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Climate change regulation: implications for business executives

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Abstract

Purpose – The purpose of this paper is to provide an overarching conceptual decision model that delineates the major issues and decisions associated with carbon regulations that will allow executives to better understand the potential regulatory schemes and implications that may be imposed in the near future.

Design/methodology/approach – The authors use the extant literature as the foundation to develop a conceptual model of the decisions pertaining to climate change regulation that face business executives today.

Findings – This paper suggests four major categories of issues that must be addressed in any climate change regulatory scheme. These include: “scope” – will carbon emission management systems be global or regional; “who pays” – will the consumer or will the supply chain be responsible for the cost of their emissions; “market or compliance-based mechanisms” – will the CO2 emissions system be market-based or a compliance-based regulatory system; and “criteria” – how can credence of the remedy be established – what is necessary for a business initiative to qualify for as a creditable carbon offset?

Research limitations/implications – This paper offers a framework that categories the fundamental decisions that must be made in any climate change regulation. This framework may be useful in advancing research into any of the four categories of decisions and their implications on commerce and the environment. This paper is designed to be managerially useful and in that way does limit its ability to specifically advance many dimensions of research.

Practical implications – The paper offers executives for a simple model of the decisions that must be made to craft an effective climate change regulatory
scheme. In addition, it suggests how these decisions may create exploitable economic opportunities for innovative and proactive firms.

**Originality/value** – This paper adds value to the debate by clarifying the decisions that must be addressed in any climate change regulation scheme.

**Keyword(s):**

Climate change; Climate change regulations; Climate change reparation scheme; Environmental regulations.

The controversy regarding the causes and consequences of global warming has emerged as one of the most significant global social, political, technological, and economic issues facing businesses today; however, there are a wide range of views on the importance of climate change. India's Environmental and Forests Minister, Jairam Ramesh, even suggested that there is a continuum of perceptions concerning the impact of human economic activities on global climates including the “climate atheists, the climate agnostics, and the climate evangelicals” (Kissel, 2010, p. A17 emphasis added). No matter what camp one is in, most firms have recognized that dealing with carbon will impact on business activities. While there is no universally accepted perspective of the causes or impacts of climate change, there is a growing tide of international mandates by the public, non-governmental organizations (NGOs), and governmental bodies to reduce CO2 emissions and that these mandates are expressed in emerging climate change regulations. This includes international treaties such as Kyoto, business-driven initiatives, and the emergence of carbon emission management systems such as the EU’s emissions trading scheme (ETS) (Egenhofer, 2007). Unfortunately, none have achieved their objectives due to the complex nature of the global climate eco-system, geo-political concerns, and economic pressures.

Clearly, organizations and households will be impacted by which ever national and international climate change regulatory policies are implemented. Like other regulatory issues, it will be useful for stakeholders, especially those who will bear the costs of addressing environmental degradation, to be proactively involved in the development of the regulatory framework (Eberlein and Matten, 2009; Porter and Reinhardt, 2007).

The fragile global economic recovery, the “failed” Copenhagen meetings, and the “climate-gate” affair in academic journals all have thrown some doubt on the “accepted” scientific body of knowledge related to climate change (Delingpole, 2009; Dyer et al., 2009). For example, Mathews (2010, p. B4) reports that steel makers have “warned that proposed limits on carbon emissions and underspending on infrastructure and energy markets could derail the
industry's nascent recovery.” The net result is a significant loss of political will and social momentum toward enacting any meaningful form of climate change legislation.

Regulatory frameworks, such as the EU's ETS, often result in huge financial challenges for organizations, but may also create significant economic opportunities for enterprising firms as new markets and technologies are created to mitigate global carbon emissions (Mathews, 2008). While there has been debate and discussion regarding alternative approaches to developing climate change regulations, there has been less discussion of the implications of alternatives in terms of business action and strategy alternatives. Rather, industry warns of a potential “climate change regulation” caused economic Armageddon and tends to ignore the economic opportunities that these regulations may offer. Informed and explicit engagement by commerce is essential for any effective regulatory framework.

