions to be compared against the first 12 month period the reporting organisation reports on. The CNP does not explicitly require a baseline in its reduction plan template. Comparisons against baselines allow stakeholders to observe annual emission reductions, and to compare reductions between years. By not requiring reductions to be compared against a baseline, the CNP makes it difficult for stakeholders to observe reporting organisation's reductions.

5.9 Changes in reports

CN programmes need to report instances of changes in reporting format, as these changes can be misleading to stakeholders if they are not informed of them. CZ requires reasons to be stated for acceptable changes in reporting style, scope, and format as all calculations carried outside of E-manage must be.

According to the ISO, the CNP would require reasons for changes in methodology and emissions factors. Because the CNC does not provide in depth reports online, there is a question of whether there are any reports on deviations of their client's

scope, format, and style from the programme. If deviation reports are in fact published; in what format is this done and where are they published? By not publishing deviations in methodology, and boundaries future inventories can become misleading due to changes in reporting style and can give the impression of reductions where there are none.

5.10 Clarity and definition of key words

Providing definitions of key words facilitates the understanding and ease of use of CN programmes and information provided to stakeholders. Clarity can refer to the availability of performance records and key information that determines inventory quality such as emission factors. Both programmes provide either a glossary or in text definitions of key words, which aids understanding of their programmes. Results of the criteria analysis are published in Tables 5 and 6.

5.11 Historical performance

Historical performance initiatives (internal emission reductions) are required in both programmes. There is no requirement for the CNP clients to publish their emission reductions publically. This can obfuscate the level of reductions made, if they are made at all, which lowers accountability of reporting organisations. But CZ requires emission gains to be stated as well as reductions showing a high level of accountability. Stating emissions gains shows a high level of transparency by a reporting organisation, a willingness to admit mistakes shows a high level of accountability to not just consumers but the wider public.

There is no requirement for the CNC clients to publish their reduction report while there is for the CZ programme. It is important to show evidence of material reductions as these demonstrate a strong commitment to reducing emission, which is a good indication that the carbon neutrality is not just ‘greenwash’. Publishing reports to stakeholders on emission reductions is an important aspect of CN as it shows and commitment to the ideal of CN rather than a more shallow idea of buying green

credentials. Requiring reductions goes one step further by actively requiring synchronisation with the ideal of CN and the reporting organisation's business practice.

5.12 Emission calculations factors

By stating emission factor sources and by showing these are up to date a CN programme can assure stakeholders that any calculations carried out have a high standard of accuracy.

For inventory calculations, CZ provides the *E-manage* online calculation tool and states its emission factor sources online. The CNP requires activity data to be up to date; however it does not state the source of its emission factors. On their online business calculator they do state the sources of emission factors, some of which are older than 24 months (http://www.carbonneutral.com/business-carbon-calculator/sbchelp.asp). By stating its emission calculation sources, CZ shows a level of quality and transparency. It allows consumers to make decisions on an aspect of inventory quality via the calculation of certain emissions sources. CNP does not provide its factor sources, although the ISO 14064-1 would require them to be up to date and from a recognised origin. But as the ISO is used as an informative document this is uncertain. Factor sources may not be published because The Edinburgh Centre for Carbon Management (ECCM) carries out assessments of emissions for reporting organisations in Europe (http://www.carbonneutral.com/pages/becomingcarbonneutral.asp) and provides their own factors (http://www.eccm.uk.com/httpdocs/about_us/about_us.html).

5.13 Comprehensiveness

CN programmes need to be comprehensive; this aids comparisons, limits omissions, and enhances accuracy of the CN accreditation. Results of the comprehensiveness criteria analysis are presented in Table 7 and 8.

5.14 Clarity of choices and report content

Statements of the choices available to, and choices made by, a reporting organisation in the accreditation process, shows stakeholders the choices made by reporting organizations that affect the content and quality of their accreditation.
The two programmes differ in their method of making the choices transparent. The CNP's choices are made visible through the use of labels and the online publication of the content of their programme. However the CNP does not state what choices the reporting organisation made on their emissions inventory, and their reductions.

CZ also uses labels to state the method of certification. While choices are not stated, the *Summary of Certification* (2008) requires reporting organisations to state emission exclusions and inclusions, as well as other areas where choices were made. This allows consumers to see the outcome of the reporting organisation's choices, but because CZ's programme is not available to stakeholders, not all of the choices made are apparent.

The lack of published choices can be partially mitigated by the use of third party verification of the reporting organisation. Third party verification of the reporting organisation's certification shows that they adhered to the programme and produced an accurate report, so long as the carbon neutrality programme is a quality programme. Both programmes require third party verification to be carried out.

5.15 Scope

Scope details the emissions sources with the operational boundary of the reporting organisation. Stating the scope shows stakeholders what emission sources were included and excluded from the reporting organisation's inventory.
The CNP publishes its scope, however it uses two different scopes; an emissions to be offset scope is based on the World Resource Institute's GHG Protocol, and a scope for the emissions inventory is based on the ISO 14064-1. CZ does not publish its scope for stakeholder viewing; however the results of the emissions inventory, including included and excluded emissions are available in the accreditation report.

5.16 Calculation methodologies

Calculation methodologies are important as they determine the quality of the emissions inventories that they produce. By stating methodologies, CN programmes show stakeholders that there is a comprehensive and accurate process in place.

CZ requires reporting organisations to use the *E-manage* online calculator, which uses CZ selected emission factors. Calculation methodologies that are not used by *E-manage* online calculation system are required to be reported to CZ, and are targeted in the verification process. CNC uses the Edinburgh Centre for Carbon Management (ECCM) to assess clients' inventories (www.eccm.uk.com/httpdocs/about_us/about_us.html). It can be assumed that by using a research institute as their agent that a high degree of knowledge is applied to methodologies used. Furthermore the ISO 14064-1 would require methodologies that minimise uncertainty and ensure accuracy. The CNP provides a 'black box' wherein the emission calculations are carried out and the inventory is produced, neither are detailed in the programmes content or reported on in-depth. *E-manage* is an online programme that provides set methods for each reporting organisation to use. No description is provided of the ECCM's processes or methodology.

It needs to be established that it is very difficult to provide transparency at this juncture as the information contained in this step is commercially sensitive. However by acknowledging that it is difficult to provide transparency on this step it does not prevent requirements to mention deviations from the established methodology and that the calculations are carried out using up-to-date emission factors from recognised sources.

5.17 Facilities and emission allocations

The CZ programme requires the reporting organisation to provide a list of all its facilities and sites to be provided. It also requires checks on reporting organisation's financial accounts to ensure relevant structures are included in the boundary, but only provides for business units to be reported alongside emission sources. The CNP does

not provide a report stating a breakdown of facility emissions. For larger organisations this can show regional or international trends and can further detail the emissions gains or losses made in particular aspects of their business i.e. manufacturing. This can be an important indicator of their commitment to making reductions in their carbon footprint.

5.18 Historical emissions

Historical emissions or emissions baselines allow comparisons to be made against historic emissions inventories to show a reporting organisation's gains or losses in emissions over time. Historical emissions (baselines) are required to be listed in reports for CZ, but not for CNC, which only requires baseline calculations as a guideline. By not providing a baseline, concrete reductions (and comparisons) are difficult to determine by stakeholders, if changes in calculation methodologies, emission factors, and organisation occur and recalculations are needed.

5.19 Explanation of changes

The CZ programme explicitly states the need for supplying information on the reasons for changes that are discovered through the verification process. The CNC uses the ISO 14064-1 as informative documents (as listed in Annex F of the CNP) which would require the statement of changes in calculation methodology and emission factors, but not for changes that do not require recalculation. The use of the ISO 14064-1 document as a guideline provides a moral choice to reporting organisations when the option arises of not reporting changes in order to hide unfavourable information. The lack of requirements for public reports to be published by either the reporting organisation or the certifier denies a standard level of transparency and accountability to external stakeholders. This in turn leads to uncertainty about the quality of the programme over all.

5.20 Managing inventory quality and accuracy

Inventory quality and accuracy ensure that errors and omissions are kept to a minimum, and that current and future results are produced through the same methods and processes. This ensures that current and future inventories will be an accurate representation of a reporting organisation's emissions. The criteria for managing inventory quality and accuracy are listed in Table 9 and 10.

5.21 Data collection and Record keeping

To ensure data collection procedures are present that allow data to be collected in future inventories, the CNP recommends that reporting organisations establish a regular data collection process to repeat data collection. CZ requires reporting organisations to produce a data process map for all data used in an emissions inventory. CZ also recommends using data quality control checks to ensure its robustness. A data collection process needs to be uniform to provide reproducible results, and to ensure that all data is collected accurately. Both programmes provide guidelines to achieve this. The use of guidelines may denote uncertainty due to the lack of assurance for repeat reporting.

