



Government Policies and Business Practices in Support of Low Carbon Economy in India

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Abbreviations

AIR	All India Radio
BEE	Bureau of Energy Efficiency
CDM	Clean Development Mechanism
CEE	Centre for Environment Education
CEMDE	Centre for Environmental Management of Degraded Ecosystems
CER	Certified Emission Reductions
CES	Centre for Ecological Sciences
CFL	Compact Fluorescent Light Bulbs
CNG	Compressed and Natural Gas
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
DAVP	Directorate of Advertising and Visual Publicity
ECBC	Energy Conservation Building Code
EIA	Environment Impact Assessment
EMS	Environment Management System
ENVIS	Environmental Information System
FMCG	Fast-moving Consumer Goods
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
GoI	Government of India
IDC	Indian Driving Cycle
ILTD	India Leaf Tobacco Development
INCCA	Indian Network on Climate Change Assessment

IOC	Indian Oil Corporation
IPR	Intellectual Property Right
IREDA	Indian Renewable Energy Development Agency
ITC	Indian Tobacco Company
LPG	Liquefied Petroleum Gas
MoEF	Ministry of Environment and Forests
MT	Metric Tonne
NA	North America
ONGC	Oil and Natural Gas Corporation
PAT	Perform, Achieve and Trade
PPP	Public Private Partnership
PUC	Pollution under Control
R&D	Research and Development
RTI	Right to Information
SACEP	South Asia Cooperative Environment Programme
SEZ	Special Economic Zone
SIPS	Special Incentive Package Scheme
TERI	The Energy and Resources Institute
TSRDS	Tata Steel Rural Development Society
UNEP	United Nations Environment Programme
VERs	Verified Emission Reductions

Abstract

This report is an attempt to summarise both government policies and business practices to facilitate a low carbon economy in India. Such summarisation is done in the context of Indian needs, thus helping to arrive at a comprehensive overview of gaps between requirements and existing provisions. The outline of the report is as follows:

Section I describes the rationale behind the promotion of a low carbon economy in India; the official institutional set up that is responsible for such promotion; and the regulations, policies, schemes and norms and the associated channels of communication which provide the necessary means in that regard.

Section II elaborates on the efforts of business to usher in a low carbon economy in India and analyses these as responses to the institutional environment described in the last section.

Section III examines the implementation of key procedures such as emissions reporting and accounting by business, which help entrepreneurs and other interested stakeholders to evaluate the success of the efforts mentioned in the previous section.

Section IV discusses the cases of four companies which have undertaken significant efforts to lower carbon emissions from their business activities.

Section V concludes on the basis of observations made in the preceding sections.

1

Introduction: Rationale and Institutional Set-up

The Indian economy has been characterised by a rapid rate of annual growth of gross domestic product (GDP), exceeding six percent in the last two decades. Despite the short run effects of the recent global recession, projections underline that such rapid growth is extremely likely to continue for quite some time. Indeed, the current income profile of the population implies that such growth needs to continue at the present rapid pace, given the current low level of per capita income (PCI) in India and the large incidence of poverty, with more than 30 percent of India's population subsisting on less than US\$1.25 per day.

These low/high levels of PCI/poverty (characterising an income distribution marked by considerable inequality) correspond to average levels of energy consumption that are extremely low (as expected, the energy consumption profile shows extremely large inequalities across households, regions and sectors of the economy). The scope for growth in energy consumption in the short and medium-term is immense, as illustrated below:

- India's per capita energy consumption is much lower than the world per capita energy consumption (2006 figures) is 510 kg oil-equivalent compared to the world average of 1818 kg oil-equivalent¹. Around 60 percent of the Indian GDP still emanates from the informal sector, characterised by low levels of mechanisation and high levels of labour intensity, as revealed by the sector's accounting for 90 percent of total employment. Past global experience would imply that as the Indian economy grows, it would formalise at a rapid pace. Thus, there would be a tendency for energy consumption to not only increase on the aggregate but also per unit of output, as human labour would be substituted by machines.

- Around 16 percent of India's 0.6 million villages remain completely un-electrified.² Even within electrified villages, many households lack an electricity connection – thus, only 56 percent of rural households and 68 percent of the total number of households have an electricity connection.³ But, even electrified households are not supplied enough to meet their needs. Data for 2001, when the percentage power deficit was the same as that being experienced at present, indicates that rural households on an average were being subjected to almost 14 hours of power outage per day. During the summer season, characterised by increased demand for power, it is not unusual even now for the representative urban household to go without power for 10 hours per day.⁴

To alleviate these shortages and meet the demands of a rapidly growing economy, massive efforts are being made to directly expand the supply of power or catalyse its expansion. Most of this expansion is likely to occur through thermal power plants, characterised by high carbon emissions per unit of electricity generated.

Given the usual relationship between expansion in GDP and growth in power consumption – a one-percent increase in GDP requires a one-percent increase in power supply – the Indian economy, growing at eight percent for the next 20 years, would witness a fivefold increase in electricity consumption. In absolute terms, consumption would increase from the current level of 520 billion kwh⁵ (just two percent of the global total of 27 trillion kwh⁶) to 2.42 trillion kwh (or five percent of the projected world total of 49 trillion kwh, assuming a growth of world GDP by three percent per annum).

Such increase in energy consumption would enhance carbon emissions. Given that total carbon emissions are the product of GDP, average energy consumptions per unit of output and carbon emissions per unit of energy consumed, there are four major ways to check such increase in emissions – to promote the development and use of energy-efficient technologies (i.e. technologies that can deliver the same outcomes as conventional technologies, but are associated with lower energy consumption); promotion of cleaner sources of energy (those associated with lower carbon emissions per unit of energy used/produced) and cleaner technologies (those associated with lower carbon emissions per unit of output produced); and checks on the growth of output.

Given the discussion above, which establishes that rapid growth of GDP in India is imperative, the establishment of a low carbon economy in

India has to rely on the first three options. Thus, both government policy and associated practice must focus on these alternatives to achieve low carbon outcomes.

The obvious question which would be asked in this context is regarding the rationale for promotion of a low carbon economy in India, which is as follows.

First, it is now fairly well accepted among the scientific community that the last century has been witness to significant climate change, which has been driven by human activity-induced increase in carbon emissions. As an important and responsible global player and one of the world's largest economies, India has a role to play and a contribution to make in terms of checking the growth of carbon emissions and, therefore, climate change. Indeed, India has committed itself, albeit in a non-binding manner, to a reduction of carbon emissions by 20-25 percent by 2020 of 2005 levels.

Second, carbon emissions in the form of carbon dioxide, carbon monoxide, methane, etc., also enhance local pollution, with an adverse impact on nationwide productivity and life expectancy.⁷

Thus, the curbing of local pollution, which is imperative in the context of promotion of social welfare, is automatically associated with the promotion of a low carbon economy.

The Indian government as well as the private sector have undertaken a number of major efforts to promote a low carbon economy in India, by stimulating energy-efficient production, clean production as well as use of clean energy. For the continuous stimulation and monitoring of changes needed for facilitating the transition to an environmentally sustainable and low carbon economy, an effective institutional setup is necessary.

