Accelerating Action on Energy & GHG Management
Acknowledgement

This report has been developed with the support of the British High Commission, New Delhi.

Disclaimer

This report was developed by the CII-ITC Centre of Excellence for Sustainable Development in partnership with the Carbon Disclosure Project. The information contained in it does not necessarily reflect the views of the National Council of CII, the Advisory Council of the CII-ITC Centre of Excellence for Sustainable Development or its partners.
Accelerating Action on Energy & GHG Management

Baseline Report
Contents

Introduction 9

1. Climate Change Reporting 11
   1.1 Disclosure trends in key sectors in India 11

2. Investment in Emission Reduction Activities 12
   2.1 Factors driving investment 12

3. Emission Reduction Targets: 15

4. Sector Focus 15
   4.1 Emissions performance 16
       4.1.1 Emissions reductions: Global 500 16
       4.1.2 Emissions reductions: Sector focus 16
   4.2 Setting targets for future emissions reductions 17
   4.3 Emission reduction activities and energy management practices: Global 500 18
       4.3.1 Emission reduction activities and energy management practices: Sector focus 19

5. Driving investment in emission reduction activities 25
   5.1 Methods used to drive investment: Global 500 25
   5.2 Methods used to drive investment: Sector focus 26

6. Emission Reduction activities and energy management practices: Indian Scenario 28
   6.1 Good practices of companies in Emission Reduction and Energy Management 30
   6.2 Methods used to drive investment, Indian Scenario: Sector Focus 33

End Note 37
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUD</td>
<td>Australian Dollar</td>
</tr>
<tr>
<td>BEE</td>
<td>Bureau of Energy Efficiency</td>
</tr>
<tr>
<td>BPO</td>
<td>Business Process Outsourcing</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
</tr>
<tr>
<td>CDP</td>
<td>Carbon Disclosure Project</td>
</tr>
<tr>
<td>CERC</td>
<td>Central Electricity Regulatory Commission</td>
</tr>
<tr>
<td>CFD</td>
<td>Computational Fluid Dynamics</td>
</tr>
<tr>
<td>CII</td>
<td>Confederation of Indian Industry</td>
</tr>
<tr>
<td>CO2e</td>
<td>Carbon dioxide equivalent</td>
</tr>
<tr>
<td>DC</td>
<td>Designated Consumers</td>
</tr>
<tr>
<td>ECBC</td>
<td>Energy Conservation Building Codes</td>
</tr>
<tr>
<td>EES</td>
<td>Energy Efficiency Services Ltd.</td>
</tr>
<tr>
<td>ESCert</td>
<td>Energy Saving Certificate</td>
</tr>
<tr>
<td>EUR</td>
<td>Euro</td>
</tr>
<tr>
<td>FGA</td>
<td>Flue Gas Heat Recovery System</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GHG</td>
<td>Green House Gas</td>
</tr>
<tr>
<td>GICS</td>
<td>Global Industry Classification System</td>
</tr>
<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>LPG</td>
<td>Liquefied Petroleum Gas</td>
</tr>
<tr>
<td>HVAC</td>
<td>Heating, Ventilation and Air-Conditioning</td>
</tr>
<tr>
<td>INR</td>
<td>Indian Rupee</td>
</tr>
<tr>
<td>IPP</td>
<td>Integrated Paint Process</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilo Watt Hour</td>
</tr>
<tr>
<td>NAPCC</td>
<td>National Action Plan on Climate Change</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>NMEEE</td>
<td>National Mission for Enhanced Energy Efficiency</td>
</tr>
<tr>
<td>OEs</td>
<td>Obligated Entities</td>
</tr>
<tr>
<td>PAT</td>
<td>Perform, Achieve &amp; Trade</td>
</tr>
<tr>
<td>REC</td>
<td>Renewable Energy Certificate</td>
</tr>
<tr>
<td>RPO</td>
<td>Renewable Purchase Obligation</td>
</tr>
<tr>
<td>ROI</td>
<td>Return on Investment</td>
</tr>
<tr>
<td>SEC</td>
<td>Specific Energy Consumption</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile Organic Compound</td>
</tr>
</tbody>
</table>
India’s 12th Five Year Plan (2012-2017) has been designed in a way; it lays out the roadmap for delivering the country’s efforts in reducing energy intensity by 20-25% by the year 2025. In addition, rising constraints on access to energy and water resources are adding to the drive for enhancing renewable energy and energy efficiency, and hence calls for increased efforts on behalf of corporates to be more resource efficient.

With the launch of the market-based schemes such as the PAT (Perform, Achieve, Trade) to improve industrial energy efficiency, there will be an additional financial incentive to reduce use of energy in heavy industrial sectors. Analysts have forecast that the low-carbon energy market would grow five-fold through to 2020.

In May 2011, Government of India’s Expert Group on Low Carbon Strategies for Inclusive Growth presented different scenarios for reducing carbon intensity by 2020 - emissions per unit of GDP - from the base year of 2005. The interim report in which the scenarios were presented indicates that over 2005-2008, India has cut its intensity about 4%. Much needs to be done still, and closing the gap requires further efforts in the power, transport, industrial, buildings and forestry sectors. The Expert Group is presently developing a strategy to ensure this which will include policy options and costing. The final report is expected to be released in February 2012, just before the 12th Five Year Plan comes into effect. Government of India also establishes consumption targets for energy-intensive industries under National Mission for Enhanced Energy Efficiency (NMEEE), as well as a cap-and-trade structure. These industries are required to report their energy consumption and have the results verified by a third party.

The greater focus on energy efficiency in India could be given a shot in the arm through the conceptualization and better implementation of the cap-and-trade market mechanism, such as PAT. The Clean Development Mechanism (CDM) has shown good results in the country, India contributes about 20% out of the total registered CDM projects; and Renewable Energy Certificates (REC) and PAT mechanisms have now been put in place. The coexistence of a market-based mechanism will both complement and supplement existing governmental policies and initiatives. While the non-tradable certificates can be used for meeting the compliance targets, the federal setup in India can make use of tradable certificates which can help meet state-level targets. The key objective of the market mechanism will be to ensure the end-user does not pay any incremental cost, and the capital cost of incorporating measures leading to energy efficiency is minimized over time. Further, the ever-expanding energy efficiency market also allows for avenues to employment generation (green jobs).