CZ strongly recommends reporting organisations carry out record keeping, and implement processes to ensure it is active and accurate. The CNP also recommends reporting organisations 'keep a clear record of all calculations and assumptions used in the quantification of emissions'(CNP, 2007; 6). Both programmes use guidelines to refer to record keeping; the assumption can be made that record keeping does not need to be mandatory due to the uncertainty of repeat reporting.

5.22 Quantification methodology and emission factors

A quantification methodology determines the methods through which an inventory is calculated. A quantification methodology covers the calculation and measurement methods used to determine an emissions inventory. Quantification methodologies need to be selected in line with their intended use to ensure accuracy and relevance.

The CNP refers to the ISO 14064-1 as an informative document to quantify emissions; the ISO requires organisations to choose quantification methodologies that produce accurate consistent and reproducible results. However the Edinburgh Centre for Carbon Management (ECCM) is

CZ emissions calculations are done in the *E-manage* online system. Calculations done without *E-manage* are a focus of the verification section. *E-Manage* is independently verified against ISO 14064-1 for its calculation methodology and reporting of GHG emissions (www.carbonzero.co.nz/help.asp). Where calculations or other data estimations or transformations are made outside of *E-manage*, all relevant information must be made available for the audit. *'The verifier will examine your GHG management system to ensure...that calculation methodologies are appropriate'* (*Preparing for the Verification* Audit CZ047, 2008; 1).

CZ explicitly states the sources of its calculation activity, and emission data processes (factors) that are used in *E-manage*; the sources are listed in Table 19. The sources are reviewed and updated annually. The CNC does not state its sources within the CNP; however the online calculators do make reference to emission factor and ratio sources. ISO 14064-1 would also require the selection of emission factors that 'yield accurate consistent and reproducible results' (ISO 14064-1, 2006; 9). It is important that emission factors etc. are up to date and their sources are stated to assure stakeholders that the inventories are developed using calculations that will ensure accuracy. Otherwise the inventory will be less accurate, leading to distrust of the inventory, and the comprehensiveness of the programme.

5.23 Checking procedures and triggers

Checking procedures are important to ensure that errors and omissions do not build rendering the inventory inaccurate. Procedures and triggers need to be put in place to identify and fix any errors or biases in the calculation of emissions.

CZ has procedures to address both systemic bias and other characteristics that could affect inventory quality in the form of *de minimus* and materiality checks. The CNC

has no explicitly stated requirements; it does have a guideline to keep a clear record of assumptions and calculations and to be aware of uncertainties in calculations.
Checking inaccuracies is an important part of maintaining an accurate inventory. By not having checks in place there is a chance of mistakes and errors building up to the point of providing an inaccurate inventory.
CNP would require checks for errors and omissions under the ISO 14064-1 (which is listed as an informative document in Annex F of the CNP). The ISO also requires explanations of recalculation of the base year in the case of changes to operational boundaries, ownership of sources and sinks changing, and changes to quantification methodologies.
CZ requires:

- calculation checks for calculations carried outside of the *E-manage* tool,
- materiality and *de minimus* checks , and
- Three triggers for uncertainty in the verification process that are stated within the CZ programme.

Both programmes require verification of their client's reports as part of the accreditation process. It is important that programmes have checks and triggers for checks in the inventory data gathering stage of their programmes, not just at the verification stage. By carrying out inventory quality checks according to a programme a reporting organisation can identify and solve errors and omissions leading to an improved inventory process.

5.24 Materiality

Materiality checks for errors and omissions are an important part of a programme quality as they ensure checks are done on an organisation's inventory to ensure it is accurate and representative. Materiality also covers relevance to stakeholders; this constitutes information that allows stakeholder to make informed decisions. The results for materiality criteria are listed in Table 11 and 12.
CZ provides for both *de minimus* and materiality (for both errors and omissions and relevance to stakeholders) checks, and provides definitions for the users of their

programme to work by. During the verification process non conformances are required to be identified, material discrepancies are categorised as a major non conformance and are required to be corrected and the inventory re submitted. Under the ISO 14064-1 (2006; 12), which the CNC uses as a guideline, errors and omissions would be required to be identified, no materiality threshold is established. Relevance to stakeholders is not required to be checked, although the IAG is a mechanism in place that may partially help this issue. It is not explicitly mentioned whether materiality checks are carried out during the verification process. Materiality needs to be established and checked, it ensures the accuracy and relevance of an inventory report. Errors can build up and lead to major discrepancies and a decline in inventory accuracy. Stakeholders will also have expectations about what information is included in the CN report. If these considerations are not taken into account the stakeholder opinion on report quality may drop as the stakeholders will perceive the report as untransparent and misleading.

5.25 Baseline and year establishment

A baseline is an emission inventory against which future emission inventories are calculated to determine changes in emissions over time. A baseline represents the emissions produced by the reporting organisation before participating in CN accreditation, and is used for comparison against future reductions in emissions. Baselines need to be recalculated if the reporting organisation's composition changes significantly, calculation methodology or emission factors change, or if it becomes obsolete over time. The results for baseline and year establishment are listed in Table 13 and 14.

CZ requires a baseline and provides for checks to be carried out on its accuracy during the verification process. The baseline relates to a single year which is based on the first reporting period. The original base year is required to be stated in future reports however a recalculation threshold is not explicitly stated, although it does say *'in the case of acquisition emissions should be reported from the date that operational*

control is gained' (CZ005A, 2008; 5). This would at a minimum show the rise in emissions from the acquisition, but not a decline from selling off assets.
The CNC requires a base year inventory for comparative purposes, as a guideline, under the ISO 14064-1. It also states as a guideline in the CNP '*establish a regular process to repeat data collection and assess changes over time relative to a bench mark or starting point'* (CNP, 2007; 6). According to the ISO 14064-1 the baseline must have verifiable emissions and removals data. The CNP requires, as a guideline, that all organisations should undertake GHG assessments annually. No baseyear is required to be stated in future reports although progress would be assessed against the benchmark. There is no recalculation threshold although under the ISO 14064-1, reasons for changes would have to be given. The CNP does state that '*relevance of benchmarks is assessed every two years'* (CNP, 2007; 7).

Engaging in a baseline as a guideline instead of a requirement impedes monitoring of a reporting organisation's progress. It can lead to misrepresentation of emission reductions. It also hinders future comparisons. Baseline calculations are important for future comparisons; they allow stakeholders to make judgements on emissions reductions, and on organisation's emissions management. Comparisons allow levels of emissions and reductions to be identified by stakeholders, which show an organisation's commitment to transparency.

5.26 Assessment boundary

A boundary determines the methodology used to establish what parts of a reporting organisation are included in an emissions inventory. The parts of a reporting organisation that are included or excluded determine the comprehensiveness of the inventory, and the transparency of the reporting organisation in representing the totality of their emissions. The results for boundaries for assessment are listed in Table 15 and 16.

5.27 Boundary approach

CZ's boundary approach is organisational and requires that '*the boundary that you define for your GHG emissions inventory will include all the business units and operations that constitute the trading entity seeking certification'* (CZ005A, 2008; 4). Furthermore '*where an organisation has ownership interest in entities but not on operational control, those interests must be disclosed in the GHG report'* (CZ005A, 2008; 5). Disclosure of financial assets to CZ is also required. This is very comprehensive and will cover most organisations' emissions well. The organisational boundaries must be correctly defined and are checked in the verification audit. CZ states in the Preparing for the verification audit document that the assessment will include: '*ensuring the organisational boundaries are correctly defined, that emission sources have been correctly identified'* (CZ047, 2008; 1). This will ensure that the reporting organisations are reporting according to the stated boundaries. This is an important aspect of verification as it ensures adherence to the programme and honesty and accuracy in reports.

The CNP uses two methods to calculate its GHG inventories. Both are referred to in Annex A. Emission boundaries for emissions to be offset are clearly stated in Annex A. The inventory emissions are only based on the 'informative' use of Annex F (read: the ISO 14064-1). The CNP states in Annex A '*quantify GHG emissions according to the guidelines given in the relevant publications, see Annex F'* (CNP, 2007; 17). This refers to the ISO 14064-1(in this case) which is used for quantifying GHG inventories. Emissions to be offset are to be quantified as listed in Annex A. It states that this must be done for *'all sites owned or under direct management control'* (CNP, 2007; 17). This is then laid out according to the World Resource Institute/ World Business Council for Sustainable Development GHG protocol guidelines covering scope 1, 2, and 3.

