VALUATION OF ENERGY COSTS IN THE INDIAN CONTEXT

A survey based study of select Indian corporates

The Energy and Resources Institute
...towards global sustainable development
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This outline paper is part of a project that seeks to understand the preparedness of India Inc. in putting a value to Energy Costs. Hence this paper is not to be considered as the final report.

For more **information**

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We thank all the corporates for their enthusiastic participation.

Introduction

India is the second most populated country in the world. However, about 30% of the population does not have access to electricity and the per capita energy consumption is about 1/4 the global average. Considering the diversity and geographical expanse of the nation, India faces unique challenges to development, driven by its unique priorities.

Through various national missions on solar energy, energy efficiency, sustainable habitat, etc., India is working towards mitigation and adaption for climate change, but a greater effort is required to make India energy secure.

The burgeoning gap between the demand and supply for energy, and an increased dependence on imports has resulted in increased costs of energy. India's Nationally Determined Contributions (INDCs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) state a target of 30%–35% reduction in emissions intensity of its GDP by 2030[1]. While many businesses are taking actions towards meeting the national targets and mitigation of climate change, an increased private sector involvement is needed to address the expected impacts of global temperature increase.

To catalyse the involvement of businesses in India, TERI's Council for Business Sustainability (CBS)[2] in collaboration with the World Bank Group initiated a project to assess the readiness of the Indian businesses in putting a value to the consumed energy, and to internalise the social cost of carbon emissions, which the society pays in many forms. The study is in sync with the mandate of Carbon Pricing Leadership Coalition (CPLC) to garner momentum in strengthening carbon pricing policies within businesses and enabling investments to address climate change.

Carbon Pricing is Gaining Momentum

An increasing number of governments consider carbon pricing to be good fiscal and environmental policy. Today, 40 countries and over 20 cities, states, and provinces are already putting a price on carbon including 7 out of the 10 largest global economies. All these instruments cover 13% of global emissions and have a collective value of $50 billion; allowing governments to raise about US$26 billion in revenues in 2015. This is a threefold increase over the past decade. Since 2012, the number of implemented or scheduled carbon pricing instruments nearly doubled. Last year, Chile approved a national carbon tax to start in 2018. In January 2016, South Korea launched an ambitious carbon market.

From the business side, currently over 1,200 global businesses use an internal carbon price or plan to do so in the next 2 years to become first movers in clean energy markets. The most rapid growth in corporate carbon pricing is happening in regions like China, Korea, and the EU, which have pricing in place.

While this momentum is encouraging, current price levels and coverage will not put us on a 2 degree development pathway. The majority of emissions-85%-are priced at less than US$10 per ton of CO_2, which is lower than the price that economic models say is needed to meet the climate stabilization goals recommended by scientists. To help advance well-designed carbon pricing systems in countries around the world, the Carbon Pricing Leadership Coalition was launched at COP21, bringing together governments, businesses and NGOs to help accelerate the pace of carbon pricing implementation around the world (www.carbonpricingleadership.org).

The objectives of the study are:

1. To understand valuation of energy costs in the Indian Context and gauge corporate preparedness in putting an internal cost to carbon
2. To showcase results of the study at the World Sustainable Development Summit (WSDS), TERI's flagship event to be hosted in October 2016.

The three phases of the study:

Phase 1: In the first phase of the project, a Leadership Summit for Sustainable Development (LSSD) was held in Mumbai on June 7, 2016 where leaders of corporate India agreed that India is very well placed to be at the forefront to build the world's low-carbon economy.

[1] http://unfccc.int/resource/docs/natc/indbur1.pdf

[2] TERI CBS is an independent and credible platform for corporate leaders to address issues related to sustainable development and promote leadership in environmental management, social responsibility, and economic performance (the triple bottom line). Presently, the network has more than 100 corporate members across India representing a varied section of Indian industry. For more information, visit our website: <http://cbs.teriin.org>.

Leadership Summit for Sustainable Development

(7 June 2016)

Corporate Consultations

(July-September 2016)

Final Consultation and Thematic event at WSDS

(October 2016)

PHASE 01

Discussions with 150+ corporate leaders

PHASE 02

-Consultations with 100+business leaders
-Surveyed 25 companies
-In-depth case studies from 8 corporates

PHASE 03

-Outline Paper on preparedness of Indian companies in putting a value to energy costs
-Consultations with 200+ corporates at WSDS

Questionnaire

Case Studies

Webinar 1 ▶ Title: Carbon Pricing Landscape Triggering Business Actions
Date: 9 August 2016

Webinar 2 ▶ Title: Evolution of Carbon Markets and Policy in India
Date: 29 August 2016

Webinar 3 ▶ Title: CPCL: Global Overview of Momentum to Price Carbon
Date: 15 September 2016

The Summit themed as 'Translating India's NDCs to Business Actions', received an overwhelming response with participation from 100+ delegates including CBS member companies. An exclusive panel discussion was held on the theme 'Financing Climate Action to Accelerate India's NDC targets' to kick-start the project activities. The panel consists of a mix of business leaders, and public and private financial institutes representing Tata Sustainability Group, Mahindra Group, IFC, NABARD, and SIDBI among others. The panel shared industry wide initiatives towards combating climate change and discussed the role of responsible investment to accelerate climate actions.

Phase 2: During the second phase of the project, corporate consultations (webinars) were held with over 100 business leaders following which a questionnaire was circulated among the participating corporates. The objective of these webinars was to generate awareness among the Indian corporates and gauge their interest in internal carbon pricing for greenhouse gas (GHG) mitigation. The webinars received participation from industry leaders like Tata Chemicals Limited, Mahindra Group, Shree Cement Limited, etc., who shared their initiatives and best practices for GHG mitigation with the participants representing leading Indian corporates.

Summary of Corporate Consultations are as follows:

Mr Rajesh Miglani, Senior Climate Business Specialist, IFC, spoke about CPLC, which aims to bring together public and private sector with a goal of implementing effective carbon pricing. Many public leaders like Jim Kim, President, World Bank and Christine Lagarde, Managing Director, IMF, are advocating carbon pricing as they see it as the most effective policy for reducing carbon emissions. Carbon markets presently put a price on 12% of the global GHG emissions. Among other benefits of internalising carbon price before the national legislation, he said that it could give a valuable hands-on experience to the participating companies.