---

A change in perception on climate change initiatives is becoming more apparent even within the industry. Such activities are now being seen as investments rather than an expense the company has to incur. The ways in which climate change will impact industry is complex, and gives rise to significant business risks and opportunities across a wide range of sectors.

Since half a decade, the Confederation of Indian Industry and the Carbon Disclosure Project have endeavoured to enable the Indian industry to respond to the risks and opportunities represented by climate change. The Disclosure to Action initiative represents the next level in these efforts, bringing some of the best international practices in greenhouse gas (GHG) and energy management to some of the energy intensive industry sectors in India. This report, based on some key performance data from the Global 500 companies, marks the first step in establishing and implementing a sound framework for mitigating the impact of high growth industrial activity in developing economies like India.
1. Climate Change Reporting

In the last decade, there has been a growing trend in transparency in climate change related business strategies, initiatives and performance. Simultaneously, regulatory requirements and stakeholder expectations from all sectors are making companies more conscious about their carbon and ecological footprints. An interesting outfall of this trend is the growing level of interest of companies in revenue-generating climate change initiatives. More importantly, this is leading to the creation and evolution of voluntary carbon emissions reporting and verification systems within different sectors, industries and industry groups.

This is clearly evident from the CDP 2011 response data, 74% (294) of Global 500 respondents disclose absolute or intensity emission reduction targets, an increase from 65% (250) in 2010. This indicates that more and more of the world’s largest companies understand the need to, and benefits of, accelerating actions to reduce emissions. 68% (269) of companies are integrating climate change initiatives into their overall business strategy, up from 48% (187) in 2010. The majority (93%, 368) of 2011 respondents report board or senior executive oversight for their company’s climate change program, up from 85% (328) in 2010. This shows a marked rise in companies linking their climate change strategy with their overall business strategy.

1.1 Disclosure trends in key sectors in India

In 2011, 57 (28%) of the top 200 companies by market capitalisation responded to the global CDP questionnaire. This is an increase of 3.5% as compared to the 2010 status. Further, 89% of the responding companies have reported either Scope 1, 2 or 3 emissions; an increase of 59% as compared to CDP in 2008.

In 2011, the materials sector is ahead of all other sectors in terms of the quality of GHG disclosure. The analysis demonstrates that a 100% GHG disclosure has been reported by the companies from Consumer discretionary; Consumer staples, Energy and Materials Sector.

The analysis also point outs that the non-energy intensive sectors like Financials and Information Technology are also in the lead of GHG emission disclosure.

The graph below depicts the sector-wise GHG disclosure to CDP 2011; the Materials sector is leading in terms of the quality of the disclosure.

Some companies have begun to verify their reported emissions using standards such as GHG protocol, India GHG protocol, ISO14064-1 protocol, GHG Protocol Corporate Reporting Standard etc. to ensure the reliability and accuracy of their emissions data. However, it cannot be missed that most of the reporting companies have not got their emissions data verified or assured. For companies reporting Scope 1 and 2 GHG emissions, 37% of the companies have reported data that is verified or assured (complete or underway). Similarly, 24% of the companies verified or assured their Scope 3 emissions data. This clearly shows that there exists a lot of scope for companies in India to lay greater emphasis on getting their GHG figures verified to ensure reliability of the GHG data.

---

2 Source: CDP 200 report 2011
2. Investment in Emission Reduction Activities

India’s economy is one of the fastest-growing economies in the world. By 2030, it is forecast to be the world’s third-largest economy and is likely to have a GDP of $4 trillion and a population of 1.5 billion. On one hand, the country’s growth implies a unique opportunity to bring hundreds of millions of people out of poverty. On the other, it means that India will face increasing environmental challenges.3

Business in India have started understanding the need to achieve sustainable development, for that the community have to think beyond the traditional practice and to devise new ways to do core businesses differently.

2.1 Factors driving investment

Apart from ongoing inter-governmental processes, many businesses and NGOs are partnering with governments to forge bottom-up solutions on a national and regional level. Speed up ambitious partnerships between business and governments are definitely the key to solving global issues4.

In India, major driving factor for the investment in emission reduction activities were policies/regulatory

---

1 Source: The Hindu Business Line
2 Source: The Hindu Business Line
3 Source: The Hindu Business Line
4 Source: The Hindu Business Line
requirements and creation of dedicated budget for energy efficiency.

Government of India (GoI) has already put in place numerous policy initiatives to promote mitigation and adaptation to climate change, a coordinated effort from all sectors of the industry, government and public will be required to take India on its low-carbon growth trajectory.

Energy Conservation Act 2001

The relevance of legislation to improve end-use energy efficiency in all sectors of the economy was realized as an outcome of a national debate on the need for strengthening the energy conservation movement (USAID’s Distribution Reform Upgrades and Management Programme). The extent of importance accorded by the central government to energy conservation is reflected in formulation of a separate Act ‘Energy Conservation Act 2001’ (shall be referred from hereon as ‘The Act’), which was specifically enacted to promote energy conservation.

The preamble of The Act mentions that The Act is intended to ‘promote efficient and environmentally benign policies’ related to energy use. The key objectives of The Act are:

- To provide a policy framework and direction to the national energy conservation activities
- To coordinate policies and programs on efficient use of energy with the stakeholders
- To establish systems and procedures to verify, measure and monitor energy efficiency improvements
- To leverage multilateral, bilateral and private sector support to implement the Act
- To demonstrate energy efficient delivery systems through public-private partnerships

Nation Action Plan on Climate Change

The National Action Plan on Climate Change (NAPCC) primarily aims at identifying potential opportunities and delineating the path forward for implementation of technologies that address India’s twin needs: sustainable development, adaptation and mitigation of commercial emissions in an accelerated manner. The NAPCC also outlines the focal components of the strategy in the form of eight National Missions, representing a multi-pronged, long-term and integrated strategy to achieve key goals in the context of climate change.