5.28 Deviations from boundary

The CNP does not require a statement for deviations from the established boundaries in Annex A; however although it is not stated, this could be carried out through the

accreditation process. The CZ *'programme will consider applications for financial control or equity share where compelling reasons exist… ensure that the inventory is a true and fair representation...in the view of a reasonable member of the public and other stakeholders'* (Measure CZ005A, 2008; 5). This allows flexibility for organisations that are not suited to the boundaries listed above. Boundary diagrams and deviations are stated in the *Summary of Certification* report.

CZ describes a very clear boundary, which is stated along side deviations from operational control in the Summary report. Although the CNP programme is published on line, reporting inventories and offsetting emissions are implemented according to two different methods, and boundaries can be misleading to stakeholders who are unfamiliar with the CNP. As the CNP does not explicitly state a requirement for deviations from the boundaries to be reported, there is space for miscommunication of emission inventories.
Clearly establishing operational boundaries and reporting on them accurately is the base of any quality inventory. Boundaries and deviations must be clearly stated for stakeholders to observe how comprehensive an emissions inventory is, and to provide transparency. While both organisations state their boundary methodologies, the CNP uses two which may be confusing to stakeholders. Clarification would be needed to alleviate this.

5.29 Operational Boundaries (scope 1, 2 and 3 emissions)

The operational boundary determines the scope of emissions calculated in an inventory. As the scope determines the GHG emissions included in the inventory it is important that it is communicated clearly to stakeholders. Transparency practice needs to show how comprehensive the scope is. This will be described by the inclusion of emissions relevant to stakeholders, and emissions relevant to the industry. The results for operational boundaries are listed in Table 17 and 18.

5.30 CO^2e, and the breakdown of emission to facility level

The CZ requires all emissions to be reported on individually, in CO^2e and published in their *Summary of Certification Report* CZ036 (2008) which lays out the emissions and sources clearly. The emissions are broken down into facility level in the emissions inventory report, but not in the Summary of certification report that is made available to stakeholders. The *Summary of Certification Report* does however provide an emissions profile graph and an outline of the organisational boundaries. There is a guideline requirement for breaking down the emissions in facility and organisation level under the ISO 14064-1; however this is not stated in the CNP. The ISO 14064-1requires organisations to report emissions in CO2e using appropriate global warming potentials for each type of GHG, but this is not explicitly stated by the CNP.

5.31 Energy ratios and factors

Scope 2 emission factors sources (or other emission factor sources) are not stated in reports or for stakeholder viewing. However *'emission factors used by the programme maybe released upon application*' (GHG inventory report CZ013A, 2008; 17), which allows a degree of stakeholder transparency whilst protecting the commercial sensitivity of the emission factors. The CNP, as a guideline, requires calculations involved in developing an emissions inventory be recorded. The calculations would be done by the ECCM; it is not stated whether they record ratios and emission factors but it is probable they do.

5.32 Scope 1, 2 and 3 Emissions

The criteria used to define scope 3 emissions are laid out in the *Measure* CZ005A (2008) Document but are not provided for stakeholder perusal. An important note is that CZ also requires *'Any other scope 3 emissions that are deemed relevant by the industry sector or consensus of reasonable members of the public'* (CZ005A, 2008; 7) to be added. This allows stakeholder input, which is a significant step towards developing industry specific programmes. That will ensure a higher level of

standardised reporting. Scope 1 and 2 are clearly laid out in the measure document within the operational boundaries which are defined as '*your operational boundary refers to all the activities within your organisational boundary that result in direct and indirect emissions'* (CZ005A, 2008; 6). Although Scope 1, 2, and 3 emissions are reported, these are not defined in the *Summary of Certification Reports* (which are published on the CZ website), they are however defined and reported in the *Inventory Report* (which is not disclosed).

The CNP boundaries for Scope 1, 2, 3 emissions are stated in Annexes A and F of the CNP. The scope of scope 3 emissions is only laid out for the emissions to be offset, and not the emissions inventory. This means that the total of emissions calculated to be offset (according to Annex A) could differ from emissions calculated for the inventory (which is calculated according to the ISO 14064). No reason is given in the CNP why this is so.

5.33 Deviations

Deviations would be considered by the CZ group so long as they maintained a fair and accurate representation of the organisation. For the CNP, deviations from the set emissions assessment criteria would be covered by the ISO 14064-1 (2006; 9-11) and would require justification. However the ISO 14064-1 is only used as an informative document and all the guidelines stated would not be strict programmes. This raises questions as to how much it is used by reporting organisations. This lack of standardisation, as shown by the abundance of guidelines rather than requirements, can lead to differing report content and levels of quality in and between reports.

5.34 Sinks Reductions and Removals

Sinks, reductions and removals refer to the reductions in GHG emissions carried out by reporting organisations. These are an important aspect of CN as they reduce a reporting organisation's emissions through initiatives that foster behaviour change and

send signals through purchasing preference. The results for sinks, reductions and removals are listed in Table 19 and 20.

Both the CNP and CZ require emissions reductions plans, however the CNP does not require mandatory reductions to be made. CZ uses emission removal or reduction factors that are from a recognised source, are current, and are calculated against a baseline. The CNP's use of the ISO 14064-1 as an informative document that would require recent, relevant emission factors to be used in the reduction calculations. The CZ requires emissions to be calculated against consecutive inventories; however the CNP's GHG reduction action plan template does not explicitly require an emissions baseline.

Using consecutive inventories could mean that that changes in the organisation that do not directly result from reduction plans or behaviour change may show reductions in emissions. No mention in the reduction section of the CNP or the CZ states that the reduction report takes account of uncertainty or requires results to be reproducible. The CNP's GHG reduction action plan is an informative template; it does not require a baseline to be stated, nor any technical data. It does require time period, target (if one is set), calculated emissions, breakdown of emissions, timeline and progress report. The CZ requires a management plan for emission reductions to be produced containing; objectives, SMART (Specific, Measurable, Achievable, Realistic, Time-constrained) targets, responsible parties, and top management commitment. The CZ requires up to 5 of the emission reduction plans to be published in a reporting organisation's summary of certification report.

5.35 Offsets and additionality

Offsets are an important part of CN accreditation as they reduce reporting organisation's emissions to zero. This is done through projects that either remove or prevent GHG from entering the atmosphere. It is important that offsets represent a accurate and permanent reduction or removal off emissions. The results for offsets and additionality are listed in Table 21 and 22.

The CZ and CNP have the following requirements for offsets used in CN accreditation of reporting organisations: offset date, time amount of emissions offset, assurance of permanence, retirement on an approved registry, and type of offset. The CNC has a very detailed online registry of offsets, while CZ publishes detailed information in its reports. Both organisations are very comprehensive in ensuring the quality of their offsets. Publishing online or providing hard copies of reports provides access to important information on offsets the reporting organisations have chosen. This allows stakeholders to see which offsets where chosen and to research their quality.

5.36 Third Party/ Internal verification

Verification of a reporting organisation's accreditation helps assure quality assurance of a CN programme. It provides assurance to stakeholders that the process of accreditation was carried out in a comprehensive and accurate manner and ensures a minimum of errors and omissions are present in the emissions inventory and any other relevant calculations. The results for third party/ internal verification are listed in Table 23 and 24.

The CNP organises verification procedures for organisations undertaking CNP accreditation. There is no mention of verification communication in the CNP's communication section. However reporting organisations are required to communicate the type of CNP initiative they undertook. CZ requires third party verification and communicates this through the *Summary for Certification* report. CZ has a verification document (*Preparing for the Verification Audit* CZ047) available for clients which details the process and information needed for the verification audit. While the CNP refers to *'verification statement by any ISO 14064-1 accredited auditor, or CNP accredited auditor will be accepted'* (CNP, 2007; 4).

CNP does not state any requirements for the exclusion and inclusion of emissions. CZ, on the other hand, requires included and excluded emissions to be stated, as well as non Kyoto GHGs. Showing Non Kyoto GHG emissions and emissions excluded

from the inventory shows high level of transparency. It goes beyond normative boundaries and shows a reporting organisation's actual footprint rather than just what they decided to report on.
CNP does not state what the content of the verification entails; the CZ document *Preparing for the Verification Audit* CZ047 (2008) details the content of the verification audit, the summary report. Showing what verification involves avoids merely auditing of the management system in place and not yielding any results on the accuracy or comprehensiveness of the reporting organisation's inventory and practices.

CNP advises reporting organisations to keep a clear record of assumptions and calculations, while CZ requires a clear document map and records all calculations on its online *E-Manage* calculation tool. Document maps and clear reporting trails are vital for recalculations or verification checks for inventories. Such a requirement in place, a standatd places unnecessary uncertainty on verification and inventory recualculations.
CNP does not state a requirement for bias checks. The CZ lists three levels of non conformities in its *Preparing for Verification* document. Checking for bias in the verification stage is an important aspect of ensuring the quality of an inventory. A buildup of bias in calculation or data gathering measures can distort a emissions inventory.

