Carbon Risk Management: A Comparative Case Study of Two Companies within the Australian Energy Sector

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Abstract

The purpose of this study is to understand how regulatory uncertainty associated with the Australian Federal government initiatives towards establishing a carbon pricing scheme has affected the perceptions and management of risks related to carbon emission reduction at the organisational level. The present study, based on evidence from archival and interview data from two Australian energy sector firms, provides insights into how managers perceived various risks associated with the Renewable Energy Trading (RET) scheme and the delay in the proposed Carbon Pollution Reduction Scheme (CPRS), and how such risks were seen to impact different features of their organisations' management control system (MCS). Our findings indicate that regulatory uncertainty and the strategic stance undertaken by organizations affect a variety of internal uncertainties related to financial, information processing and organisational values, which in turn impact risk mitigation and performance management strategies.

Keywords

Emission Trading Scheme
Risk Management
Carbon Energy
Management Control System

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Introduction

An organisation's management control system (MCS) is generally viewed as "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organisation's objectives (Anthony, 1965). Further, there is large body of literature providing evidence that the design and use of MCS are a function of a number of external environmental and organisational factors such as environmental uncertainty, organisational strategy and technology (Chenhall, 2003; Berry et al, 2009). In more recent years, risk management has been recognised as part of an organisation's overall MCS, and that there needs to be a better understanding of how organisational risks impact not only related control system features such as planning and performance evaluation but also organisational performance. In particular, where the environment is highly dynamic with significant business uncertainty, there is a greater need to understand how firms identify and evaluate emerging risks and in turn respond to such risks through their MCS. To date however, there has been little attention paid to the nature of the perceived environmental uncertainty and how managers in turn may perceive and respond to such uncertainties.

The purpose of this study is to understand how managers in Australian organizations in the energy sector have perceived and responded to regulatory uncertainty associated with carbon emissions adaptation and mitigation schemes. In Australia, the introduction of the Renewable Energy Trading (RET) scheme and the proposal of a national emission trading scheme; the Carbon Pollution Reduction Scheme (CPRS); were two major regulatory initiatives announced by the Rudd government in 2009-2010. While the RET scheme was aimed to incentivize organisations to adopt new technologies that are able to more effectively reduce carbon, the proposed CPRS in 2008 was designed to reduce carbon emissions through placing a price on such emissions (Department of the Environment, 2010). However, a series of major revisions of the RET scheme as well as a delay in the introduction of the CPRS until the end of the current commitment period of the Kyoto

Protocol were played out in the political arena with significant uncertainty on the outcome of the latter (Department of the Environment, 2010). Subsequently, a newly formed Labour Coalition government was formed with the Gillard government, who then supported the enactment of the Carbon Tax scheme in late 2011. These developments not only have posed significant uncertainties for business organisations, particularly those in the carbon (emissions) intensive sector such as energy and utility firms, but also continue to do so with the debate on carbon tax impacts making frequent media headlines. To date, there remains scant empirical evidence on how regulatory risks associated with the carbon emissions management schemes are inter-related with other internal organisational risks, and the nature and extent of use of organisations' MCS to manage and mitigate such risks.

Our choice of the Australian energy sector as the main context for this study relates to carbon emission reduction being one of the greatest challenges to businesses today, and that energy firms in particular face direct regulatory impacts from a pricing scheme. More specifically, the risk of firms in the carbon intensive sector stalling or even abandoning investments in low emitting carbon projects continues to loom (Linares and Pérez-Arriaga, 2009). Potentially, such delays in investment may only work to increase the cost of emissions for the firm in the long-run, and thus a better understanding of how energy sector firms are planning to establish appropriate and effective systems of risk management and other management controls in managing their carbon emission targets becomes critical.

Further, our study is guided by the broader MCS literature which suggests that risk management is an important part of a MCS, and that a key role of a MCS is to support organisational strategy. According to Mikes (2009), enterprise risk management (ERM) is part of a strategic management control system given that such an approach takes into account both the entity's goals and the effective and efficient use of resources. Increasingly, the approach to risk management is to conceptualise it from a more organisation-wide perspective, which is also commonly referred to as ERM. The Committee of Sponsoring Organisations (COSO) (2004, p. 2) defines ERM as "a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." Yet, there is little empirical evidence to date on how climate change regulatory developments impact specific MCS features include risk management and other control processes e.g. strategic planning and performance management. Dent (1990), Samson et al. (1991) and Simons (1990) suggest that MCS should be tailored explicitly to support the strategy of the business to lead to competitive advantage and superior performance. Similarly, Archer and Otley (1991) based on case study evidence; support the role played by management control mechanisms, such as strategic planning, and financial and non-financial measurement systems, in organisational coordination and implementation of organisational strategy. Tarui and Polasky (2005) argue that environmental regulation is a significant source of regulatory uncertainty, as it is typically based on very long term considerations, with science playing an important role in agenda setting, policy making, and evaluation (e.g., Arentsen et al, 2000; den Elzen et al, 2005; Hulme and Dessai, 2008). However, no study to date has examined how regulatory uncertainty impacts the design and use of MCS in managing the strategies and risks related to reducing carbon emissions. Given the increasing volatility and uncertainty in carbon emission related regulatory requirements, a better understanding of firm risk management of the increasing risks has implications for the efficient and effective use of firm resources.

Regulatory uncertainty arises when the actions of politicians in charge of creating and enforcing regulation are unpredictable (Birnbaum, 1984). In general, uncertainty refers to the unpredictability of variables both internal and external to the firm (Miles and Snow, 1978) or the inadequacy of information about these variables (Galbraith, 1973). Although risk results from uncertainty, risk and uncertainty are theoretically not synonymous. Risk involves situations where

the probability of a particular outcome is known, while uncertainty exits when the probability is not known. Risk is the consequence of taking an action in the presence of uncertainty, while uncertainty is the manifestation of unknown consequences of change (Lefley, 1997).

The present study adopts a qualitative approach with data pertaining to two large Australian energy companies. Data was collected through in-depth interviews and analysis of secondary data. More specifically, the in-depth interviews of nine managers provides the primary empirical evidence on assessing the effects of carbon emission regulatory uncertainties on firms' strategic response to such uncertainties and the various organisational level risks associated with carbon emission management. In particular, the interviews focus on the use of the general use of MCS mechanisms in supporting the various risk management strategies in the two companies within the context of the energy sector. Given the exploratory nature of this study, the use of interview data is deemed appropriate for tracing the potential linkages between risks associated with regulatory changes and uncertainty, and the role of MCS in managing such perceived risks (Hansen, 2010). The verbally espoused organisational risks and strategies are also contrasted with secondary data, namely companies' Annual Reports and the report of each organisation provided to the carbon disclosure project (CDP). The CDP is an independent not- for-profit organisation holding the largest database of primary corporate climate change information in the world (Carbon Disclosure Project, 2009). It is an important source of additional information as participants are required to specifically state the firm's status and views on the various risks imposed on their organisation in terms of climate change legislation.

A literature review suggests that organisations are generally faced with two major strategies in managing their carbon emissions: (1) adaptation strategies whereby investments are made in renewable energy sources, (2) mitigation strategies whereby current carbon emissions are minimised through the implementation of performance management mechanisms to monitor and reduce greenhouse gas (GHG) emissions. From the context of carbon emission regulatory developments, firms adopting adaptive approach may invest in renewable energy technologies to reduce GHG emissions. An investment in renewable energy technology can be defined as a strategic investment decision, which is a form of strategic planning (Berry et al, 2009). A strategic investment decision is a decision on a substantial investment that has a significant effect on long term performance and the organisation as a whole (Carr and Tomkins, 1998). For example, Sharfman et al (1998) described how a firm (Conoco), when faced with enormous permitting costs under the US Clean Air Act amendment, developed technology that reduced its emissions so that Conoco was no longer subject to the regulation. The permit and compliance costs for just the natural gas production facilities, where the technology was developed, were so great that Conoco had an incentive to implement a solution that avoided such regulation, thus reducing permit and compliance costs. Therefore, a better understanding of how energy sector firms are responding to the emergent risks associated with carbon emission reduction through the use of their MCS will be critical for enhancing more effective and efficient resource allocation and related organisational decisions. Thus, given the scant empirical evidence in this area, this study aims to extend prior literature through addressing the following key research issues:

Issue 1: The impact of external regulatory developments, namely the RET Scheme and the delayed CPRS on the Australian energy sector entities in terms of their organisational strategy and risk management.

Issue 2: The use of MCS to mitigate the various risks and organisational-level uncertainties emanating from external regulatory developments

The remainder of this paper is structured as follows. In the next section a review of climate change regulatory developments and the relevant literature is provided, and three specific research questions are further proposed in the subsection. The methodology for this study will be explained in section three, followed by the findings in section four. A conclusion will be provided in section five

along with the limitations and future areas of research.

Literature Review

Background: Climate Change Regulatory Developments

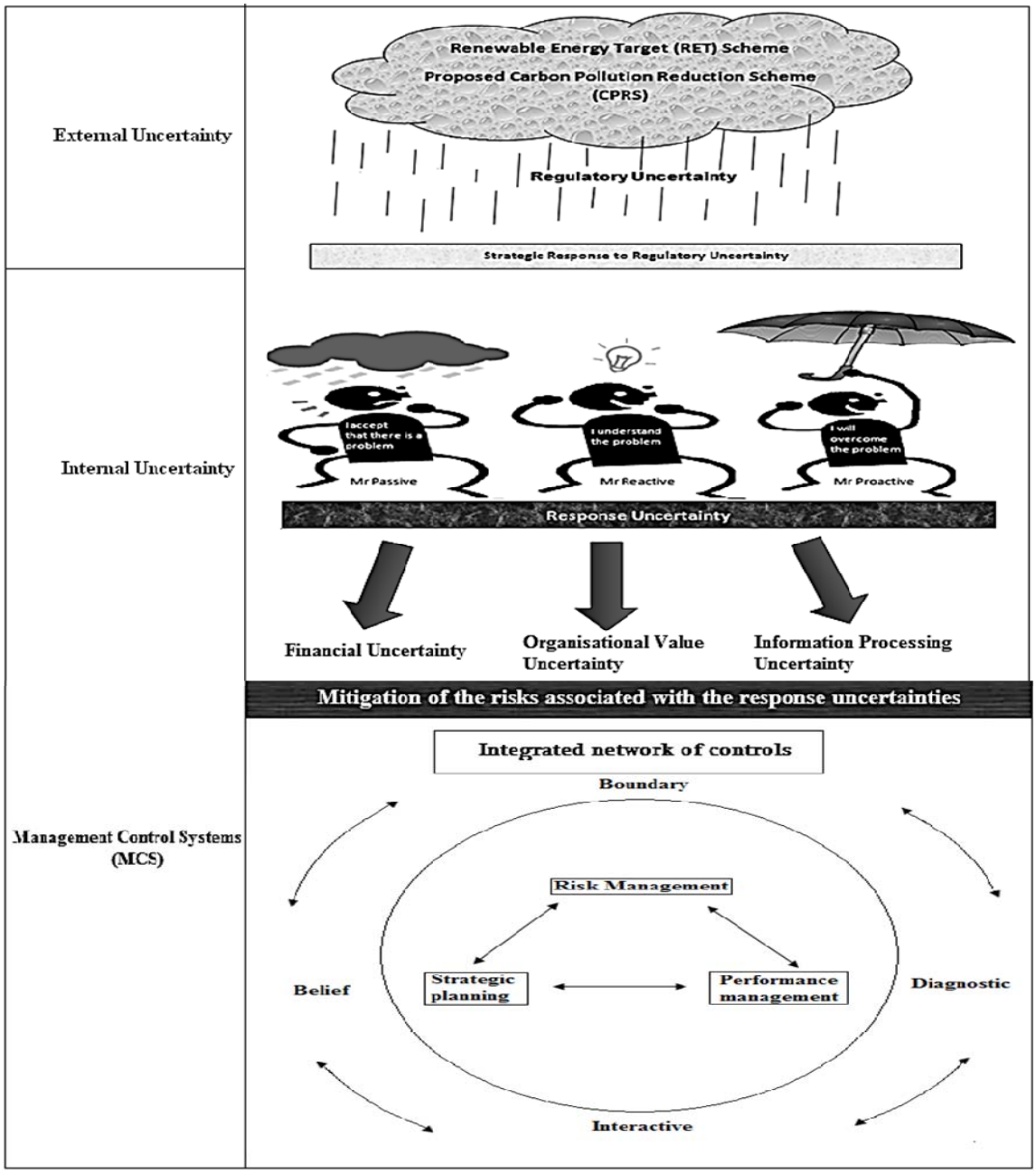
Climate change is a real and significant problem facing the entire world. Burritt et al (2011, p. 91) consider climate change "a major societal issue" for politicians, consumers and investors, and thus putting more pressure on companies to publicise their climate control efforts through media and websites (Ratnatunga et al, 2011). In Australia, climate change poses a major threat not only to our economic prosperity but also to our unique environment and way of life. Scientists have predicted that the earth's temperatures could increase between 1.4 and 5.8 degrees Celsius, pushing sea levels up between 0.09 to 0.88 metres over the next 100 years (Australian Parliament House, 2009). This may result in climatic extremes, such as severe storms, floods and droughts would become more frequent in many regions in the 21st century. It is clear that climate change is a global problem and requires a global solution; hence the Kyoto protocol was adopted. While Australia is only a relatively small GHG emitter comprising around 1.4 per cent of total world emissions, it registers as a relatively high emitter based on a per capita basis. International Energy Agency data at the end of 1999 indicated energy related emissions in the United States and Europe (the world's two largest emitters) amounted to 5 585 million tonnes (Mt) and 3 534 Mt compared to Australia at 322 Mt. However, on a per capita basis, Australia emits 16.95 tonnes, third highest behind the United States at 20.46 tonnes and Luxembourg at 17.19 tonnes (Australia Parliament House, 2009). Therefore the very first act of the Hon Kevin Rudd, in December 2007, was to ratify the Kyoto Protocol.