Mr Vivek Adhia, Head- Business Engagements, WRI India, defined carbon price as the amount to be paid for emitting 1 tonne of CO2 equivalent into the atmosphere and when a company puts an internal carbon price, they keep it as high as possible and when considering investment decisions, it is generally keep at less than $20.

Mr Anirban Ghosh, Chief Sustainability Officer, Mahindra and Mahindra Ltd, stated that unless there is a sharp reduction in the emissions, the world is headed towards difficult times. Ninety corporations around the world are responsible for around 67% of the total emissions and at Mahindra we look at both shadow and explicit pricing method together to have a greater positive impact on the environment.

Mr Damandeep Singh, Director, CDP India, said that we are already in a changing scenario with more than 1000 companies around the world talking about pricing carbon. It is picking momentum because investors, having assets management of about $24 trillion, are asking for a price on carbon. Companies have to be prepared if they want foreign investments.

Dr Prodipto Ghosh, Former Secretary, Ministry of Enivironment, Forest and Climate Change, Government of India, shared that India's position in the international negotiations has been that developing countries should not be subject to mandatory carbon reduction and adoption of an emission reduction target. In the 2015 Paris agreement there is a place holder for negotiating a future carbon market. There will be regional and national markets, and they will be connected to have a global market in place.

Dr Thomas Kerr, Principal Climate Policy Officer, IFC, Climate Change Group, shared that the World Bank group cares about carbon pricing because the world is being affected with the growing emissions and the resulting climate change effects. Major economies are adopting the carbon pricing mechanism as it is the most suitable and workable solution in an efficient market system. In the analysis of the national plans submitted by countries after the Paris agreement, it was observed that more than 90 countries had included some form of carbon pricing or carbon markets.

Phase 3: In the third phase, a thematic track sharing the preparedness of India Inc. on putting a value on energy by Indian corporates will be tabled at the Business Day of the WSDS on October 5, 2016. The thematic track will have two sessions; the first is on experience sharing by corporates in moving towards a decarbonised economy. The session will discuss technologies to reduce GHG emissions, existing national schemes like PAT and REC, measures taken by companies to meet GHG emission targets; and understanding and acceptance towards internal carbon pricing mechanism. The second session, talks about financing opportunities and challenges in pricing carbon to mainstream climate change in the decision making processes by businesses. The discussion will be around role of investment towards mitigating climate change, global climate financing momentum and its implications on Indian economy, and role of financial instruments in putting a national carbon trading platform in place.

Global Carbon **Pricing Landscape**

As the effects of climate change have become more evident throughout the globe, there is an increasing attention, discussion and debate going around the possible actions to be taken, to keep the global warming below 2°C. There is a global momentum behind putting a price on carbon emissions with support from both private and public sector. More than 1000 companies reported that they are either using an internal price on carbon or they plan to do it within a year or two, according to a report by CDP.[3]

The dominant reasons for these companies to move towards carbon pricing are:

- To make the company ready and future proof for any such national legislations;
- Companies can brand themselves as green; and
- Investors too are calling for carbon pricing as they recognise carbon pricing as a means to mitigate material risk from current and future climate change regulations. Hence, they are driving investments to clean energy and low carbon alternatives.

An increasing number of companies and countries are putting a cost to their carbon emissions especially due to the momentum garnered post COP21. There are national schemes, either regulatory or voluntary in nature, adopted by countries to aid in emission reduction.

A growing number of businesses are also putting a price on carbon to internalise the economic cost of GHG emissions. These internal carbon pricing mechanisms are presently voluntary in nature. The three major types of internal carbon pricing include: shadow pricing, implicit pricing, and internal taxes.5

Shadow Carbon Pricing	Implicit Carbon Pricing	Internal Taxes, Fee or Trading System
A shadow price is a hypothetical value that some companies create to evaluate risks associated their potential investments. Companies may build a range of shadow prices to test sensitivities or build them in financial models with assumptions, probabilities, and discount rates. Example: Google	An implicit price is calculated as cost per $MTCO_2E$ based on their planned expenditures on GHG reduction measures. Example: Unilever	Some companies create a system of formal internal financial incentives and programmes, such as internal tax (assessed on various expenditures), to meet its GHG reduction target. Example: Microsoft

While the above mentioned mechanisms are applied in companies, on a national level two major types of such carbon pricing/market schemes exist, namely Emissions Trading Scheme (ETS)[6] and Carbon Tax[7]. While the European Union (EU) pioneered the ETS launched in 2005, covering more than 11,000 power stations and industrial units across 28 countries, many countries include Sweden, Finland, and South Africa have put carbon taxation.

Carbon emission regulation in various countries began in the European Union in early 1990s when an Emissions Trading Scheme was initiated and a cap was put on the GHG emissions. This external regulatory pressure mechanism has been implemented in various parts of the world, for instance countries like Sweden, Norway, and Tokyo have a carbon tax of $\$130/tCO_2$, $\$62/tCO_2$ and $\$38/tCO_24$, respectively, and are now making their way into the developing world with China soon, introducing a national carbon market.

[3] https://www.cdp.net/cdpresults/carbon-pricing-in-the-corporate-world.pdf

[4] http://wbcsdpublications.org/wp-content/uploads/2015/11/Leadership-2015-Emerging_Practices_in_Internal_Carbon_Pricing.pdf

[5] https://www.unglobalcompact.org/docs/issues_doc/Environment/climate/CarbonPricingExecutiveGuide.pdf

[6] Emissions trading or cap and trade is a government-mandated, market-based mechanism to control emissions by providing monitory incentives for achieving decline in the emissions of pollutants

[7] A carbon tax is a mechanism of explicit carbon pricing. It refers to a tax directly linked to the amount of carbon dioxide emissions, often expressed as a value per tonne CO2 equivalent (per tCO2e) (Source: World Bank)

Some carbon pricing stories are shared below:

Brazilian Businesses' Endeavour with ETS: Challenges and Lessons

The Brazilian emissions trading scheme or the EPC ETS, offered the Brazilian business sector with an opportunity to explore carbon pricing as an instrument to reduce emissions and be a part of the international debate on carbon pricing. In the 2015 operational cycle, 23 companies participated, representing almost 3% of the national emissions of 2014. Based on the carbonic intensity of sectors, about 50% allowances were allocated free. Eight auctions took place and nearly all auction's demand exceeded the supply, by 81% on average. Resulting from this, the closing price of auction were 27% greater than opening prices and the overall scheme led to a reduction in total emissions by the companies who participated in the auction.