Among the eight national missions under the NAPCC, the National Solar Mission, National Mission for Enhanced Energy Efficiency and the National Mission on Sustainable Habitat are the key components of the strategy to achieve climate change mitigation related objectives.

Perform Achieve and Trade (PAT)

The Perform, Achieve and Trade (PAT) scheme is an initiative under the National Mission for Enhanced Energy Efficiency. It is a market based mechanism to enhance cost-effectiveness of improvements in the energy efficiency of Designated Consumers (DCs). The DCs are energy-intensive facilities / establishments identified across eight energy intensive sectors by Bureau of Energy Efficiency (BEE) in Phase-I for the period 2011-2014. These sectors are: power, iron & steel, cement, fertilizer, pulp & paper, aluminium, textiles and chlor-alkali. So far, about 477 DCs have been identified by BEE.
The scheme received the in-principal approval of the Prime Minister’s Council on Climate Change in August 2009 and the approval of the Union Cabinet on June 2010. The regulatory functions of the PAT scheme will be implemented by BEE and Energy Efficiency Services Ltd. (EES) under the Ministry of Power. BEE is expected to announce energy efficiency targets for DCs by end 2011. Each DC will be mandated to reduce specific energy consumption (SEC) by a fixed percentage within a specified time period of three years. Under the scheme, DCs will have the choice to reduce energy consumption either through the implementation of energy efficiency measures or through the purchase of Energy Saving Certificates (ESCserts). If DC is capable of exceeding its energy-saving targets, then through the PAT scheme, DC can avail the ESCerts and sell them to other DCs.

The PAT scheme can make a vital contribution to India’s low-carbon growth through the promotion of investments in energy-efficiency measures and mandatory energy efficiency benchmarks for energy intensive industries.

Companies are already operating on the assumption that PAT will come into effect soon. The key impact of the measure is to give an additional financial incentive to reduce energy use in heavy industrial sectors. This will shorten the payback period for cash-flow positive investments and bring forward CAPEX on process control technology. Over the medium term, PAT could provide a basis for an internationally compatible sectoral trading mechanism.

**Renewable Purchase Obligation and Renewable Energy Certificates**

The Central Electricity Regulatory Commission (CERC) oversees the Renewable Purchase Obligations (RPO) and Renewable Energy Certificate (REC) mechanism, which aims at meeting the targets for renewable energy specified in NAPCC. Under the NAPCC, the target for the purchase of renewable energy was set at 5% of the total grid power purchase for FY 09-10, with an increase by 1% every year for the next decade. Obligated Entities (OEs) such as distribution licensees, captive power plant owners and open access consumers will be mandated to fulfil RPOs.

**Appliances: more stringent labelling**

Currently, labelling of air conditioners, tube lights, frost-free refrigerators and distribution transformers is mandatory. In addition, ceiling fans, LPG stoves, electric geysers and colour TVs are covered on a voluntary basis. Over the next year, three major developments are expected:

- The labeling programme for refrigerators and air conditioners will become more stringent by one level.
- Two more products from the current voluntary list will be added to the mandatory list.
- A ‘super-efficient equipment’ programme will be launched with the aim of manufacturing products that are 30-50% more efficient than 5-star labeled goods. Ceiling fans are likely to be the first product.

These initiatives will result in a push from manufactures to clear their inventories before the new standards become applicable.
Buildings: new state regulations

The Bureau of Energy Efficiency (BEE) is currently discussing the incorporation of the Energy Conservation and Building Codes (ECBC) into municipal by-laws in 8 states and successful integration in most of these states might take place by the end of 2012. The initial focus for a star rating system for commercial buildings is on the offices of IT companies, Business Process Outsourcing (BPOs), and few more categories.

Transport: carbon reduction rules

With transport sector accounting for 40% of India’s oil consumption, the BEE is also drawing up new carbon performance standards based on average fuel economy (in miles/litre or km/litre of fuel consumed) for the automobile industry for 2015 and 2020. The standards will be launched by April 2012.

Electric Vehicles: new roadmap

Following the GoI announcement in March 2011 that it would set up a National Mission for Hybrid and Electric Vehicles, it has launched a National Mission for Electric Mobility. The mission is expected to launch an electric vehicles roadmap soon, which lays out a holistic approach to develop the electric vehicle industry. The roadmap will include policy support and other incentives requirements and clearly defined short term and long term objectives.

3. Emission Reduction Targets

In 2011, several (48%) respondents did not have any quantified emission reduction targets that were active, ongoing or reached completion in the reporting year. Over 41% of the responding companies have reported an intensity target for emission reduction, and only one company reported an absolute target. Also, 4% of the respondents reported both absolute and intensity targets.

Table 01: Targets & Initiatives, India 2011

| Percentage of respondents with intensity emission reduction targets | 41 |
| Percentage of respondents with absolute emission reduction targets | 2  |
| Percentage of respondents with absolute and intensity emission reduction targets | 4  |
| Percentage of respondents with no emission reduction targets | 48 |
| Not Answered | 4 |

4. Sector Focus

This report sets out data from the CDP Global 500 Report 2011 and CDP India 200 Report 2011 (aggregate and specific industries) as well as the emission reduction examples from Indian companies. It focuses on energy management and emissions reduction activities being employed within companies in the following sectors / industry groups in detail:

* Automobiles and Automobile Components
* Utilities
4.1 Emissions performance: Global 500

4.1.1 Emissions reductions: Global 500

In 2011, 41% (165) of responding companies in the Global 500 reported a year on year absolute reduction in emissions. However, 58% (232) of responding companies reported a year on year reduction in emissions intensity. Almost half (192) of the companies reported that they had achieved emissions reductions as a result of undertaking emissions reductions activities. The reductions ranged from 0.05% to 99.2%, with an average of 7.5%.

4.1.2 Emissions reductions: Sector focus

The sector with the greatest number of companies reporting an absolute reduction in emissions was the Utilities sector, with seven companies (35%) reporting an absolute reduction (see figure 2) is lower than the overall proportion of Global 500 companies reporting an absolute reduction (41%). The sector with the fewest companies reporting an absolute reduction in emissions was the Materials sector, with only six companies (16%) reporting this. The average proportion of companies in these sectors reporting an absolute reduction in emissions was 27%.

