Climate Change and Corporate Environmental Responsibility

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Abstract

Climate change, as an international environmental issue, is getting a lot of attention. The negative effects of climate change have become one of the most talked about issues among Governments, scientists, environmentalists and others. It is said that business activities are affecting the climate negatively. In order to minimize the negative effects of climate change, the activities of the businesses should be controlled and encouraged to perform in a socially responsible manner. The article focuses on the responsibilities and the responses of businesses on climate change issues. The article first highlights on two prominent issues: Corporate Social Responsibility and Corporate Environmental Responsibility. Then the article introduces climate change as an international environmental concern. Then, by going through several published literature, the article highlights various responsibilities of business towards climate change issues. The article also highlights the several strategies the businesses are following to respond to the climate change issues.

Introduction

Any business is a social unit. It is said that business and society have a symbiotic relationship. On one hand, businesses help society by creating employment and providing better products or services to the people of the society and thus increasing the quality of the life of the people. On the other hand, society also supports the businesses by providing them with various resources (raw materials, labor and many other inputs) for their development and survival. As a part of the society, business has to deal with the people of the society and generate profit out of the resources provided by the society.

As businesses cannot survive without the help of the society, they have to fulfill the expectations of the society. Business should not do any harm to the society through their activities and in order to survive, they will have to give importance to the changing needs and values of the people in the society (Krishnan, 1977). It is now said that today a business lives in a 'glass house' and that is why a business has a greater 'public visibility' (the extent that an organization's activities are known to the persons outside the organization) in comparison to other institutions in the society (Davis, 1975). Now, the society is becoming interested to know the activities of business and the growing popularity of 'social welfare' is also compelling the businesses to perform social responsibilities (Hossain, 2004).

In the business literature, the issues like 'corporate citizenship' and 'corporate social and environmental responsibility' are not new anymore. According to Carroll (1977), innumerable managers and organizational theorists are in agreement that the radical and sweeping changes which are altering the contemporary social fabric have had a myriad of effects on business organizations. A growing body of literature in the field of business highlights the fact that an increasing number of corporate managers are accepting the need to serve society in ways that go well beyond the performance of a narrowly defined economic function (Buehler and Shetty, 1977; Monsen, 1974; Rockfeller, 1974, Committee of Economic Development, 1971).

There remained a continuous debate among the researchers, academicians and professionals on what should be the scope of corporate social responsibility. One of the most prominent views was that of Friedman (1970). According to this view, there is one and only one social responsibility of business and that is to use its resources and engage in activities designed to increase profits so long as it stays within the rules of the game, which means, remaining engaged in open and free competition without deception or fraud. Wheelen, Hunger and Rangarajan (2004) explained Friedman's view by saying: a businessperson who acts responsibly by cutting the price of the firm's products to prevent inflation or by making expenditures to reduce pollution, or by hiring hard-core unemployed, is spending the shareholder's money for a general social interest. Though this remained a prominent view in the business literature, later, some other views also got popularity. For example, Carroll (1979) did not support this view in total. Carroll's view extended the responsibility of the business beyond only economic responsibility. According to Carroll, the managers of business organizations have four responsibilities

and these are economic, legal, ethical and, discretionary. Firstly, Carroll identified the economic activities as the 'must do' activities. That is, businesses must produce goods and services of value to the society so that the firm can repay its creditors and shareholders. Then come the legal activities that are characterized by 'have to do' activities that are related to Government laws that management is expected to obey. After that, there comes the ethical activities or 'should do' activities that include following the generally held beliefs about behavior in a society. Lastly, there are some discretionary activities that an organization 'might do'. These are purely voluntary obligations a corporation assumes (Examples are philanthropic contributions, training the hard core unemployed, and providing day care centers). Another author, Frost (2001) argued that companies have two kinds of responsibility - commercial and social. On one hand, commercial responsibilities involve running a business fruitfully, breeding profit and satisfying shareholder expectations. On the other hand, social responsibilities involve taking on responsibilities as an actor in the society and the community by engaging in activities that go beyond making a profit - such as protecting the environment, looking after employees, addressing social issues, and being ethical in trade.