1.1 Low Carbon Economy in India: Challenges and Institutional Set-up

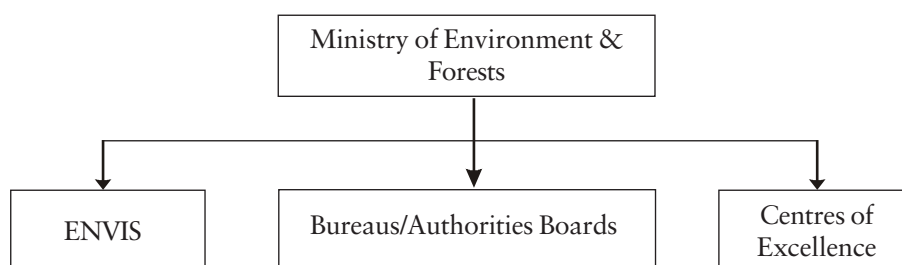
The Indian government has an institutional mechanism in place to monitor and stimulate progress in environmental and energy issues. The promotion of a low carbon economy is one of the important criteria on the basis of which such progress is judged.

The Ministry of Environment and Forests (MoEF) plans, promotes, coordinates and oversees the implementation of India's environmental and forestry policies and programmes. The Ministry also acts as a nodal

agency in the country for international/regional programmes and bodies dealing with the protection of environment such as the United Nations Environment Programme (UNEP), the South Asia Co-operative Environment Programme (SACEP) and the Commission on Sustainable Development (CSD).⁸

Under the Ministry, a network of various committees, boards, organisations and centres has been instituted. Figure 1 gives the structure of MoEF's environmental network, the individual components of which are elaborated below:

Figure 1: Structure of MoEF's Institutional Network



- The *Environmental Information System* (ENVIS) concerns itself with the provision of environmental information to policy makers, scientists and researchers.
- The Ministry has set up a system for environmental protection and regulation consisting of various *boards/authorities/bureaus*. These offices constitute a regulatory system in regard to environmental issues, which provides rules and guidelines for private players. Some of these agencies are: the Central Pollution Control Board (CPCB), the Bureau of Energy Efficiency (BEE), regional offices of the Ministry, the National Biodiversity Authority, the Clean Development Mechanism (CDM) India, (National CDM Authority) and the recently setup Indian Network on Climate Change Assessment (INCCA).
- The MoEF has also recognised/established *Centres of Excellence* in the country based on partnerships between the government and non-governmental institutions such as the Centre for Environment Education (CEE), the Centre for Ecological Sciences (CES) and the Centre for Environmental Management of Degraded Ecosystems (CEMDE). These establishments usually support research and development and also provide training in specialised areas.

1.2 Government Initiatives for Promotion of a Low Carbon Economy

These initiatives can be classified into the following categories:

- a. Regulations/Legislations;
- b. Norms/Guidelines/Existing Schemes;
- c. New/Proposed Schemes; and
- d. Financial/Market Instruments.

1.2.1 Regulations/Legislations

These statutes regulate the functioning of various industries and, in turn, their environmental implications, including carbon emissions. As objectives and targets in regard to environmental protection are updated and modified with the passage of time, these acts are amended. Some of the key acts are as under:

*The Environment (Protection) Act, 1986,*⁹ is related to protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property. The Central Government is given the power to take all such measures that it deems necessary for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution. Given the correlation between local pollution and carbon emissions, the latter are effectively curbed both on account of the mandate to check local pollution as well as the direct commitment made by the government to reduce carbon emissions.

To enforce the Act, the authorities (Centre/state) plan and execute a nationwide programme. The provisions of the Act are designed to ensure that the negative environmental impact arising from the production practices of industries is checked. The Act, therefore, lays down standards and procedures for, among others, a) emissions and discharges from various sources, and b) maximum allowable limits of concentration of various environmental pollutants. The first set of standards acts as a direct check on carbon emissions, while the second one indirectly curbs these, as carbon emissions are a correlate of the concentration of pollutants.

*The Energy Conservation Act, 2001,*¹⁰ provides for efficient use and conservation of energy. The Act provides for a three-tier framework for energy conservation – legal framework, institutional arrangement and regulatory mechanism.

Under the provisions of this Act, the BEE was established in 2002. This Bureau develops policies, schemes and strategies to encourage reduction

of energy intensity in the Indian economy, mainly through self-regulation and market principles.

Apart from the BEE, the Act also grants powers to the Central and state governments to facilitate and enforce efficient utilisation of energy. Some of these powers, among others, which relate to reduction of carbon emissions, though regulation of energy consumption and energy intensity, are:¹¹

1. Specification of energy consumption standards for notified equipment and appliances;
2. Provision of directions for mandatory display of label on notified equipment and appliances and prohibition of manufacture, sale, purchase and import of notified equipment and appliances not conforming to energy consumption standards;
3. Establishment and prescription of energy consumption norms and standards and building codes for energy-intensive industries, commercial buildings, etc.;
4. Facilitation of energy audits through designation of an accredited energy auditor; and
5. Ensuring compliance with energy consumption norms and standards.

The parties are subjected to penalties for non-compliance with the provisions of the Act.

The Air (Prevention and Control of Pollution) Act, 1981,¹² deals with prevention, control and abatement of air pollution. As mentioned, the correlation of local air pollution with carbon emissions would ensure that the enforcement of this Act has positive implications on the latter. The Central Pollution Control Board, which was constituted in 1974 under the Water (Prevention and Control of Pollution) Act, 1974, has been entrusted with powers and functions under this Act.¹³

The main provisions of this Act relate to the following:

1. Declaration of air pollution control areas: Industries which are granted permits to operate in these control areas are directed to install/modify new/existing pollution control equipments and chimneys in their units in order to meet standards in regard to air pollution;
2. Stipulation of instructions for ensuring that standards for emissions from automobiles are met;
3. Acquisition and testing of emission samples from industrial plants; and

4. Penalisation (monetary fines or imprisonment) for non-compliance with prescribed standards/norms.

As pollution has increased in India over time, with an increase in the relative significance of highly polluting industries in the manufacturing sector,¹⁴ the Government of India recently issued a statement that norms for green approvals would be tightened. At the end of the financial year 2009-10, there were as many as 99 projects with a worth of ₹60,000 crore¹⁵ awaiting approval. Most of these projects involved modernisation and expansion of steel and aluminium producing units by top companies.

Indian Emission Standards

Vehicular emission standards were enforced from 1989, through a combination of regulations and measures, to promote environment-friendly technology.¹⁶ The emission norms were initially applicable to idle emissions, but these were replaced with mass carbon monoxide (CO) emission limits in 1991. These have been revised eight times since 1991, with the most recent revision occurring in 2010.

In 2000, Euro I norms, Modified IDC (Indian Driving Cycle) and Bharat Stage II Norms were implemented in Delhi. In 2010, in regard to four-wheelers, Bharat Stage III Emission Norms (equivalent to Euro III) for the entire country and Bharat Stage IV (equivalent to Euro IV) norms for 11 major cities¹⁷ were introduced.

Regulations in regard to Use of Renewable Energy

The government is considering a regulation to make use of renewable energy mandatory for special economic zones (SEZs) to save on traditional fuel such as coal and diesel.