The Kyoto Protocol stipulates that Australia is required to limit its average annual GHG emissions over the 2008-2012 periods to 108 per cent of its emissions in 1990. To achieve this, the Government implemented the RET Scheme, which is designed to deliver on the Government's commitment to ensure that 20 per cent of Australia's electricity supply will come from renewable sources by 2020. The RET scheme guarantees a market for additional renewable energy generation, using a mechanism of tradable Renewable Energy Certificates (RECs). RECs created or purchased by liable parties to meet annual targets can be "banked" by the owners for sale or surrender in later years of the scheme, thus creating a market for additional renewable energy generation (Department of the Environment, 2010).

The Government, in cooperation with the States and Territories through Council of Australian Governments (COAG), has increased the legislated target more than four times from 9 500 gigawatt-hours (GWh) to 45 000 GWh in 2020. The RET scheme expands on the existing Mandatory Renewable Energy Target (MRET) and absorbs existing and proposed State and Territory renewable energy schemes into a single national scheme. The RET scheme incorporates a compliance mechanism which is a fixed (un-indexed) shortfall charge or penalty for non-compliance. The penalty for non-compliance is set at $65 per megawatt-hour, maintained in nominal terms over the life of the scheme (Department of the Environment, 2010). The expanded RET is expected to help to bring renewable energy technologies into the market over time, and reduce Australia's green house gas emissions. However, the unpredictable nature of the RET scheme has heightened regulatory uncertainty for energy suppliers.

Likewise, the proposed CPRS is a form of emissions trading scheme that utilises a cap and trade mechanism. The cap is set at the upper limit of the country's carbon emissions, which is expected to be reduced in future years in order to achieve positive environmental outcomes. The cap and trade scheme reduces the negative impact associated with the economic cost of meeting carbon pollution reduction targets, as the ability to trade ensures that carbon pollution reduction opportunities throughout the economy offsets some of the economic burden associated with a carbon pollution reduction target. The CPRS ensures that carbon emissions are reduced through the implementation of an annual limit on the total amount of carbon pollution that can be emitted in Australia. The limit is gradually reduced over time, thus reducing the level of carbon pollution produced each year. Organisations

Figure 1: Conceptual Framework



that need to emit carbon will only be allowed upon the acquisition of permits that allow them to do so.

However, on 27 April 2010, Kevin Rudd (as the Australian Prime Minister then) announced that the Government had decided to delay the implementation of the CPRS until after the end of the current commitment period of the Kyoto Protocol in 2012. Subsequent political developments, resulting in a change in Prime Minister did not change this stance for many months, which then continued to pose significant regulatory uncertainty for business organisations, particularly those operating in a carbon intensive industry, such as stationary energy sector. Finally, in late 2011 the newly formed government under Julia Gillard's prime ministership, announced the Carbon tax which is to come effective from 1 July 2012 where a tax of $23 per tonne of carbon emitted is to be effective for a 3-year period (allowing for CPI), followed by a market-driven pricing i.e. trading scheme. Nevertheless there was still strong lobbying for the removal of the carbon tax and a backlash against the government with opinion polls indicating strong disagreement with the tax, which in turn

increased political uncertainty. Interestingly, in 2013, with the change of the Federal Government from a Labor to a Liberal-Coalition, the carbon-tax is under consideration for repeal. In conclusion, the level of regulatory uncertainty continues to be high for business, and the situation made worse by growing political uncertainty.

Conceptual Background of Study

The overall conceptual framework for this study is depicted in Figure 1 and is guided by prior studies within the strategic management and MCS literature. In particular the framework is adapted from the work by Sinding et al (1998) where external uncertainty is seen to drive organisational strategic response and internal uncertainty within the entity. In this study, the environmental change and regulatory developments are seen as a form of external uncertainty (which is also referred to as regulatory uncertainty) within this study. Further, the strategy adopted by firms in response to such regulatory uncertainty in tune is predicted to affect a range of internal uncertainties within a firm, namely financial uncertainty, information processing uncertainty and organisational value uncertainty. Subsequently, the risks identified in association with various internal uncertainties will be, within a given contextual setting, mitigated and managed through a system of risk management, strategic planning and performance management. In other words, an integrated network of controls is viewed to represent MCS, where management control is not only obtained through one form of control like performance management but through multiple control systems working together (Widener, 2007). Further, Simons (1995) lever of controls framework is also used to reflect on the style of MCS used. This is based on Mundy's (2010) argument that the different uses of MCS, i.e. belief, boundary, diagnostic and interactive systems, can either impede support or impede the implementation of business strategies.

External Uncertainty, Regulatory Uncertainty and Organisational Strategy

Prior literature has classified the types of uncertainty that may affect firm performance into two types which are external and internal to the organisation. External uncertainty reflects the environment in which the business operates and can be further classified into two forms (Milliken, 1987). The two external sources of uncertainty are associated with external pressure on a companies' environmental performance arising from regulation and various forms of collective action by stakeholder groups. Likewise internal uncertainty can be classified into two types i.e. effect uncertainty and response uncertainty. Effect uncertainty refers to the impact external variations have on an organisation. Response uncertainty is related to the nature and consequences of the organisation's response and can be classified as uncertainty regarding the nature of the chosen response, the outcome of choices made and the value resulting from the chosen response (Milliken, 1987). In this study, the focus is on regulatory uncertainty (i.e. an aspect of external uncertainty) and response uncertainty (i.e. an aspect of internal uncertainty).

Sinding et al (1998) conducted a study on the impact environmental uncertainty has on corporate strategy. In their study, a structured understanding of the different types of uncertainty was undertaken, which formed the foundation of an in-depth analysis into the strategies implemented by firms to manage such uncertainties. Sinding et al (1998) found that environmental regulation increased a firm's level of uncertainty and which in turn had a significant impact on corporate strategy. For example, the sources of uncertainty play an important part in developing the firm's strategic response, and for the way in which it evaluates and takes action to accommodate that strategy. More specifically, Sinding et al (1998) contended that organisations may respond differently to regulatory uncertainty, as an organisation has the option to respond via the implementation of a passive, reactive or proactive strategy.

A passive approach infers that a firm will accept statements about the current state of the environment and assertions made by other stakeholders about the impact the firm has on the environment. Passivity does not imply that a firm will ignore such statements, but rather that the firm understands the impact of financial effects, organisational value effects and information processing effects on uncertainty (Sinding et al, 1998). Further it also refers to how a firm reacts to statements made by stakeholders. A reactive approach

infers that a firm will take measures to understand these sources of uncertainty, thus giving them the ability to question the relevance of assertions made about its impact on the environment. This strategy can potentially damage the firm's reputation as it may portray the firm as taking evasive action, by not responding to assertions that it is impacting the environment (Sinding et al, 1998). A proactive strategic response involves a firm implementing a solution to effectively manage uncertainty, thus effectively mitigating the risks associated with uncertainty (Sinding et al, 1998). A proactive approach may involve a firm implementing a mitigation or adaptation approach to alleviate the risks associated with regulatory uncertainty. Firms adopting a mitigation approach may aim to reduce their current carbon emissions through the implementation of a performance management system designed to effectively manage GHG emissions. Each strategic response in turns potentially affects various response uncertainties, as uncertainties arise in relation to the nature of response options, the outcome of choices made and the value resulting from the chosen option (Sinding et al, 1998). These are seen as financial uncertainty, information processing uncertainty and organisational value uncertainty and a more detailed discussion of their nature is provided in the following section.

Response Strategy and Internal Uncertainties

The external regulatory pressure imposed on firms often place significant pressure on firms to implement some type of response strategy, which may be passive, reactive or proactive. As suggested by Sinding et al (1998) response uncertainty results from a firm's strategic response to an environmental problem. For example, an environmental problem may arise as a result of the various risks and uncertainties associated with climate change regulation. However, no matter what the strategic response is, all three response uncertainties will have an effect on internal uncertainties, which can be further classified as financial, information processing and organisational value uncertainty (Sinding et al, 1998).

Financial uncertainty occurs when changes, originating from the response strategy, have an unpredictable impact on the firm's financial performance (Sinding et al, 1998). For example, the possibility of going out of business or reporting reduced earnings is driven by the irreversibility and leverage dimensions of environmental investment, thus resulting in financial uncertainty. Rugman and Verbeke (1998) state an effective environmental investment depends on the leveraging and reversibility of an investment. Leveraging refers to the degree to which investment in environmental capabilities in a firm leads to improved industrial performance (Ghemawat, 1986), while reversibility refers to the degree to which an investment can be recovered if it turns out to be a mistake (Dixit and Pindyck, 1994).

Management will make an investment decision with the goal of investing capital in an investment that is highly leveraged and highly flexible. This is not always achieved as an investment may have three outcomes. A reversible mistake may occur when an investment is deemed to have low leverage and high flexibility; a gamble is made when an investment is deemed to have high leverage and low flexibility, and an irreversible mistake arises when an investment is deemed to have low leverage and low flexibility (Sinding et al, 1998). In firms where employees lack incentive to strive for environmental excellence, through investments that are highly leveraged and flexible, mechanisms need to be put in place to align strategic investment decisions with the firm's strategy.

Information processing uncertainty occurs when environmental information is hard to analyse as it is often ambiguous and complex (Sharfman et al, 1998). When information processing uncertainty arises from the firm's inability to process large volumes of information associated with the environmental problem, new information processing systems may be in order (Sharfman et al, 1998). As technologies advances, management's ability to process large volumes of complex information increases accordingly. New technologies for analysing large quantities of information allow employees to process large quantities of data which may not have been possible previously.