However, the Materials sector was also the sector with the greatest proportion of companies reporting...
a year-on-year reduction in emissions intensity, with 29 (76%) companies reporting this (see figure 3)
apportion exceeds the overall proportion of Global 500 companies reporting a year-on-year reduction in
emissions intensity (58%). The sector with the lowest proportion of companies reporting a year-on-year
reduction in emissions intensity was the Oil, Gas and Consumable Fuels sector, with only 16companies
(46%) reporting this. The average proportion of companies in these sectors reporting a reduction in
emissions intensity was 62%.

### 4.2 Setting targets for future emissions reductions

Out of 400 responding companies in the Global 500, 304 (76%) reported that they have one or more
emissions reduction targets and gave some details about the targets. 177 companies reported having absolute
emissions reduction targets, whereas 183 companies reported having emissions intensity reduction targets
(several companies reported more than one type of target). Of these 183 companies, 103 reported having
intensity targets for which a decrease in absolute emissions is expected and 44 companies reported intensity
targets where an increase in absolute emissions is expected. 12 companies reported intensity targets where
no change in absolute emissions is expected and 58 companies reported intensity targets with no clear
expected change in absolute emissions.

Figure 04 below shows the total number of targets (596) reported in six Scope categories. The most common
type of target reported covered all three scopes of emissions (Scope 1 + Scope 2 + Scope 3).
4.3 Emission reduction activities and energy management practices: Global 500

The vast majority of companies (382) reported that they had undertaken emissions reduction initiatives. The most popular activity with a payback period of less than one year was behavioural change, whereas the most popular activity with a payback period of one to three years was improving the energy efficiency of processes (see Figure 5). In contrast, the most favoured activity with a payback period of over three years was improving the energy efficiency of building services.
This demonstrates that many companies are looking for opportunities to reduce their carbon footprint and that energy management can provide a good source of emissions reductions with a relatively short financial payback across the leading companies.

### 4.3.1 Emission reduction activities and energy management practices: Sector focus

In contrast to the results for the Global 500 companies, the most popular emissions reduction activity with a payback period of one year or less and one to three years amongst the four sectors examined was increasing the energy efficiency of processes (Figure 06). The most popular activity amongst the four sectors with a payback period of over three years was through low carbon energy installation and improving the efficiency of processes.

![Figure 6](image)

**Figure: 6.** Number of companies in the four sectors examined choosing each emissions reduction activity with a payback period of less than one year, one to three years and over three years.

#### Automobiles and Automobile Components

Within this sector, the most popular emissions reduction activity with a payback period of one year or less was behavioural change, which three companies chose to undertake (see Figure 07). The most popular emissions reduction activity with a payback period of one to three years was process emissions reductions, which four companies chose to undertake. Low carbon energy installation was by far the most popular emissions reduction activity with a payback of over three years, with 11 companies undertaking this activity.

#### Company examples of energy efficiency activities

*The principal technological and process solutions already adopted by various Sectors...to reduce energy consumption include:

- high-efficiency lighting systems (LED or traditional technology) for production facilities, offices and external areas, combined with light intensity regulators and remote controls (FGA and Comau)
- flue gas heat recovery systems (FGA)
high-efficiency engines, electric motor inverters and variable speed air compressors (MagnetiMarelli, Fiat Powertrain)

heating systems with heat exchangers, air destratifiers and automatic management systems (FGA, MagnetiMarelli and Teksid).

All the reported initiatives, developed on a voluntary basis by the Group, will have an impact on Scope 1 and 2 of Group’s emissions. These solutions apply to processes with an expected lifetime of over 3 years and their application will be further extended within the Group.

**Fiat, on the Group’s energy efficiency activities with a payback period of one to three years.**

“Significant amounts of energy were saved through the implementation of the “best practice” approach for innovative production technologies. One example of this is the new Integrated Paint Process (IPP) technology which was initially developed at the Oxford plant and introduced at the Spartanburg plant in 2010. The technology ensures considerably lower environmental pollution and higher productivity at the same time. After full conversion, energy consumption in the paint shop will be reduced by 30%, CO2 emissions by 43% and solvent emissions (VOC) by 7%. Scope: Scope 1 and 2; type of initiative: mandatory initiative; stage of development: phase of use, planning phase for further plants; expected lifetime: 15-25 years.”

**BMW, on the company’s energy efficiency activities with a payback period of less than one year.**

**Oil, Gas and Consumable Fuels**

The most popular emissions reduction activity with a payback period of both less than one year and one to three years was improving the energy efficiency of processes, which 12 and 56 companies chose to undertake respectively (see Figure 8).
Company examples of energy efficiency activities

“We are in the midst of planning to move our headquarters to Cenovus’s brand new office tower in Calgary, currently under construction, The Bow. The Bow will be an environmentally sustainable complex that responds to the needs of our employees. The building orientation maximizes sunlight and views, while the building form reduces wind load. The Bow’s unique aerodynamic crescent shape, with an inversely curved, south-facing atrium, is designed to absorb the sun’s energy and create a tempered buffer zone which warms the tower during the winter months. Displaced venting from the active systems in the office area will provide cooling in the summer months. Other sustainable features include:

1) An interlacing diagrid design which reduces the amount of steel required;

2) Enhanced indoor air quality through unique air distribution systems using under floor mechanical systems and the atriums for air displacement;

3) An estimated energy reduction of over 19 million KWH/yr and cut annual CO2e emissions by 45 million pounds (~21,000 tonnes CO2e).

Cenovus employees will occupy The Bow by mid-2012.”

Cenovus Energy, on the company’s energy efficiency activities with a payback period of one to three years.

“In our Bulwer Refinery in Australia in 2010 we achieved real sustainable reductions in CO2 emissions as a result of risk assessing and then turning off some natural gas purges to our flare header. We looked for places where there was already a flow, no chance of oxygen ingress and the streams were not corrosive. The annual savings are approx AUD$400K, depending on natural gas price. There was no capital investment to implement this project. Thus there is no payback period either. The only real cost is extra inspection around the flare header to ensure that we are not increasing any corrosion.”
BP, on the company's energy efficiency activities with a payback period of less than one year.