Just like the debate on the scope of the social responsibility activities of businesses, there are also some prominent arguments on whether business should be allowed to perform social responsibilities or not. Davis (1977) compiled several views in favor and against corporate social responsibility.

Davis (1977) presented several arguments in favor of the social responsibility activities. Some of these arguments are discussed here. Firstly, it is mentioned that, the firm which is most sensitive to its community needs will as a result have a better community in which to conduct its business and it is argued that 'a better society produces a better environment for business'. Secondly, as social goals are now a top priority with members of the public, the firm which wishes to capture a favorable public image will have to show that it also supports the social goals. A good public image may help a firm to get more customers, better employees and other benefits. Thirdly, the businesses should maintain the socio-cultural norms. The businessmen are operating under a set of cultural constraints in the same way that any other individual in the society is doing. If the society shifts toward norms of social responsibility as it is now doing, businessmen should be guided by those norms also. Fourthly, it is said that as many other institutions have failed in handling social problems, and as many people are frustrated with the failure of other institutions, why not turn to business now and 'let business try'. Fifthly, it is argued that as businesses have valuable resources which could be applied to social problems, society should use them.

Davis (1977) combined several arguments against the thought of businesses performing social responsibilities. Firstly, it is argued that social involvement may become costly. If businesses are pushed into social obligations, these additional costs may result in economic impotence of business. Secondly, many businessmen may lack the perception and skill to perform social responsibilities. They might also be philosophically and emotionally unfit for the job. Thirdly, it is argued that involvement in social goals might dilute business' emphasis on economic productivity. Fourthly, it is said that businesses already have enough social power and the society should not take any steps which would give it more power. If the business performs both social and economic activities, this might result in excessive concentration of power. Lastly it is argued that businessmen have no line of responsibility to the people, and therefore, it would be unwise to give businessmen responsibilities for areas where they are not accountable.

Whatever may be the issues of debate, the fact is that, the businesses in the world are trying to perform social responsibility activities. Businesses are trying to move forward from just an economic view of operations. This recognition of social responsibility issues from the part of the business world can be explained by a well-renowned theory called 'legitimacy theory'. This theory asserts that organizations continually seek to ensure that they are perceived as operating within the bounds and norms of their respective societies, that is, they attempt to ensure that their activities are 'perceived' by outside parties as 'legitimate' (Deegan and Unerman, 2006, p. 271). So, by performing social responsibility activities (in many cases on a voluntary basis), the organizations actually seek for the legitimacy of their existence in the eyes of the society. For any company, giving a high priority to social responsibility issues is no longer seen to represent an unproductive cost or resource burden, but, increasingly, as a means of enhancing reputation and credibility among stakeholders - something on which success or even survival may depend (Holme and Watts, 2000).

The issue of 'social responsibilities of business' has got immense popularity over the last few years in several economies. As a consequence, the companies have picked up wide-ranging exercises that cover different levels of activities that have an effect on corporate governance, employee relations, supply chain and customer relationships, environmental management, community involvement as well as key business operations. Corporate responsibility covers a number of aspects of the dealings of the business. Skinner and Ivancevich (1992) argue that consumers, special interest groups, and the general public are aware of business' impact on the society and demand firms to do more than try to create profit, and as a result, at present, nearly all managers view social responsibility as a required duty of doing business. They also comment that business organizations have an impact on consumers, employees, the environment and on those who invest in the firm.

Corporate Environmental Responsibility (CER):

Among these several issues, environmental responsibility is getting huge attention over the last few years. Environmental protection, along with the related costs, revenues and benefits, is of increasing concern to many countries and organizations around the world (Jasch, 2009, p. xxi). Corporate Environmental Reporting (CER hereafter) as a part of Corporate Social Responsibility

has drawn immense attention from the part of researchers, academicians, professionals and activists:

> "In the past two decades, CER has changed and continues to rapidly evolve to keep pace with new markets in the global economy. Several forces are driving the evolution of CER, including consumer activism, shareholder and investor pressure, and competitive advantage (Jamison, et al, 2005)."