The economic adjustments and potential mandated reductions in carbon production are already fuelling the hot winds of a tsunami of entrepreneurial destruction that may devastate existing markets and technologies with disruptive innovation (Rosen, 2001; Schumpeter, 1934). For better acceptance by commerce, entrepreneurial initiatives must be an outcome of any climate change regulatory scheme as Barrett (2006, p. 22) suggests:

An effective climate change treaty must promote the joint supply of two global public goods: climate change mitigation and knowledge of new technologies that can lower mitigation costs. R&D is especially needed to bring about substantial long-term reductions in atmospheric concentrations of greenhouse gases, for this will require the development and diffusion of revolutionary “breakthrough” technologies (Hoffert et al., 2002).

In some cases, these innovations are a joint activity between government and business; for example, the Australian Government has allocated more than 4.5 billion Australian dollars to:

[…] support the growth of clean energy generation and new technologies, and to reduce carbon emissions and stimulate economic activity in a sector that will support thousands of new green-collar jobs (Carr, 2009).

Other critical economic activities, from livestock production to transportation to manufacturing also generate significant quantities of CO₂, and therefore should also become more engaged in the debate regarding alternative carbon regulations (Ekholm et al., 2010).
The complexity and variation in potential regulatory approaches makes it imperative for managers to more fully understand the potential managerial implications of alternative carbon emission management systems, if they are going to be in a position to shape their development. Climate change regulations are inherently complex. Wiener (2001, p. 151 emphases added) notes that:

Climate change is complex on many dimensions, frustrating simple and hasty regulatory responses. The challenge is to design a regulatory system that matches these complex realities and thereby accomplishes cost-effective advances in global climate protection. At least three kinds of complexity confront regulatory design for global climate change: causal complexity, spatial complexity, and temporal complexity […]

More informed executives will be better positioned to proactively craft strategy. They will also be better able to influence policy formation rather than being forced to reactively respond to impending changes. By engaging in the policy formulation process, industry and academia can shape policy alternatives that improve the environment and create business opportunities (or possibly minimize negative economic impacts). The policy initiatives implemented to date have not solved the global problem of climate change, or even, sadly, reduced the speed at which environmental harm is accelerating (Botkin et al., 2007). This paper offers business decision makers a framework that categorizes the complexity of issues surrounding climate change regulation into four fundamental questions.

**The framework**

Adapted from works by Wiener (2001), Olmstead and Stavins (2006), Farber (2007) and Ramseur (2007), four fundamental issues emerge that must be addressed in every climate change regulatory scheme. These include:

*RQ1.* “Scope” – the “spatial” complexity dimension (Wiener, 2001) – will carbon emission management systems be global or regional with each region (or nation) adopting their own standards and systems?

*RQ2a.* “Who pays” – the “causal” dimension of complexity (Wiener, 2001; Olmstead and Stavins, 2006; Farber, 2007) – will the ultimate consumer be liable for the paying for the cost of carbon emitted in the supply chain (similar to a value added tax), or will each organization within the supply chain be responsible for the cost of their own CO₂ emissions?

*RQ2b.* “Who pays” – the “temporal” dimension of complexity – should the developed nations pay for the impact of their long term and historical carbon emissions – including some form of climate change reparations scheme, or
should a redemptive model, forgiving all past sins of emissions, but require all to be accountable for emission from the day the regulatory framework is enacted?

RQ3. “Market- or compliance-based mechanisms” (Olmstead and Stavins, 2006) – will the CO₂ emissions system be market-based or a compliance-based regulatory system?

RQ4. The addition of “criteria” – how can credence of the remedy be established (Ramseur, 2007) – what is necessary for a business initiative to qualify for as a creditable carbon offset?

Figure 1 shows these fundamental issues.

The specific regulatory action undertaken regarding each of the above issues can have vastly different impact on organizations. This suggests there is a strong incentive for commerce to proactively engage policy makers in the development of CO₂ regulations and standards. While some firms may see involvement in framing regulation as an opportunity to immunize themselves from excessive and costly mandated oversight (Levine and Forrence, 1990), others will take this opportunity to shape the CO₂ regulatory framework into a system that can be exploited to provide new economic opportunities and potentially create a strategic entry barrier exclude less responsive or smaller firms from competing (Eberlein and Matten, 2009; Mathews, 2008; Porter and Reinhardt, 2007; Rosen, 2001). Entrepreneurial firms will recognize and exploit opportunities that arise due to carbon regulations allowing these organizations to create new competitive market positions (Barrett, 2006; Nehrt, 1998; Orsato, 2006).