Organisational value uncertainty occurs when a conflict between employee values and organisational values, embedded in the response strategy, cannot be predicted

(Sinding et al, 1998). Uncertainty created by a lack of coherent organisational values can be mitigated through imposing a set of values or developing a set of values through consensus. There are advantages and disadvantages of imposing values on employees (Sinding et al, 1998). Values imposed on employees within the firm will enable management to stipulate what employees are supposed to deem as important. However, these advantages create their own inherent problems. By imposing the values, there is no guarantee that the rest of the organisation will accept the new value structure. While the values might look good in the Sustainability Report, unless they are accepted, the existence of the imposed value set will not change anything. Further, the imposition of the values may cause a backlash amongst employees creating conflict and attendant uncertainty. Management may, however, develop a set of environmental values through a consensus, thus gaining employee input and enhancing the probability that the values will be accepted.

For the present study the aim of the research is to identify how firms within the Australian energy sector are mitigating the risks associated with response uncertainty. Prior studies have suggested that certain aspects of MCS support the mitigation of risks, which include risk management, strategic planning and performance management systems. In particular MCS that help manage the various risks associated with the RET scheme and CPRS will be examined. For example, Chenhall (2003) suggested that MCS, such as target costing, may help support the mitigation of operating risks associated with decreasing product life cycles.

In the next section a review of the MCS literature will be undertaken, and the empirical evidence on the link between MCS and risks will be discussed. However, given the scant empirical evidence in this area, this study will extend the literature through addressing the following key research questions:

RQ1: How have entities in the Australian energy sector responded to external regulatory developments, namely the RET Scheme and the CPRS in terms of their strategic response?

RQ2: What types of internal uncertainties (e.g. financial, information processing and organisational value uncertainties) and risks have emerged as a consequence of firm response to carbon emission regulatory uncertainty?

RQ3: What types of MCS features are perceived as being important for managing such risks and uncertainties?

Management Control Systems (MCS)

Prior literature on MCS has suggested that the main objective of MCS is to support organisational strategy. Preble (1992) stated that the effective implementation of an organisational strategy requires the allocation of resources and a suitable administrative system, which include MCS. Dent (1990), Samson et al (1991) and Simons (1990) suggest that MCS should be tailored explicitly to support the strategy of the business to lead to competitive advantage and superior performance. Similarly, Archer and Otley (1991) conducted a case study on a firm in which they identified that control mechanisms acted to coordinate the major activities of the business and encourage efficient and effective implementation of the current organisational strategy. Hence, this study will focus on the effectiveness of MCS, guided by Simon's (1995) lever of controls, in supporting the firm's response strategy through reducing response uncertainty.

Risk management can be viewed as a MCS, as it can be used to control employee behaviour. MCS according to Merchant and van der Steede (2007) addresses the question whether employees behave appropriately or not. MCS are therefore intended to help the organisation motivate employees to make decisions and to take actions which are in the organisation's best interest (Chow et al, 1999). For example, Ratnatunga and Balachandran (2009) suggest that MCS may be used to modify employee behavior to achieve carbon efficiency targets. Similarly, ERM imposes a cybernetic form of control that can be used to control employee behaviour (Power, 2007). COSO (2004) suggested that ERM can support managers at all levels of decision making and planning, and can also potentially provide a guide for the design and implementation of an ERM framework (Arena et al, 2010).

Mundy (2010) suggested that Simons (1995) levers of control framework were a useful analytical tool because they focused on the

different uses of MCS rather than their technologies, structure, existence or design. Prior studies have utilised this framework to explain how firms use their MCS to encourage innovation and learning whilst exerting control over the achievement of organisational goals. Further the framework has been used to identify how firms classify their MCS in four key processes, belief, boundaries, diagnostic and interactive mechanisms, in order to support the implementation of business strategy (Bruining et al, 2004; Tuomela, 2005).

Simons (1995) defined belief systems as an explicit set of organisational definitions that communicate formally the organisation's basic values, purpose and direction. Marginson (2002) found that beliefs and values are incorporated into MCS in order to ensure employees were committed to organisational goals. A belief system is any MCS that provides managers with information regarding the firm's values or priorities (Mundy, 2010). For example, Roberts (1990) described how senior managers used a staff conference to communicate the firm's vision and values. Belief systems illustrate to managers the goals and values of the firm, which may not be portrayed in routine MCS, and restrict any deviations from routine expectations (Simons, 1995). Belief systems are important when management modifies or introduces new values and priorities, for example when organisational change occurs (Bruining et al, 2004). Belief systems are particularly important when employees operate in uncertain conditions, as managers are able to impose strategic goals on employees, thus ensuring employee behaviour is aligned with organisational goals (Speklé, 2001). However, in dynamic environments there must be some restraint placed on employees to stop them from engaging in high risk behaviours, the restraint being the boundary system.

Simons (1995) defined boundary systems as an explicit set of organisational definitions and parameters, expressed in negative or minimum terms. Boundary processes aim to prevent employees from wasting time by communicating those activities deemed acceptable and those considered off- limits (Mundy, 2010). Therefore a boundary system restricts opportunistic behaviour (Mundy, 2010). MCS that set out minimum standards or guidelines for behaviour can be used as a boundary lever of control. Further, Tuomela (2005) found that financial data establishes boundaries that protect a firm from financial risk, whereas non- financial data publicise the strategic boundaries of employees and management authority. Similar to the boundary system, the diagnostic system acts as a constraint on employee behaviour (Simons, 2000).

Diagnostic systems are implemented to compare actual performance against expected performance (Simons, 1999). Diagnostic MCS are used by managers to identify expected performance and actual performance in order to identify any deviations. Financial data is used to indicate when targets are being met whereas non-financial data is used to monitor and control critical success factors (Abernethy and Lillis, 2001 and Tuomela, 2005). Diagnostic MCS enable corrective action to be taken through performance feedback received, through monitoring processes that highlight problems, thus motivating employees to achieve their goals. Diagnostic MCS are intended to motivate employees to perform and align their behaviour with organisational objectives. They report information on the critical success factors which enable managers to focus their attention on the underlying organisational drivers that must be monitored in order for the firm to achieve its intended strategy.

While diagnostic MCS allow managers to manage results on an exception basis, interactive MCS are forward-looking and characterised by active and frequent dialogue among top managers. Interactive MCS enable formal two way communication between managers and subordinates at different levels within the firm (Mundy, 2010). Any MCS that facilitates formal processes of debate is considered an interactive control (Abernethy and Brownell, 1999). Speklé (2001) found that interactive MCS were used to bring together individuals with different sets of information about the firm's activities. Managers use these interactive processes to identify organisational priorities and develop new strategic plans (Naranjo-Gil and Hartmann, 2007). Bisbe et al (2006) found that interactive processes allow managers to monitor employee activities, whilst opening up debate and discussion in a non evasive manner. Frow et al (2005) suggested that face to face can be used to

discuss and resolve problems, rather than to apportion blame. However, interactive MCS tend to be time consuming and costly (Widener, 2007).

Chenhall (2003) suggests that environmental factors are an important factor to consider when implementing MCS. The levers of control framework identified two environmental factors that are of most significant, these include strategic uncertainty and strategic risk. Simon (2000) defined strategic uncertainty as "the emerging threats and opportunities that could invalidate the assumptions upon which the current business strategy is based". Galbraith (1973) suggests that uncertainty implies that there is a gap between the information available and the information required to make accurate decisions. Therefore the greater the level of uncertainty, the greater the reliance on monitoring as monitoring is necessary to reduce the information gap (Simons, 2000). Numerous prior studies have suggested the Simon's lever of controls can be used support a reduction in strategic risk and uncertainty.

Strategic uncertainty and risk greatly increase the information processing needs of a firm. Strategic risk requires an increase in information processing to effectively assess the likelihood of risk and the impact such risks may have on the firm. However Galbraith (1973) suggested that once a firm has implemented organisational goals, the next step is to reduce the need for information processing or increase their capacity to process information. A firm can increase its information processing capacity by implementing a vertical information system, which encourages action, attention, and dialogue, similar to an interactive control system.

Interactive control systems are effective in firms facing various types of strategic risk and uncertainty, such as environmental uncertainty (Bisbe and Otley, 2004 and Simons, 1990). Bisbe and Otley (2004) found that firms facing risk and uncertainty performed better when they implemented interactive controls. Further, Widener (2007) found that when firms are faced with competitive uncertainty they were more inclined to implement interactive controls, however they were more inclined to adopt diagnostic controls when operational risk and uncertainty is present. The controls referred to were performance evaluation measures used in a diagnostic or interactive manner.

Belief and boundary systems can be implemented to reduce risk as they help align employee behaviour with the organisational strategy, thus mitigating the possibility that a firm will be harmed (Mundy, 2010). Boundary and belief systems can also be used to mitigate problems associated with strategic uncertainty. Boundary and belief systems are implemented to reduce undesirable employee behaviour and minimise the negative impacts associated with strategic uncertainty. For example, Groot and Merchant (2000) found that profit centre managers were more likely to manipulate earning during periods of uncertainty, thus implying that the likelihood of engaging in unethical acts is higher in firms facing strategic uncertainty.

Simons (1994) suggests that when a firm is faced with an increase in uncertainty due to strategic change, belief systems are used to communicate the organisational vision and value and boundary systems are used to minimise opportunistic behaviour. Further, Simons (2000) concluded that firms use diagnostic control systems to manage strategic uncertainty and risk. Gailbrath (1973) suggested that decision making authority can be delegated to employees throughout the firm in order to reduce the information processing burden placed on top management. Performance measurement mechanisms incorporated within the diagnostic systems can be then used to ensure employee behaviour is aligned with organisational goals

Methodology

Research Method

For this study, a case study approach based on in depth semi-structured interviews is seen appropriate because it allows a comprehensive analysis of how different management control mechanisms interplay in dealing with environmental uncertainty (Roslender and Hart, 2003). Further, given that the overall research objective is exploratory in nature, a case study method allows the researchers to empirically investigate a contemporary phenomena within its real-life context; particularly when the boundaries between the phenomenon and context are not clearly

evident; and in which multiple sources of evidence are used (Yin, 2003).

Primary evidence was obtained, in this study, from in-depth interviews, which provided the ability to explore areas suggested by the respondent's answers, picking-up information that had either not occurred to the interviewer or of which the interviewer had no prior knowledge. Further secondary data was collected from the CDP, which is the largest online database of primary corporate climate change information in the world, and Sustainability Reports. However, as this study examines two firms, it relies on a comparative logic of analysis, which is likely to reveal subtle similarities and differences between cases and lead to more sophisticated understanding of the impact climate change regulatory developments have on specific MCS features.

Sample

For this study, two companies were chosen from the Australian stationary energy sector, as this sector is significantly affected by regulatory uncertainty due to their high level of GHG emissions. Emissions from stationary energy in Australia grew by 49.5 per cent between 1990 and 2007, which was largely due to combustion of brown coal. The stationary energy sector makes up 54 per cent of Australia's emissions (Australian Parliament House, 2009). Electricity generation (which in Australia relies mainly on coal) is the largest single contributor to GHG emissions, at 37.45 per cent of total emissions (Department of the Environment, 2010). We chose two companies; Company A and Company B[1] based on their level of GHG emissions and source of electricity generation, and the fact that they have taken action to reduce their carbon emissions. For example, Company A generates the majority of its electricity from coal fired power stations, whereas Company B generates the majority of its electricity from gas fired power stations. Further, it is evident that both companies have invested a significant amount of capital in reducing carbon emissions.