1.2.2 Norms/Guidelines

The following are the norms and guidelines across key sectors:

National Auto Fuel Policy

This policy was approved by the legislation in October 2003. It provides a road map for the implementation of various vehicular emission norms from time to time, which obviously have enormous implications for the overall level of carbon emissions in India. Among others, it recommends encouraging the use of Compressed Natural Gas/Liquefied Petroleum Gas (CNG/LPG) as vehicular fuel, improving Pollution under Control (PUC) checking systems for all vehicles, augmentation of city transport systems and measures for ensuring compliance with emission norms. It also suggests increased research and development in regard to use and

generation of air quality data and health administration, which would, in turn, aid the formulation and implementation of new policies.

The National Policy on Bio-fuels

The government has formulated this policy and given its approval for setting up the National Bio-fuel Co-ordination Committee and Bio-Fuel Steering Committee. Under the policy, it targets increasing the blending of bio-fuels with petrol /diesel so that that bio-fuel content accounts for 20 percent of the volumes of the latter by 2017.

Ecomark Scheme

The GoI launched the eco-labelling scheme, known as *Ecomark*, in 1991 to facilitate easy identification of such products, which in the process of production, utilisation or disposal reduce environmental harm significantly, which would have otherwise been caused. Such identification and consequent labelling with the logo of the scheme (*Earthen Pot* to signify sustainable consumption) was initiated to encourage consumers to undertake green consumption and consequently provide signals to the market and producers for engaging proactively in environment-friendly production.¹⁸

The reduction of environmental harm thus facilitated, given the arguments presented above, would thus also result in the curbing of carbon emissions, which would otherwise have been caused and thus promote a low carbon economy.

Standards and Labelling Programme

The BEE launched this programme in 2001, under which various energy-consuming appliances and equipments are tested for certain energy efficiency standards and rated accordingly. These ratings, depicted through labelling, indicate an appliance's energy-saving and cost-saving potential for consumers. Thus, the higher the rating, the larger the consumer demand for such products, thus providing an incentive to producers to produce more of these goods as well as innovate to improve on their energy efficiency.

Corporate Social Responsibility (CSR)

The Ministry of Corporate Affairs has provided voluntary guidelines for responsible behaviour of the corporate sector towards various segments of society. An important part of CSR guidelines relates to 'Respect for Environment' through measures to check and prevent pollution and thus also curb carbon emissions. These guidelines recommend cleaner and more efficient technologies.¹⁹

1.2.3 New/Proposed Schemes

A key development in India is the constitution of the *Prime Minister's Council for Climate Change* on June 06, 2008. This is a committee chaired by the Prime Minister, mandated with the task to co-ordinate national action for assessment, adaptation to and mitigation of climate change. The plan identifies eight core “national missions” running through 2017. The relevant national missions are as under:

National Solar Mission

Designed by the Ministry of New and Renewable Energy, this mission is a part of the *National Action Plan of Climate Change*. It aims at feeding 20,000 MW of energy generated through solar power into the national grid by 2022. The mission provides for the granting of subsidies for installation of solar modules in commercial buildings. The government's initial investment in this regard would be ₹4337 crore. The mission aims at roping in the public and private sector enterprises in the creation of a clean energy-based economy, which would, therefore, be a low carbon one.

National Mission on Enhanced Energy Efficiency

This mission, as approved ‘in principle’ by Prime Minister's Council on Climate Change, will facilitate about ₹75,000 crore worth transactions in energy efficiency. This is expected to help reduce India's annual energy consumption by five percent of the present levels by 2015. Under this mission, the ‘Perform, Achieve and Trade’ (PAT) mechanism will be introduced, which will assign energy efficiency improvement targets to the country's most energy intensive units²⁰. Any excess of saving above targets would be available for conversion into tradable *Energy Savings Certificate* (ESCerts).

Issues relating to measurements, setting targets and the modalities of trading are being discussed with industry. The BEE is the nodal agency dealing with this scheme and has identified 714 energy-intensive installations in nine sectors, which include power stations, cement, steel and fertilisers. The NMEE is expected to enable about ₹75, 000 crore (US\$16bn) worth of transactions. It is envisaged this will save about 100 million tonnes of CO₂ each year.

This scheme will cover big energy-intensive units, but there is some provision for small and medium units as well. In the latter segments, the BEE is involved in consultation with 25 clusters and has brought in engineering consultants.

Hopefully, these incentives would be enough, given that the scenario regarding financial support from multilateral sources is not very encouraging. The actual incidence of investments would depend on special rates of interests for purchase of appropriate technologies and incentives regarding duties on imported technology and expertise. Intellectual property right (IPR) issues also need to be sorted out so that commercial transfers of technology between foreign and Indian companies, which have hitherto been taking place selectively, can be further increased.

National Mission for Sustaining the Himalayan Ecosystem

The plan aims to conserve biodiversity, forest cover and other ecological values in the Himalayan region. Measures to conserve the forest cover in the Himalayan region would certainly help to check net carbon emissions and the associated impact on global warming, as forests are effective carbon sinks.

National Mission for a 'Green India'

Its goals include the afforestation of six million hectares of degraded forest lands and expanding the forest cover from 23 to 33 percent of India's territory.

National Mission on Strategic Knowledge for Climate Change

Among other measures, this mission would also encourage private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

Other Programmes under NAPCC

The NAPCC also includes other initiatives including:

Power Generation: The government is mandating the retirement of inefficient coal-fired power plants and supporting the research and development of integrated gasification combined cycle (IGCC) and supercritical technologies.

Renewable Energy: Under the Electricity Act 2003 and the National Tariff Policy 2006, the Central and State Electricity Regulatory Commissions must purchase a certain percentage of grid-based power from renewable sources. This would directly imply a reduction in carbon emissions.

Energy Efficiency: Under the Energy Conservation Act 2001, large energy-consuming industries are required to undertake energy audits. An energy labelling programme for appliances has been also been

introduced under this Act. This would decrease energy consumption, which should also imply a decrease in correlated carbon emissions.

Expert Group on Low Carbon Economy²¹

The Planning Commission of India has constituted an Expert Group on Low Carbon Economy in January 2010. Having committed itself to making India a low carbon economy, through related announcements of voluntary and unilateral targets to reduce emission intensity of its GDP, the government has commissioned this expert group to formulate a low carbon growth pathway for the nation.

The Commission will review existing studies on low carbon growth and assess options available to India to progress on this pathway. The final report, to be presented by the end of September 2010, will outline a road map for the nation. The most important expected outcome from the analysis is an action plan specifying sector-wise initiatives, which will lead to a low carbon economy and legislations enabling these actions.

Renewable Energy Projects

Indian Renewable Energy Development Agency (IREDA) will be investing around US\$3.39bn for the development of renewable energy (RE) projects during the 11th Five-Year Plan. As per the Planning Commission estimates, RE projects worth US\$15.97bn (expected to generate 15,000 MW) are likely to come up in the Plan period.

Individual state governments are also taking some proactive steps in this direction. The Ministry of Non-conventional Energy Sources has issued guidelines to all state governments regarding policies to attract private sector investment in this regard. Gujarat, with a view to tackling the menace of global warming, has taken an in-principal approval from the Union Government to set up a separate department for climate change. The Punjab government has chalked out an ambitious plan to generate power from agricultural waste by setting up co-generation power plants in all state-owned co-operative sugar mills.