Scope and spatial concerns

Climate is a global and natural system, irrespective of national borders, and therefore international in scope; however, there has been debate regarding what level of spatial coordination of regulation is most effective and efficient. The first major issue is should the carbon emission regulations be managed at the local, national, regional, or global level (Wiener, 2001). When considering the implications of scope, it is important to consider:

- geographic domain – national, regional, or global;
- uniform or compensatory standards (where the standards could differ by country); and
- enforcement authority.
Global warming as a geo-political problem is being addressed in many ways across the world. For example, in 2009 Australia proposed, but failed to pass, legislation setting firm carbon targets whereas in 2005 the EU implemented regulations utilizing a cap-and-trade style market mechanism to manage carbon emissions (Egenhofer, 2007; Shapiro, 2007). Unfortunately, environmental systems mandate that an international approach is needed to address the global issue. A nationally based patchwork system will mean that there are greater opportunities for firms to exploit differences in regulations and engage in free riding, while not addressing the problem at the most effective level of government. Such problems have already been experienced regarding regulating other environmental issues where some firms have shifted facilities to countries that have more lax environmental standards (Nehrt, 1998).

The difference in environmental circumstances within nations and regions means that there has been extensive debate as to whether standards should be applied equally to all countries (Kissel, 2010). Some leaders, such as India's Environment Minister Jairam Ramesh, suggest that, in the name of equity, different approaches and standards must be enacted in the actual mechanics of how richer and poorer nations address climate change (Kissel, 2010). These compensatory standards would exempt some nations from any climate change regulation if they could constrain the nation's economic growth.

The global impact of climate change and the multi-national nature of commerce suggest that climate change regulations can be most effective through an internationally coordinated policy (Wiener, 2001). Because of the global nature of climate systems, carbon emissions from one region will impact climate in other regions. This issue is made more complex, as outsourcing of manufacturing from developed countries to developing nations shifts the source of carbon emissions, reinforcing the perspective that a national or regional approach is not viable for addressing carbon management (Chilton, 2000). While the Kyoto protocol set up a broad-based international scheme in 1997, it allowed each country to design its own unique program, resulting in a fragmented set of standards, definitions, and management systems (Barrett, 2006). These differences have greatly complicated the problem of climate change for policy makers, firms, and consumers. Similar to suggestions that ISO 9000 and 14000 could be adopted as international standards for quality and environmental management, it is arguably in the best interests of all parties to move towards a consistent global set of standards, definitions, and management systems for dealing with carbon emission issues (Miles et al., 1997).

*The causal and temporal dimensions of paying the cost of carbon emissions*
The question of who pays is the second major issue to be determined in any climate change regulatory framework (Farber, 2007). There is currently debate over which economic actor(s) should take responsibility for carbon emission management – governments, consumers, and/or commerce, and at which level of the supply chain should the costs of compliance be allocated? For example, should emissions be credited to the nation that produces the goods and emits the CO₂ or to the nation that consumes the goods? There is also a temporal dimension to this issue – should developed countries that produced greenhouse gases since the industrial revolution pay more of the costs of climate change (a climate change reparations scheme) than developing countries that are only now increasing their production of greenhouse gases?

The models of regulating carbon have varying impacts on who should pay. If, for example, the ultimate consumer is held responsible for the carbon dioxide released to build, transport, consume, and dispose of a good/service that he or she purchases, it might require a valued added tax (a CO₂ added tax, CO₂AT); however, a CO₂AT scheme in which the “consumer pays” may provide manufacturing firms in developing nations with little incentive to reduce their carbon emission since the cost is ultimately passed onto the consumer. An alternative “emitter pays” scheme may encourage all firms involved throughout a supply chain to leverage innovation to ameliorate their respective carbon footprints.