Protecting the environment from pollution and maintaining an ecological balance have become burning questions these days. Several Governments, policymakers, and environmental activists are working hard to mitigate the environmental problems worldwide. Preventing land, water and air pollution, conservation of energy, protecting plant and animal resources, finding solutions to the problems caused by global warming have become the most talked about issues these days.

Almost from the beginning of this movement, businesses were blamed for the environmental pollution. In the process of producing products, businesses have to go through manufacturing processes that may result in emitting harmful gases in the air, throwing effluents in land and water and thus creating air, water and land pollution. Though environmental pollutions are created by the individuals and other social institutions also, as businesses have a greater public visibility than any other institutions in the society, they were highly targeted mainly by the several environmental activist groups of the society. As a result, the demand for environment friendly manufacturing processes, environmental audits, environmental management accounting and environmental reporting increased day by day.

In order to meet the social expectations, business organizations tried to include all these matters in their activities. But these actions created a dilemma all over. Because of the introduction of environment friendly manufacturing processes and environmental audits, the cost of production increases by a good proportion and as a result, prices of the products also increase. Historically the usual assumption among most of the managers has been that improving environmental performance represents only extra costs for the organization with no corresponding benefit other than to ensure compliance with laws and regulations and thus avoid possible precaution or fines (Schaltegger et al, 2008). But over the years, several researches and case studies have shown a different picture which is a bit different than this usual assumption. Many company examples have shown that adopting environmental protection measures can often substantially reduce costs and a growing number of companies have demonstrated the potential to reduce both their costs and their environmental impacts at the same time (Schaltegger et al, 2008). Thus, these days, transnational companies turn their attention to environmental issues in a more coherent and active manner than was previously the case (Perry and Singh, 2001).

Business organizations respond to environmental challenges because of three motives: to gain strategic advantage; to avoid strategic disadvantage and to act responsibly (Eden, 1996; Bansal, 1997; Perry and Singh, 2001). In terms of getting strategic advantage, it is said that being environmentally cleaner can bring cost savings and pollution prevention can pay through saving resources, recycling materials at a lower cost than using new materials, and reducing clean up costs (Perry and Singh, 2001). Moreover, recently it was noticed that, here is a budding market for environmentally friendly products. Companies often adopt environmentalism to avoid strategic disadvantage:

> "They may, for example, attempt to match the behavior of competitors, in order to avoid placing themselves at a strategic disadvantage. This disadvantage may be a loss of market share if the strategies of competitors prove effective, or it may be a loss of reputation or standing. The impact of poor publicity can be seen in the reaction of individual company share prices to good and bad environmental news… Corporations often view environmentalism as a means of deflecting or preempting new legislation, which is seen as detrimental to market advantage. To deter demands for legislation, TNC (Transnational Companies) self-regulation needs to attain a high degree of credibility (Perry and Singh, 2001)."

Other than these, organizations are finding not becoming environmentally conscious can act as a legitimacy threat for them. Environmentally sensitive business organizations are facing new demands to demonstrate their legitimacy as their global reach increases (Grolin, 1998; Rodgers, 2000; Perry and Singh, 2001). So, they are almost becoming bound to act responsibly.

Over the years, the world is being challenged by new environmental problems and these newer issues are affecting the business world with the social demand for being more environmentally responsible. Among all the environmental issues, the issue of global warming and climate change is getting high significance from different parties at this moment. Again, businesses were blamed because of their contribution to climate change and the environmental degradation. New responsibilities were assigned on the business world.