5.37 Assurance provider standards: credibility and impartiality

Ensuring assurance providers are credible and impartial ensures that an assurance report will not be biased and will provide an accurate and expert opinion on a reporting organisation's CN accreditation. The results for assurance provider standards are listed in Table 25 and 26.

CZ preselects verifiers. Reporting organisations are given the choice of selecting from this pool of verifiers. CZ requires that verifiers have no recent (two years) contracts with the reporting organisation. This ensures that there is no undue influence on the

verifier by the reporting organisation. Furthermore, verifiers must complete a CZ training course and be monitored undertaking verification to ensure a high standard of reporting.

The CNP requires that verifiers providing the verification statement for an organisation seeking to be accredited by their programme must be ISO 14001 or CNP accredited. CZ has a very high standard for training of its verifiers, as well as good checks for ensuring independence. The CNP does not appear to make any checks on independence which could lead to a verification reports content being influence by the reporting organisation. Verification must be by a well trained independent party, or risk being a misleading or outright incorrect statement of quality. If this occurs it could cause a CN programme to gain a bad reputation.

5.38 Assurance statement

An assurance statement is usually a statement by an independent verifier on the accreditation process of a reporting organisation. An assurance statement communicates to stakeholders the results of CN accreditation for the reporting organisation. This not only provides details of accreditation but shows that the reporting organisation adhered to the CN programme. The results for assurance statements are stated in Table 27 and 28.

CZ provides a detailed description of the contents of its Assurance statement in its *Summary of Certification* document which covers the criteria set out by this thesis. This is required to be verified by an independent verifier which is listed at the end of the summary.

The CNP does not require an assurance statement, but does maintain case studies online of reporting organisations who are accredited. This covers:

1. *Organisations undertaking CarbonNeutral Initiatives and type of CarbonNeutral Initiative*
2. *Status of offset instruments (contracted, pending, delivered or cancelled).*

3. *Description of each project used to supply GHG offset instruments'*
(CNP, 2007; 15)

Communication of the results for a reporting organisation's CN accreditation needs to be detailed, comprehensive, relevant, and accurate to achieve transparency and accountability to stakeholders. CZ's assurance statement is quite comprehensive and provides information relevant to stakeholder decision making. The CNP communication strategy provides information on offset projects, which communicates insufficient information on the rest of the CN accreditation process.

6.0 Discussion

The discussion section will cover the implications of the analysis by this thesis of the CN programmes. It will explore the application of the criteria used by this thesis, and the topics covered in the literature review.

6.1 Case studies

Only two CN accreditation providers participated in this study out of 14 CN programmes requested to take part. Issues leading to the low level of participation could include the following:

- Avoidance of scrutiny due to fear of poor performance
- New market: programmes are still developing and therefore are not yet ready for in depth analysis
- Time: Programme provider's perception of the time taken to participate in the study led them to decline
- Wording of invitation to participate may have been perceived as a threat.

The lack of participation disappointed as it may denote a lack of willingness by CN programme providers to provide transparency and submit to quality checks. At least one programme provider replied that they did not have a documented version of their programme to be assessed. If this is a widespread phenomenon it could imply a low level of quality for the market.

6.2 Criteria

The criteria used by this thesis were useful in extracting the requisite information on the two CN programmes' content. The criteria have shown areas of differentiation and convergence between the two programmes. This is an important aspect of this thesis, as identifying these areas gives us greater understanding of variability that may be apparent in the broader CN market.

There are areas, retrospectively where the criteria could be modified to better address CN programmes:

- Calculation methodologies; needs to be more in depth and detailed to properly address its complexity,
- Effectiveness of stakeholder communication methodologies, and
- The method of verification; rather than prescriptive criteria a method which communicates the content of verification could be more effective, as it would communicate content rather than identify what checks are absent.

The criteria developed by this thesis provided the analysis with an effective framework which could be further developed to be used on other types of accreditation i.e. eco-labels. An issue for further use of the criteria is the cost of examining a programme in terms of time spent. The process of using these criteria may be too long, and time consuming and therefore prohibitive for individuals to use, but could be useful for consumer assurance organizations

6.3 Comprehensiveness

A comprehensive CN programme needs processes that ensure that all relevant GHG emissions are measured, offset and reduced, and that appropriate reporting and calculation procedures are used. By stating the boundaries of emissions inventories and the exclusions and inclusions of CN reports, a reporting organisation allows choices to be made on the comprehensiveness of what emissions they decided to measure and mitigate (through offsets and reductions). This is also a measure of their responsibility to the pollution that they create.

The CNC boundaries are based on two documents; the World Resource Institute GHG protocol for emissions to be offset and the ISO 14064-1 for the emissions inventory. Both allow quite a few choices and have many guidelines in their content. This could lead to variability in their application. CZ states the emissions inventory boundaries in its online reports for each reporting organisation detailing business units and

included and excluded emissions. This not only illustrates the boundaries but details the excluded emissions allowing consumers to make decisions based on the boundaries comprehensiveness. What boundaries cover appears to be standardised by documents like the ISO 14064-1 and the WRI GHG protocol. It is their application to reporting organisations that needs to be standardised. Variance in how the boundaries are applied to reporting organisations needs to be reduced.

6.4 Offsets, and pollution abatement

Offsets are an intrinsic part of becoming CN; reporting organisations reduce their emissions to zero by purchasing offsets. Offsets are produced by projects that either remove GHGs from the atmosphere (i.e. forests, Carbon sequestration in soils etc.) or prevent emissions that would have happened by providing alternatives (i.e. methane capture in landfills, green energy projects). Both programme providers provided detailed information on the offsets used in their CN programmes. The level of information provided could be considered as a minimum standard for information disclosure on offsets, as it communicates clearly relevant information allowing stakeholders to make decisions based on the quality of the offsets used by the reporting organisation.

Offsets may be seen as a key signifier of quality due to the wider range of literature available on them, the use of government registries and trading markets, and potentially because of the higher level of public knowledge. Also the availability of Kyoto emissions units and government produced offsets provide a visible standard for offsets to be assessed against. Offsets may be communicated more clearly than other areas of a programme because programme providers will see offsets as an easy way to convince consumers of the quality of their programme.

6.5 Reductions

Reducing pollution (GHGs) is an important part of CN accreditation; it reduces the impacts organisations have on the climate and can evidence positive flow impacts to

other areas of the environment as well. Bruce and Laoiya (2007) identify the issue of over investment in pollution abatement and reduction of investment in the environment. This can be described as overspending on offsets (abatement) and under spending on investing in reducing GHG emissions (investing in the environment) through changing behaviors and fostering a society whose impact on the environment is minimized.

CZ requires reductions to be made and reported on, as well as the purchasing of offsets. The CNP encourages firms to use the shadow price of carbon offsets to determine how much they should purchase; internal reductions are to be reported on but are not mandatory. This can mean that not enough time is invested in actually reducing footprints while offsets are purchased instead. Offsets can provide benefits through investment in new technologies and through stimulating markets for alternative energy etc. However it can be argued that behaviour change is needed to reduce human induced climate change.

Reductions are needed in concert with offsets to ensure that the use of CN labels are encouraging behaviour change as well as financing new technologies through the purchasing of offsets. It would be difficult to mandate a certain baseline of reductions to be achieved, if a reporting organisation does not engage in reporting after the initial report. However it is reasonable to require a reduction report to be published within a time period (a year) that lists reductions (and gains) measured against the initial emissions inventory. Failure to do so should lead to revocation of the CN accredited status. Offsets cannot be used as a sole solution; behavior change is needed to power broader societal reductions in emissions. In-house reductions of GHG footprints will have a larger impact on climate change through flow on impacts.

6.6 Transparency

Transparency is the dialogue between a programme provider and stakeholders and a reporting organisation, which shows the actions and procedures in place determining the level of CN achieved. CN programmes are a new good in a new market which addresses complex and obscure information and issues. They also require higher

transparency due to the lack of common standards and commonality derived from market development.

Bruce and Laoiya (2007) state that to ensure transparency and validity of a label's claims these must be verifiable. If the label's claims are unverifiable then the consumer cannot effectively choose their preference. Both the CNP and CZ have third party verification for reporting organizations carrying out CN accreditation. Florini (1999; 4) describes transparency as a process by which information about existing and historic conditions, decisions, and actions are made available, visible and understandable. CNP discloses its content online.