The Ministry of New and Renewable Energy is planning to develop Nagpur, Maharashtra, as the country's first solar city. The government statement said that Nagpur will become a model solar city by 2012, with the city deriving up to 10 percent of its energy consumption from renewable energy sources and implementing other energy efficiency measures.

1.2.4 Financial/Market Instruments

CDM/Carbon Credits

India is second only to China²² in regard to the number of registered CDM projects hosted. India's designated national authority for the CDM – National Clean Development Mechanism Authority – evaluates and approves these projects as per the guidelines of the Executive Board. The registered and implemented projects are issued *carbon credits* (each unit equivalent to one metric tonne of CO₂). Given that such carbon credits can be sold to firms in developed countries, so as to meet shortfalls in emission reduction targets, there is an inbuilt incentive to implement these projects. From the global point of view, this facilitates the meeting of ambitious reduction targets, as firms in developed countries incapable of meeting stiff targets for emissions reduction on their own can financially incentivise Indian firms to help compensate for such inability.

India is one of the largest suppliers of carbon credits. The Environment Ministry also organised a 'carbon bazaar' in April 2009 to facilitate investment in carbon offset projects through direct business-to-business meetings²³ among domestic suppliers and foreign buyers, especially those from Germany. Emission reductions such as Certified Emission Reductions (CERs) and Verified Emission Reductions (VERs) are all tradable emissions, which have been encouraged by the Indian government.

Futures Trading in Carbon Credits

Indian industries are taking the lead in reducing carbon emissions through innovation in technology and green projects. To provide these industries with an incentive to increase green efforts, the Mumbai-based Multi-Commodity Exchange launched Asia's first commodity exchange for futures trading in carbon credits in January 2008. This makes carbon credits more easily marketable.

Fiscal Measures

Official measures taken by the Indian government to encourage green investments are very encouraging. In the budget speech of February 26, 2010, the Finance Minister announced measures to reduce dependence on fossil fuel in the long run and promote clean energy technology as well as check pollution. He announced the plans of the government to levy a tax on the use of coal and use the money to start a national clean energy fund to back renewable energy projects. In addition, he announced a series of customs and excise duty cuts for photovoltaic and solar thermal power units. This is in line with the government's resolve to implement

the National Solar Mission. He proposed reducing central excise duty on LED lights from eight percent to four percent.

Besides, there are wind energy incentives – for instance, a provision for 80-percent accelerated depreciation in the first year, a 10-year tax holiday and an income tax waiver on power sold to utilities and favourable tariffs. India offers several subsidies for solar power systems and generation-based incentives of up to ₹12 per kilowatt-hour for power plants. In regard to small hydropower projects, the following incentives are being provided: concessions on customs duty, a 10-year tax holiday and other state level incentives, including sales and electricity tax exemptions and preferential tariffs.

It must be noted here that trends in government's budgetary allocations convey a general increase in concern in regard to environmental issues. Central budgetary allocations for the Ministry of Environment and Forests have risen by about 10 percent, from ₹2129 crore (US\$470mn) in 2009-10 to ₹2351 crore (US\$520mn) in 2010-11.

India's special incentives package scheme, which aims at galvanising investments in semiconductor fabs, ecosystem units and solar PV projects, has attracted proposals worth ₹2.29 lakh crore (close to a million billion US\$)

While the government has undertaken a slew of measures to promote energy efficiency and check pollution and thereby promote a low carbon economy, the success of these measures depend critically on the effectiveness with which industries are made aware of their significance and utility and associated modalities. This is the subject matter of the next sub-section.

1.3 Communication of Measures to Industries

The recent national missions are expected to be a mix of public-private sector initiatives. The Ministry regularly brings out notices and invites proposals. Various mechanisms are in place for appraisal of these proposals and subsequent award of contracts. Incentives have also been announced by the government to stimulate such initiatives.

The Directorate of Advertising and Visual Publicity (DAVP), which is the nodal agency for undertaking multi-media advertising and publicity for various ministries and departments of the GoI, is the principal medium for the operationalisation of communication regarding environmental

measures, including those that relate to the promotion of a low carbon economy. The channels of communication which are used by the agency are:

- Release of press advertisements;
- Exhibitions;
- Outdoor Publicity – Display of hoardings, kiosks, bus panels, wall paintings, cinema slides, banners, etc.;
- Printed Publicity – Booklets, folders, posters, leaflets, calendars, diaries, etc.;
- Audio and Visual Publicity – Spots/quickies, jingles, sponsored programmes, short films. etc.; and
- Mailing of publicity material – Distribution of publicity material.

Apart from these, the government also uses All India Radio (AIR) as a medium to communicate important decisions to the interested parties.

While the government has played an important role in promoting environmental measures and initiating steps that have had a salutary impact on emissions, significant steps have been taken by the corporate sector, especially in key sectors such as power, steel and construction, even though these have been limited to large firms. This segment has taken active steps to control and regulate its emissions and energy consumption, many in response to the mentioned communications and incentives provided by the government. In the next section, we examine and evaluate these steps.

2

Measures Taken by Business for Promotion of a Low Carbon Economy

2.1 Trends and Perceptions

India has a market value of US\$289bn in low carbon and environmental goods and services. The emerging economies in Asia represent 38 percent of the global total, followed by the Americas at 30 and Europe at 27 percent. India and China are identified as the hotbeds of the emerging low carbon economy, though developments in this regard are not characterised by the level of technological sophistication currently observed in Japan and the US. However, these countries display immense potential owing to their fast developing economies and large population bases.²⁴

It is imperative that significant developments in regard to achieving economies in energy consumption and curbing of carbon emissions take place in the large and fast growing economies of India and China. Energy needs in India have gone up sharply in the past few years. According to the International Energy Agency's report, India and China would account for approximately half of the increase in world's energy demands between 2006 and 2030,²⁵ owing to extremely rapid growth in incomes and associated consumption and production.

The global thrust on reduction of greenhouse gas (GHG) emissions has been felt in India, even though it is not a signatory to mandatory reductions under the Kyoto Protocol. Indian companies have begun to sense the likely changes in the regulatory environment resulting from international emphasis on the need for reduction as well as domestic

compulsions to reduce the level of local pollution. Enhanced global demand for low carbon goods and products, along with new measures such as border taxes, has also encouraged companies to think ahead. Consequently, companies, at least the large ones, have begun to plan in anticipation and invest in research and development (R&D) as well as adaptation-related matters.

In this context, it must be noted that Indian companies, both public and private, have to gear up to conflicting demands. On one hand, there is demand for greater material consumption owing to the rapid growth in GDP (an increase in per capita GDP by 10 percent is accompanied by an increase in emissions per capita by about eight percent²⁶) – from domestic households needing electricity, from farmers needing irrigation and from a growing middle class with its consumption-related aspirations.

On the other hand, there is demand from pro-green lobbies and other national governments as well as multilateral bodies for lower emissions. The challenge for Indian companies will be to strike a balance between pressures arising from enhanced material demand and the (policy-driven) demand for a low carbon economy. The companies need to identify options that help to profitably meet growing consumption demand, subject to the constraints imposed by the policy environment. A technological switchover in key sectors is needed to ensure that growth continues to take place at recent rapid rates, while energy consumption and emissions do not.