Climate Change as an International Environmental Issue:

There is no doubt that the earth is getting warmer and the weather pattern is getting more unpredictable and according to most of the scientists, the reason that is mostly acting behind this is the concentration of Greenhouse Gases (GHGs hereafter) (Schultz and Williamson, 2005). The most important of these GHGs is carbon dioxide. This gas is emitted into the air mainly when fossil fuels like oil, natural gases, coal etc. are burnt.

Other than carbon dioxide, the other GHGs include methane, chlorofluorocarbons, nitrous oxide, aerosols etc. The main sources of GHGs are (Rahman, Robins and Roncerel, 1998) - see Table 1:

From this table, it can be said that industrial production and business activities generate a good amount of these GHGs. As these gases are harmful for

GHG	Source
Carbon Dioxide	The two main sources of the increase in atmospheric Carbon Dioxide are the combustion of fossil fuels and land use changes; cement production is a further important source. This gas is released every time fossil fuel is burnt to obtain energy.
Methane	Methane is produced from a wide variety of anaerobic (i.e., oxygen deficient) processes with emission from both natural sources and human activities. Anthropogenic sources seem to account for about two-thirds of the total emissions. A good amount of methane results from human activities of fossil origin, largely from coal, oil and natural gas industries. Rice agriculture, biomass burning in tropical and subtropical regions, enteric fermentation in ruminant animals, animal and organic domestic wastes in landfills also release methane.
Chlorofluorocarbons (CFCs)	CFCs are used in various forms in refrigerators and air conditioning units, as aerosol propellants, as solvents, and as foam blowing agents. Unlike other GHGs, they are not produced naturally and their presence in the atmosphere is due solely to industrial production, which started in 1930s.
Nitrous Oxide	This gas is produced as a result of microbial activity in the soil. Its rate of release is accelerated if mineral fertilizers containing nitrogen are used in agriculture. It is also released by fossil fuel burning and nylon production.

Source: Rahman, Robins and Roncerel (1998)

Table 1: Sources of GHGs

the environment, a control on their emission has become imperative:

" The earth is warming and scientists are increasingly confident that this is due to the rise in man-made greenhouse gas emissions caused by industrialization. Higher temperatures are leading to widespread melting of snow and ice, and rising sea levels. Their effects can be felt in changing global climate, whether as increased rainfall and more frequent storms in some parts of the world, or more intense and longer droughts in others. Continued emissions at or above current rates will cause more warming and bigger climate changes in the years ahead. The impact on fresh water access, food production and health will vary across the globe, but is likely to be destructive and to grow over time. (CBI, 2007)."

GRI & KPMG (2007) reveal the disasters that will be caused by the climate change as follows:

"The potential economic impacts of climate change were brought into sharp focus in late 2006 with the publication of the Stern Review on the Economics of Climate Change. The report states that our actions over the coming few decades related to climate change could create risks of major disruptions to economic activity, and that costs of extreme weather alone could reach 0.5-1% of world GDP per annum by the middle of the century. The report states that at higher temperatures, developed economies face a growing risk of large-scale shocks, and provides examples such as increasing hurricane speeds, floods, heat waves and costs of insurance. It warns that if climate change is not addressed, it could create risks of major disruption to economic activity on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century."

The United Nations' Framework Convention on Climate Change (UNFCCC, 1992) had the following objective:

"…stabilization of green-house-gas concentrations in the atmosphere at a level that would prevent dangerous atmospheric interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner".

Over last few years, climate change, as an international environmental concern, has radically attracted business attention. This awareness among the corporate world mainly started after the adoption of the Kyoto protocol in 1997 (Grubb, et al, 1999 and Kolk and Pinkse, 2004). Kyoto Protocol is an international voluntary agreement signed by 141 countries of the world. These countries include the European Union, Japan and Canada and the agreement aims at reducing GHG emission by 5.2% below 1990 levels by 2012. Most environmentalists see the Kyoto Protocol as the last best hope to counter global warming (Ruiz-Marrero, 2005). The Kyoto Protocol suggested three separate market-based mechanisms that assist the countries to achieve the targets: Clean Development Mechanisms (CDM), Joint Implementation Projects (JI) and Emissions Trading .