The CZ programme does not disclose its content to the public but makes it available to purchasers of its programme. This is an important distinction, as it appears that the two programmes have different methods of communicating information to stakeholders. CZ provides a detailed summary report of the outcomes of accreditation for each reporting organisation and requires each reporting organisation to provide a complaints register. CZ also requires legal, financial, operational responsibilities to be stated. The CNP communicates its programme's content, and requires reporting organisations to provide a reduction action plan, and provides a communications section in its programme's content.

The two programmes differ in that CZ reports on outcomes, and CNP provides information on the process of accreditation. An outcome based approach shows the end result of accreditation and the choices made by the reporting organisation on the level of quality. A process based communications approach will only show the potential choices a reporting organisation can make. Accreditation outcome communication is an important aspect of CN. It needs to adhere to a high standard to ensure that stakeholders are being communicated relevant information of the reporting organisations behavior.

Communicating the detail and outcomes of work carried out externally to the CN programme provider is important as each step of the accreditation process should be transparent to stakeholders. Use of an external inventory calculation organisation, in the case of the CNP; the Edinburgh Centre for Carbon Management could be beneficial as research institutes can provide expert information. However based upon the lack of detail provided in the CNP on the calculation process, and the use of ECCM as inventory calculators, either a higher level of transparency or reassurance would be required on the veracity of the inventories calculated by this organisation.

Historical information needs to be provided to allow stakeholders to track and reporting organisations progress over time. CZ reports on baselines and year to year reductions in its summary report. The CNP provides a reduction action plan template, but does not state ant requirement to report on it, furthermore there is no stated requirement for providing an emissions baseline.

6.7 Relevance

Relevance is an indicator of the applicability of the information provided by reporting organisations to their stakeholders. Relevance requires feedback from stakeholders to work; feedback allows stakeholder input into report content, ensuring the relevance of the information provided. CN programme content must also be relevant to allow stakeholders to make decisions based upon the accreditation process reporting organisations go through.

The CNP uses their Independent Advisory Group which is required to have a client on group's board. The CZ includes sections in its programme for stakeholder input into inventory boundaries and materiality, as well as an advisory group comprised of industry and government experts. Not having stakeholder input will reduce the relevance of report's content, and therefore their uptake. This is avoidable. A well put together programme developed through initial consultation with stakeholder groups can initially provide the same relevance, but this will decline over time as new

information enters the market. Ensuring ongoing stakeholder dialogue and input is a tool for maintaining relevance and quality.

Relevance of information provided allows transparency to provide stakeholders with information to make decisions. Stating the choices that a reporting organisation can make versus the choices they did make provides a simple comparison. This allows decisions to be made as the relevant information reveals the choices made. Only stating choices a firm could make does not show the outcomes, and therefore will not be as relevant as it does not allow effective choices to be made.

6.8 Comparability

Comparability refers to comparability of year to year accreditation, or comparability of CN reports between different reporting organisations. Stating choices and outcomes of choices made also allows comparability of reporting organisations' accreditation processes, as does stating a programme's content. If these are not stated a situation where '*apples can be compared with oranges'* can arise. This means that reporting organisations that choose less comprehensive accreditation methods will get equal standing with those that carried out comprehensive reports. Both programmes require any reporting to be done in CO_2 equivalent aiding inventory total comparisons between organizations. Neither programme requires regular reporting; however this can be seen as an unreasonable requirement as reporting organisations must be given the opportunity to change programme providers.

6.9 Reputation

Reputation can be useful for ensuring environmental compliance by reporting organisations; however it requires certain prerequisites to work effectively. Graafland and Smid (2004; 277) state that the reputation mechanism only works well if the following conditions are met:

- *The strength of the reputation mechanism depends on the availability of the information about the past performance of the company. The more*

information is available, the more transparent is the company's performance.

- *A good reputation only pays off in the future. If the company is especially interested in short term profits, the company has less incentives to build up a good reputation, because the company has to make short term costs to get a better reputation that will lead to long term profits, and*
- *Reciprocity: the reputation mechanism is more effective if a good reputation is collectively rewarded and a bad reputation collectively punished. This depends on the reactions of various types of stakeholders on the labour, goods and capital market.*

Mechanisms that can be used to enable the effective use of these reputation mechanisms could include; historical inventory reports, annual reports, GHG reduction reports, publishing a programme's content and the provisions of reports to stakeholders containing both positive and negative information. This will allow them to make decisions to 'punish' poorly performing reporting organisations.

The CNP does not require historical baseline emissions, or reduction plans to be reported. It does however provide its programme's content online. The CZ publishes historical baseline and reductions plans detailing both emissions gains and losses in its accreditation reports which are published online, but does not make its programme content available.

The CNP provides information about reporting organisations on its website but it is not very detailed (except for the offsets register) as it only lists the steps an organisation took in the accreditation process. CZ provides detailed reports detailing information involved in the reporting process including the emissions inventory, historic baselines and reductions. By not providing a comprehensive report detailing the reporting process an organisation fails to disclose a lot of information to stakeholders. This in turn can lead to mistrust as the report seems incomplete or intentionally misleading. Both reasons could lead to less stakeholder up take by stakeholders.

Multiple reports are required by neither programme, as it is unrealistic to require a reporting organisation to purchase the same programme year after year. Once the market for CN programmes has developed more and controls or standardisation have been implemented, then year on year reporting may become more of a norm.
The evidence of a slant towards publishing more information on the quality of offsets on the CNP website, could be indicative of a wider market trend to focus on the quality of offsets and offsetting rather than emissions reductions and inventory quality. Offsets appear to be a prominent area through which quality is perceived by stakeholders (consumers) and assuring their quality. Potentially offsets are a measure of exhibiting quality that is more cost effective and simple for programme providers than having comprehensive inventories and requiring material reductions. Thus the perception of quality stakeholders have could negatively influence programme quality by incentivizing quality in readily observable areas, offsets, at the expense of other aspects of a programme.

6.10 Information asymmetry

Graafland and Smid (2004; 272) describes information asymmetry as a situation that allows the better-informed party to exploit the less informed party by manipulating the quantity, quality or price in a way that is not easily detectable to the less informed party. In the case of CN programmes this can apply to:

- The process of accreditation,
- Criteria used in accreditation,
- The weighting given to certain criteria, and
- What is revealed through reports to stakeholders.

CZ provides summary of certification reports for reporting organizations, clearly communicating the outcomes of accreditation, and the criteria used in it.

The CNP provides its programme's content online, communicating the process and criteria of accreditation. The CNP statement of guidelines in its programme's content allows stakeholders to view areas where certain choices are not mandatory, communicating weighting. The CZ programme provides guidelines for reporting as well, stakeholders cannot view this. As the CN market grows, information asymmetry will become more of an issue as consumers seek to differentiate programmes. While both programmes assessed have communication systems in place, their effectiveness will need to be improved to minimize misunderstandings.

Vining and Weimer (1988; 285-286) state the following categories, as factors that help determine whether information asymmetry is likely to lead to serious market failure:

- *The effectiveness of any information gathering strategy, other things equal, generally depends on the variance in the quality of units of a good (heterogeneity) and the frequency with which consumers make purchases.*
- *The potential cost of information asymmetry to consumers depends on the extent to which they perceive the full price of the good, including imputed costs of harm from use*
- *The cost of searching for candidate purchases and the full price determine how expensive and potentially beneficial it is for consumers to gather information.*

The carbon neutrality market is relatively new which can make information gathering difficult for consumers facing information asymmetry. As global warming, and CN, are complex problems it is difficult for a lay person or consumer to make judgments on the quality of a CN programme. Because there is no directly observable failure in the quality of the good it is difficult to make a judgment on the quality of the purchased good, offsets have become the observable quality by proxy.

The variance in the quality of the good is observable through the quality of the programme and its accreditation process. It would take a lot of time for the consumer to research every carbon programme. This could be alleviated by wider use of

external accreditation for carbon programmes. Because consumers would be required to spend a significant amount of money on programmes, they may be motivated to extensively research their purchase; NGO's or market watchdogs may provide their own assessment of CN programmes. The search cost may be reduced as more studies on the CN market are produced making identification of quality programmes easier.

Other incentives for market research to be carried out by organisations seeking to be CN (and the consumers researching the validity of reporting organisation's CN claims) are their environmental commitment or belief in the immediacy of climate change and its perceived cost, or the threat of future costs either through legislation or from the impact of climate change in their industry and environment. Organisations who are more interested in market share may be less interested in acquiring comprehensive accreditation. Another issue influencing the research for a good's value may be industry variability in both the reporting organisations industry (i.e. manufacturers who produce certain types of emissions) and variability in programmes of CN.
It appears that information asymmetry will be an ongoing issue in the CN programmes market, and that programmes that can effectively overcome it should gain prominence providing they can communicate this to consumers effectively

6.11 Accountability

Accounting is the measurement of the costs and beneficial aspects of an organization's practice. A simple way of being accountable is to provide a report on the organization's environmental (or social, financial) practices.
Truffer *et al.* (2001; 889) state that accountability is an important factor which depends on the ability of the programme provider to guarantee the application of their criteria according to a transparent and objective procedure.