"Nature of activity: A focused program to build and implement an energy management system (CEMIS) in the control rooms was used to drive improved energy efficiency performance in 2010 in the Moerdijk chemical plant. The plant is located in the Netherlands and makes products for the chemicals industry such as ethylene, benzene, styrene monomer and propylene oxide. Scope: Scope 1; Voluntary/mandatory: voluntary; Development Stage: implemented; Expected lifetime: Over 10 years"

Royal Dutch Shell, on the company's energy efficiency activities with a payback period of less than one year.

"Refinery energy optimization program at HOVENSA -- Installation of meters and other hardware and software to optimize energy efficient operations for type of crude oil and refinery configuration. Some of this investment was to meet the USEPA’s GHG Mandatory Reporting Rule and some was voluntary. The energy optimization program is now part of refinery operations and will be in place as long as the refinery operates."

Hess Corporation, on the company's energy efficiency activities with a payback period of less than one year.

Materials

The most popular emissions reduction activity with a payback period of less than one year and one to three years within the Materials sector was improving the energy efficiency of processes (see Figure). The most common activities with a payback period of over three years were improving the energy efficiency of processes (10 companies) and improving the energy efficiency of building services (eight companies). Low carbon energy installation was also a particularly popular activity with a payback period of over three years amongst Metals and Mining companies, as five companies endeavoured to reduce their emissions in this way.

Figure: 9. Number of Materials companies choosing each emissions reduction activity with a payback period of less than one year, one to three years and over three years.
Company examples of energy efficiency activities

“As part of a global projects review process, engineers voluntarily revisited the design of our newest greenfield iron ore venture in Brazil (Minas-Rio) to find opportunities to reduce operating costs over the estimated 33-year life of the project. They found that by investing more in its initial construction – which includes three major design improvements to the plant and one in the mining operation – an anticipated 33% or 550,000 MWh saving on electricity per annum could be achieved (Scope 2), along with around 12 million litres of diesel a year (Scope 1). Combined, these could reduce the carbon emissions related to the project by an estimated 50,000 tonnes annually.”

Anglo American, on the company’s energy efficiency activities with a payback period of one to three years.

“More than 60 individual energy efficiency projects were implemented at our sites in North America initiated by a process optimization program. For example at the Geismar site in Louisiana, the product yield was increased and energy saved at the ethylene oxide plant by using an improved control system based on model predictive controls. Energy savings of more than €5 million were achieved through these projects in 2010. The activities refer to our scope 1 and scope 2 emissions and are fully developed. They are voluntary and the lifetime of those activities is expected to be an indefinite period.”

BASF, on the company’s energy efficiency activities with a payback period of one to three years.

“Multiple projects to reduce heating/cooling and modify lighting at the company’s headquarters. Over the past 18 months, we have decreased total energy consumed per degree day by 10 percent, and over the last four fiscal years, we have reduced GHG emissions by more than 8,000 metric tons CO2-e.

i. Nature of activity – modified temperatures controls, automatic lighting;
ii. Scope – at corporate headquarters;
iii. Voluntary or mandatory – voluntary;
iv. Stage of development – changes implemented;
v. Expected lifetime – ongoing”

Air Products and Chemicals, on the company’s energy efficiency activities with a payback period of less than one year.

“Fuel shift from coal to natural gas for site steam supply at DuPont’s Old Hickory facility in Tennessee. There was no significant investment required for that since the boilers were equipped to fire gas already. This voluntary activity was completed in 2010 and resulted in Scope 1 emission reductions which will continue while these boilers are utilized.”

DuPont, on the company’s energy efficiency activities with a payback period of less than one year.

Utilities

The most popular emissions reduction activity with a payback period of one year or less was behavioural change, which three companies chose to undertake (see Figure 10). The most popular emissions reduction
activity with a payback period of one to three years was process emissions reductions, which five companies chose to undertake. Low carbon energy installation was by far the most popular activity with a payback period of over three years, with 17 companies undertaking this activity.

![Figure 10. Number of Utilities companies choosing each emissions reduction activity with a payback period of less than one year, one to three years and over three years.](image)

**Company examples of energy efficiency activities**

“Fortum made decision to improve the quality of coal used in Russia by gradually changing to coal with lower ash and sulphur content and better heat value. Coal change was started in late 2010. Better quality improves the energy efficiency and consequently reduces CO2 emissions.”

**Fortum Oyj, on the company’s energy efficiency activities with a payback period of one to three years.**

“E.ON Ruhrgas moved in a new building in 2010, which sets standards in terms of energy efficiency and climate protection. With the aid of various technological innovations, primary energy demand for heating, cooling and ventilation systems is reduced by some 40% compared with conventional buildings. Each office can be ventilated separately; a cooling/heating ceiling provides the room climate desired. E.ON Ruhrgas is using gas-fired combined heat and power generation to ensure low CO2 emissions. A packaged cogeneration system provides the heat supplies for the building, and a photovoltaics system on the roofs of the low-rise buildings rounds off the innovative energy concept. In the UK, the installation of SMART building technology at our Greenwood site has reduced energy consumption by 15%, saving EUR 33,000, and at our Westwood site an energy reduction of 14%, saving EUR 33,000. Estimated savings per annum across the two sites are 1.1m KWh, which will save EUR115000 and 615 tonnes of CO2. 142 LED street lights have been installed in the car parks at Greenwood and Westwood reducing energy consumption by 60%. We also aim to create a zero carbon workplace by 2030 in the UK unit. Therefore detailed site energy efficiency plans are in place for our top 19 energy consuming sites. A number of site surveys have been undertaken to identify additional sites where PV can be installed. We’re trying to extend this program to Germany and are already identifying buildings where this could be realized.”