Among these three, the issue of emissions trading got attention in the business world. The Kyoto Protocol establishes a legally binding obligation for industrialized countries to reduce their emissions of GHG and in order to do this, emissions are to be reduced in aggregate by at least 5% below 1990 levels by 2008-2012 (International Energy Agency, 2001). The protocol embraces a number of flexibility mechanisms, including a system of international emissions permit trading and various credits for the international transfer of clean (low-carbon) technologies (Goulder and Nadreau, 2002). Egenhofer (2007) comments that emission trading is likely to be a crucial pillar of future climate change policy. According to UNEP Finance Initiatives (2004):

> "Under International Emissions Trading, industrial countries can trade part of their emissions budget, known as Assigned Amount Units (AAUs), which will be allocated to the Kyoto Protocol signatory states. A party with high marginal costs of reduction can acquire emission reductions from another party with lower costs of reduction. This helps both the buyer and the seller reduce their emissions at minimal cost. Legislators implement emission reductions by decreasing the number of certificates available in the market. This provides incentives for companies to invest in emission abatement technologies. In principle, this trading regime applies to nation states, although the participation of companies is not entirely excluded."

Actually, a central authority (mostly a Governmental authority) signifies a limit, usually called cap, on the amount of a pollutant that can be emitted. Companies or other groups are given 'emission permits' that indicate allowances (or credits) which signify the entitlement to release a specific amount of pollutants. The entire amount of allowances and credits cannot go beyond the cap. Companies that are required to emit more pollutants than their credit need to buy credits from those who pollute in a lesser amount. So, it can be said that after the introduction of 'emission trading', businesses are facing a new challenge that is to be faced by them strategically.

Moreover, the awareness on climate change issues among the investors and other stakeholders has also increased these days. Kolk and Hoffmann (2007) cited an example by extracting news from the Financial Times published on 24 May, 2007. This was related to Exxon-Mobil and it says that the US and the European institutional investors led a charge to oust an Exxon-Mobil board member for 'inaction' on climate change.

The United Nations Climate Change Conference of 2009 known as the Copenhagen Summit was held in Denmark from 7 December to 18 December and this summit ended up with lots of questionable unresolved matters. Developed and highly industrialized countries were blamed by a lot of activists for harming the climate to a greater extent and not helping in the GHG emission reduction movement.

A few months before the Copenhagen summit, the global business leaders presented "The Copenhagen Call" at the end of the World Business Summit on Climate Change on May 26. The objective of the World Business Summit on Climate Change, Copenhagen was as follows:

> "The goal of the Summit is to demonstrate how policy, coupled with innovative business models, can drive a sustainable transformation of the economy and stimulate job creation and low-carbon solutions." (Found in the summit brochure in http://www.copenhagenclimatecouncil.com/world-business-summit.html)

In the official web site of the Copenhagen Climate Council, a comment made by Connie Hedegaard, Minister of Climate and Energy, Denmark draws attention:

> "We, the politicians of the world, have a responsibility to reach a truly global climate change agreement in Copenhagen in December 2009. But it is the business society that can deliver the tools to turn our vision into reality. Businesses can provide the clever solutions to make it possible to live in both a modern and sustainable society." (Found in http://www.copenhagenclimatecouncil.com/world-business-summit.html)

From various research results, it was found that the industrial sector emits a good amount of GHGs in the air. Data from IPCC Fourth Assessment Report of 2007 reveals that electric generation, industrial processes and transportation account for more than half of the planet's GHG emissions (Southworth, 2009):

IPCC Fourth Assessment Report of 2007 data also reveals that transportation fuels, fossil fuel retrieval, processing and distribution, industrial processes and power stations account for 80% of the carbon emissions (Southworth, 2009) - see Table 2.