The two companies, however, vary in terms of their total carbon emissions. Company A recorded carbon emissions of 15 459 000 tonnes in 2009 (refer to parent company's website), whereas Company B recorded GHG emissions of 3 192 000 tonnes (i.e. about a fifth) in 2009 (2009 Sustainability Report). Company A emitted 2.9 per cent of total Australian GHG emission in 2009, whereas Company B emitted 0.6 per cent of total Australian GHG emissions. Company A was accountable for 7.6 per cent of total electricity generation emissions, whereas Company B was accountable for 1.6 per cent of total electricity generation emissions.

The main contributing factor to this difference is the fact that Company A has a brown coal fired power generation, which emitted 15 388 000 tonnes of GHG emissions in 2009, whereas Company B does not own any brown coal fired power stations. Company A would need to plant over 41 million trees to offset the GHG emissions, emitted from its coal fired power station in one year (Australian Parliament House, 2009). Therefore this power station represents a very significant issue, and greatly increases its exposure to regulatory uncertainty, when compared to Company B. Hence the risk exposure of Company A will be much higher than Company B; therefore a comparative case study is undertaken to assess the impact of regulatory uncertainty on MCS. The comparison between Company A and Company B will also provide a more holistic view of the Australian Energy Sector, by investigating a company at the lower end of the risk spectrum (gas generation) and another at the upper end (coal fired generation). The two primary sources used for electricity generation are coal and gas, coal emits 1 tonne of GHG per megawatt-hour, whereas gas emits 0.57 tonne per megawatt-hour. However, both companies have adopted measures to mitigate the risks associated with regulatory uncertainty; therefore these two companies were chosen for analysis.

Company A has publicly committed to reducing carbon emissions in the medium to long term. The company's climate change strategy commits it to reducing its GHG emissions across its portfolio by 60 per cent by 2050. It has also spent close to $1 billion expanding its clean energy portfolio, including a $292 million commitment to Melbourne-based Solar Systems, a world leading manufacturer of concentrated photovoltaic technology. This deal will now enable Solar

[1] For confidentiality, pseudonyms were used in the study.

Systems to construct the world's most efficient concentrated solar power station in northwest Victoria. Furthermore Company A is involved in various other clean energy developments, such as; a new $350 million combined cycle natural gas power station, which when complete will be Australia's most efficient gas-fired power station and will provide gas and electricity to over 200 000 homes, a $57 million structured deal to pilot geothermal technologies, and participated in a study that is investigating the ability to reduce carbon emissions from brown coal.

Company B is Australia's leading integrated energy company focused on gas and oil exploration and production, power generation and energy retailing. Their commitment to sustainable development requires that they understand their impacts on people and the environment and that they incorporate social, economic and environmental risks and benefits into their business decision-making. Company B has taken a proactive stance towards climate change regulation over the past five year, through numerous investments. Firstly, investments have been made in gas-fired generation which allows Company B to generate electricity at about half the GHG intensity of the National Electricity Market. Secondly, investments have been made in renewable geothermal energy through an investment in and a joint venture with Geodynamics Limited. Thirdly, successful pilot development and progress towards the commercialisation of solar cell technology.

Background of Interviewees

A total of nine participants were interviewed, five participants were from Company A and four were from Company B. The sample was obtained through writing to staff involved in carbon management and asking for their cooperation in the project by providing suitable names and access to staff at a senior responsible level overseeing various aspects of carbon policy and management. Employee background information is illustrated in Figure 2.

Figure 2: Profile of Interviewees

Interviewee	Company	Position	Length of Employment at Organisation	Qualifications
A1	A	Manager (Wholesale Regulatory)	7 years	Electrical Engineering
A2	A	Manager (Carbon Trading)	5 years	Economics
A3	A	Senior Analyst (Business Development)	2 years	MBA
A4	A	Manager (Carbon Policy)	3 years	Masters of Economics
A5	A	Manager (Commercial)	4 years	MBA
B6	B	Senior Analyst (Carbon Data)	3 years	CPA, Masters of Finance
B7	B	Manager (Risk Strategy)	1 year	Masters of Finance
B8	B	Trader (Energy and Derivatives)	8 years	BMS (Hons), Finance & Economics
B9	B	Senior Analyst (Carbon Policy)	3 years	Bachelor of Commerce (Finance) & Bachelor of Laws

Data Collection and Interview Protocol

Each participant was interviewed face to face and the interviews lasted 45 minutes and were conducted at the participant's work place. The interview guide comprised of three main parts:

1. Assessment and effectiveness of their carbon reduction strategy and what investments were made to support the reduction strategy.
2. The risks related to regulatory uncertainty and the impact it has on the organization.

3. The use of MCS in mitigating risks, and their involvement in the carbon reduction strategy.

The participants were all sent a plain language statement as part of ethical clearance prior to the commencement of the interview, which outlined the study and potential interview questions. It was stated to participants in the plain language statement that the purpose for this research is to investigate the carbon risk management strategies of firms within the Australian Energy Sector. All nine of the interviews were tape-recorded, which were subsequently transcribed. A brief description of the study was provided to each participant at the beginning of the interview with assurance that all information would be kept confidential.

Content Coding

Coding of the interview transcripts is guided by Neuman-(2000), where the implicit meaning or underlying theme is derived from the content of a text. It involves examining the transcripts in three phases:

1. *Open coding* - where the aim of the open coding of interview transcripts is to identify and to form categories. In this study, financial, organisation value and information processing uncertainty were formed as the three key categories.
2. *Axial coding* - which focuses on interpreting the initially coded patterns as themes. In this study, we further classified the first phase coding into the sub-dimensions for each three main internal uncertainty categories e.g. issue identified under information processing uncertainty were further classified as an uncertainty arising from ambiguous information or lack of valid information. Likewise for the other categories, sub-themes were identified.
3. *Selective coding* - where quotations are selected to illustrate the themes identified in the earlier two stages of coding (Neuman, 2000, p. 420).

Findings

Company A

Company A generates the majority of its electricity from coal fired power stations. Its primary source of electricity generation comes from its Y power station which is fuelled by coal, however it emitted 15 388 000 tonnes of GHG emission in 2009. Regulatory uncertainty associated with the proposed CPRS had a significant impact on the overall strategy of Company A, as it had to adjust its strategy in order to mitigate the financial impact of regulatory uncertainty. Hence, Company A clearly identifies regulatory change and uncertainty as a significant commercial risk. Evidence of this has been reported in the CDP and further verified during interviews. According to the CDP: "Climate change regulation represents a commercial risk to Company A because of the potential exposure to future regulation on carbon emissions from the use of coal powered generators. Uncertainty of the potential regulation is a significant component of this risk. New climate change regulation could result in increased capital and/or operating costs for emission reduction projects, such as energy efficiency enhancements and/or early retirement of coal fired power plants" (Carbon Disclosure Project, 2009).

The commercial risk in relation to climate change regulation in turn is expressed or understood in terms of its impact on financial statements. This is consistent with prior studies as it is common for private sector companies to rank the key risks in terms of their impact upon the core financial statements (Woods, 2009).

The most significant risk facing Company A is the probability that a significant impairment loss, of an asset, will arise as a result of the introduction of a CPRS. The impairment loss is seen to arise as an increase in expenditure reduces expected future net cash flows received from the Y power station (see Figure 3). Therefore a CPRS will result in the asset being overstated in the balance sheet. As highlighted by Participant A1, and further verified within the CDP: "The CPRS will have a *major negative financial impact.* An increase in expenditure over time will phase the Y power station out, but the balance sheet will be impacted slowly with the Y station closing over time as new plants come online. However, on day one when you introduce the scheme, the *impact on the balance sheet* is extreme, *debt covenants are blown out and shareholder equity is gone*" (Participant A1).

"In Australia, the introduction of the CPRS in 2011 could raise our operating costs for our

brown coal Y power station, relative to our competitors. For example, an estimated carbon price of A $23 (~US$16.4) per tonne would cost nearly A$300 million (US$ 214 million) per year for our Y power station in Australia (estimated on 2008 CO2e emission figures)" (Carbon Disclosure Project, 2009).

Further, the financial impact of an impairment loss also seems to greatly impact the financial well-being of the parent company's shareholders, who are predominantly international investors, as this increases their risk exposure. Company A is exposed to an economically significant risk as shareholders may stop providing capital to fund present and future capital investments. Participant A4 explained this risk: "There is another risk, when everybody built their brown coal power station, there was no inkling of a cost on carbon, so now those investments will be stranded when you bring in those costs as they are not bringing in money, but if you bring in gas as the next form of generation, those gas investments could be stranded if you build based on a wrong carbon price or the carbon price changes. So when you are asking investors to continue to put out risky money and they keep getting burnt, they will stop investing in Australia and invest in other countries" (Participant A4).

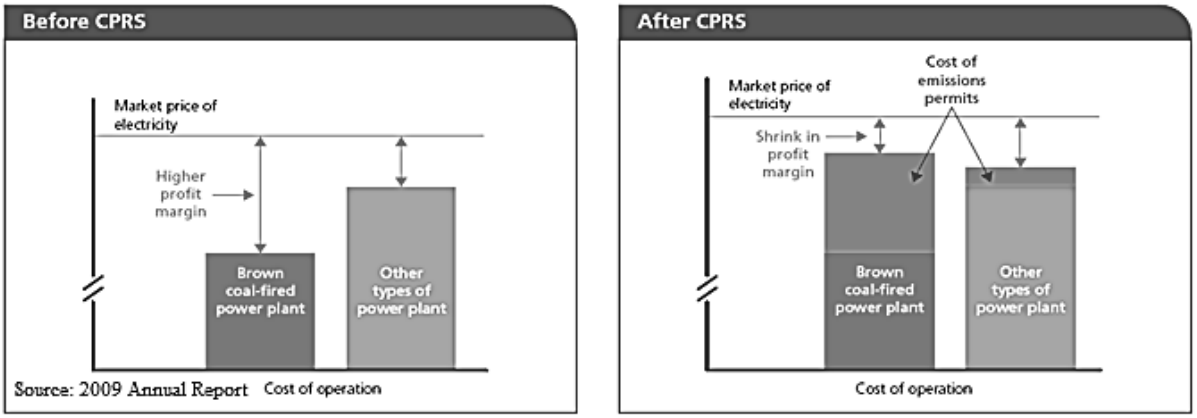
In terms of strategic response to regulatory uncertainty, Company A appears to have taken a proactive stance. In 2007 Company A implemented a climate change strategy to mitigate the risks associated with a CPRS, which was the same year in which a CPRS was first proposed. Participant A4 recalled such the event: "When I started at Company A four years ago, the company was right on the cusp of what should we do about climate change, management looked around and started to see that *climate change was an issue* and our *business is very carbon intensive* therefore we have a *climate risk.* Management agreed that we needed a business strategy that mitigated or managed that risk" (Participant A4).

This is further supported by Participant A2's observation where the following was noted: "The central platform of our approach is our climate change strategy, which is our *blueprint* for taking substantial steps to *mitigate the impact of climate change* on our business" (Participant A2).

Further enquiry into the response strategy, during an interview, indicated that the primary approach of the climate change strategy was to focus on investing in renewable energy technologies as a means to reduce their GHG emissions and hence reduce the costs associated with these carbon emissions. This was evident within Company A's Sustainability Report.

"The climate change strategy focuses on the four key areas of work; cap carbon intensity, reduce emissions, invest in emerging low and zero emission technology and help managers manage their own footprint. These targets will be met through a commitment to building no *new coal power stations and invest in renewable and low emissions technology*, and supporting research and development" (Sustainability Report, 2009).