One way is to look for avenues to enhance energy efficiency. On this account, India's record is very impressive. According to the Energy Efficiency Indicator (2009), a study commissioned by Johnson Controls India,²⁷ efficiency is the top concern of business leaders and those responsible for energy management within Corporate India. The findings highlight that business leaders are becoming increasingly aware of the need for energy efficiency and the potential impact in terms of reduced operating costs. The key findings of this survey are:

- 47 percent of respondents are paying more attention to energy efficiency, as compared to 2009.
- Energy management is extremely, or very, important, say 94 percent of the respondents.
- Increase in capital investments for energy efficiency characterises 62 percent of the respondents.
- It is interesting to note that 17 percent are seeking green building certification for new construction projects, while none are seeking such certification in renovation projects.

- From an alternative energy perspective, 14 percent are considering use of solar energy. In regard to new construction, 22 percent are seeking use of solar thermal technology.

Given that this is a survey of 1100 leaders, the sample cannot be said to have problems of inadequate representation. Johnson Controls has conducted a similar survey of 1400 respondents in North America (NA) in 2009. The comparison between the North American and Indian surveys yields useful findings:

- 72 percent in India believe that energy management is very important for their organisation, as opposed to 39 percent in NA.
- 94 percent in India and 93 percent in NA want to make energy efficiency a priority in their current or planned new construction, or renovation projects.
- In India, 64 and 72 percent plan to make energy capital investments and undertake operating expenditure for enhancing energy efficiency, respectively, while in NA the corresponding figures are 46 and 55 percent.
- Up to 10 percent of an organisation's facility-related budget will be invested in energy efficiency over the next 12 months in India, while in NA this percentage varies between 10 and 30.
- 18 percent in India are making investments for cost savings, compared to seven percent in NA. In both India and NA, 37 percent undertake investment for cost-related as well as environmental reasons. In India, two percent are investing purely from an environmental perspective, compared to five percent in NA.
- 44 percent in India vs 57 percent in NA consider climate change as somewhat/very/extremely significant for the company's energy efficiency decisions.
- 21 percent of companies in India have a publicly stated carbon reduction goal, compared to 12 percent in NA.
- 37 percent in India, compared to 30 percent in NA, believe that significant legislation mandating energy efficiency and/or carbon reduction within the next two years is very likely.
- 18 percent in India, as opposed to 13 percent in NA, believe that incentives offered by governments or utilities are extremely influential in regard to their energy efficiency decisions.
- 17 percent of the new construction projects in India seek certification in terms of a recognised green standard, as compared to 38 percent in NA. The comparable numbers for renovation projects are 0 and 17 percent in India and NA, respectively.

- Percentages of companies adopting various energy efficiency measures differ across measures in both India and NA and for a given measure across India and NA. NA has a higher percentage only in regard to installed or adjusted lights and time clocks. In regard to all other measures, such as energy efficient lighting, installing a building management system, etc., India rates higher.
- In India, 40 and 10 percent undertake energy monitoring on daily and weekly basis, respectively, while in NA the corresponding numbers are three and five percent only.

Going by the above facts, there is a higher interest in energy efficiency in India, as compared to North America on many counts. Given this, it is not surprising that sustainable energy investment in India went up to US\$3.7bn in 2008, up 12 percent since 2007.²⁸ This included asset finance of US\$3.2bn, up by 36 percent. Venture capital and private equity saw an increase of 270 percent to US\$493mn. Merger and acquisition activities totalled US\$585mn. Most acquisition activity was centred on biomass, small hydro and wind projects, according to the report '*Global Trends in Sustainable Energy Investment*' 2009.

2.2 Estimates of Investment Undertaken by Indian Companies for Lowering Emissions

The following data from the Carbon Disclosure Project (CDP) report allows for some (limited) inferences. It is drawn-based on the data given by the CDP report (2009) and is based on the information given by the Indian companies.

Table 1: Emissions by Reported Companies 2007-09			
	2007	2008	2009
Emissions (in mn tonnes)	35.4	36.3	68.9
No. of Companies	39	200	200
Average Emissions (Emissions/No. of Companies)	0.90	0.18	0.34
Source: CDP 2009.			

From 2007-08, average emissions per reporting company dropped drastically. While 39 companies in 2007 reported emissions of 35.4 MT, around the same amount of emissions (36.3 MT) were reported by 200 companies in 2008. This could imply several things. One possibility is that emissions declined due to some action related to scope 1 and 2 (see Box 2 for how scope for reporting and mapping of emissions is defined)

Box 2: Mapping of Emissions

Scope 1 Emissions

Also known as direct GHG emissions, these occur onsite or from sources that a company owns and controls. Scope 1 emissions include those from the combustion of fuels (e.g., boilers, furnaces, turbines), vehicle fleet; refrigerants, etc.

Scope 2 Emissions

Indirect GHG emissions that result from the consumption of purchased electricity, heat or steam.

Scope 3 Emissions

All other indirect emissions: examples include emissions associated with the extraction and manufacture of materials and fuels a company purchases, waste-related emissions and any transportation using vehicles not owned or controlled by the company.

Source: Greenhouse Gas Protocol Initiative, World Resource Institute

or that the decline in per firm emissions from 2007-2008 is attributable to widespread CDM project-related activity. In any case, the similar total magnitude of emissions by 39 and 200 companies in 2007 and 2008, respectively, points to the possibility of significant investments having been made during the period.

Between 2008 and 2009, there was a significant increase in emissions to 68.9 MT from 36.3MT. This has been ascribed to greater transparency and voluntary reporting by the companies. In other words, had 2008 been characterised by the same transparency as 2009, the jump in total emissions recorded from 2008-2009 would have been much smaller.

If a comparison is made between 2009 and 2007, the average level of emissions per firm is lower in 2009. During 2007-2009, absolute emissions doubled, but the number of reporting companies quintupled (five times the original size, i.e. from 39 to 200). Given that average emissions have decreased, it can be inferred, though not with complete certainty, that there have been significant investments which have offset the effects of greater transparency and led to a decrease in average per firm emissions.

This is despite the observation made by CDP 2009 that “despite a high priority placed on climate change issues in terms of involvement of top management, the Indian industry has still not considered climate change in its investment decisions. Not one of the responding company factors the cost of future emissions into its capital expenditure or its investment decision”.²⁹

It could be argued that, while companies are willing to disclose their levels of emissions, they are yet not willing to disclose investment decisions or plans. However, going by the reduction plans, one can infer a greater thrust on green investments. The *Energy Efficiency Report* (2009) reveals that 72 percent of the respondents feel that their organisations can achieve more energy efficiency through operating budgets and more than 92 percent feel that energy efficiency is a priority in new construction as well as renovation projects.

As case studies demonstrate, adoption of technologies, emission reducing instruments, etc., have led to tangible cost saving. Sterlite Industries, for instance, saved ₹351 million as a result of reduced energy use. Infosys Technologies Ltd. reported reduction in per capita energy consumption by 10 percent in 2008-09 over 2007-08. Larsen and Toubro, ONGC, ABB and Tata Motors have reported various benefits over a period of time.