IPCC Fourth Assessment Report of 2007 data also reveals that transportation fuels, fossil fuel retrieval, processing and distribution, industrial processes and power stations account for 80% of the carbon emissions (Southworth, 2009):

The Copenhagen Summit got huge media attention all over the world. As a result, there grew a consciousness on the negative effects of climate change among the people of the world. From the data presented in Table 3, it can be

Sector	GHG Emission (%)
Agricultural Bio products	13
Fossil fuel refining, processing and distribution	11
Residential and commercial	10
Land use	10
Transportation fuels	14
Industrial processes	17
Power stations	21
Waste treatment and disposal	4

Table 2: GHG Emission by Sectors

Sector	Carbon emission (%)
Fossil fuel retrieval, processing and distribution	12
Residential and commercial	14
Transportation fuels	20
Industrial processes	22
Power stations	32

Table 3: Carbon Emission by Sector

understood very clearly that businesses are affecting climate to a greater extent. The public consciousness has again thrown a huge range of challenges on the activities of the corporate world.

Business Responsibilities and Responses to Climate Change:

Over the last few years, climate change, as an international environmental concern, has radically attracted business attention. It is because climate change poses strategic dilemmas for companies across a range of industries, affecting those that produce fossil fuels (e.g., oil, utilities), depend on these fuels directly (e.g., chemicals, airlines) or indirectly (automobile and aircraft manufacturers), and those that want to develop new market opportunities arising from risk coverage or emerging emission trading systems (e.g., banks and insurance) (Kolk and Pinkse, 2004).

After the Kyoto Protocol meeting, a good number of big multinationals concentrated highly on influencing (both from an individual level and from business association level) their government's position on international climate treaty and emission reduction policies (Kolk and Pinkse, 2004). Kolk and Pinkse (2004) mention that:

> "Compared to 1997, when the discussions on the Kyoto Protocol were taking place, and doubts about the science and feasibility of climate measures played a large role in the public debate, this really represents a salient change. In the current situation, the market benefits receive considerable attention and there is an overall interest on the part of investors to not only minimize the risks associated with climate change but also seek the opportunities.

As discussed previously, as the issue of climate change got immense attention from the part of the world media and different research results identified the activities of the businesses as one of the most significant reasons of climate change and environmental degradation, the businesses around the globe were attacked with legitimacy threat. Moreover, the Governments of different countries are also taking this issue as a burning question. As a result, the corporate world started to take this issue seriously:

> "Many businesses have taken steps to reduce greenhouse gas emissions voluntarily. Many are taking into account some of the impacts of climate change-potential state and federal regulations, shareholder perceptions, and changes in consumer and supplier markets, for example, on the cost of doing business now and in the future. Fewer businesses, however, are incorporating the risks and opportunities associated with the physical effects of climate change in their business planning (Sussman and Freed, 2008).'

For the business world, two of the very prominent topics that came into existence after the climate change issue became a burning question are:

a. **The issue of Cleaner Production (CP),**
   and,
b. **The issue of environmental reporting,**

CP can be described as a preventive, integrated strategy in which costly end-of-pipe pollution control systems are replaced by measures which reduce and avoid pollution and waste throughout the entire production cycle, through the efficient use of raw materials, energy and water (Schaltegger et al, 2008). According to Schaltegger et al (2008), the main objectives of CP are to:

a. Minimize the use, as well as optimize the reuse and recycling, of hazardous and non-hazardous materials.

b. Use materials in the manufacturing process in a more efficient way, reducing the amount of inputs needed and the amount of non-desired output.

c. Minimize risks and improve human capital through worker hygiene and safety programs.

d. Improve monetary returns by minimizing energy consumption and reducing material and handling costs. This may often require capital investment.

CP can play a crucial role in achieving eco-efficiency and CP represents not merely a technical solution for the production department, but also an internal corporate strategy which requires all decision-makers in a company to assess the potential to adopt cleaner technologies and techniques in all parts of the organization (Schaltegger et al, 2008; Yacooub and Fresner, 2006).