The lessons and challenges from the Brazilian system were: (i) there is a need to make the business leaders realize and establish a relationship between carbon pricing and business strategy within their respective companies; (ii) there was a lack of data regarding the emissions and production. (iii) Strict compliance was an issue,as strict penalties, if enforced, can strictly affect the financial viability of the company, (iv) the carbon market is a futures' market, and it is important for the company' sustainability to engage in the subject and (v) a strong feedback mechanism is essential for adjustments and improvements.

20 Canadian Companies Sign on to Keep Carbon in Check

Canadian environmental minister is planning to introduce a nation-wide cap and trade carbon pricing mechanism by the end of 2016, to reduce nation's GHG emissions. Four Canadian provinces, making up more than 80% of the Canadian population, either already have or are introducing a carbon price[8]. British Columbia, a Canadian province, which established a tax on carbon in 2008, levies $21 per tonne of CO2e emissions. Today, the province is a home to a growing green technology sector, with greater than 200 companies generating an estimated $1.7 billion in annual revenues. This is of global importance as Canada is responsible for about 15% of global emissions, as observed by WRI, cumulatively from 1990–2011.[9] Recently, 20 Canadian companies, ranging from retail to airlines to finance, have signed on to the carbon pricing leadership coalition.

"Getting business to be working with governments in terms of tackling climate change is really how we're going to make progress." - Canada's Minister of Environment Catherine McKenna.

China: Set to become the Largest Carbon Market in the World

China, being the world's largest greenhouse gas emitter will soon be a host to the largest carbon market of the world.[10] Chinese presence in the global emissions trading scheme will have major implications for policy making around the globe and will significantly change the dynamics of current carbon markets. The expected cap size is minimum four billion tonnes, making China's ETS double the size of European Union's ETS and bigger than all present carbon markets put together.

In response to the scheme, fossil-fuelled power generation and manufacturing activity in China has dropped significantly enough which has prompted concerns that carbon emission permit allocations based on historical emissions can possibly lead to an oversupply of units and create a situation like the one which has plagued the European Union's ETS since 2009.[11]

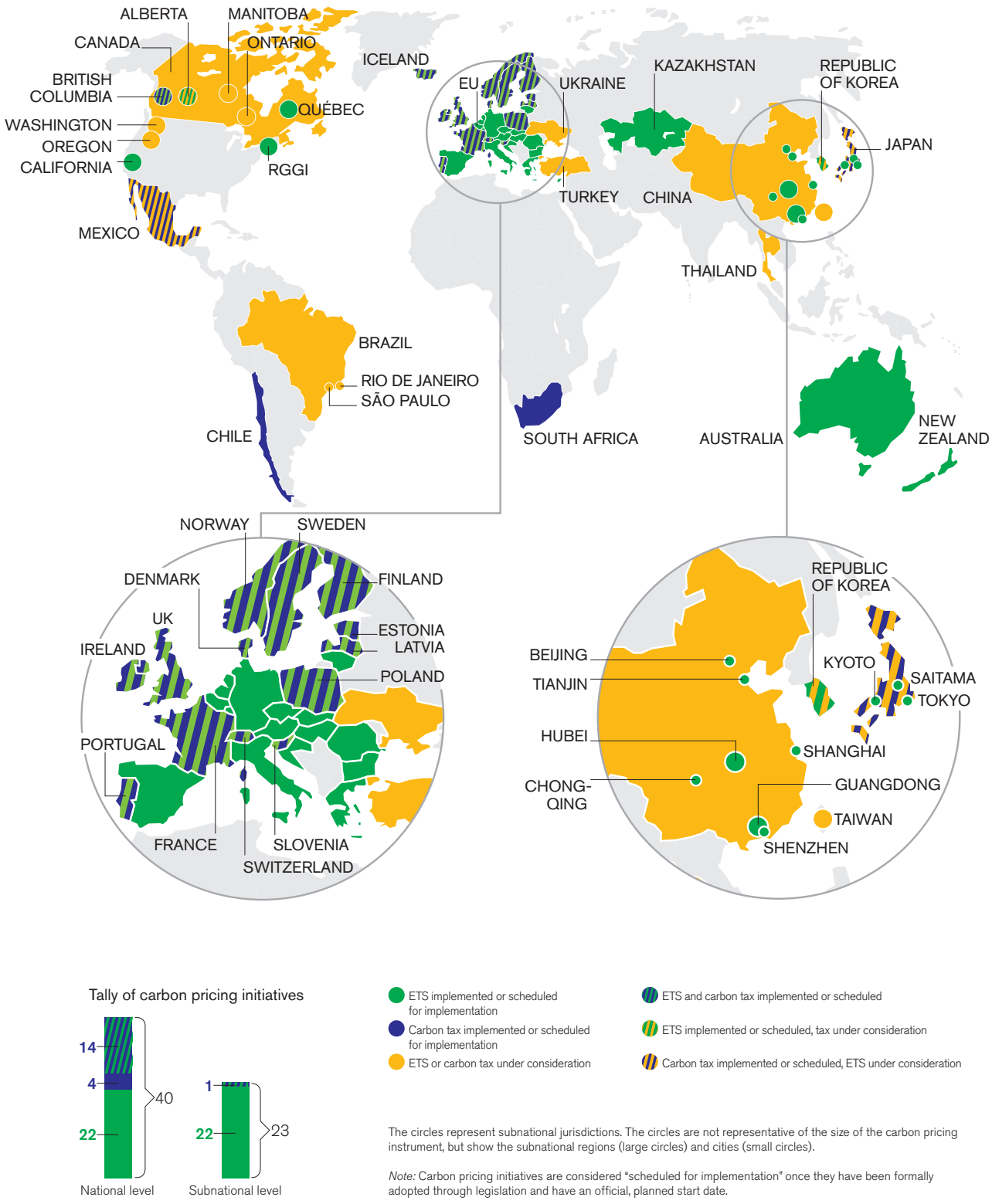
[8] http://www.bloomberg.com/news/articles/2016-07-15/canada-to-introduce-national-carbon-price-in-2016-minister-says