There are several plans in place and several processes underway for large investments that would facilitate a low carbon economy. Some instances are:

- PV Technologies India (a subsidiary of Moser Baer), Titan Energy Systems, Reliance Industries Ltd. and Tata BP Solar Power are among the 12 Solar Photo Voltaic projects filed under Special Incentive Package Scheme (SIPS), which have received in-principle clearance from the government. Together, these 12 projects would entail an investment of US\$16.34bn over a 10-year period.
- Several eco-friendly green models of automobiles, including Nano (diesel and hybrid versions) of Tata Motors and others proposed by global majors such as Toyota and Honda are expected to be launched in Indian markets by 2010. This will facilitate the ongoing plans of the government to bolster measures for cleaning up the environment.
- GE Energy Financial Services and EPURON Pte Ltd Singapore, a regional subsidiary of Germany's Conergy Group, have together launched Asia-Pacific's first renewable energy private trust to promote investments in wind, solar, small-scale hydroelectric, biogas and biomass projects across the region.

Sizeable investments in clean energy funds from domestic and foreign sources are taking place in India, given India's rising and insatiable energy demand and, therefore, the need to ensure that emissions increase associated with this increase in energy consumption is minimised. For example, a middle sized market private equity firm, Olympus Capital

Holdings Asia has applied for approval of raising funds in the Indian share markets and is planning to invest about 50 percent of its US\$250mn regional environment fund in India. The view of Olympus is that the great environmental challenges faced by India imply the availability of attractive investment opportunities in the clean technology space, including waste management, water treatment, energy efficiency and renewable energy.

Renewable Energy

The turnover of the renewable energy industry is estimated at US\$500mn³⁰ and growing at an annual rate of 15 percent. India stands third among nations in terms of additions to capacity for wind power and fifth globally in regard to capacity for generation of power from renewable sources.³¹

Given vast possibilities for investment in the areas of solar energy, wind energy, small hydro-plants, waste-to-energy, biomass co-generation systems and alternate fuels, many Indian companies are seeking joint ventures and licensing arrangements with foreign companies. In regard to partnerships of Indian companies with foreign companies, those with the US exhibit the highest incidence (40 percent of all partnerships), followed by those with UK (21), Germany (17), Sweden (six) and Netherlands (five percent). Other partners include Japan, Denmark, Switzerland, Canada, Australia and France. Most of the manufacturers of renewable energy technology focus on sales to government, though opportunities exist in regard to purchase from the private sector, particularly in solar energy products.

2.3 Conclusion

This section has noted the preparedness of Indian companies for evolving a low carbon economy. While steps have been undertaken by the government and the private sector to enhance energy efficiency and curb growth of carbon emissions, the success achieved through these measures as well as assessment of the scope for future steps are dependent on accurate auditing and reporting of emissions and energy consumption by business. The next section evaluates the progress in this regard.

3

Emissions Reporting, Accounting and other Key Developments

3.1 Accounting, Reporting and Methodologies

According to a new study, India's sustained progress towards reducing GHG emissions will ensure that the country's per capita emissions of GHG will reach a level in 2030-31 of below four tonnes, which is not only low in absolute terms but lower than the 2005 level of 4.22 tonnes.³² The use of emission norms in India was first initiated for vehicular use, but subsequently there was an increase in use of such norms in the industrial and energy sectors.

The incidence of reporting on emissions has increased impressively, according to the CDP report (2009), from 33 percent in 2008 to 63 percent in 2009. Such increase has occurred for energy-intensive as well as non-energy-intensive sectors. Improvements have marked the reliability, accuracy and methodology of reporting.

Emission accounting is being actively and increasingly employed by most companies, a significant example being the ONGC, which is working towards having a system of emissions accounting in place in all its locations by 2012. A majority of the companies are using the GHG protocol.³³

Ideally, emissions mapping is in terms of Scope (1, 2 or 3 as explained in Box 2). 62 percent of the companies have reported for Scope 1 and 2 in 2009 and this is a significant improvement over 2008. There has, however, been no change in regard to Scope 3, as reporting has stayed constant at

26 percent. In most instances, this relates to business travel and comes from the IT sector, including Wipro, Infosys, TCS, etc.

However, as far as reduction in emissions is concerned, higher emissions have been reported in the aggregate, with a few examples of reduced emissions. Overall, 56 percent of the respondents have reported a rise in emissions in 2009, as compared to 2008. This is not alarming, as rising emissions are a natural consequence of growth, which, in the Indian case, has been fairly rapid, even during recessionary times.

Further, emissions intensity and not total GHG emission³⁴ has been reported directly. This can lead to obfuscation of facts, since measurement of emissions intensity is not standard and varies from industry to industry. Emissions intensity may be defined as the ratio of emitted GHGs to a measure of economic activity. Over 60 percent of the companies have used sales and turnover as the second measure, while 20 percent have used output. Only one company, namely, Bharat Petroleum Limited, monitored total GHG emissions and not its intensity.

It is noteworthy that the non-energy-sensitive sectors as well as the energy-intensive ones have put in place systems for GHG mapping and are initiating plans and strategies for implementing low carbon practices. In addition to this, Scope 3 emissions have begun to be accounted for. This is a notable development, which has the potential for widening the domain of emission accounting. Incidentally, the reported magnitude of Scope 3 emissions has increased by ten times in 2009, as compared to 2007 and 2008.

3.2 Voluntary Disclosures by Indian Companies

Indian companies have demonstrated a progressively higher transparency over time in declaring their emissions in response to official drives for a low carbon economy. The recently launched CDP Report has outlined these developments. Some key features of voluntary disclosures by around 200 top Indian companies are:

- 63 percent of the companies disclosed their GHG emissions in CDP 2009, which is almost double, as compared to only 33 percent in CDP6 (2008).
- The overall total GHG emissions reported by the respondents of CDP 2009 stand at 68.9 million metric tonnes (MT), which is almost double the GHG emissions reported in the last two years. But, such increase from 2008 to 2009 has been attributed largely to enhanced transparency.

- 68 percent of the respondents in CDP 2009 have reduction plans in place for slashing either their energy or GHG emissions, as compared to 61 percent in the preceding year.
- 84 percent of the companies do not consider existing regulatory mechanisms as a risk, but rather an opportunity for triggering long-term investment in energy efficient technologies. However, these companies do acknowledge that, in future, the regulations may affect their businesses.
- 82 percent of the companies acknowledge physical risks such as damage, disruption and displacement resulting from climate change as some of the major challenges likely to result in financial losses.
- In 2009, a larger number of companies not only disclosed information on their GHG emissions than ever before but also adopted more accurate methodologies for doing so and provided unprecedented categorical breakdowns of their GHG emissions. While only 0.4 MT of Scope 2 emissions were reported in CDP (2008), the figure rose by ten times to 4 MT in CDP 2009.
- Indian companies perceive three kinds of risks from low carbon-related changes: regulatory, physical and other risks. Regulatory risks arise from current or expected government policies; physical risks from impact of real time climate change and other risks emanating from energy/resource scarcity; change in consumer demand; reputation risk; and disruption of production and supply chain processes.
- The corresponding perception of opportunities makes for an optimistic balance. The percentage of companies seeing opportunities has gone up from 71-79 percent for 'other risks' and remains more or less constant for the perceptions regarding physical risks. The changes in regulation are perceived to be the most important opportunity presented to companies.