The programmes reviewed by this thesis both used third party verification to guarantee the criteria of their programmes were accurately applied to the reporting organisations. The programmes ensure the transparency, CNP through publishing their programme online and CZ through comprehensive accreditation reports. The

transparency methods only assure that the programme is available to the public or that the public can see the results of CN accreditation for a reporting organisation. It does not ensure that the programme itself is of sufficient quality, only that the consumers can view it. As there is a lot of confusion on climate change in general and on the definition of CN it would appear to be difficult for stakeholders (consumers) to ascertain the programme's quality. Basic accounting practices may be simpler to understand but the CN market is new and complex.
A consumer is not likely to have the knowledge or experience to be able to ascertain whether a CN programme provides a quality service.
Objectivity can be achieved through input in to the programme's content though industry groups, expert advice and stakeholders. Both programmes have methods for input in to their programmes through outside groups; the CNP Independent advisory group, and CZ's Scope 3 allows input from stakeholders and industry groups and materiality (relevance to stakeholders) checks, and their advisory group of experts.

Gray (2000; 248) states that an environmental or social report might be thought of as seeking to satisfy *either* the intentions of management *or* the demands of accountability. Because CZ reports on outcomes, and the CNP provides its programmes content and not in-depth reports, it could be seen that the CNP risks falling prey to reporting only on management procedures and not actual performance. A report for accreditation of CN must not just state management practices and offsets without material evidence of reductions and a comprehensive and accurate GHG inventory. This ties back to the statement that there are different definitions of CN in the market that do not include reductions of GHG emissions to be achieved or proven.

O'Dwyera and Owen (2005; 209) identify another problem faced when comparing quality assurance programs the major inconsistencies regarding the subject matter addressed, and the scope. CZ effectively communicates differences between reporting organisation's accreditation through its summary of certification reports. Because the CNP does not prove accreditation reports; only labels stating the level of accreditation,

the quality of the communication of the reporting organisations individual accreditation is low.

Dando and Swift (2003; 197) and O'Dwyera and Owen (2005) who reference Ball *et al.* (2000) posit that uncertainty over assuror independence and the degree of rigor applied to their work, evidence of management control over the process together with an overriding emphasis on management systems as opposed to performance based issues were indicative of managerialism, rather than the exercise representing any corporate commitment to external transparency and accountability.
CZ uses assuarance providers which are subject to indpendance checks, assessed on each audit they carry out, and are limited to a select pool verified by CZ. The CNP only mentions that the assuarence provider is either CNP, or ISO 14001 accredited. This could potentially mean that the issues listed above could affect the assurance of their reporting organisations.

Both Adams (2004; 732) and Brown and Fraser (2006; 108), state that accountability is both taking an account of a reporting organisation's actions and providing that account to stakeholders; being accountable. Some CN programmes require an inventory and an account of the accreditation process from the reporting organisations. By providing this information to stakeholders the reporting organisations become accountable. CZ provides reports on the accreditation process for each reporting organisation; it becomes accountable through publishing these online for stakeholder perusal. The reports are in depth and contain information covering the entire process of CN including reductions and a breakdown of emissions inventories.
The CNP does not provide an in depth report, but does note the steps the reporting organisation took i.e. offsetting, emissions inventory however these are not very detailed and do not provide much accountability as the information provided is of little use in stakeholder decision making. It does provide an online offset register where stakeholders can view the type and quality of offsets used by reporting organisations. By publishing their programme online the CNP shows the makeup of

the accreditation process; a reporting organisation's individual accreditation is not detailed, leaving little information for stakeholders to make decisions on.

Different firms will use different methods of accountability which may or may not be comparable, or of a similar level of quality. Standardisation of what accounting methods entail could partially defuse this. Reporting organisations must be accountable to their claims and their stakeholders, otherwise an organisation can be incentivised to make false claims.

O'Dwyera and Owen (2005) state that firms only collect and disseminate information if it is deemed appropriate to advance the corporate image, rather than seeking true transparency and accountability to stakeholders. Because CNP does not provide in-depth reports it could risk being identified as one of these firms. It is important that CN programme providers communicate both the negative and positive aspects of their reporting organisatuions to avoid being perceived as untransparent.

Adams (2004) cites targets as a part of corporate acceptance of responsibility implicit with environmental reporting. Targets in CN reporting would be reductions of GHG emissions. This would involve providing a reduction plan to stakeholders as part of a report detailing material emission reductions. CZ reduction reports are part of the accreditation report published online; this report requires reductions and gains in emissions to be stated. The CNP does require a reduction report (which does not require reductions to be made), but does not require it to be published. Adams (2004; 732) states that a good report should be transparent and represent a genuine attempt to provide an account which covers negative as well as positive aspects of all material impacts. The CNP does not state reporting organisation reductions or require targets to be reached, while the CZ does. By stating reduction targets and publishing results of initiatives which are developed to meet these targets, a reporting organisation is showing an commitment to reducing its GHG emissions, not just paying for offsets as an attempt at 'green wash'. It also shows an acceptance of its responsibility for its

emissions contributing to global climate change. Requirements for reductions could become a key sign of quality as the CN market develops in the future.

6.11 Definition of Carbon Neutrality

CN is a relatively new concept and can feature different definitions from different programme providers. Truffer *et al.* (2001; 888) states that programmes should '*ensure that the criteria based on this ideal are inherent in the production of the good or service'*. The criteria contained in a programme may differ due to different definitions of CN, which may lead to programmes with differing content selling different methods of CN accreditation. Regardless the criteria implicit in programme must reflect the idea of CN;

'*Carbon neutrality does not mean emissions have been negated entirely by offsite measures; it represents a higher quality of action by changing business-as-usual behaviour as the bulk of the response to global warming'* (Total Environment Centre, 2007; 2).

This an example of an definition of CN used by The Total Environment Centre, it shows an example of how a firm may define CN as compared with the CNP and CZ definitions below.

The CNP (2008; 1) defines CN as

'*The net greenhouse gas emissions associated with an organizational unit, product, service or process are zero, through a combination of direct (internal) emission reducing actions and indirect (external) offsetting actions'*

Part of the CZ (http://www.carbonzero.co.nz/faq.asp) definition is

'*Additionally,* (organisations) *they must implement and report on their emissions reduction plan before neutralising or offsetting their remaining unavoidable emissions. Without overall reductions in emissions, just neutralising emissions is like*

'buying a Diet Coke to go with your double bacon cheeseburger - and calling it a weight-loss program. Efficiency (and calorie reduction!) comes first.'

Both CZ and CNP have similar definitions but differ in their emphasis and the content of their programme. The CZ programme states that reductions must come first (as does the TEC definition). The CNP notes internal reducing actions as an integral part of CN but it does not require actual reductions to be made; only reduction plans. This shows that firms can even lay claim to similar definitions of CN and still have differing programmes.

Graafland and Smid (2004) ask whether you can represent an ideal with an eco-label, or in this case CN accreditation? If different definitions are being portrayed in the market a case of '*apples being compared with oranges'* may emerge. CZ requires non Kyoto GHG to be reported as well as reductions but the CNP does not. These two programmes appear to be defining two very different things. Stakeholders (consumers) may not have the knowledge to differentiate between programmes, or these differences may not be readily apparent, potentially creating a 'market for lemons'.

Reducing the impact of a business on climate change and fostering the societal change of organisations towards a more climate friendly operating system, requires reductions to be made mandatory in CN accreditation, by carrying out reductions ,a reporting organisation will have to change its business practice and consumption methods. This will incentivise producers of goods and services that are purchased by reporting organisations to make their product (service) more climate friendly, forcing less climate friendly organisations to follow suit. Further criteria implicit in the definition of CN must be a comprehensive inventory defined by clearly laid out boundaries and any further criteria that support comprehensive and qualitative quantification of GHG emission produced by reporting organisations.
Either different definitions of what CN is need, to be classified within the market to allow consumer choice, or one definition needs to be applied across the market. This can be implemented either through government legislation nationally, industry

initiatives both nationally and internationally, and through bi and multilateral agreements of nations.