[9] http://www.wri.org/blog/2014/11/6-graphs-explain-world%E2%80%99s-top-10-emitters

[10] http://www.ieta.org/resources/China/Chinas_National_ETS_Implications_for_Carbon_Markets_and_Trade_ICTSD_March2016_Jeff_Swartz.pdf

[11] http://carbon-pulse.com/17057/

Fig 1: Summary map of existing, emerging, and potential regional, national and subnational carbon pricing initiatives (ETS and tax)



The circles represent subnational jurisdictions. The circles are not representative of the size of the carbon pricing instrument, but show the subnational regions (large circles) and cities (small circles).

Note: Carbon pricing initiatives are considered "scheduled for implementation" once they have been formally adopted through legislation and have an official, planned start date.

Source: https://openknowledge.worldbank.org/handle/10986/24288

National Frameworks **Triggering Business Actions**

India is committed to reduce its emissions intensity and promote sustainable development to address climate change. In 2008, India launched the climate change program under the National Action Plan on Climate Change (NAPCC) to provide guiding principles for sectors adopting low-carbon growth strategies. Thus the NAPCC serves as the guiding document for climate policy in India. The action plan establishes eight national missions slated to run through 2017: National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission for Sustaining the Himalayan Ecosystem, National Mission on Sustainable Habitats, National Mission for a Green India, National Water Mission, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge on Climate Change.

The NAPCC is a comprehensive action plan which aims to address the nexus between GHG reduction goals and development, and it outlines strategies to achieve both, without compromises or trade-offs.

A Tax on Coal to Fund Clean Energy: In the recent Union Budget 2016–17, the Ministry of Finance, Government of India, has doubled the cess on coal production and imports from Rs 200 per tonne to Rs 400 per tonne last year. The fund promotes clean energy technologies, but the cess may not significantly reduce consumption, as coal continues to dominate India's overall installed capacity. This cornerstone regulatory policy acts as a sort of carbon tax for the country. The funds collected through coal cess are deposited in Government's Clean Environment Fund (CEF), and used by the government for funding various climate change mitigation and adaption measures. It is estimated that CEF is likely to collect Rs 23 944 crore in the financial year 2016–17.[12]

In the area of energy efficiency, the National Mission for Enhanced Energy Efficiency (NMEEE) is one of the eight missions which aims to provide and promote innovative policy and regulatory regimes, financing mechanisms, and business models to strengthen the market for energy efficiency in a sustainable manner.

To enhance energy efficiency in energy intensive industries, the following four initiatives are taken under the NMEEE:

- Perform Achieve and Trade Scheme (PAT)
- Energy Efficiency Financing Platform (EEFP)
- Market Transformation for Energy Efficiency (MTEE)
- Framework for Energy Efficient Economic Development (FEEED)

The Mission seeks to upscale the efforts to unlock the market of Rs 74 000 crore for energy efficiency and help to achieve total avoided capacity addition of 19,598 MW, fuel savings of around 23 million tonnes per year and greenhouse gas emissions reductions of 98.55 million tonnes per year at its full implementation stage.

The Perform, Achieve and Trade (PAT) scheme is one of the successful initiatives under NMEEE. PAT scheme is designed to accelerate implementation of cost-effective measures in energy efficiency in large energy-intensive industries. PAT scheme establishes a market to achieve twin objectives of financial incentives, thereby reducing cost and compliance of energy efficiency targets, through certification of energy savings that can be traded.

In the PAT Cycle I (2012–15), the scheme covered eight sectors: thermal power stations, iron and steel plants, fertilizer, cement, pulp and paper, textile, chlor alkali, and aluminium.

Another scheme which includes providing a roadmap for increasing the renewable energy in total national power generation is called the Renewable Purchase Obligation.

This obligation is applicable to the open access consumers procuring power, distribution licensee—power distribution companies or DISCOMs and captive consumer generating and consuming power from captive coal/natural gas power plants. In each state, the Regulatory Commission mandates a certain percentage of electricity to be generated from renewable sources.

Also, the Renewable Energy (RE) generators injecting power to the grid are eligible to generate Renewable Energy Certificate (REC)—a tradable certificate of proof that 1 MWh of electricity has been injected (or deemed to have been injected). The REC mechanism addresses the mismatch between availability of renewable energy sources and the requirements of obligated entities to meet their RPO. Open access consumers, Distribution companies and captive consumers can comply with the obligation either by purchasing renewable power or by purchasing RECs to meet their obligations.

[12] http://economictimes.indiatimes.com/industry/banking/finance/government-may-get-rs-23944-crore-from-clean-environment-cess-in-fy17/articleshow/53651980.cms

Insights from **India Inc.**

As a part of this study, TERI CBS conducted a survey for companies to capture India Inc. initiatives on GHG mitigation and gauge their understanding and actions on the following themes:

- Corporate actions to address climate change
- Experience with GHG inventories
- GHG reduction targets
- Policy and advocacy
- Internal carbon pricing

The survey questionnaire was shared with select Indian businesses and responses were received from 26 leading corporates. The findings of the survey responses are as follows:

(Please note that the sum total of percentages may not be hundred in certain questions as allowed selection of multiple answers)