Future Targets and Plans of Companies

A list below captures the plans by major Indian companies in regard to emission reductions, which obviously have to be implemented through green investments. This information has been culled from the CDP report (44:2009).

- Mahindra & Mahindra (Automobiles & Components) plans to reduce GHG emissions by five percent by 2013-14 from 2008-09 levels.
- ONGC (Energy) plans to reduce GHG emissions by 15 percent by 2014 (short-term), and 40 percent by 2019 (mid-term) and later make emissions carbon neutral (long-term).
- Sterlite Industries (Materials) has a GHG emission reduction target of 1.4 tonne of CO₂/tonne of copper cathode produced.

- Infosys Technologies Ltd. (Software & Services) has set a target of a five percent annual reduction in per capita emissions (time line not provided).
- Tata Consultancy Services (Software & Services) plans an overall annual reduction of two percent in CO₂ emissions per employee for the next 10 years.
- Ambuja Cements (Materials) plans for 20 percent reduction in net specific CO₂ emissions by year 2010.

3.3 Conclusion

The above developments point to plans being put in place by the Indian corporate sector for reduction in carbon emissions. Given that such plans can only be implemented through investments, there would be a massive increase in green capital in the years to come. The next Section looks at case studies of companies which have taken some important measures in regard to energy conservation and control of emissions, though not at the cost of competitiveness. These would provide observers some idea about probable future measures for ushering in a low carbon economy. These case studies can also be a guide for smaller companies which have not yet become proactive in the mentioned sphere.

4

Case Studies

4.1 Introduction

In India, an annual average growth rate of GDP of eight percent has been achieved with less than four percent annual growth in energy consumption. Further, there is a high level of willingness and preparedness among companies for catering to new national regulations, especially those incorporated in the national climate change action plan. Relatively low growth in energy consumption, willingness to adhere to low emission norms and a massive government stimulus, as mentioned earlier, mean that the top end Indian companies are well geared to take defining measures for low carbon growth. These are illustrated by the case studies described below.

4.2 Case Studies³⁵

Four case studies of low carbon and environmentally sensitive operations at the firm level, with discussion of relevance for competitiveness, are provided here.

4.2.1 Indian Tobacco Company Limited (ITC)

ITC is one of India's foremost private sector companies and a leading FMCG³⁶ company. At the end of 2008-09, its market capitalisation was nearly US\$19bn. It has a diverse presence in hotels, agri-business, information technology and many FMCGs such as packaged food and confectionary, cigarettes and safety matches. It is among one of the largest Indian exporters of agricultural products. The company has committed itself to contributing towards building a sustainable, secure and inclusive future for India. In fulfilment of this commitment, it has published the company's Sustainability Report each year, starting in 2004.

Table 2: ITC Emissions 2005-08				
	Unit	05-06	06-07	07-08
CO ₂ released (Manufacturing & Freight)	Kilo tonnes	1202	1143	1352
CO ₂ sequestered	Kilo tonnes	1244	2025	2638
CO ₂ sequestered	Percent	104	177	195

Environmental Initiatives

ITC has a well-defined Environmental Management System (EMS)³⁷ and written EMS policy, which ensures that the company's functioning is eco-friendly. It also conducts emissions accounting.³⁸ The total CO₂ (equivalent) emissions from ITC's businesses in 2007-08 amounted to 1352 kilotonnes (KT), as compared to 1,143 KT in 2006-07.

Some key characteristics of the Environment Management Initiative of the company are as under:

1. It has been carbon positive for the last four years and is the only such company of its size to be able to claim this distinction. It is increasing its 'Carbon Positive' footprint every year.
2. It is efficient in resource use and recycles 100 percent of its wastes, thus saving emissions.
3. It has disbursed ₹550 lakh (US\$1.2mn) in environment conservation expenditure, comprising of investment worth ₹480 lakh (close to US\$1mn), and operational cost expenditure of ₹70 lakh (US\$150,000).
4. ITC's India Leaf Tobacco Development (ILTD) Division has made energy management efforts by installing new (production) lines. These new lines exhibit oil and electricity consumption, which is lesser than that of existing lines by 50 percent. The company's cigarette business achieved an 18.7 percent reduction in specific energy consumption in 2008 over 2007.
5. The ITC Chain of Hotels has spent over ₹2 crore (US\$0.5mn) each for the installation of effluent treatment plants and the energy efficiency programme.

The company has been quite active in stakeholder engagement as well. While setting up a production unit, ITC takes into consideration its responsibility towards nature. In compliance with its EMS policy, it signs contracts with various vendors, which include specific clauses requiring suppliers to establish the energy consumption of their equipments. This encourages suppliers to innovate for reduction of energy consumption.

4.2.2 Indian Oil Corporation Limited (IOC)

IOC Limited is India's largest commercial enterprise, with the highest ever turnover amongst Indian companies. Indian Oil is also the highest ranked Indian company in the prestigious Fortune 'Global 500' listing. The company is investing US\$10.8bn during the period 2007-12 for augmentation of refining and pipeline capacities, expansion of marketing infrastructure and product quality upgradation, as well as integration and diversification projects.³⁹

Green Initiatives

Since oil refining is one of the most energy-intensive manufacturing industries, its environmental impact is very high. Indian Oil recognises the protection of the environment as a core commitment of its businesses. It innovates to keep the functioning of its refineries and other production units as environment-friendly as possible. It is an active partner of the Global Compact Project (GCP) of the United Nations. Given that Indian Oil is a leading fuel provider for meeting India's energy needs, one of its main contributions towards the creation of a low carbon Indian economy is the development of green alternative fuels such as CNG, Autogas LPG, ethanol-blended petrol, bio-diesel and hydrogen energy on a commercially viable scale. Such development helps to meet demand and keep emissions low.

As an active partner of the GCP of the UN, Indian Oil is fully focused on "sustainable development". The company has taken the following steps to function in an environmentally-friendly way:

1. The company has a self-defined *Green Agenda*.
2. The company fully complies with the emission standards prescribed by government authorities and uses state-of-the-art effluent treatment technologies.
3. Indian Oil refineries have adopted various measures to control gaseous emissions. These measures reduce emissions and, at the same time, conserve energy to reduce fuel consumption.
4. Indian Oil has invested about ₹7,000 crore (US\$1750mn) so far in green fuel projects at its refineries.

Stakeholder Engagement

The company had conducted programmes to generate awareness among its employees about the 14001 Environmental Management System and steps involved in it, before it got accredited with ISO 14001. This resulted in enthusiastic participation by employees as stakeholders contributing towards the facilitation of low carbon practices.

4.2.3 Maruti Udyog Limited⁴⁰

Maruti Udyog Ltd. initially started as a joint venture between the Government of India and the Suzuki Motor Corporation of Japan. It has been a major player in the automobile industry in India. Its annual turnover for the fiscal year 2008-09 was at ₹203,583 million (around US\$4000mn) and since its inception it has sold over 7.5 million vehicles in India and exported more than 5 million to other countries.