The European Union and Australia favour the “emitter pays” alternative in which each firm in the supply chain is held responsible for the carbon that it emits; while China (and many other developing nations such as India), favour a “consumer pays” CO₂AT (Kissel, 2010; Watts, 2009). Regardless of the approach, the questions still arises – how can an equitable system be developed that will both create incentives to reduce carbon emissions and fairly allocate the costs of carbon emissions?

The question of long-term carbon emitters (the developed nations) being required to pay reparations to less-developed nations for the negative externalities of past emissions (which still impact the global climate) has the potential to cause dramatic international political and cultural conflict. There are efficiency, social welfare, social justice, equity, geo-political, and implementation concerns with the temporal issue of reparation.

**Implementation mechanism**

The third issue pertains to the type of regulatory system enacted. While there is some general agreement that carbon emissions should be reduced, at present there is no consensus on whether carbon management should be a compliance-based regulatory system or a market-based cap-and-trade system. In general,
transparent and enforced regulatory systems that possess government coercive power can result in more immediate emission reductions, but sometimes at a high economic cost to the firm and its stakeholders, including lower returns, job loss, and diminished tax revenues (Hovi and Holtsmark, 2006). In addition, a compliance-based regulatory system is, by nature, a punitive system which tends not to create any positive incentives. Libecap (2009) suggests that a compliance-based regulatory system is also highly autocratic and the implementation might precluded firms from seeking more innovative, economical, and effective solutions to meet their emission standards by mandating specific pollution abatement technologies, thereby constraining innovation, profits, and economic growth.

In a market-based system, carbon emissions are capped for each firm, and the right to emit carbon is transformed into a marketable “property right” by a regulatory body that can allocate them (by grant or sale) to economically (or politically) significant carbon emitting firms. Excess property rights to emit CO2 are then traded in a public market that allows more efficient firms to economically benefit from their ability to create surplus carbon emission “property rights,” while other firms decide that it is more effective to buy surplus credits than invest in carbon-reducing innovations (Button, 2008). This creates an economic benefit to the carbon credit seller, often reduces the cost of compliance for the buyer, and social welfare is no worse off in terms of overall carbon production, and potentially better off in terms of economic productivity. When the price of surplus carbon credits does not fully reflect all economic and environmental costs, there may be little economic incentives for firms to invest in carbon emission amelioration technologies and processes. Firms may simply purchase carbon permits without any reduction in their own emissions. This scenario becomes more likely when a market failure results in an excess supply of carbon credits reducing their price to such low levels that it is cheaper to simply emit carbon and by carbon credits then it is to invest in emission reducing innovations (Andrew, 2008). The creation of positive incentives from innovations may be more helpful in allowing firms to gain some form of positional advantage, as these organizations identify opportunities for exploiting carbon-reducing innovations (Nehrt, 1998). The EU’s ETS is based in the “emission reduction targets” for each member nation specified under the 1997 Kyoto Protocol to create these property rights termed carbon emission allowances (EUAs) (Bushnell et al., 2009; Engels, 2009).

The industries that are awarded EUAs include the major emitters of carbon such as utilities, steel producers, and pulp and paper mills (European Commission Directorate General for Environment, 2005). The EU enforces compliance by requiring that each firm in the targeted industries self-report the amount of carbon that they emitted that year and balance these emissions with EUAs that
the firm holds (either from the allocation or purchase of EUAs from others). If a firm produces carbon emissions in excess of the EUAs that it holds, it is required to purchase additional EUAs or invest “in emission-saving projects in third countries” in the form of a “carbon offset credits,” and fined (European Communities, 2005). In this way, the EU's system not only stimulates carbon emitting firms to improve their efficiency but also creates an entrepreneurial opportunity for firms, in the EU, and other countries, to develop carbon saving innovations can be sold to firms exceeding their carbon emission targets. The EU's ETS has been so successful in managing carbon emissions using economic incentives that it has become an attractive model for a global carbon trading scheme (Egenhofer, 2007).