Figure 3: An Illustration of an Impairment Loss Arising from the Devaluation of the Y-Brown Coal-Fired Power Plant



However, as evident in the conceptual framework, the way in which a firm responds to regulatory uncertainty tends to result in response uncertainty. Regulatory uncertainty affects response uncertainty through its impact on Company A's strategic investment decision making process. The impact of regulatory uncertainty was evident in the carbon disclosure project and further verified in interviews.

"The major challenge for our business in Australia will continue to *be investment uncertainty surrounding the proposed carbon trading legislation (CPRS), given its political uncertainty.* The proposed CPRS would have severely limited the ability of brown coal-fired generators such as our business, to invest in new opportunities" (Carbon Disclosure Project, 2009).

"At the moment *there is uncertainty as we are not sure what the CPRS will look like*; for example we could invest in things with no return. We manage these risks through scenario planning/modelling. The scenario planning/modelling allows us to identify what the projects would mean under a CPRS i.e. would a CPRS affect investment? Our day to day activities are not impacted, however long term investment decisions are affected as we do not know what to expect, and how a CPRS will impact our investments" (Participant A5).

"*Uncertainty about the stability of existing regulation and uncertainty about whether something new will come in has a significant impact on our investment decisions.* Greater certainty would promote investment in renewable energy technology as it is difficult to invest for the next 20 year when you're not sure whether legislation will change" (Participant A3).

In summary, the proactive response strategy implemented by Company A seems to be connected with various types of internal uncertainties with much of the concern central to investment decision-making.

Further elucidations are provided in the next section on the risks and MCS support utilised in relation to three specific types of internal uncertainties: financial, organisational value and information processing uncertainty.

Financial Uncertainty at Company A

Financial uncertainty is defined, within the context of this study, as the probability that an investment decision will have an economically significant impact on the firm's financial performance. It is evident that investment decisions are affected by financial uncertainty as the commercial viability of investments in renewable energy technologies is questionable. Therefore strategic investment decision making is impaired as the commercial viability of an investment cannot be adequately assessed, thus an irreversible mistake may be made, as illustrated by Participant A1.

"The power generation side of this industry is very capital intensive sector, therefore once an investment is in you cannot move it, it's there for a long time. Therefore if an adaption strategy is to invest in a particular technology and *legislation changed then that technology may not be commercially viable*, thus resulting in a significant financial loss" (Participant A1).

It would appear that Company A has undertaken a portfolio approach so as to diversify the financial risks associated with an irreversible mistake occurring. Investments are made in various renewable energy technologies to ensure that, if one investment fails it does not have a significant financial impact on the business. As noted by participant A1 an A4.

"We adopted a portfolio approach towards investments in renewable energy technologies. We have a few wind farms, some geothermal investments. Therefore we now understand these technologies reasonably well" (Participant A1).

"We are trying to transform our energy portfolio so that it turns the climate risk into a business opportunity. There was a need to transform the company so we are investing small amounts of capital in different types of renewable energy technology" (Participant A4).

At Company A, corporate level risk management strategy has been effective in reducing financial uncertainty, through diversifying Company A's investments in

renewable energy technologies, thus enabling them to effectively manage the introduction of a price on carbon, as illustrated by Participant A4: "Our risk management strategy has been about preparing us manage a carbon price and we are ready now. So *the risk management strategy has been all about preparation.* If we didn't have a risk management strategy we would not be ready for the introduction of a CPRS. *Our risk management strategy has put us in a position* where we have investments in wind, solar and geothermal technologies and *are ready for a CPRS*" (Participant A4).

However, Berry and Collier (2007) argue that when a firm assumes that all risks have been accounted for and controlled within the risk management process, it may be exposed to further risks (control risk). This is evident at Company A, as the ability to effectively mitigate quantifiable risks is impaired when uncertainty is present, as illustrated by participant A3: "The risk management framework is only as good as you can make a reliable business case, which is not the case when there is uncertainty surrounding the nature of a proposed CPRS. Therefore you can either price all the risks in the beginning and have an un- economic business case but we will be losing money from day one when you price all the risks into that project" (Participant A3).

The inability of Company A to effectively quantify all risks has resulted in Company A placing an emphasis on the mitigation of quantifiable as well as non-quantifiable risks, which is similar to the case study on Gotebank in Mikes (2009). This ensures that quantifiable and non-quantifiable risks are accounted for, thus mitigating control risk. The risks associated with financial uncertainty can be quantified in terms of the potential financial loss, whereas the risks associated with information processing uncertainty and organisational value cannot be as easily quantified (Sinding et al, 1998).

In summary, the primary risk associated with financial uncertainty, at Company A, is the probability of an impairment loss resulting from an irreversible investment mistake. This risk is mitigated through the diversification of investments in various renewable energy technologies, in order to minimise the financial impact, should an impairment loss arise over the devaluation of an investment.

However, the level of investment uncertainty has impaired Company A's ability to effectively manage the mitigation of such quantifiable risks. Therefore, the mitigation of risks associated with financial uncertainty are supported by MCS, through the effective management of information processing and organisational value uncertainty, thus enabling Company A to make better investment decisions.

Information Processing Uncertainty at Company A

Information processing uncertainty is defined, within the context of this study, as the probability that an investment decision will be made on incorrect information or assumptions. Sinding et al (1998) states that if information processing uncertainty results from a problem that management cannot evaluate correctly, management may engage in a variety of problem solving activities designed to facilitate a collective agreement about the nature of the problem. By obtaining a collective agreement on the nature of the problem, management will be more inclined to have a comprehensive understanding of the problem, thus the problem can be appropriately managed.

In Company A, information processing uncertainty is partly dealt with by putting decisions on hold with using a set of assumptions (e.g. scenario planning). The inability of management to adequately assess the outcome of an investment is as highlighted by participant A5 as follows: "We have to identify what and how much output we need in terms of generation. We need to understand the current state of our generation infrastructure and identify what type of investments we need to make, to maintain operations. We rank each investment according to the risk associated with each investment, the available funds go to the more favourable investments. However, a CPRS would impact the level of risks associated with each investment and change its ranking. We also need to identify how we are going to mitigate the other risks for which funds are not available. *A lot of our decisions have been put on hold pending CPRS regulation, as it is just a theory at the moment. We make decisions based on assumptions"* (Participant A5).

According to Sinding et al (1998), given that information processing uncertainty results from investment uncertainty, problem solving measures need to be implemented to facilitate the effective management of those problems associated with investment uncertainty, as suggested by Sinding et al (1998). In Company A, at least three types of problem solving measures were evident.

The first is flexible planning is implemented to accommodate regulatory changes and ensure investment decisions take into account regulatory changes. This ensures that management is aware of any regulatory change, thus ensuring investments are based on accurate information, as illustrated by Participant A1:

"MCS do help align the investment decision with the response strategy but they are in development, they aren't static, the politics keep changing therefore you have to keep going back to formal planning in order to check if investment decisions still fit within the current environment. It's hard to keep up and formal planning is constantly being developed to ensure investment decisions fit with the climate change strategy" (Participant A1).

Another problem solving measure is scenario planning is used to assess the impact of a CPRS on investments, which enables management to make better investment decisions through evaluating the potential outcome of an investment, as illustrated by Participant A5: "At the moment there is uncertainty as we are not sure what a CPRS will look like; we could invest in things with no return. We manage these risks by performing scenario planning to determine what could happen and the different impacts. The scenario planning allows us to identify what the projects would mean under a CPRS, i.e. would a CPRS impact an investment" (Participant A5).

Interestingly, NGER reporting is another problem solving measure or tool used to evaluate the ability of an investment to reduce GHG emissions, as well as identify the investments that are most effective in reducing GHG emissions. In other words, the NGER reporting process is therefore not just about collecting data for the purposes of compliance, but it is also useful as a management control tool for GHG emissions. It appears to be used in a diagnostic style (Simons, 1995) where it enables management to accurately assess the outcome of an investment thus mitigating the problems associated with investment uncertainty - as noted by the observations of the following two participants: "NGER reporting can be used to evaluate the impact of investments in renewable and low emissions technology through assessing the reduction in GHG emissions caused by such investments. This enables a firm to identify the most appropriate investments" (Participant A3).

"NGER reporting enables us to identify what our emissions are and how they have moved. It identifies whether or not our investments are helping to reduce carbon emissions, it also enables us to evaluate the investments to identify whether investments performed as expected, in terms of GHG reduction" (Participant A5).

However, in addition to adopting a diagnostic approach, an interactive approach to problem solving is also adopted in Company A where the strategic investment decision making process enables all departments to participant in the investment decision. For example, the accounting department can focus on budgeting, whereas the carbon policy team can focus on evaluating the impact of climate change legislation on the potential investment.

This interactive planning control, in the form of an interdisciplinary meeting (Kober et al, 2007), was illustrated by Participant A3: "To make an investment decision it is a process of 'hundreds' of people. To make a decision on the investment it is not a single decision, it may start within the business development team but then as it grows you have all levels of enterprise involved. It affects the budget, trading, cash flow, strategy . everything" (Participant A3).

Thus it is likely that management is able to obtain a more holistic overview of problem at hand and can therefore manage the problem more effectively when an interactive, more organisation-wide approach to information processing is adopted.

In summary, in relation to Company A, information processing uncertainty, arising from management's inability to adequately assess the outcome of an investment, has been

mitigated through the use of planning and performance management controls. Flexible planning is used to accommodate regulatory changes and scenario planning is used to assess the impact of a CPRS on a particular investment. Further, NGER reporting is used to evaluate the outcome of an investment, through assessing its ability to reduce GHG emissions. Therefore planning and performance management controls enable management to more effectively assess the outcome of an investment, thus better investment decisions can be made.

Organisational Value Uncertainty at Company A

Organisational value uncertainty is defined, within the context of this study, as the probability that a conflict will arise over the misalignment between employee values and organisational values. Sinding et al (1998) stated that when the source of uncertainty results in a conflict over organisational values, management may implement two methods aimed at creating a cohesive value set. The first option is to impose a set of values on employees while the second option is to develop a set of values by consensus.

It is evident that investment uncertainty has affected organisational value uncertainty as some employees were sceptical about implementing change, in regards to investments in renewable energy technology as opposed to coal powered generation, when a CPRS had not actually been legislated, as illustrated by Participant A5: "We are not implementing changes, within our strategic investment decision making process, until regulation comes in; we will execute and do certain things only when the regulation comes in. There is no impact on performance as nothing has been implemented yet. Our strategic plan is reviewed yearly to identify what has changed, compared to this time last year" (Participant A5).

Therefore, the primary risk associated with organisational value uncertainty was emerging employee scepticism towards investments in renewable energy technology which in turn may have resulted in employees resisting such change, thus potentially impairing management's ability to make effective investment decisions.

However, it is evident that Company A implemented a climate change strategy to mitigate the problems associated with organisational value uncertainty. The climate change strategy was developed through an interactive process, which aimed to foster employee commitment towards a reduction in GHG emissions. This interactive process involved an organisational debate over the climate change issue; therefore employees were able to understand the strategic uncertainties impacting the organisation and the need to develop an appropriate response strategy. It thus appears as though the climate change strategy was developed by consensus whereby employees, within the sustainability group, engaged in a debate over the structure of the strategy, as illustrated by Participant A2: "The climate change strategy formed the basis for all initiatives. It was the blueprint for a lot of debate, within the sustainability team, before the metrics were agreed to. Once everybody knew what they were, all business units could work on their individual goals. It brought the whole company together through debating climate change issues" (Participant A2).

In Company A, organisational values were fostered through promoting a climate change strategy. The climate change strategy was developed within an interactive process in which a sustainability group was developed to come up with a climate change strategy and implement it within the organisation. The sustainability group was dispersed within all business units, and performance evaluation metrics were developed to ensure appropriate investment decisions are made. Therefore the climate change strategy was implemented within Company A as a form of belief and boundary system to control employee behaviour. It is, therefore evident that the climate change strategy was developed by consensus; however it was used to impose values on employees, thus influencing their behaviour.