7.0 Conclusion

The aim of this thesis was to gain a better understanding of CN programmes through an analysis of the programmes available in the market. The analysis focused on the content of CN programmes and how they provide accuracy and quality to the reporting organisations that purchase them. The analysis was based on the development of criteria through a literature review that focused on potential market failures, and eco-labels and environmental reporting. The criteria developed from the literature review were then used to analyse two case studies, one on the CNP, and one on CZ. The analysis revealed instances of convergence and difference between the two programmes, which has broader implications for the CN market.

Methods to increase transparency and reduce information asymmetry were present in both programmes, CNP published its programme's content, CZ provided reports detailing the outcomes of certification. Because CZ reports on outcomes, and the CNP provides its programme's content and not in-depth reports, it could be seen that the CNP risks falling prey to reporting only on management procedures and not actual performance. This suggests that in-depth reporting on the reporting organisation's outcomes may not be prevalent in the market leading to those organisations gaining accreditation who may not be environmental friendly, but who are accredited as CN, which can be termed as 'greenwash'.

Both the CNP and CZ provided very informative and detailed information on offsets. As offsets are a highly visible sign of quality in a CN programme's accreditation process, this may lead to an emphasis on offsets quality rather than on other areas of accreditation. If consumer perception of programmes' quality is restricted to offsets,

programmes that act as offset brokers may flourish within the developing market. These organisations that present themselves as purveyors of CN, but merely calculate and offset, may drive the quality of the market down as they compete with more comprehensive programmes.

Stakeholder input is apparent in both programmes. Both CZ and the CNP have advisory groups, and CZ has input on its scope 3 emissions and materiality threshold. Ensuring dialogue with stakeholders is an important part of a CN programme; however having a mechanism in place does not ensure its effectiveness or uptake of any outcomes stemming from it. Verification of uptake of stakeholder demands, and dialogue need to be implemented; this is by no means a simple task and will require further research.

The publication of reduction plans and historical emission baselines are important tools in enhancing the reputation mechanism with consumers. CZ provides reports that detail historical baselines and emission reductions. The CNP requires reduction reports but does not state requirements for publication. A lack of reports detailing a reporting organisation's reduction plans means that stakeholders will lack information to make decisions on organisation's environmental practices, lessening the reputation mechanism's ability to punish poor environmental performance.

A clear definition of boundaries for the calculation of a reporting organisation's emissions inventory is important. The CNP used the ISO 14064-1 and the WRI GHG Protocol to define its boundaries. Use of the ISO 14064-1 standard and the WRI GHG protocol may be detrimental to the distribution of quality programmes in the market. While they do form a quality base for a comprehensive programme they both have too many guidelines and optional sections in their content. Because developing a programme in accordance with these documents can be seen as a sign of quality; it has the potential to give lesser quality programmes undue credit. This will impact the usefulness of the information provided on the boundaries, and increase information asymmetry.

As the CN market develops more, consumers will seek out information on the quality of CN programmes available in the market. CN is a complex topic, the information provided will need to be clear and readily understandable as well as easily gatherable to avoid information asymmetry. Information gathering cost may be prohibitive for consumers looking to purchase CN programmes. This is exacerbated by the lack of studies carried out on CN programmes, and the relative newness of the market and concept.

The findings of this thesis illustrate some issues in the CN market that may have a negative impact on the CN market as a whole. These will need to be addressed by CN programmes, NGO's and/or governmental bodies to avoid the severity of market failures growing. Without such action, adverse selection will occur leading to lower quality programmes to develop, turning the CN market into a 'market for lemons'.

As the CN market is still underdeveloped, more studies need to be carried out to avoid market failures such as information asymmetry. These market failures are still exhibited by the lack of comprehensiveness in some of the programmes' content. Further studies will provide a better idea of how market failures affect the market and how changes can be made to CN programmes to increase their quality and usefulness to stakeholders. The criteria developed in this thesis have the potential to be used in further studies on CN programmes as well as in other areas such as environmental reporting and eco-labels. This is because this thesis's criteria are based on broadly applicable concepts like transparency, and tackle market failures like information asymmetry.

This thesis does exhibit limitations in the form of lack of participation by CN programme providers and the need to further develop the criteria used in the analysis. The criteria this thesis uses needs to be further developed to provide more comprehensive information on CN programmes and related market failures. Further

development will allow greater understanding to be gained, which will be important as the market develops and expands providing a higher diversity of programmes.

Lack of participation by programme providers was unfortunate as this thesis's criteria could benefit from further application to more CN programmes to gain a broader picture of the CN market. Perhaps the wording of the e-mail used to communicate with programme providers was discouraging, although the lack of participation could also imply programme providers are reluctant to have their programme analysed. This might be because of fear of poor performance. One programme provider contacted stated that they did not have a document of their programme. Other reasons given consisted of time constraints not allowing them to participate. Out of the 14 programmes asked to participate 10 providers did not reply at all, even though follow up e-mails were sent.

There is a need for further development of CN programmes to address international standardisation: globalisation and the blurring of national, regional, and international boundaries, which means that trading products and services (or the companies that produce them) are crossing these boundaries. This creates the issue of conflicting regional and national accreditation programmes.

Programmes of CN need more research carried out on them, however it appears that the market is maturing and that if appropriate controls are put in place, it could develop into an effective tool for reducing GHG emissions. The CN market should not be left to develop without addressing the issues raised in this thesis as it is important that effective tools for reducing GHG emissions are implemented as soon as possible to slow the impact of rising anthropogenic emissions.

Appendices

Appendix 1 Criteria for analysis

		Is the required criterion present	References and Further comments	Comments
Section	**Questions**			
Stakeholder dialogue	Within the programme what mechanisms are in place for addressing stakeholder issues, feedback, and input?			
	Are there any mechanisms through which External stakeholder dialogue is present? Is this dialogue ongoing (within the reporting period and between reports)?			
	Are accountability and transparency controls are in place to ensure stakeholders are provided with clear and non misleading data?			
	What are the information disclosure policies present in the programme?			
	Is a contact person provided within the organisation being assessed and within the programme certifier's organisation?			
	Is the content of the programme which is used to certify organisations made available to the public? If so how?			

	Are all the assessment criteria stated clearly in a manner through which stakeholders can easily understand them?		
	Are external drivers (legislation, industry initiatives) influencing the companies decision making required to be stated in the report?		
Comparability and consistency	Are emissions required to be listed in CO2 equivalent (CO2e)?		
	Are regular reporting time periods set? Is the report period clearly stated in the report?		
	Are consistent and comparable methodologies and processes used to calculate and report the emissions removals and sinks present in the organisation?		
	Are reasons required to be stated for changes in reporting format, style, scope etc?		
	Are historical performance initiatives noted and gains quantified against a baseline?		
C**larity and definitions of key words**	Is a glossary or annex required to be provided, one that details definitions of all relevant and vital phrases, words and technical details?		
	Are any performance standards (i.e. emissions reductions) stated for future reports, and is success or failure against these standards stated?		
	Are the assessment criteria clearly defined and stated, including their source? This includes:		
	Data calculations		
	Emission ratios		
	Activity data		
	Emissions estimates		

Comprehensiveness	Are the choices, for the organisation being certified, on the content of the report and its level of assessment made clear, and are the reasons given for the decisions made?	
	Is scope (what sources of emissions) of emissions covered stated, and are non Kyoto GHG emissions covered?	
	Are the calculation methodologies used to determine emissions estimates and inventory content required to be stated?	
	Are historical emissions stated, where available?	
	Is a list of facilities and sites included, with their emission allocations?	
	Is information provided on the cause of changes that did not trigger a recalculation?	
M**anaging inventory quality and accuracy**	Are data collection procedures present that allow the same data to be efficiently collected in future years?	
	Are procedures in place that document and archive relevant GHG inventory records, and methodologies?	
	Are procedures in place that investigate systemic bias or other characteristics (errors and omission) that could affect inventory quality	

	Does quality management cover any additional, but relevant, data used to estimate emissions intensity or other ratios or equations?				
	Does the programme ensure the selection of quantification methodologies, including GHG activity data and GHG emission and removal factors? Is this consistent with their intended use?				
	Do all calculation, activity and emission data processes from recognised sources that ensure accuracy?				
	What triggers are in place for the rechecking of data?				
	Are rechecking procedures in place for errors and omissions in the following areas:				
	Comprehensive data gathering methods?				
	Data source and input quality and accuracy?				
	Data documentation procedures?				
	Calculations for emission estimates, ratios, and activity data?				
M**ateriality**	Are there checks in place to identify whether information either relevant to stakeholders or that influences stakeholder (either internal or external) decision making is included in the report?				