The EU's cap-and-trade system is designed to reduce the EU's overall carbon emissions in a cost efficient manner that encourages entrepreneurial initiatives. There are suggestions that a global cap-and-trade market-based carbon emission regulatory scheme could be developed based on the EU ETS and using international certification standards such ISO 14.064 to create a functional global market for the trading of carbon credits and positive economic incentives for firms globally to create surplus carbon credits through innovation (Egenhofer, 2007; Mathews, 2008). A global version of the ETS suggests that a firm might simply reduce the amount of carbon it emits by investing in an innovative technology or processes, or they may decide that it is more efficient to offset the excess carbon they emit by either:

- purchasing credits from others who have surplus carbon credits; or
- the purchase of some form of carbon credit or offset from others that are generating certified emission reductions (CER) credits.

In either case, total global emissions of carbon are reduced.

**The criteria for creditable CER**

Measurable avoidance, reduction, or sequestration of carbon dioxide (CO₂) or other greenhouse gas (GHG) emission. Offsets generally fall within the following four categories […] : biological sequestration, renewable energy, energy efficiency, and reduction of non-CO₂ emissions. To be considered a credible offset, the emissions reduced, avoided, or sequestered need to be additional to business as usual; i.e. what would have happened anyway (Ramseur, 2007).

The fourth and final issue of concern with regulation pertains to how can creditability be established and insured in climate change regulatory systems? To have economic value, these certified CER must meet the following broad conditions:
• *Additionality.* The reduction in carbon must be in addition to what the organization would have done without an economic market for CERs.

• *Permanence.* The CER must be a permanent elimination, sequestration, or reduction CO₂.

• *Uniqueness.* CERs may only be counted only once as an offset (Australian Competition & Consumer Commission, 2008).

For example, a forest products company could not sell CERs derived from the activity of planting trees in a commercial forest as this activity would be considered a normal business activity of a forest products firm and, therefore, fail to meet the additionally criteria. In addition, if the trees were “ever” harvested, then this activity would also fail to meet the permanence condition, as the carbon would be released back into the atmosphere after harvest. Likewise, due to the condition of uniqueness both an electric power utility that provides highly energy efficient light bulbs to all of its customers and a manufacturing plant that is a large customer of that same utility that replaces its bulbs with these utility provided high efficiency ones could not claim an offset, only one of the parties, either the utility or the manufacturer, could.

There are potentially more fundamental issues of complexity revolving around the issue of the inherent environmental value of alternative carbon offsets and savings that must also be considered. A firm can meet its carbon emission obligations by either reducing the actual carbon it produces or purchase carbon savings from others. In the first instance, there is a real reduction in the carbon being produced by organizations; however, in the latter, an organization can increase the carbon it produces, but purchase CER “savings” elsewhere through the market for carbon offsets, and still be in compliance. Four different types of carbon offsets are:

1. biological sequestration whereby trees or other biological carbon sinks are preserved or planted;
2. renewable energy projects that involve activities that undertake projects that produce energy without producing carbon (e.g. solar, wind farms);
3. energy efficiency which involves improving energy efficiency, developing environmentally responsible buildings; or switching/funding the switch to long-life light bulbs; and
4. reduction of non-CO₂ emissions from specific sources (e.g. phasing out greenhouse gasses) (Ramseur, 2007).

Recent work has even found that consumers care about how the type of carbon offset utilized (MacKerron et al., 2009). There are, of course, other details of offsets that should be considered. For example, would the location of the CER influence consumer decision making? Consumers may inadvertently assume
that the firm is investing in CERs located within their local market, which is often not the case. The world's climate system is global and high levels of CO₂ generated in one region do impact the climate in other regions. For example, tree plantations can be established in New Zealand, or Canada that could be used to “offset” CO₂ generated during the harvest of the Amazon rainforest but without considering the impact on global bio-diversity. In fact, some policy makers suggest that these other environmental externalities should not be considered in an assessment of carbon offsets (Australian Competition & Consumer Commission, 2008), and, thus, the discussion of offsets could become very narrowly defined, in regards to the broader environmental debate.

There are also issues around the temporal dimension of offsets. Some of the offsets take many years or decades to occur (in the case of a tree plantation), while the carbon emissions may take place at one point in time. The temporal and uncertain nature of the savings also means that complicated insurance arrangements need to be put in place to ensure that the offset of CO₂ actually occurs. For example, if the forests (or other biological carbon sinks) planted do not live due to harvesting, fire, or disease – then the carbon is not sequestered and another offset must be implemented.