The company is conscious of the limited availability of natural resources and acknowledges its responsibility to use them judiciously. Environmental management is, therefore, considered necessary and of significant importance. It has taken several steps to reduce its material and energy consumption and also find ways to reduce emissions from its production process:

1. Being the first Indian automobile company to be certified as ISO 14001, it has put in place a robust EMS.
2. It has initiated CDM projects to combat climate change and reduce its carbon footprint.
3. The company is exploring options for transporting cars for distribution in the domestic and international markets so as to minimise carbon emissions.
4. To reduce the use of resources in its production process, the company has initiated a unique 'one gram one component' weight reduction programme. This, too, would help to reduce carbon emissions. This programme encourages employees to give suggestions in the mentioned regard.
5. The company has launched the highly fuel-efficient and environment friendly K-series engine in its new car, A-Star.
6. It has launched a Production Management System to identify and minimise wastages in the manufacturing process. This is expected to increase the efficiency of the process, while the reduction of wastages would lead to curbing of emissions.

Stakeholder Engagement

It consider its direct stakeholders (customers, investors and employees) to be key players in implementation and formulation of its Environment Policy:

1. Maruti conducts EMS programmes for around 30 suppliers and dealers and around 70-finished vehicle transporters.
2. Maruti Suzuki also shares its best practices on energy conservation with its vendors to help reduce the company's indirect energy consumption and scope 2 emissions.

3. The company issues warnings to trucks entering its premises without the pollution control certificate.
4. It has also introduced an afforestation programme and enhanced its green belt area to 27 percent of total geographical area covered by its units.

4.2.4 Tata Steel

Tata Steel was established in 1907 and is among the top-ten steel producers in the world. It has a global presence in over 50 European and Asian economies and manufacturing units in 26 countries. With its acquisition of major steel-producing units all over the world, including Corus and Millennium Steel, its network has increased manifold.

The company's efforts at environment management are well recognised. Its mines, collieries and manufacturing divisions are ISO 14001 certified. It has included environmental protection as a clause in the company's code of conduct and environmental policy, which is available in the public domain. The company has also launched a green drive named *Ecocitizen*. The company has started focusing on reducing its GHG missions substantially.

The initiatives taken to manage the company's impact on the environment are:

1. Tata Steel recently launched Vision 2012 that emphasises on the reduction of CO₂ emissions. The company has set itself a goal of reducing its CO₂ footprint by at least 20 percent by year 2020, compared to 1990. Tata Steel Works at Jamshedpur in India has reduced its CO₂ emissions by 36 percent in the last 12 years.
2. The Tata Steel Group, through projects such as that on Ultra Low CO₂ Steelmaking (ULCOS), is engaged in cutting edge research to develop new technologies for the long-term future of the industry, which are targeted towards achieving a 50 percent reduction in carbon emissions by 2050.
3. The company publishes a *Corporate Sustainability Report* every year which is externally assured (verified) by Pricewaterhouse Coopers. Among other things, it reports on the environmental performance of the company, which is measured in terms of various parameters such as raw materials used; input materials recycled; energy consumed; renewable energy initiatives; and magnitudes of emissions, effluents and wastes.
4. As per its reports, in 2002-03, cumulative capital investment for pollution abatement was ₹3220mn (US\$650mn approx). This expenditure more than doubled by 2006-07 to ₹7214mn.⁴¹

Stakeholder Engagement

1. All the vehicles of contractors and suppliers are checked for *Pollution under Control Certificates* at the factory's entry gate.
2. It organises trainings and workshops for its vendors, employees and suppliers in regard to control of pollution and emissions and conservation of energy on a regular basis.

4.3 Relevance for Competitiveness

The above examples suggest that corporate leaders are undertaking the following measures for energy conservation and emissions and pollution control, which directly or indirectly have positive implications for facilitation of a low carbon economy:

- Use of new industrial products, switchovers and change in industrial processes (Hard Options);
- Changes in value chains and transfer of good practices (Soft Options); and
- Capacity enhancement (training and awareness generation programmes).

Over time, more and more companies are engaging in a dialogue with the government and there is a greater thrust on partnerships. About 55 percent of the companies participating in the CDP 2009 reported a dialogue with the policymakers on possible responses to climate change, including taxation, regulation and carbon trading. Tata Motors is participating actively in national committees working on the formulation of policies and regulations to protect the environment through various means, including GHG emission reductions.

The stakeholder engagement described in the case studies is likely to be instrumental in generating an enhanced market culture of good environmental practices, with associated financial investments and returns. Ancillary industries and services will rapidly develop. Pollution checking and labelling of vehicles at gas stations (petrol pumps) is one development. Such initiatives have generated new avenues of employment and require only basic skills.

The role played by the corporate sector in enhancing environmental awareness is illustrated below by the following examples:

- Global systems and services company, Dell, in partnership with The Energy and Resources Institute (TERI), has launched 'The Climate Eduxchange' – an IT-enabled initiative to improve environment education in schools across India. The campaign aims to raise

awareness and understanding about climate change issues among students and teachers of all disciplines.

- Tata Steel Rural Development Society (TSRDS), an organisation involved in the steel major's community building initiatives, has embarked on a programme to empower communities by creating awareness regarding the *Right to Information (RTI) Act*⁴² at the grassroots level. Such awareness among citizens and consumer groups can enhance tracking of efforts by the government and industry for environmental protection.

It is hoped that such initiatives taken by corporate sector leaders would also stimulate their adoption by lesser known and smaller companies. Similarly, adoption of energy conservation and green measures by educated sections of society might motivate others to follow suit.

Conclusions

The Indian economy accounts for a large and rapidly growing share of the world economy. Therefore, the ability and willingness of actors in the Indian economy, especially the government and business, to take measures to control GHG emissions is a significant determinant of global emissions and the future pace of climate change. Such measures, moreover, should not be at the expense of economic growth, which needs to continue for quite some time at its recent rapid pace to lift the large number of poor Indians above the poverty line.

Major Indian actors have already started playing their part in curbing the growth of carbon emissions, while ensuring that the growth momentum does not slacken. An elaborate institutional set up is in place with the MoEF as the co-ordinating agency. Separate wings of this set up perform the diverse functions of provision of environmental information to policy makers and scientists; formulation and implementation of environmental regulations and incentives; and research and development.

Indian business, especially large corporate entities, has already responded to this web of incentives and regulations and supplemented these with initiatives of their own. These include investments in clean sources of energy and technologies, changes in operational practices and initiatives to undertake reporting of emissions and their breakdown into various categories.

Our case studies reveal that large and reputed Indian companies have not only spread environmental awareness among their employees to make them partners in enhancing environment-friendly change but also ensured that entities with which they do business also meet certain environmental norms and standards in regard to pollution and emissions. Thus, supply chains of raw materials and finished products would become environmentally-friendly and sustainable.

However, considerable room for progress still exists. Among corporate entities, only large ones are characterised by a significant level of awareness. Small and medium entities still lack environmental awareness, while the informal manufacturing and service sectors remain totally unaware and unregulated entities. Efforts for the spread of environmental education among these entities and to ensure their compliance with environmental regulations are necessary. While reporting of emissions by companies is on the increase, a large number of these still do not report their emissions. In the case of those who report, underreporting is significant in the case of emissions that are an indirect product of business activity, i.e. business travel, etc. In the future, such reporting needs to be ensured through appropriately designed incentives and regulations.

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- 34 The CDP report draws the distinction between emissions from sources and emissions intensity, but does not quite clarify if the total emissions reported equalise across different parameters of intensity, as used by various companies.
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