	Are there, at each stage of the assessment, tests to ensure materiality is dealt with?			
	Is a materiality threshold established in the report for vital information? Are these checks made at multiple levels (i.e. factory to organisation)?			
	Are there any other checks in place to avoid the aggregation of errors?			
B**aseline and year** establishment	Are there policies are in place to ensure baseline data availability, reliability and the minimization of limitations?			
	Is quantification of base year GHG emissions and removals carried out using data representative of the organizations activity? What policies are in place to ensure this?			
	Does base year data consist of single year data, a multiyear average or rolling average?			
	Is a base year recalculation threshold established?			
	Is a statement of the original base year emissions stated in all future reports?			
B**oundaries for assessment**	Does the programme show that it has identified and measured GHG sources, sinks, and reservoirs that are:			
	Controlled by the organisation?			
	Related to the organisation?			
	Affected by the organisation?			

	A statement of the boundary establishments reasoning and context, including the boundary selection methodology that is used?			
	Detail the context and reason behind any deviations from the boundary methodology?			
Operational Boundaries	Are all scope 1, 2, and 3 emissions clearly reported on in CO_2 e?			
	Are all emissions included in the inventory laid out in an easy to understand manner, detailing sources, and emission types?			
	Are the scope 1, 2, and 3 data broken down, i.e. into facility level etc. to allow transparency?			
	For scope 2 emissions; are energy usage source and emission ratio(s) recorded?			
	Are the criteria used to define the scope 3 emissions included in the report?			
	Are all the scope 1and 2 emissions measured within the organisations organisational boundaries?			
	If the report departs from the programme's basic assessment criteria and procedures does it provide a statement justifying this departure from those criteria and procedures?			
Sinks Reductions and Removals	Are GHG reductions required to achieve the CN certification?			

	If applicable, are GHG emission reduction or removal factors used that;				
	Are derived from a recognized source?				
	Are current at the time of quantification and are calculated against a baseline?				
	Take account of the quantification uncertainty and are calculated in a manner intended to yield accurate and reproducible results?				
	Do GHG emission sinks, reductions and removals state:				
	The baseline level of emissions?				
	The method of sink removal or reduction including: site, time period of implementation, predicted and actual reduction, any technical data related to the reduction, and provider of reduction technology, service etc. (if applicable)?				
	Calculations of the amount GHG emissions reduced since the baseline?				
Offsets and additionality	Is the following data required:				
	An emission offset accreditation statement including a statement that the GHG offsets is listed in an appropriate GHG registry, and that the offset has been retired?				
	Type of accreditation: Gold standard/ Kyoto: CDM, JI?				
	Year of offset credit approval?				
	An assurance of permanence offsets GHG removal or reduction				

	Total amount of GHG emissions removed by offset?			
	A statement of offset type (i.e. wind)?			
Third Party/ Internal verification	Is there a requirement for the report to be either third party or internally verified? Is this clearly communicated to stakeholders?			
	Is a verification section required stating which sections are verified and which are omitted from verification (if any)?			
	Is the omission and inclusion of information relevant to the GHG inventory, emissions removals and sinks, and other emissions (non Kyoto GHG's) stated?			
	Is the organisation required to report on the presence of any reporting and data gathering methodologies, inventory data quality controls, and materiality checks?			
	Is appropriate documentation of all the relevant data used in the organisation reports provided?			
	Is a GHG inventory report required? And is this checked as part of the verification process?			
	Are bias checks required to be verified?			
Assurance provider standards: credibility and impartiality	Is proof of expertise and experience required for verifiers?			

	Is the assessment of certification carried out by an independent third party, whose independence is assured?
	Does the verification organisation provide a statement of independence, including a financial independence statement including future and past relations with the reporting organisation?
Assurance statement	Is the following information provided in a assurance statement in the Carbon Neutrality report;
	Organisational information (i.e. Number of sites, employees, net sales, products sold, nature of ownership, number of countries operated in etc.)?
	Purpose and objectives of the report in the context of the organisations GHG policies, strategies or programmes and applicable GHG programme?
	Data and information to be included in the report? Historical information i.e. changes in structure? Report parameters; the Scope and boundaries? Period for which the report is valid?
	Relative contextual information informing the organisation's practice: legislation, related reporting frameworks, standards, and guidelines related to GHG emissions and reductions?
	A list of GHG assertions, including a statement of GHG emission reductions and removal enhancements stated in tonnes of CO_2e?
	A statement describing whether the GHG assertion has been validated or verified, including the type of validation or verification and level of assurance achieved?

	Describe the level of assurance pursued, including if different levels of assurance that were available?		
	A statement of the aggregate GHG emissions and/ or removals by GHG sources sinks and reservoirs for the GHG project that are controlled by the project proponent, stated in tonnes of CO2e, for the relevant time period (e.g. annual, cumulative to date, total)?		
	A statement of the aggregate GHG emissions and/ or removals by GHG sources, sinks and reservoirs for the baseline scenario, stated in tonnes of CO_2e for the relevant time period?		
	A general description of the criteria, procedures or good practice guidance used as a basis for the calculation of project GHG emission reductions and removal enhancements?		

Appendix 2 Letter, and consent form sent to programme providers.

Information sheet for research on analysis of carbon neutrality standards

Hello I am Robert Mitchell, and I am carrying out research for a Masters thesis in Environmental Studies at Victoria University. The topic is standards of carbon neutrality. The aim of this research section is to analyse three standards of carbon neutrality by comparing each to criteria selected from a broad selection of literature. I am asking you to participate by providing a copy of your standard of carbon neutrality. Subsequently I will give you an opportunity to comment on my analysis of your standard.

Below I describe the purpose, procedures, and details needed to comply with the human ethics approval gained for the research section of this thesis.

I would like to ask you and the other participants to provide a copy of the principles, guidelines, and criteria your standard uses to assess organisations for certification of carbon neutrality. I would like the documentation that includes the accounting/ calculation, assurance, and general requirements, the non mandatory requirements and the choices provided to the organisations purchasing their certification.

In a second phase I would like you to comment on my initial analysis of your standard of carbon neutrality after I have analysed your document. This will be achieved by me sending you a draft document containing my preliminary analysis of your standard once the initial assessment has been carried out. You will then be able to comment, through a response sheet provided, on the findings I have extracted from the analysis of your standard. This will allow you to comment on any errors or omissions, aiding the clarity and accuracy of the research.

The intended academic benefits of this thesis are to better enhance the understanding of the available standards of carbon neutrality visible in the market, and the methods

used to ensure the standard's quality.
I appreciate that your time is valuable and that I am asking for a copy of your certification documentation and an hour of your time to check over the analysis I have made and to respond if there are any gaps. In total 1-2 hours of your time will be taken up by these endeavours.

Once the thesis has been examined and accepted all data you provided will be deleted within 2 years. This thesis will be placed in the university library and results may be reported in publications, reports, and disseminated in future policy seminars etc. You may withdraw before the 10th of February 2009, if you no longer wish to participate in the assessment.
Although it is recognised that in such a small market there is potential for assumptions to be made by observers on which standards were analysed, you will be given the option of not having your name or that of your standard recorded in the thesis. If you choose this option but still wish to be part of the research your standard shall be referred to as one of the following: standard A, B, or C.

A electronic copy of the thesis will be provided upon request once it has been examined and accepted by the university.
Contact details: Robert Mitchell, Masters in Environmental Studies candidate, Victoria University, Wellington, New Zealand
E-mail: mitcherobe@myvuw.ac.nz<mailto:mawgaw06@hotmail.com>, Phone 027 3809 759, Room 104 cotton building, School of Geography, Environment and Earth Sciences, PO Box 600, Wellington, New Zealand, Subject line must start with 'Robert Mitchell thesis'
Supervisor of thesis: Cath Wallace, School of Government, Victoria University of Wellington, PO Box 600, Wellington, Tel; (04) 463 5713 or Email Cath.Wallace@vuw.ac.nz<mailto:Cath.Wallace@vuw.ac.nz> Subject line must start with 'Robert Mitchell thesis'

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui

Consent form

☐ I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

☐ I understand that my participation is voluntary and that I am free to withdraw up to 10th February 2009, without giving any reason.

☐ I understand that data collected during the study may be looked at by supervisors from Victoria University of Wellington where it is relevant to my taking part in this research. I give permission for these individuals to have access to these data.

☐ I understand that direct quotations from the documentation and the research interview may be used in the thesis, publications and presentations arising from this research, and that these will be attributed to the company or to me as an individual as relevant and I have the authority of the company to respond on its behalf..

☐ I have the authority of the company to disclose this material.

I w I wish for my standard to remain unnamed, which would entail there being no mention of the name or brand of the standard of Carbon neutrality in the text relevant to the assessment of the said standard

☐ I agree to take part in the study.

☐ I wish to be sent an electronic copy of the findings of the research when it has been finished and examined

Name of Participant Date Signature

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