**E.ON, on the company’s energy efficiency activities with a payback period of one to three years.**
"Activity: Since 2004, Endesa has implemented a program to reduce energy consumption in the Headquarters in Madrid. Between 2004 and 2010, actions carried out represented a reduction of 28% on energy consumption. Specifically for 2010, this reduction represented 4%. Examples of actions carried out during 2010 comprise: installation of thermostatic systems in showers to reduce water and energy consumption, awareness campaigns including subcontractors working in the building, etc. Scope: 2; Voluntary/mandatory: Voluntary; Development stage: ongoing program. These measures are to be implemented in all Spanish office building during the next year and to be extended to other countries in the future. Lifetime: indefinite, as this program is part of the environmental management system."

Endesa, on the company’s energy efficiency activities with a payback period of less than one year.

5. Driving investment in emission reduction activities

In 2011 CDP asked respondents for the first time to identify the methods they used to drive investment in emission reduction activities. This provides valuable information for investors and companies alike, allowing a greater understanding of successful business practices that can promote sustainable investment.

5.1 Methods used to drive investment: Global 500

The three most commonly used methods for driving investment in emissions reduction activities were compliance with regulatory requirements or standards and creation of a dedicated budget for energy efficiency (see Figure: 11).

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnering with governments on technology development</td>
<td>100</td>
</tr>
<tr>
<td>Marginal abatement cost curve</td>
<td>80</td>
</tr>
<tr>
<td>Lower return on investment (ROI) specification</td>
<td>60</td>
</tr>
<tr>
<td>Internal price of carbon</td>
<td>40</td>
</tr>
<tr>
<td>Internal incentives/ recognition programs</td>
<td>20</td>
</tr>
<tr>
<td>Internal finance mechanisms</td>
<td>20</td>
</tr>
<tr>
<td>Financial optimization calculations</td>
<td>20</td>
</tr>
<tr>
<td>Employee engagement</td>
<td>20</td>
</tr>
<tr>
<td>Dedicated budget for other emission reduction activities</td>
<td>20</td>
</tr>
<tr>
<td>Dedicated budget for low carbon product R&amp;D</td>
<td>20</td>
</tr>
<tr>
<td>Dedicated budget for energy efficiency</td>
<td>20</td>
</tr>
<tr>
<td>Compliance with regulatory requirements/standards</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure: 11. Number of companies reporting each type of method for driving investment in emissions reduction activities.
5.2 Methods used to drive investment: Sector focus

Across the four sectors examined, the most common method used to drive investment in emissions reduction activities was compliance with regulatory requirements or standards, which were cited by 65 companies (see Figure 12). The least favoured activity was a lower return on investment (ROI) specification, cited by only eight companies.

**Automobiles and Automobile Components**

Within this sector, the most popular methods for driving investment in emissions reduction activities were creation of a dedicated budget for energy efficiency and compliance with regulatory requirements and standards, cited by six companies each (see Figure 13).
Oil, Gas and Consumable Fuels

The most method of driving investment in emissions reduction activities in the Oil, Gas and Consumable Fuels sector was compliance with regulatory requirements and standards, cited by 21 companies (see Figure 14).

Figure: 14. Number of Oil, Gas and Consumable Fuels companies reporting each type of method for driving investment in emissions reduction activities.

Materials

Results for the Materials sector are consistent with those for the four sectors overall, with compliance with regulatory requirements and standards as the most common method of driving investment in emissions reduction activities (see Figure 15). Employee engagement and creation of a dedicated budget for energy efficiency were also popular methods. However, within the Metals and Mining industry group, creation of internal incentives and recognition programs was also a particularly common method for driving investment in emissions reductions.

Figure: 15. Number of Materials companies reporting each type of method for driving investment in emissions reduction activities.
Utilities

Results for the Utilities sector also reflected those of the four sectors overall, with compliance with regulatory requirements and standards cited most frequently (16 companies) as a method used to drive investment in emissions reduction activities (see Figure 16).

![Figure 16](image)

**Figure 16.** Number of Utilities companies reporting each type of method for driving investment in emissions reduction activities.

6. Emission Reduction activities and energy management practices\(^5\): Indian Scenario

The Financials sector leads in the year 2011 with highest number of respondents. Material sector has the second highest number of respondents, followed by IT. The number of companies responding from each sector is given in the following graph.

In 2011, 89% of the companies\(^6\) observed some sort of risk due to climate change, and 87% of the respondents see positive revenue avenues from regulatory changes because of experience of working in a developing country, with rapidly changing regulations and business climate. Further, 50% and 65% of the

\(^5\) Source: CDP India 200 report 2011; and The resource efficiency mantra, HSBC Global Research

\(^6\) Source: CDP India 200 report 2011.
Carbon Disclosure Project respondents are looking forward to cashing in on physical opportunities, and other opportunities arising out of climate change related developments, respectively.

**Regulatory Opportunity**

The companies are looking forward to secure maximum revenue from new regulations in the form of tradable certificates through schemes such as PAT, Renewable Purchase Obligations (RPO) and the CDM. Coming off blocks early by manufacturing sustainable products or sustainable services, will provide opportunities like charging premium prices. Such steps can result in greater capital availability. This helps in achieving greater discipline, stakeholder acceptance, reduced operational costs, and wider social benefits.

**Physical Opportunities**

About 50% of the responding companies foresee physical opportunities in the near future. A lot of respondents are big players in their fields, and thus, they believe they are in a better position to capitalize because of their strong management structures and wide operational infrastructure. This, they believe, will enable them to fight regional competition better.

**Other Opportunities**

While evaluating other opportunities, 65% of the responding companies see climate change related developments as an opportunity to rebrand themselves, leading to benefits such as greater stakeholder awareness, disclosure on economic, social and environmental performance indicators, and improvement in governance, enhanced reputation in the market, as well as providing intangible benefits in the form of international acceptance, funding, employee turnover and smoother project clearances. These consequences are perceived to cause significant impact to their business by 17% of the respondents.