With the development of a burgeoning portfolio of carbon saving industries, technologies and auditing/certification services to verify activities, creditability concerns have emerged on the part of regulators, NGOs and, corporations, regarding potential abuses of exuberant marketers to mislead those in the market (Australian Competition & Consumer Commission, 2008; Rosch, 2008). In addition, while a range of regulations deal with any potential misrepresentation and deception, the complexity associated with offsets means that communicating information, whether to organizations or consumers, is ripe with potential dangers and there is even scientific debate as to how one measures the carbon produced or saved (Millard-Balla and Ortolanob, 2010). Some governments have dealt with some of these complexities previously when they developed green marketing guidelines, and marketing claims related to carbon offsets should fall within the prevue of these regulations and guidelines (Weidner and Mez, 2008).

**Implications and conclusions**

There is currently a lack of information and research about the implications of carbon offsets on firm and consumer behaviour (Miranda, 2009). Most companies generally recognize the need to adapt to changes related to environmental issues. These changes are not simply seen as constraints on the market, but rather the need to consider how environmental issues can be strategically used to achieve market and environmental advantage (Crane, 2000;
Ginsberg and Bloom, 2004; Miles and Covin, 2000). Given the lack of a consistent long-term vision by policy makers regarding the issue of global warming, firms have a unique opportunity to provide input to shape regulation. This paper has attempted to illustrate the complexity and global nature of the nexus of climate change, carbon emissions, and commerce and offers a set of four fundamental questions that must be addressed in any climate change regulatory system. The paper offers a summary of the implications of various carbon emissions management alternatives in Table I.

**The regulatory scope of carbon emissions management systems**

There are clear advantages to executives in having a global carbon management system designed to ameliorate climate change:

- the physical nature of climate;
- lower cost of global compliance; and
- the credence of a global system with consistent terms and standards that consumers would understand internationally.

Climate change is a global phenomenon and if human produced CO₂ is the issue, it does not matter if CO₂ is emitted in Stockholm, Sydney, or Singapore; it will have the same effect on the world's climate. Additionally, it is much more efficient for firms to face one global carbon emission management system, eliminating the need to adapt their actions for each specific market that they operate within. Fragmented regulatory approaches may also increase consumer confusion, as they will possibly not know which set of standards apply.

The specifics of the system are important for environmental improvements and any system needs to be consistent in terms of the requirements placed on firms operating in all markets. Fragmented regional and national approaches may also result in less responsible firms moving to jurisdictions with lower standards (Eskeland and Harrison, 1997). Thus, while they would comply with their new relevant national standards, the global carbon emission improvements may be negligible, or even negative because of lower standards in the new host countries. Should international agreements on developing unified standards fail, resulting in multiple standards being implemented, then multi-national firms would be better off complying with the highest accepted standard rather than the lowest common standard of carbon emissions. While complying with the most restrictive national standard is possibly more expensive, this approach of acting beyond compliance can enhance a firm's reputation and provide the greatest level of brand protection, ultimately lower costs in the long term (Polonsky and Jevons, 2009). Additionally, these innovative firms could become leaders in the industry by setting global industry standards.
Determining who should pay

This is a very complex issue. On one hand, the more costs that can be shifted to others in the supply chain, the less this may impact on the perceived price of the good to the consumer. The major weakness of this “emitter pays” strategy is the concern by policy makers in the developing world that their nations will be charged for the carbon emitted in the production of products exported to consumers in the developed world.

Alternatively, a “user pays” CO₂AT system shifts costs to end-users (i.e. consumers who purchase and use the goods), resulting in price differences between goods that exhibit different CO₂ emission profiles. This may make a CO₂AT based “user pays” scheme an effective market mechanism that directs consumers towards lower impact consumption alternatives.

In addition, equity and social justice concerns may require that the temporal aspects of allocating the cost of climate change be acknowledged. Nations, such as those in the G-8 that have enjoyed the benefits of advanced industrial economies have also been emitting increasing amounts of CO₂ into the global atmosphere since the industrial revolution, and potentially should consider some form of climate change reparations scheme where they pay for both their historic and current carbon emissions.