The matter of environmental reporting is also gaining attention these days. As the issue of climate change is getting attention from different parties, it may act as a legitimacy threat for the organizations. The emission of GHGs creates problem in the natural environment and thus the people in the society are harmed. Thus it creates a 'threat' for the organization's survival (or it acts as a legitimacy threat). Threats to an entity's perceived legitimacy are predicted to lead to responsive actions by management who will try to minimize such impacts of legitimacy threats and one of these minimizing strategies is the disclosure-related strategies (Islam and Deegan, 2008 and Woodward et al, 1996). Disclosure can be a solution to overcome the legitimacy threats:

> "….a firm may provide information to counter or offset negative news which may be publicly available, or it may simply provide information to inform the interested parties about attributes of the organization that were previously unknown. In addition, organizations may draw attention to strengths, for instance, environmental awards won, or safety initiatives that have been implemented, while sometimes neglecting or downplaying information concerning negative implications of their activities, such as pollution or workplace accidents." (Deegan and Unerman, 2006, p.274).

Deegan, Rankin and Voght (2000) showed that companies did appear to change their disclosure policies around the time of industry related major events. Deegan, Rankin and Tobin (2002) identified positive correlation between media attention for certain social and environmental issues and the volume of disclosure on these issues. So, it can be expected that the companies will disclose more about GHG emission issues in order to reduce the legitimacy threat.

Though still there is no important law regarding the disclosure of climate change issues in the annual reports; there are growing concerns about this issue. Feichtner (2009) comments in respect of the US context that:

> "Securities law requires publicly-traded companies to report material risks. Does the Securities Exchange Commission (SEC) currently stipulate that material climate risks be disclosed under existing law? No - at least not yet. Should publicly-traded companies evaluate whether climate change is reasonably likely to impact their future financial performance? Yes - especially as the Obama administration attempts to position the U.S. for a low-carbon future. While the SEC has yet to draft specific guidelines for assessing and measuring climate-related issues, companies can perform a basic assessment of the environmental risks and opportunities that could materially affect their operations."

Sellers, Strait and Thrower (2009) found a sign of increasing climate change disclosure by the US companies:

> "Climate change disclosure practices of U.S. public companies have been gradually changing over the past several years. Possible explanations include the increasing likelihood of national regulation of greenhouse gas (GHG) emissions, and growing attention to the topic by investors and the media. Another influence may be the insurance industry, which at the prompting of its regulators, is planning to seek information on this topic from its customers and investees."

O'Riordan (2000) suggested the following actions in relation to the climate change issue, from the part of the businesses:

- Businesses should develop their own view on the accuracy and reliability of the science, and the significance of the "best guess" predictions.
- Businesses should create their own response through the inventory of greenhouse gas emissions and set clearly defined emissions reduction targets.
- Businesses should commit a range of in-house efficiency options plus scope for trading carbon permits, jointly implementing carbon reducing schemes, and building in a business opportunity for renewables and energy servicing.

The evidence suggests that despite the absence of enough legislation and regulations from the part of the governments of the world, corporations are trying to respond to the climate change issues and are behaving in a responsible manner in many ways. Using empirical information from the largest multinational companies worldwide, Kolk and Pinkse (2004) identified that corporations are taking several kinds of actions on climate change. These actions include strategies like target setting,

Sector	N	Target setting (%)	Process improvement (%)	Product Improvement (%)	Supply chain (%)	Market Mechanisms (%)	Partnerships (%)
Automotive	4	100	100	100	100	25	75
Chemicals and synthetics	7	57	100	86	57	0	29
Communications and media	9	56	89	44	78	11	33
Electronics and computers	16	69	56	56	81	13	50
Finance and securities	21	48	57	5	52	14	33
Food and beverages	9	89	89	44	78	22	33
Insurance	8	50	75	0	50	25	13
Metals and manufacturing	6	83	83	83	100	50	33
Mining	3	100	100	67	100	0	33
Oil and gas	5	60	100	100	40	40	60
Pharmaceuticals	10	80	90	20	70	0	40
Utilities	13	69	54	31	31	31	69