Organisational values and priorities were communicated via the climate change strategy, therefore creating a shared vision, which inspired and motivated the workforce to reduce GHG emissions. Strategic parameters were implemented to control employee behaviour through the entangled strategy.

The business development team, in particular, need to understand the strategic risks that are to be avoided or minimised and operate within specific constrains. This issue was illustrated by Participant A3: "Certain parameters are communicated via the climate change strategy and then you can incorporate those into your daily tasks. That drives us to ensure that all projects are in line with the strategy and to ensure projects move along. We as the business development department are well *aware of the strategy* as we have to ensure the *investments made are in line with the strategy or they will not be approved*" (Participant A3).

Further, employee behaviour appeared to be influenced through the use of performance management controls. Performance management controls contain a metric associated with the climate change strategy, which ensures employee behaviour is aligned with the climate change strategy. Therefore employees work towards reducing GHG emissions.

"The climate change strategy is integrated into every business unit; therefore employee performance would contain an aspect of the climate change strategy. The strategy is part of their performance; it is literally a business strategy to reduce GHG emissions" (Participant A4).

The approach to disseminating the importance of a reduction in GHG emissions was undertaken, within Company A, as an enterprise wide approach. This provides an insight into how Company A was able to mitigate organisational value uncertainty through the effective integration of its climate change strategy throughout the organisation.

Participant A4 recalls the effective implementation of the climate change strategy: "Our climate change strategy is integrated into the company. Our sustainability group started to implement the strategy through tentacles into the company, when it broke up; people from the sustainability business unit went into different business units. *So now all business units have carbon as part of their mandate,* it's not a control system put on top of everything, it is integrated. It is a deeply rooted control system, but not anymore, it is a business strategy. *The strategy is part of their performance; it is literally a business strategy to reduce carbon emissions*" (Participant A4).

In summary, the climate change strategy was effective in aligning employee behaviour with organisational goals and objectives. Organisational values, within the climate change strategy, were developed by the sustainability team through consensus. The sustainability team developed the strategy through an interactive process, involving debate, which increased employee commitment to reducing GHG emissions through illustrating to employees the importance of such a strategy. Further, values were imposed on employees as aspects of the climate change strategy were embedded within performance targets to ensure that employees work towards reducing GHG emissions. Therefore the climate change strategy was effective in reducing organisational uncertainty through creating a shared vision amongst employees, thus investments are made with the intention of reducing GHG emissions. Figure 4 provides a summary of the key findings in Company A.

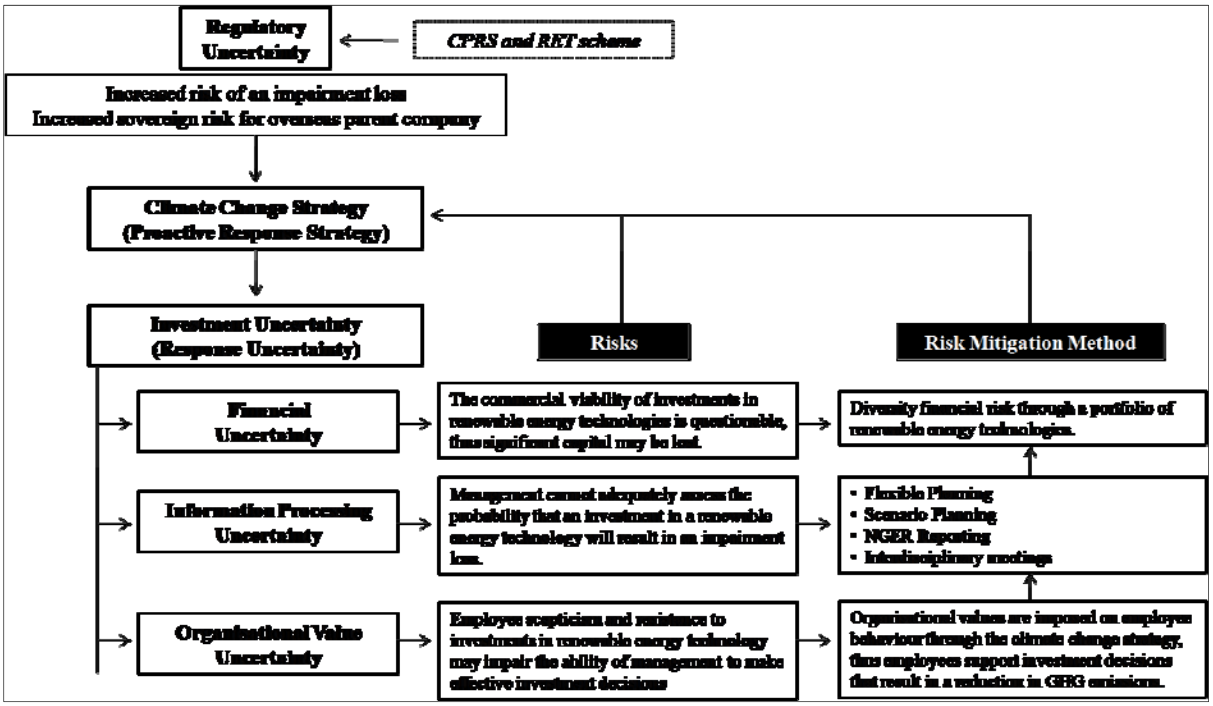
Company B

Company B generates the majority of its electricity from gas fired power stations. Company B emitted a total of 3 192 000 tonnes of GHG emissions, which was a fifth of Company A's GHG emissions from its Y power station alone. Despite its lower level of GHG emissions, Company B also clearly identifies regulatory change as a significant source of uncertainty, and in particular financial risks associated with high compliance costs is uppermost. Evidence of this was illustrated by Participant B8, during an interview:

"The RET scheme has recently been split into smaller renewables, which have the solar scheme, and larger renewables have a different scheme. This regulatory uncertainty has a massive impact on our investment decisions, as the RET scheme is changing all the time. For example, the government comes in and changes the RET scheme and the goal posts move and we have to scramble around and try and identify the investments that will enable us to comply within such short time frames. A massive amount of capital gets spent on complying with schemes" (Participant B8). Further, the financial impact of regulatory uncertainty is identified in terms of the

financial impact upon core financial statements.

Figure 4: Findings from Company A



This is consistent with Company A as well as prior studies as it is common for private sector companies to rank the key risks in terms of their impact upon the core financial statements (Woods, 2009). The most significant risk facing Company B is the financial costs associated with regulatory compliance. The real financial risk of this compliance is determined by the level of cost that can be transferred to the customer. Participant B7 illustrated the impact of such compliance on the firm.

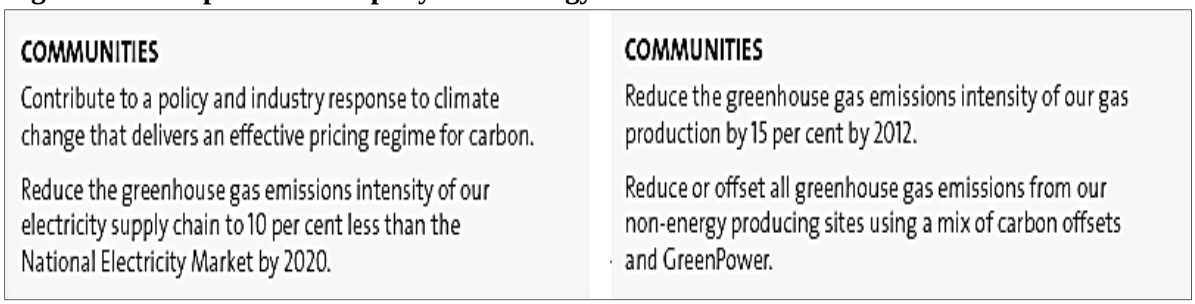
"Now for any energy company they face two types of issues there's the *financial side and the physical side* and within the *physical side essentially* because this is legislation, it is not voluntary we have *to comply as it is a mandatory compliance* so that mandatory compliance has a cost associated with it. The primary issue of how physical becomes financial is once you comply there is a cost of that compliance and how much of that cost can be transferred to your end use customer. That's where the *real risk comes from and the level of pass through* i.e. the more you can pass onto the customer the better it is for the company" (Participant B7).

Similarly, RECs carried by Company B, to meet annual renewable energy targets, are affected by regulatory uncertainty. Interestingly, while there are two types of risks - market and regulatory, for Company B the predominant risk appears to be associated with regulatory risk. Regulatory change can have a negative financial impact on the value of RECs held by Company B, thus potentially reducing the value of assets within the balance sheet. The impact of regulatory risk, in terms of a devaluation of REC prices, was illustrated by participant B7: "Within REC prices, there are two types of risk. There is the market risk and the regulatory risk. The largest is the regulatory risk, 90 per cent of risk would come from regulatory risk. What has happened in the last few years, is that there has been not only political instability, but even the current government that was in power changed the RET legislation in bits and pieces. The biggest of which was when they first allowed little solar panels to create RECs which flooded the entire market and that depressed the price. Now they [government] are going to split the scheme into small and large RECs. So the small RECs are basically getting a fixed price of $40 and the large RECS, which are created by big wind farms, may cause the price to go decrease from $40 to $15 or $20" (Participant B7).

However, it is evident that Company B appears to have adopted a less organisation-wide, centralised approach to reducing GHG emissions, compared to Company A. Company B's slower, passive approach response could be attributed to the level of GHG emissions are much lower than Company A which are much lower than Company A. Participant B6 illustrated thus issue:
"We are actually currently in the process of looking at a climate change strategy so I really cannot comment too much on this at the moment, as it is still in development. *However, that [i.e. climate change strategy] is a challenge other energy companies, who have brown coal generators, have to face as brown coal generators are very carbon intensive*" (Participant B6).

Further, it was evident in Company B's Sustainability Report (see Figure 5) that one of its objectives is to reduce the GHG emissions intensity of their electricity supply chain to 10 percent less than the National Electricity Market by 2020.

Figure 5: A Snapshot of Company B's Strategy to Reduce GHG Emissions



COMMUNITIES

Contribute to a policy and industry response to climate change that delivers an effective pricing regime for carbon.

Reduce the greenhouse gas emissions intensity of our electricity supply chain to 10 per cent less than the National Electricity Market by 2020.

COMMUNITIES

Reduce the greenhouse gas emissions intensity of our gas production by 15 per cent by 2012.

Reduce or offset all greenhouse gas emissions from our non-energy producing sites using a mix of carbon offsets and GreenPower.

(Source: 2009 Sustainability Report)

Additional enquiry into Company B's five year strategy suggests the existence of a significant level of confidence in the primary strategy for reducing the effects of regulatory uncertainty which involve investments in renewable energy technologies to reduce their GHG emissions and hence reduce the compliance costs associated with these carbon emissions, as illustrated by Participant B8:

"The overarching strategic message is that we will always comply with all environmental schemes which we are involved in, we will never pay a penalty. We are a supporter of the carbon industry and the leading green power supplier in Australia. *We will comply with all regulation, thus the right investments are made therefore we are compliant*" (Participant B8).

The emphasis placed on investments in renewable energy technologies to reduce GHG emissions was also evident in the 2009 Sustainability Report (see Figure 6).