Fig 2: Industry Representation of Survey Respondent Companies

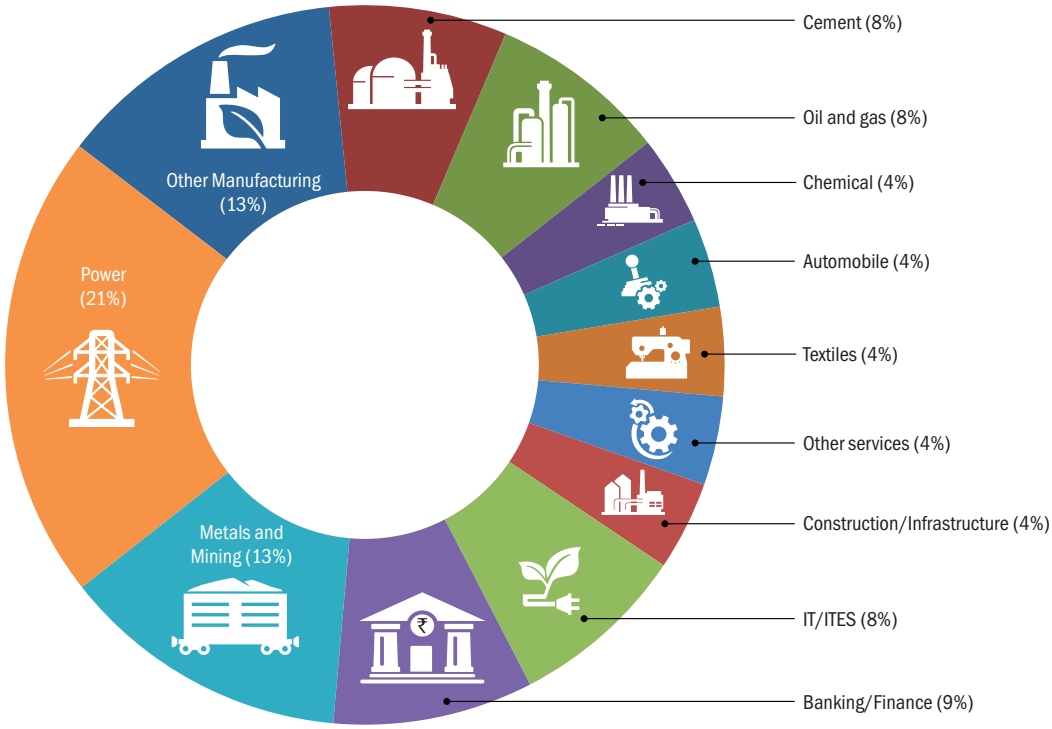
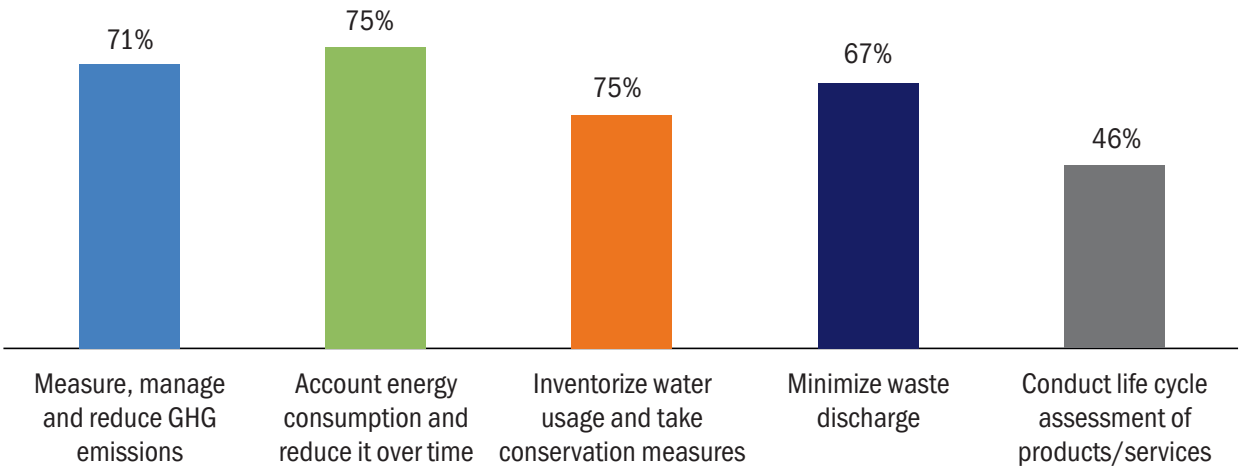
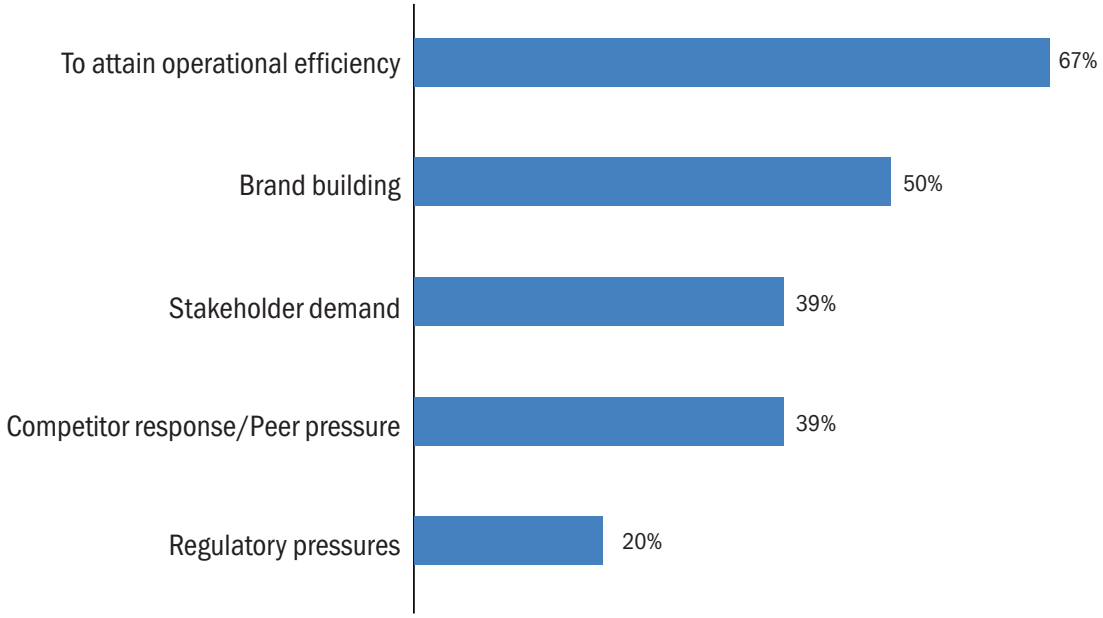