The choice between a market- or regulatory-based scheme

The question of whether a carbon emission reduction system is market or regulatory based has a number of ramifications. If a regulatory system is created that mandates the technology is selected, then incremental costs associated with carbon abatement will be passed along to consumers resulting in price increases for industries that are significant carbon emitters. Alternatively, if a market-based cap-and-trade scheme is adopted, there is the opportunity for the creation of new carbon abatement technologies that result in positive economic externalities. For example, in the EU’s ETS there is an economic imperative to reduce carbon emissions through entrepreneurial initiatives and technologies that reduce carbon emission throughout the entire supply chain.

Credence and CERs

There is an assumption that for markets to operate then general information must be free and costless. In regards to carbon and climate change, while the information is possibly freely available, explaining the complex meaning of various carbon management schemes to consumers is potentially problematic (Polonsky et al., 2002). For example, in a recent study of 361 consumers, it was found that while 71.8 percent could pass a factual test on general environmental
issues (five out of eight questions correct), the majority of the same sample failed miserably on a similar test about carbon offsets. In addition, subjects having a high level of general environmental knowledge were less knowledgeable about carbon and climate change issues (Polonsky et al., 2009). Thus, the question of how firms communicate this complex environmental information about carbon emissions to consumers, whether they are final consumers evaluating firms or industrial organizations, is much less clear. One approach is through the use of global certification schemes or labels, but at present there are a multitude of alternative certification schemes for carbon offsets and no one scheme is necessarily universally more accepted than any other (Kollmuss et al., 2008).

How can consumers be expected to evaluate such complex carbon information? Some aspects of this information appear to matter to consumers (MacKerron et al., 2009). The issues of additionally, permanence, and uniqueness suggest that without a standardized system of international regulation consumer confusion may condemn any system to failure. The competition between emission schemes means variances in these emission control systems will make their assessment by consumers more difficult. Some managers unfortunately will see this as an opportunity to “spin” any corporate action into an environmental and carbon reduction benefit through “green washing.” This potential for miscommunication resulted in the early failures in green marketing, and without some consistent globally recognized meaning, may occur with the communication of CERs (Mohr et al., 1998).

By addressing the implications of these issues on organizational strategy, academics and managers will be able to ensure that organizations are able to respond to regulation as it is developed, as well as to participate in the discussions thus shaping regulation that creates sustainable environmental and business outcomes.
Figure 1 The four questions of climate change regulations and implications

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<th>Positives</th>
<th>Negatives</th>
<th>Positives</th>
<th>Negatives</th>
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<tbody>
<tr>
<td>Local</td>
<td>Fragmented nature means multiple systems, thus creating confusion in the market, higher compliance costs, as well as the ability to relocate to seek minimum standards.</td>
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| Global    | Potential to adopt a minimal standard due to political pressure from high-emitting markets, which may have difficulty in meeting higher standards.
| Local     | Limited implementation costs, or cost increases could drive innovation. |
| Global    | A CO2 AT shifts costs to the user and possibly will motivate more direct behavioral change. |
| Local     | Allows more direct control on activities associated with carbon production. |
| Global    | Market forces direct environmental improvement as well as stimulate innovation. |

Table 1 Summary of issues

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<th>Positives</th>
<th>Negatives</th>
<th>Positives</th>
<th>Negatives</th>
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<tr>
<td>Local</td>
<td>If fines for not meeting standards are too low, there will be limited motivation to implement change.</td>
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</tr>
<tr>
<td>Global</td>
<td>Small changes to the consumer level will be less as standard costs will be high implementation costs.</td>
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</tr>
<tr>
<td>Local</td>
<td>May provide a promotional advantage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global</td>
<td>Costs for the right to emit CO2 may be artificially too low and simply encourage firms to purchase credits.</td>
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References


European Communities (2005), EU Action Against Climate Change: The EU Emissions Trading Scheme, European Commission, Brussels, .


Rosch, J.T. (2008), "Responsible green marketing", paper presented at the American Conference Institutes Regulator Summit for Advertisers and Marketers, June 18, .


Watts, J. (2009), "Consuming nations should pay for carbon dioxide emissions, not manufacturing countries", *The Guardian.co.uk*, Environment, March 17, .


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