**Figure: 17. Sector-wise response of companies to emission reduction targets**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>7</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>4</td>
</tr>
<tr>
<td>Utilities</td>
<td>3</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>3</td>
</tr>
<tr>
<td>Financials</td>
<td>9</td>
</tr>
<tr>
<td>Industrials</td>
<td>7</td>
</tr>
<tr>
<td>Energy</td>
<td>5</td>
</tr>
<tr>
<td>Materials</td>
<td>8</td>
</tr>
</tbody>
</table>
6.1 Good practices of companies in Emission Reduction and Energy Management

Emission reduction activities and energy management practices

There are a number of ways to pursue energy efficiency projects which too includes low-investment, fast-payback measures. Some of the measures are as follows:

- Lighting upgrades,
- Energy supply and demand management strategies, and
- Behavioural improvements

Apart from the above longer-payback measures like HVAC and control improvements, onsite renewable energy, smart grid or smart building technologies, and building envelope improvements also have a huge potential in India.

The investors are more inclined towards larger-investment, longer-payback projects than did those with smaller facilities.

Indian organisations appear to focus on four key good practices for implementing energy efficiency measures:

- Setting energy or carbon reduction goals,
- Analysing energy data frequently,
- Adding internal or external resources to undertake efficiency projects; and
- Using external financing to help pay for projects.

Overall, organizations that followed all four best practices had implemented an average of 10.2 efficiency measures, and those that followed none of the four had implemented 2.2 measures. Data also showed:

- 85% of respondents had an energy or carbon reduction goal.
- Executives in the industrial sector were the most likely to analyse energy data often.
- 72% of respondents said they had added resources to deal with efficiency.

The most commonly used energy efficiency measures in are

- Switching to energy-efficient light bulbs, lamps, ballasts or fixtures.
- Replacing inefficient equipment before the end of its useful life.
- Increasing preventive maintenance schedules.
- Implementing computer or electronics power management.

---

De-lamping, or removing fixtures in over-lit areas.

- Employing a centralized control system for lighting.

![Image](image_url) **Figure: 18. Survey of Good Practices in energy efficiency**

<table>
<thead>
<tr>
<th>Practice Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set a reduction goal 85% of respondents have either an energy or carbon goal</td>
<td>8.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Analyze energy data frequently Industrial sector reviewing data most often</td>
<td>8.8</td>
<td>6.6</td>
</tr>
<tr>
<td>Adding internal or external resources 72% of respondents have added resources</td>
<td>9.0</td>
<td>6.1</td>
</tr>
<tr>
<td>Using external financing Easier for longer facilities to obtain attractive rates</td>
<td>9.7</td>
<td>5.2</td>
</tr>
</tbody>
</table>

10.2 measures adopted by organizations with all 4 best practices

2.4 for those with none

![Image](image_url) **Figure: 19. Scope-wise emissions disclosed, in metric tonnes of CO2 equivalent**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Scope 1</th>
<th>Scope 2</th>
<th>Scope 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Discretionary</td>
<td>127987.48</td>
<td>1093921</td>
<td>219733</td>
</tr>
<tr>
<td>Energy</td>
<td>0</td>
<td>326680.88</td>
<td>1721843.73</td>
</tr>
<tr>
<td>Financials</td>
<td>56604.32</td>
<td>1342940</td>
<td>9423338.75</td>
</tr>
<tr>
<td>Industrials</td>
<td>1342940</td>
<td>1721843.73</td>
<td>3607.01</td>
</tr>
<tr>
<td>Information Technology</td>
<td>464697.62</td>
<td>935258.5</td>
<td>158077.34</td>
</tr>
<tr>
<td>Materials</td>
<td>975565.38</td>
<td>1607576</td>
<td>35073841</td>
</tr>
<tr>
<td>Utilities</td>
<td>11096</td>
<td>129618</td>
<td>14797069</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>280</td>
<td>3175308</td>
<td>2843081</td>
</tr>
</tbody>
</table>

Tonnes of CO2 @equivalent
Critical cooling system design

Educating facilities operations staff or increasing awareness among facility occupants to reduce energy use

When asked which on-site technologies they expected to have the greatest increase in market adoption over the next 10 years, India’s respondents most often mentioned lighting technologies, advanced building materials, solar photo voltaic, other solar technologies, and smart building technology.

Shift towards Green buildings

Energy Efficiency Indicator survey 2011 conducted by Johnson Controls indicates that there is a strong growth in emphasis on green buildings. About 53% of the respondents said they planned to pursue green building certification in the next year, either for new construction or for existing buildings and 12% more than last year said they had at least one certificated green building. In addition, 38% said they had incorporated green elements in their building without certifying.

Developing Energy Management Program for an Organization

Energy management programs are essential for reducing energy use in buildings within any organization. The steps involved in developing an energy management program for a facility is depicted in the below (see figure 20).

Figure 20. Steps involved in developing energy management program

---

Buildings accounts for at least 40% of energy use in most countries. TERI had conducted an analysis on High Performance commercial buildings. According to the analysis the overall energy saving potential that can be realized in the existing Wipro building (in Wipro best case) is summarized as follows (see figure 20).

- Overall saving potential in cooling load (TR) is 23%.
- Overall saving potential in electrical load (kW) is 17%.
- Overall saving potential in energy consumption (kWh) is 14%.

![Figure 21](image)

**Figure 21** Overall impact of Low-energy strategies

### 6.2 Methods used to drive investment, Indian Scenario: Sector Focus

**Energy Sector and Industrial sector**

Within these sectors 5 companies from Energy sector and 7 companies from Industrial sector participated in CDP 2011 and the key opportunities identified by the sector are as follows

---

11 Source: TERI – High Performance Commercial Building in India
Opportunity to earn revenues from mechanisms like PAT and CDM

Entering new and growing markets like bio fuels

Opportunity to invest in renewable energy

Improving energy efficiency at plants and reducing fuel costs

Product labeling regulations & standards provide greater opportunities for business since many products have to meet required international certifications

Catering to the growing demand for energy efficient equipments.

Changing weather patterns would lead to demand for new varieties of construction materials and new types of infrastructures.

**Example from the Industries**\(^2\)

The annual savings achieved from the implementation of the project ‘steam generation using parabolic solar concentrators by Kirloskar Copeland Ltd. is INR 1.5 lakhs. The total investment made is INR 5.64 lakhs. 35% subsidy was availed by Government. The simple payback period for the amount invested by the plant works out to 30 months.