Fig 3: Business Actions to Address Climate Change and Environmental Issues



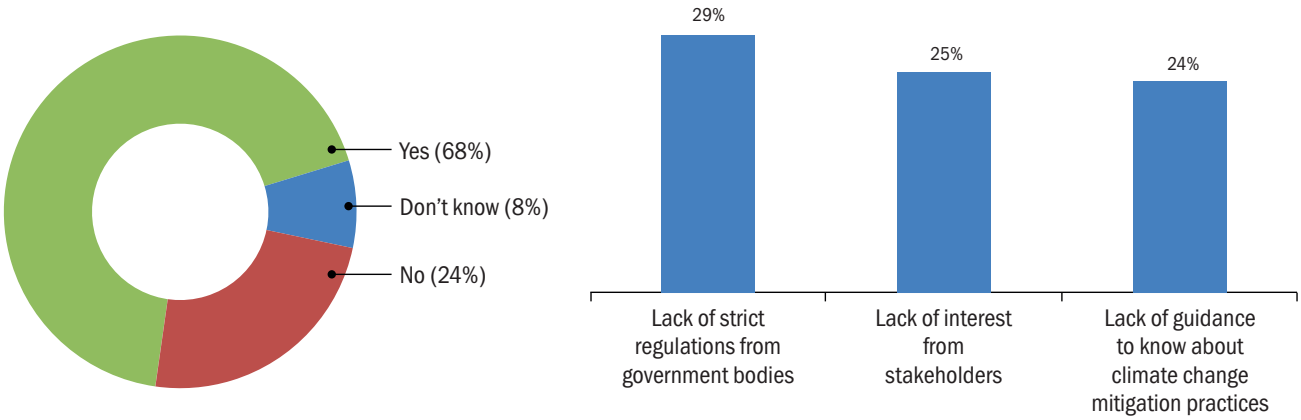
75% of the organisations who responded to the questionnaire said that they account their energy consumption and make efforts to reduce it overtime.

Fig 4: Motivations for GHG Emission Reduction Initiatives



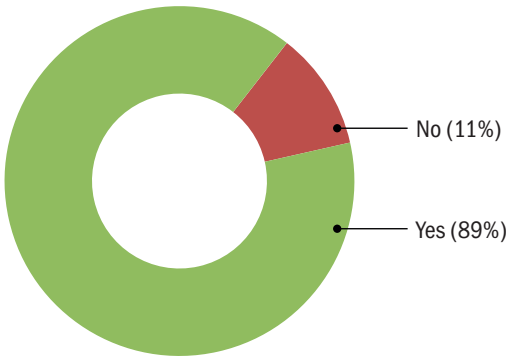
Out of the 71% organizations who measure, manage, and reduce their GHG emissions, 67% measure it with the aim to obtain operational efficiency, while 50% companies also see this as an opportunity to build their organisational brand. This shows that apart from achieving efficiency, having a green brand image is also very important for businesses.

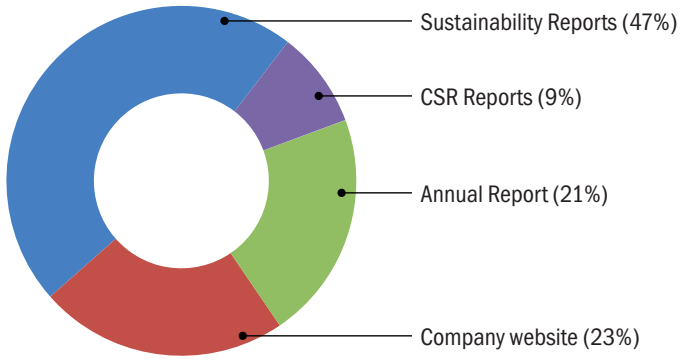
Fig 5: Climate Change Associated Risk-Assessment by Companies



About 70% of the respondent companies are undertaking an assessment of potential risks and opportunities associated with climate change. This clearly indicates that the respondent companies are seriously looking at managing the increased risk due to climate change impacts. Around 24% of the respondent organisations who are not undertaking climate change mitigation action are not doing so because of lack of strict regulation from government bodies and a lack of know-how about the climate change mitigation practices

Fig 6: Businesses Reporting their Emissions

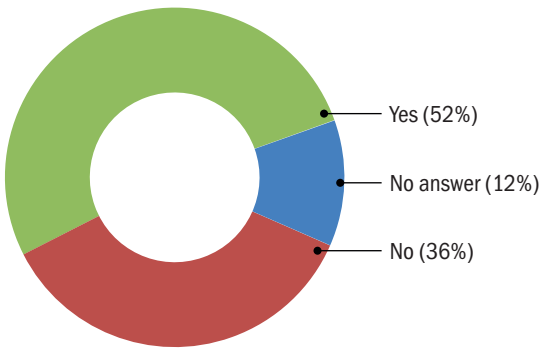


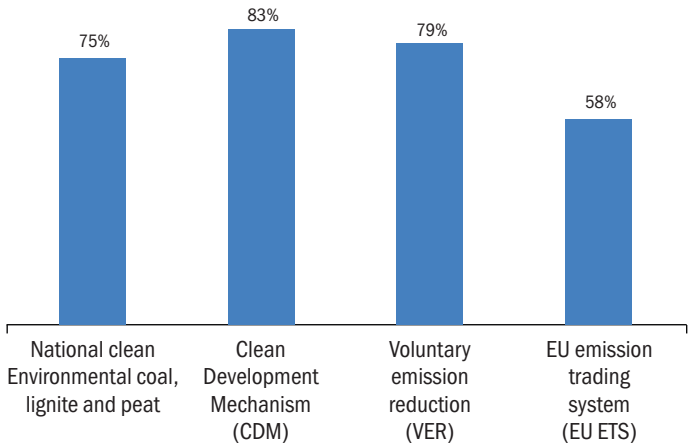


Increasingly companies are investing time and money into developing their sustainability reports, charting out their achievements, such as emissions reduction and increased resource efficiency, present emissions and targets for the coming year.