Figure 6: A Snapshot of the Emphasis Placed on Investments in Renewable Energy Technologies to Reduce GHG Emission

Five year Strategy	What we said	How we went	FY10 Actions
Reduce the greenhouse gas emissions intensity of our electricity supply chain to 10 per cent less than the National Electricity Market by 2020.	Expand generation capacity in technologies which have an emissions profile >10 per cent lower than the National Electricity Market average.	• All major capacity expansions for the year (Cullerin Range Wind Farm, Uranquinty Power Station and the Quarantine expansion) produce electricity at an emissions intensity >10% lower than the National Electricity Market average.	• Expand generation capacity in technologies which have an emissions profile >10 per cent lower than the National Electricity Market average. • More than double our investment in exploration for new sources of gas. • Expand investment in identifying new sources of renewable energy.

(Source: 2009 Sustainability Report)

It is possible given that unlike Company A where the targets for GHG emission reduction based on a CPRS-driven control scheme is highly uncertain, for Company B there is

greater uncertainty through the RET scheme on what should be a good response strategy. As noted by one interviewee: "Regulatory uncertainty has a massive impact on our investment decisions, and the scheme is changing all the time. The Government comes in and changes the RET scheme and the goal posts move and we have to scramble around and try and comply within short time frames, massive amounts of money gets spent on complying with schemes we have now. Therefore, greater certainty would support our investment decisions" (Participant B8).

Interestingly, the CDP report notes that: "The increased uncertainty created by the announced delay to the CPRS has had a roll-on effect for investment decisions. Without a carbon price, there is no incentive for electricity generators to shift over time from carbon intensive coal to lower emission fuels such as gas. The uncertain environment is also reducing the incentive for companies to invest in long term projects. The RET scheme also imposes significant risks associated with investment decisions, allocation of capital, management of commodity portfolios and compliance with the scheme requirements" (CDP, 2009).

It is apparent that Company B's response strategy is affected by its lower carbon emissions and that it is already in a gas-based sector. Nevertheless, the uncertainty imposed by the RET scheme changes has implications for internal uncertainty within the organisation, and more specifically in relation to the financial, organisational value and information processing uncertainty as discussed in the following sub-sections.

Financial Uncertainty at Company B

For Company B, risks related to financial uncertainty are largely associated with an irreversible investment mistake occurring, which include penalties imposed for non-compliance or capital lost. The current RET scheme stipulates that 20 per cent of electricity generation, by 2020, must come from renewable sources, with a penalty of non-compliance being $65 per megawatt-hour. For example, Company B is predicted to generate 48 842 megawatts in 2020 (2009 Annual Report), of which 9 768 (20 per cent) megawatts will need to be derived from renewable sources. Therefore if an irreversible investment mistake is made, which impairs the ability of Company B to meet the RET target, it will have an economically significant impact on the business, in terms of an increase in costs, associated with non-compliance. This issue was illustrated by Company B's response to the CDP: *"The key regulatory risks, associated with compliance of the RET scheme, for us lie in the success, or otherwise, of our strategic decisions to either meet our compliance obligation through investment* directly into renewable energy projects and/or through the electricity supply market" (Carbon Disclosure Project, 2009).

Company B appears to adopt an integrated risk management approach towards the financial risk associated with non-compliance. For example Company B has an integrated risk management team, as various business units are incorporated into the risk management team, thus potentially mitigating information processing uncertainty through the use of reliable and credible information. Similarly, in Company B organisational value uncertainty is attempted to be mitigated through the implementation of a centralised view towards risk, as illustrated by Participant B8: "We have a dedicated corporate policy and sustainability team in addition to a corporate strategy team. Across the two groups, there are a large number of people *experienced in a range of aspects* of national and international climate change regulation, and related business strategy and development. The policy team, in combination with relevant business units, is responsible for identifying high level regulatory risks around carbon and renewables and for coordinating regulatory teams in our business units in order to *create a centralised view* of our overall exposure to climate change regulation" (Participant B8).

Therefore, it appears as though the methods adopted to mitigate information processing and organisational value uncertainty, driven by investment uncertainty, may also mitigate the likelihood of an irreversible investment mistake occurring. Thus supporting the compliance efforts of Company B, as appropriate investments in renewable energy technologies are used to comply with the RET scheme. This was illustrated by two participants: "If we see a gap in our compliance level that can either be filled by our own investments in renewable energy technologies or by purchasing RECs,

depending on which option is more beneficial" (Participant B8).

"To take an example you have got a renewable energy target and they have increased the target quite a lot, and we have a target of 20per cent reduction by 2020. I'd say a lot of that target is going to be met by investments in renewable electricity generation technologies, such as wind and solar generation" (Participant B9).

Further, participant B8 illustrated the high costs of compliance, in terms of investments in renewable energy technologies, which are associated with complying with the RET scheme. Therefore, if an irreversible mistake occurred it would result in a significant loss of capital, as the investment would have not been able to reduce GHG emissions. Thus, further investment will be required to meet the compliance target, as illustrated by Participant B8: "A massive amount of capital gets spent on complying with such schemes, such as the RET scheme" (Participant B8).

Scenario planning is used to assess the percentage of compliance costs that will actually have an impact on Company B, given that some of the compliance costs cannot be passed onto consumers. It appears as though scenario planning can be used to appropriately identify the level of financial risk associated with the compliance of the RET scheme. Thus, by reducing information processing uncertainty, financial risks can be appropriately identified and managed.

"Regulatory uncertainty starts off as a physical risk. Our stance is yes we comply, but if we comply how much of that financial cost is going to be passed onto the customer. If we can pass through, this is how much we can pass through and this is how much we can't pass through, you puts risks around that, you put dollars around that. We then implement a second level of analysis where you create synthetic forward curves and you *say these are the scenarios that could occur and these are the dollars you could lose*" (Participant B7).

In summary, the regulatory environment in which Company B operates may result in investment uncertainty. However, it appears that scenario planning as a MCS feature can be used to mitigate financial risk, through mitigating the information processing and organisational value uncertainty associated with investment uncertainty.

Information Processing Uncertainty at Company B

Sinding et al (1998) stated that if information processing uncertainty results from a problem that management cannot evaluate correctly, management may engage in a variety of problem solving activities designed to provide management with a better understanding about the nature of the problem. Information uncertainty appears to create a problem for management as it affects investment decisions and the ability of management to adequately assess the outcome of an investment becomes restricted For example, as noted by an interviewee: "The RET scheme has recently been split into smaller renewables, which have the solar scheme, and larger renewables have a different scheme. This regulatory uncertainty has a massive impact on our investment decisions, as the RET scheme is changing all the time. For example, the government comes in and changes the RET scheme and the goal posts move and we have to scramble around and try and identify the investments that will enable us to comply within such short time frames" (Participant B8).

Therefore, with changing regulatory requirements, information processing also becomes problematic. In order to address the issue, several problem solving measures were instituted in Company B as discussed below.

Firstly, the NGER reporting enables information, on GHG emissions, to be processed in a more meaningful manner. NGER reporting is seen to be useful for assessing the performance of investments through identifying investments that have had a positive impact on reducing GHG emission. The benefits of NGER reporting were illustrated by participant B6: "With the onset of NGER reporting I started undertaking monthly reporting of our GHG emissions across each business unit. It is for internal use only, and has helped convey to the business units what their emissions are. I think it is especially helpful to the generation units, because *it reflects the positive impact of gas powered generation*. So I think going forward it will definitely play a greater part in our investment decision making process" (Participant B6).

Mundy (2010) suggested that a firm can increase its information processing capacity by implementing a vertical information system, through bottom-up communication, which may encourage action, attention and dialogue. Thus providing management with a comprehensive understanding of the problems associated with investment uncertainty. A vertical information system appears to be evident at Company B as the carbon trading team is able to provide input on the firms REC requirements. This enables Company B to make decisions, which ensure they are compliant in the least cost effective manner, as illustrated by Participant B8: "A lot of the wind farm developments are driven by REC trading, because we are on the ground trading the REC's, *therefore we are able to identify a gap in our compliance position. This gap can either be filled by our own business through investing renewable energy technologies or by purchasing RECs,* depending on which option is the least costly. We feed that into our strategic group, so we have a say as to what we invest in" (Participant B8).

Further, strategic investment decisions are undertaken during the strategic planning process through the use of interdisciplinary meetings and ensuring wide representation from all business units are involved. This ensures that specialists have their say on certain areas and thus ensuring more reliable and perhaps even credible information is used, and the most appropriate investments are made. This issue was illustrated by Participant B8: "Strategic planning is done every year at the same time. We get representatives together from all different business groups. We plan and come up with what strategically do we want to achieve in the future, do we want to own or do we want to go into long term agreements with people who perhaps can do things more effectively than us. So investment decision making comes out in that strategic planning process. We do all the base work, and then our general manager takes it up to a larger meeting with generation and retail, and the feedback down strategic investment decisions" (Participant B8).

However, if the uncertainty comes from the firm's inability to process the volume of information attached to the problem then new information processing systems may be implemented (Sharfman et al, 1998). It is evident that Company B implemented a carbon trading system to ensure compliance of current and future regulation is achieved, as illustrated by Participant B8: "As we have grown we have had to build massive internal systems such as carbon trading systems that are auditable and secure. Certain people have access to it and certain people don't and there are different levels of permission as to what you can do in that system. The carbon system has made our systems allot more robust, in regards to tackling what inventories we have, our compliance of the RET scheme and other environmental schemes. Having a robust system allows us to keep track of what is going on, in terms of our compliance. It also ensures we don't enter in a REC twice" (Participant B8).

In summary, investment uncertainty has created an information processing problem as management is unable to adequately assess the outcome of an investment. Hence investment uncertainty appears to have had an impact on information processing uncertainty. However, various MCS appear to effectively support the management of the information processing problem. NGER reporting enables management to adequately evaluate the effectiveness of an investment in reducing GHG emissions. Vertical information sharing enabled various departments to have a say on the matter, thus obtaining information that was useful in supporting the effective management of such a problem. For example, the carbon trading team responsible for acquiring RECs, to ensure Company B complies with the RET scheme, was able to provide feedback on the most appropriate investments, required to achieve compliance. Further, a carbon trading system was implemented to keep track of the compliance level of Company B, thus identifying when investments in renewable energy technologies are required to achieve compliance.

Organisational Value Uncertainty at Company B

As previously noted, Sinding et al (1998) stated that when the source of uncertainty results in a conflict over organisational values, management may implement two methods aimed at creating a cohesive value set. The first option is to impose a set of values on employees while the second option is to develop a set of values by consensus.

It is evident that investment uncertainty has affected organisational value uncertainty as employees are sceptical about incorporating a carbon price into their investment decisions when a CPRS does not actually exist. This poses a risk that employee values may not be aligned with organisational values, as illustrated by Participant B8:
"We are investing in gas as it will be cheaper to operate than coal fired generation, should a CPRS occur, but then if there is not a price on carbon why do these investments matter?" (Participant B8).

However a stringent internal governance process is incorporated to ensure investment decisions made by employees are aligned with the organisation's strategy to reduce GHG emissions. Similarly, Sinding et al (1998) suggested that management may impose a set of values or develop a set of values by consensus. It is evident that management at Company B mitigates the problems associated with organisational value uncertainty by imposing organisational values on employees, through the internal governance process in which investment decisions are made.

Strategic parameters were implemented to ensure that appropriate investments are made through restricting the behaviour of employees. For example, strategic parameters are enforced through a pre-approved strategy that dictates what investments can and cannot be made. "There has to be a pre-approved strategy for us to do something, which means that management is aware of what we are about to do" (Participant B8). Any investment decision, with a face value over $100 000, has to go through a stringent corporate governance process, which further restricts employee behaviour.