**Financial Sector**

Government’s focus on renewable and clean energy provides significant investment opportunity for the sector to focus in the emission reduction initiatives. The other driving factors are Extreme weather conditions may fuel the need for change in insurance products across the health sector, agriculture and building contractors. The other major factor is the unexpected changes in the fuel and commodity prices provide the opportunity to diversity the financial portfolio.

**Information Technology Sector**

In the case of IT sector 7 companies responded to CDP 2011 the opportunities identified are, the revenue earning through selling of Carbon Credits, mandatory regulation for emission reporting will generate new demands for automated emission reporting tools and emission regulations and compliances provide opportunity for new offering and services in Green IT domain.

**Example from the Industries**\(^3\)

**Measure: Use of cold outdoor air for cooling during night and early mornings**

**Implementation Highlights**

Energy savings of 20% envisaged.

Can be implemented in air conditioning systems where outdoor night and early morning temperatures are lower than 24°C.

---


\(^3\) Source: Bureau of Energy Efficiency, India
Initially implementation of the measure was carried out by manual operation. After seeing the results, the company went for automatic controls, which are simple. Reduces the compressor operating hours thereby increases the life of the equipment and refrigerant. Since 100% fresh air is circulated the volatiles and formaldehydes were flushed off fully and make the space fresh.

**Details of techno-economics:**

Average energy consumption of the chiller unit is 81 kW
Reduction in operating time of chiller unit: 1400 hours in a year
Annual Energy savings: 1.13 Lakh kWh
Payback period: 6 months

**Materials Sector:**
The responded 8 companies in the material sector identified opportunities to focus on emission reduction measures; the opportunities are as follows;

- Opportunity to earn money through domestic and international schemes like CDM and PAT
- Increased focus on energy efficiency will lead to lowering of fuel costs.
- Extreme weather conditions may lead to increased demand for climate resistant materials.
- Opportunity to forge better relationship with local community

**Example from the Industries**

Implementation of the Computational Fluid Dynamics (CFD) analysis & Flow smoothing project by Dalmia Cements resulted in an annual saving of 6 lakhs kWh. The investment made was INR 5 lakhs. The total saving achieved is INR 14.5 lakhs with a payback of 5 months.

Apollo Tyres Limited has implemented ‘heat recovery from the hot water system of tyre curing section’ resulted in reduced steam consumption in the de-aerator, reduced the fresh water make-up as well as reduction in power consumption of the pump.

Steam consumption for process heating came down to 60MT/day from the original 120MT/day. Flash steam losses were almost eliminated. The reduced steam consumption, in turn, resulted in reduction in fuel consumption of the boiler to the extent of 4000 litres/day.

**The annual savings achieved is INR 7.8 lakhs. The investment made for this project is INR 9 lakhs. The simple payback period is 14 Months.**

**Utilities Sector**
The opportunities identified in the sector are as follows:

---

14 Source: Bureau of Energy Efficiency, India
Government of India is promoting Renewable Energy hence there are opportunities to earn revenues through various schemes like CDM and RECs.

- Opportunity to forge better relationships with stakeholders by disclosing climate change performances.
- Extreme weather conditions will increase the demand for air conditioning. This in turn would lead to greater demand for power.
- Opportunity to diversify into power generation from Renewable Energy sources like wind, hydro etc.

**Examples from the Industries**

**Measure: Improving the Specific steam consumption of power plant**

The captive power plant is run by a Condensing type turbine. The Turbine exhaust was maintained at 0.25 ata by operating Air Cooled condensers. Slowly by other steam conserving measures, The CPP capacity was increased from 2.5 MW to 3 MW. The Air Cooled condensers were the bottleneck and the turbine exhaust shot to 0.5 ata, increasing the specific steam consumption from 6 kg/kW to 6.5 kg/kW. In the same complex, we also have a Thermal desalination plant which requires steam at 0.3 ata. A team at 1.5 ata also was available in the plant. The 1.5 ata steam was used as motive steam to suck the CPP, turbine exhaust and take it to thermal desalination plant through a Thermocompressor. This reduced the backpressure of the turbine back to 0.25 ata and also fed steam to the thermal desalination plant to make more DM water. There was dual benefit of water generation and efficiency improvement of turbine.

**Cost Benefit Analysis**

- Annual energy Savings: Rs. 27.00 Lakhs per annum
- Actual cost savings: Rs. 40.00 Lakhs per annum
- Actual investment: Rs. 80.00 Lakhs
- Payback: 2 years

---

15 Source: Bureau of Energy Efficiency, India
End Note

The period leading up to 2020 forebodes increasing demand for more stringent business action, and a shift from the business-as-usual growth for economies worldwide, necessitating deployment of low carbon strategies. Added to this, the Government of India has clearly put forward its expectations from the Indian businesses by articulating its low carbon aspirations through the consistent deployment and implementation of national missions under the NAPCC framework and the 12th five year plan.

Indian businesses have already started to expand in the global as well as domestic markets. Establishing integrated, efficient and effective frameworks will be imperative to mitigate the environmental effects of their rapid growth, as well as managing the requirements from a widening stakeholder base and diminishing natural resources.

This report is an attempt to share the experiences in order to learn from some of the best available practices in the global arena on climate change management under the aegis of the Disclosure to Action project. The partners CII and CDP have developed a baseline for implementing GHG and energy management strategies in energy intensive sectors in the Indian economy. Beyond managing the risks alone, this study showcases the economic benefits of putting in place organisation-wide GHG abatement initiatives embedded in business operations, and driven by the corporate leadership.
Project Partners

CII-ITC Centre of Excellence for Sustainable Development enables businesses to transform themselves by embedding concepts of sustainable development into their strategies, decisions and processes.

Contact: Dr. S. Majumdar
Tel: +91 11 4150 2308
Email: s.majumdar@cii.in
Web: www.sustainabledevelopment.in

CARBON DISCLOSURE PROJECT

Carbon Disclosure Project (CDP) is an independent, not-for-profit organization holding the largest database of primary corporate climate change information in the world.

Contact: Mr. Damandeep Singh
Tel: +91 98100 45950
Email: damandeep.singh@cdproject.net
Web: www.cdproject.net