Increasingly companies are reporting their GHG performance in the public domain, which shows a clear indication of the companies' commitment towards reducing it. Around 89% of the respondent companies are declaring its GHG related data in various forms of reporting. Out of which, close to 50% companies are using Sustainability Report as a tool to report its GHG performance.

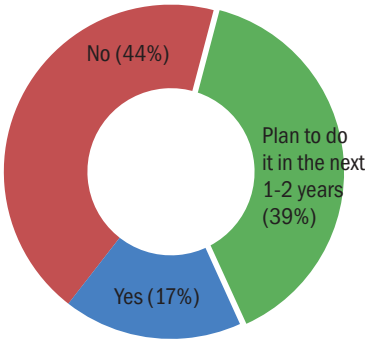
Fig 7: Awareness about Carbon Pricing Mechanisms and the Carbon Pricing Leadership Coalition (CPLC)

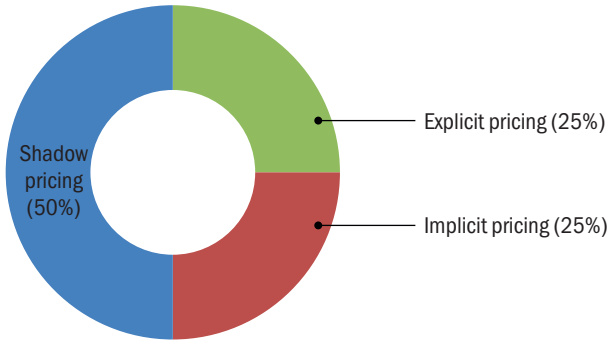




Around 52% of the respondents know about the carbon pricing leadership coalition is managed by the World Bank group whereas more than 80% know what carbon pricing is, and 85% are aware of the clean development mechanism apart from awareness on other carbon markets including National Clean Energy Cess, VER, and EU ETS. The awareness regarding the Carbon Pricing Leadership Coalition (CPLC) is increasing slowly in India and still needs efforts to reach out to more companies to make them understand its benefits. Respondent companies also feel that there is a need of a defined framework or roadmap in order to enable companies to choose a right method of internalizing carbon price.

Fig 8: Internalised the Price of Carbon Yet?





Out of the 17% who are putting an internal carbon price, about 50% have adopted a shadow price in their organisation, 25% are putting an explicit price and 25% have put an implicit price to carbon emissions. Around 35% of respondent companies plan to bring in carbon pricing in the next 1 or 2 years.

The companies who are putting a price to carbon or are planning to put it in the coming one or two years are doing so because it helps them achieve ambitious GHG reduction targets, increases support and investment for energy efficiency projects and helps translate carbon into business relevant terms and engage internally.

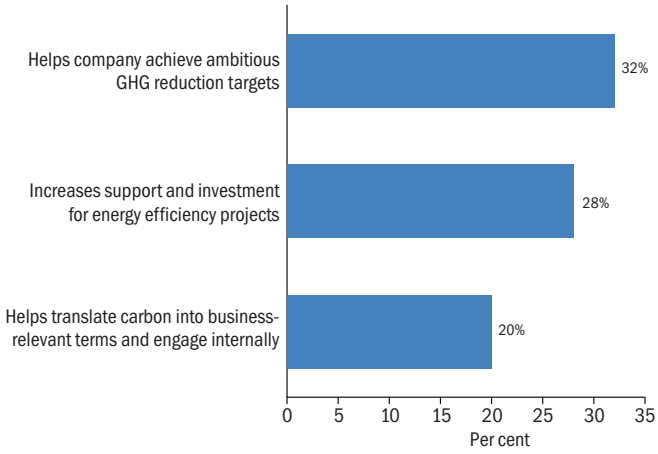
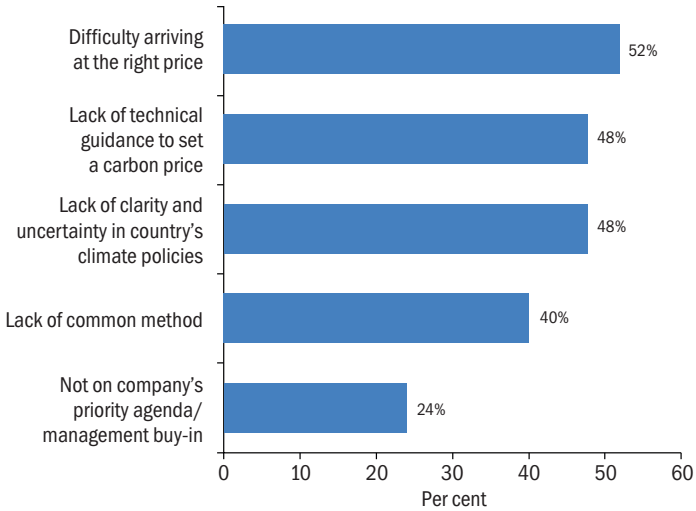


Fig 9: Key Challenges in Pricing Carbon

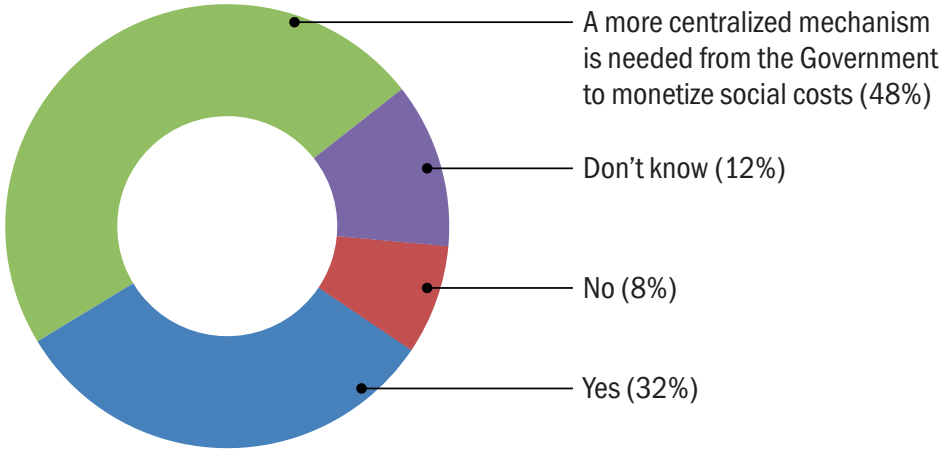
Out of 44% (refer Fig 8) of total respondents 'not' putting an internal price to carbon, more than 50% find it difficult to arrive at the 'right price[13]', around 48% lack technical guidance to set an internal carbon price and a similar percentage of respondents feel that there is uncertainty in the nation's climate policies which is a roadblock in putting a price to carbon. Around 40% feel that there is a lack of common method to carbon pricing.