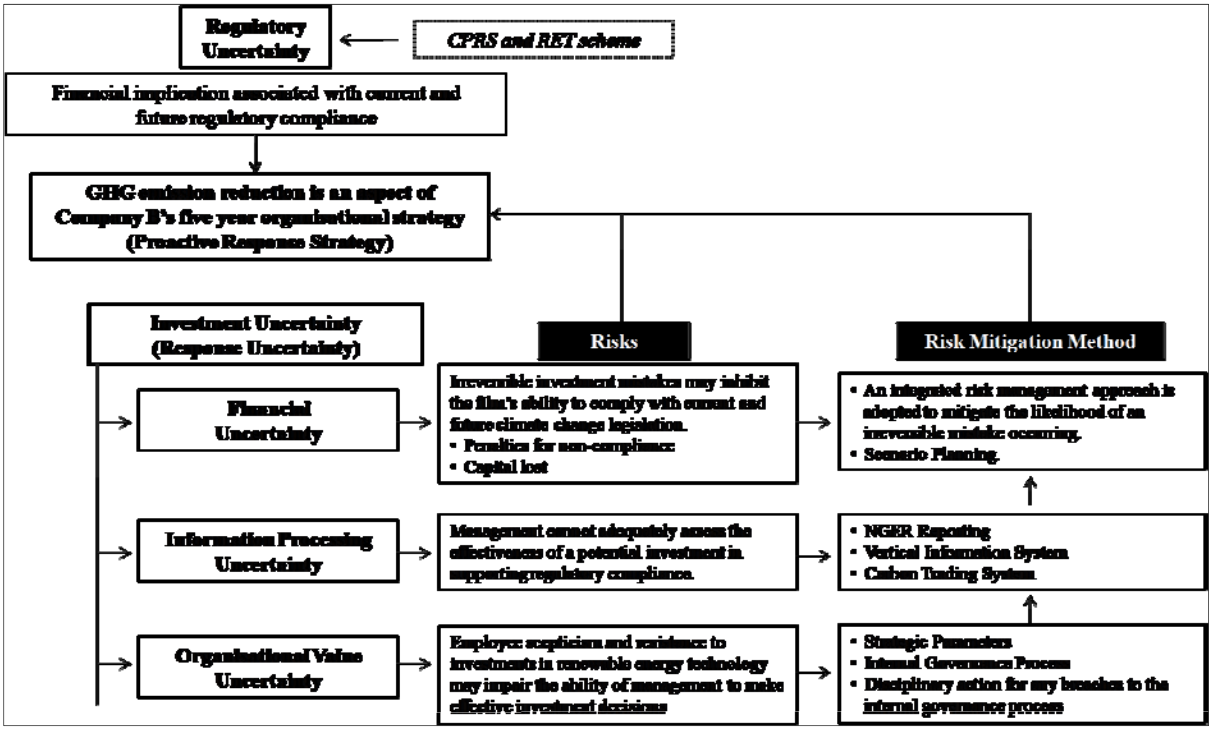
"There is an internal governance process, and we cannot execute an investment decision until it has been approved by the investment committee. To get a project approved there has to be documentation that legally signs off on our corporate governance process. *When you put a contract up for approval it goes through health and safety, credit, treasury, legal, carbon, it is a very lengthy and intensive process.* Every group in the business needs to sign off and once all the business groups have signed off, the general manage signs off that everything is done correctly and all ready to go. Any contract over $100 000, face value, has to go through that corporate governance process" (Participant B8).

Further, employees are motivated to behave in a manner that is in line with organisational values, as they will be reprimanded if they do not. This is illustrated by Participant B8: "Any breaches to that process go to the board, get fed up through the internal governance process. The board is aware of any breaches and breakdown in processes. There is a very high motivated on people not to be reported to the board for doing the wrong thing; thus ensuring employees follow the right processes" (Participant B8).

The internal governance process is very effective in imposing organisational values on employees, as there is an instilled belief that the board will not approve investments in coal power stations. Thus employees will support the decisions of management to invest in renewable energy technologies, as opposed to cheaper investments in coal fired power stations. This is illustrated by Participant B9: "It's cheaper to use brown coal but we are stuck. If you take it from the investors' point of view at the moment everyone is talking about GHG emissions, so executive boards are not going to let us invest in a new coal station" (Participant B9).

In summary, employee scepticism towards investments in renewable energy technologies had the potential to impair management's ability to make effective investment decisions. However, in Company B the internal governance process, which potential investments have to go through, was effective in mitigating such risks through ensuring employees make decisions that support a reduction in GHG emissions. For example, strategic parameters are implemented via the corporate governance process, to ensure that employees know what investments they can and cannot undertake. Further, if an employee breaches this corporate governance process he or she will be reprimanded, thus employees are motivated to abide by the corporate governance process. Therefore, management is able to dictate what investment projects employees work on through their ability to influence employee behaviour, via the corporate governance process. Figure 7 provides the summary findings for Company B.

Figure 7: Findings from Company B



Conclusion

In Australia, the regulatory uncertainty surrounding carbon emissions management and pricing in recent years has given rise to various strategic and risk management issues. This study offers a number of insights into the inter-relationships among organisational strategy, risk management and related MCS features within the Australian energy sector. The study specifically focuses on three key research questions - RQ1: How have entities in the Australian energy sector responded to external regulatory developments, namely the RET Scheme and the CPRS in terms of their strategic response?; RQ2: What types of internal uncertainties (e.g. financial, information processing and organisational value uncertainties) and risks have emerged as a consequence of firm response to carbon emission regulatory uncertainty? and RQ3: What types of MCS features are perceived as being important for managing such uncertainties and risks?

Data collected from in-depth interviews of managers from two large energy sector companies, i.e. Company A and Company B, provide a rich contextual background for the study. While both firms are in the electricity generation sector, Company A generates the majority of its electricity from coal, whereas Company B generates the majority of its electricity from gas (and does not own any coal powered generators).

In relation to RQ1, the strategic response by both firms appears to have been proactive. Company A is potentially exposed to a much greater level of carbon emission management risk, particularly in terms of investment risks associated with the delay in the proposed CPRS. More specifically, the financial impact of a price on carbon is perceived to have an economically significant impact on its asset valuation and financial performance. However, Company B's risk exposure is more concerned with those relating to the compliance of current and future regulation, particularly in relation to the RET scheme. The risk of non-compliance with the RET scheme has increased as a result of the recent regulatory changes that have been made to the current RET scheme. Further a proposed carbon price through a CPRS is also considered to be a critical issue. Interestingly, it would appear that Company A has undertaken a more centralised, organisation- wide proactive approach towards mitigating the financial risks associated with the introduction of a potential

price on carbon emissions. In contrast, Company B appears to have undertaken a less centralised, proactive approach towards mitigating the financial risks associated with non-compliance. Potentially there is a greater sense of understanding of the organisational value uncertainties in Company A and the MCS needed to manage such an uncertainty.

In terms of RQ2; Sinding et al (1998)'s classification of internal uncertainties provided the conceptual framework for analysis of the findings. Overall, it is clear that regulatory uncertainty and the subsequent investment uncertainty emanating from the strategic response each firm appears to have implications for the three different types of internal uncertainties: financial uncertainty, information processing uncertainty and organisational value uncertainty.
At Company A, financial uncertainty is associated with financial risks in terms of potential asset impairment, leading to financial statement loss. At Company B, financial uncertainty is more closely linked in with potential costs as a result of non-compliance with carbon emissions regulations. It also seems that in both firms the risks arising from financial risk exposure are inter-related with information processing uncertainty and organisational value uncertainty. For instance, information processing uncertainty impairs the ability of management to adequately assess the probability that a potential investment may result in an impairment loss, and concurrently there are concerns over employee support for further investment in large renewable energy technologies. Organisational value uncertainty also increases the risk exposure of Company A and B as the primary risk of such uncertainty, evident within both firms, is employee scepticism towards change and investments in renewable energy technology. This has the ability to further impair the investment decision making abilities of management, as employees at Company A appeared to be sceptical about implementing changes to the current investment decision making process. Similarly, employees at Company B appeared to be sceptical towards incorporating a price on carbon within their investment decision making process. Therefore, it is evident that information processing uncertainty and organisational value uncertainty appear to have a negative impact on the investment decision making processes of both firms.

Finally, in relation to RQ3, it appears that a variety of risk management and related MCS features are adopted in mitigating the risk exposure of firms. Some of the management control features adopted include: risk analysis based on scenario planning, linking carbon strategy with business planning, use of an organisation-wide approach where experts who had come together to form the firm's vision of climate change strategy were then de-established and their roles devolved to different business units (functioning very much as knowledge distributors), and staff training including carbon trading training. Interestingly, the interviews also suggest the use of the NGER reporting process in a diagnostic manner. NGER reporting is used by both firms, in a diagnostic manner, to enable management to effectively evaluate the outcome of a potential investment. Company A appears to use scenario planning, in a diagnostic manner, to effectively evaluate the outcome of potential investments. Therefore it appears that scenario planning and NGER reporting enable management, at Company A and B, to effectively assess the outcome of a potential investment before they proceed with an investment decision. Further MCS, that enable management to effectively gather the information required to make effective investment decisions, appear to mitigate the risks associated with information processing uncertainty. Management at Company A gathers information through flexible planning and interdisciplinary meetings, whereas management at Company B collects information through a vertical information sharing and a carbon trading system. Consequently, investment decision making processes can be improved through a reduction in organisational value uncertainty, which can be achieved through various MCS.

Company A implemented a climate change strategy, which was effective in mitigating such resistance to change. Various MCS supported the introduction and development of the climate change strategy. Interactive controls enabled organisational values and priorities to be communicated, ensuring a shared vision amongst employees. Further, aspects of the climate change strategy were embedded within performance targets to ensure that employees worked towards reducing GHG emissions. In contrast Company B utilised its existing internal governance process, which potential

investments were approved through, to mitigate such risks through ensuring employees make decisions that support a reduction in GHG emissions. For example, strategic parameters are implemented via the corporate governance process, to ensure that employees knew what investments they could and could not make. Therefore it appears that Company A overcame organisational value uncertainty through implementing a climate change strategy, which was effective in gaining employee commitment towards investments in renewable energy technologies. In contrast Company B utilised a more controlling function through the use of a structured governance process, in which investments are approved through.

In sum, the interview evidence suggests that there are substantial inter-linkages between regulatory uncertainty and the strategic response by organisations leading to a variety of internal uncertainties and risks. Evidence on the use of a variety of MCS features, both diagnostically and interactively, in supporting the management of risks as a consequence of regulatory change is a rather complex and dynamic issue. More pointedly, an important and potential policy implication of this study relates to the recently released white paper on a national Emissions Reduction Fund (ERF) scheme proposed by the Australian government. The ERF involves receiving support for direct actions or carbon reduction investments by firms from the government, and for companies to effectively participate in such a scheme there needs to be clear and comprehensive strategies around long-term investments in carbon-reduction technologies (Australian Government, 2014).

However, the study remains exploratory, and thus the following limitations of this study are apparent. The generalisability of the study remains limited. The limitations of case study research include both its dependence upon the knowledge of interviewees and the resulting lack of ability to generalise theory from the findings. Further, the responses of the interviewees may not represent the views of the companies. The time frame for the study reduced the scope of the study, as only nine managers were interviewed. Further, given that the study was focused on the MCS of both companies, a significant limitation was due to the fact that management accountants could not be interviewed, as interviews were conducted during the end of the financial year.

Nevertheless, such disadvantages are outweighed by the resulting empirical richness of the data, which also raises various issues for further study. Firstly, a similar study could be undertaken with a focus on interviewing management accountants, which would provide a more in depth understanding into the use of MCS in practise. Secondly, a questionnaire or survey could be developed to gather data from a larger population so results could be further verified and made more generalisable. In particular, the use of specific MCS features can be evaluated using more standard forms of instruments which will enhance comparability and generalisability. A third suggestion would be to examine the impact of regulatory uncertainty in relation to carbon in other industries such as transport and mining sector as business models are often industry specific.

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