Source: Kolk and Pinkse (2004)

Table 4: Corporate Actions on Climate Change per Sector

process improvement, product development, supply chain measures, market mechanisms and partnership. Organizations set several kinds of targets in order to respond to the climate change issues. Target setting includes targets to reduce or stabilize GHG emissions or to diminish energy consumption. Organizations are also trying to respond to climate change issues by process or product development. They are trying to develop improved energy efficient products. The process improvement is mainly targeted towards energy efficiency improvements. Process improvement activities are also directed towards the reduction of carbon dioxide emission. Many companies try to integrate GHG emission issues in the design phase of their products.

Corporations are trying to consider emissions of their supply chain also. Many companies select their suppliers based on their environmental programs. Many companies expect their suppliers to have the same environmental standards. Companies, now, are also able to achieve GHG emission reduction in cooperation with other companies or Governments either by trading emission credits or by a partnership in an offset project. The research of Kolk and Pinkse (2004) shows the following corporate actions on climate change per sector (see Table 4 above):

Southworth (2009) found several voluntary actions in response to the climate change issues from the part of the American corporations:

a. Some American corporations have voluntarily agreed to participate in annual reporting of GHG emission and pledged to reduce overall carbon footprints.

b. Corporate boards and oversight committees have adopted corporate sustainable development plans and climate change mitigation strategies.

c. American corporations are investing in research and development of green energy technologies and climate friendly industrial processes. They are searching for inefficiencies in resource use.

d. Corporations are also developing green products to satisfy a growing consumer base and are preparing for shifts in public perception of environmental responsibility.

e. But it is important to understand that these developments have occurred in a context where regional and international mandates are also affecting corporate actions.

Southworth (2009) also mentions:

"Forward thinking corporations see both the opportunities and risks presented by climate change. The opportunities include bottom line improvement through efficiency and alternative energy supply, reduced petroleum dependence and a more reliable energy market, boosting shareholder and investor confidence, preventing or preparing for the physical effects of climate change, improving industry reputation, access to new markets, lowering insurance costs and preparing or preempting restrictive carbon emission legislation. The risks include inefficient business models, uncompetitive products and industrial processes, a fluctuating energy market, loss of institutional investors and

shareholder support, liability for contribution to climate damage, physical impacts of climate change, a bad reputation in the market's consumer base, and high insurance costs."

Southworth (2009) also found that the rise in global energy costs and increasing consumer demand for sustainable energy are making energy efficiency and renewable energy sources more attractive to corporations that depend on inexpensive energy for production and transportation of goods. It was found that increased involvement in renewable energy projects and investment correlated with industries that are already subject to regulation or that are predicted to be subject to regulation in the near future. A good number of automobile companies were found to be developing their products in an environment friendly manner (General Motors, BMW, Chrysler etc.).

Conclusion

From the discussions of this article it can be said that there is no doubt of the fact that business activities are affecting the environment a lot and thus contributing negatively toward climate change. As a part of society businesses have to respond to climate change issues in a responsible manner. Thus, businesses should perform their activities in a way that does not harm the environment. Moreover, if their activities harm the environment, they must compensate society for that. As, these days, there is a continuous demand from the various pressure groups for making the businesses behave in a responsible manner, businesses are challenged with a new kind of burden. Performing activities in an environmentally friendly manner involves more rigorous planning, difficult activities to perform and huge cost. This can affect the financial performance of the businesses negatively. But as the businesses will have to perform their activities in the society, they must meet social expectations and behave in an environmentally responsible manner. That is why, although still there is not much effective regulation to control and guide the activities of businesses in order to reduce the negative effects on climate and environment, businesses of the world are trying to behave in a responsible manner. In many cases it was also seen that business are thinking that behaving in an environmentally responsible way can help them to generate a good image in the eyes of the public.

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