When asked if internal carbon pricing can help manage future risks in terms of investments within your organization, 60% responded that they are not aware of the mechanism and its usefulness. Nobody said that they feel that the method is not useful. Engaging corporates in generating awareness and momentum about the mechanism may address this issue.



[13] A right price is onethat is neither too high to be reasonably implemented nor too low and ineffective in shifting investment decisions

Fig 10: Is Carbon Pricing a Good Tool to Internalize Social Costs Associated with Emissions?



Around 32% believe that carbon pricing is a good tool to monetise the social costs (that the public pays in ways like man induced natural disasters, health problems related to global warming, crop failures due to excessive heat, etc.) of carbon. Around 48% of the survey respondent companies feel that there is a need for a centralised mechanism from the government's end.

There are several schemes existing in India that put a monetary regulation on companies to go green. For example, the PAT and RPO schemes have a mandatory compliance in India for certain sectors; hence only 92% respondent companies are aware about them (even though only 30% of the respondents are designated consumers under the PAT scheme).

Select Best Practices of Indian Corporates
Working Towards a Low Carbon Pathway

Fig 11: Case Studies received from corporates working in various states on GHG emissions' reduction initiatives

Shree Cement Ltd. (Beawar)

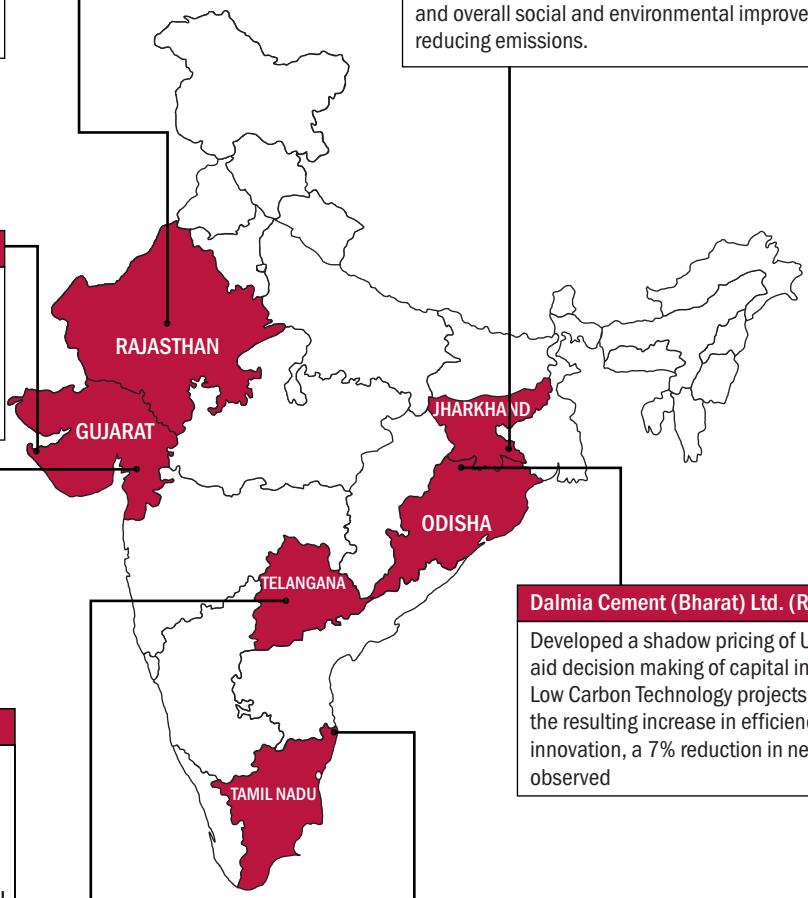
Installed a waste heat recovery plant to capture 45% of energy wasted in the process of clinkerisation, and used that green power to manufacture greener products. This also resulted in reduction in water consumed for cool down and reduction in GHG emissions by 504376 tonnes.

Tata Steel Ltd. (Jamshedpur)

Improved combined productivity output of seven blast furnaces installed, by dismantling smaller and insufficient furnaces and upgrading charging system in bigger blast furnaces and raising agglomerate in burden. The benefits were a drop in coke rate by 100kg/thm resulting in US$120 million savings, reduction in 120kg/thm of CO_2, and overall social and environmental improvement by reducing emissions.

Tata Chemicals Ltd. (Mithapur)

Reduced energy loss and increased performance of captive steam power plant by reducing carbon content in fly ash from 18.94% to 13% and 8% to 6.5% in bed ash of High Pressure Boiler. This resulted in saving of 115.8 lakh INR.



Dalmia Cement (Bharat) Ltd. (Rajgangpur)

Developed a shadow pricing of US$11 to aid decision making of capital intensive Low Carbon Technology projects. Due to the resulting increase in efficiency and innovation, a 7% reduction in net CO_2 was observed

GAIL (India) Ltd. (Vaghodia)

Recovery of waste heat from exhaust of Gas Turbine Compressor was undertaken by setting up a Waste Heat Recovery Steam Generation System, thereby enhancing equipment efficiency by around 49 %, which resulted in annual operating cost saving of Rs8.12 crore.

Mahindra & Mahindra Ltd. (Chennai)

Set up a Bio-CNG plant that converts food and kitchen waste into energy and fertiliser, used by the local community. Spread over an area of 1000 square metres, the plant converts 8 tonnes of food waste generated at Mahindra World City into 1000 m of raw biogas every day.

Yes Bank Ltd. (Hyderabad)

Integration of Internet-of-Things (IOT) based monitoring system for improving energy efficiency in banking operations, by monitoring energy consumption at branches centrally through smart metering and censor based control of electrical connections resulted in saving 16.5 lakh INR.

Way **Forward**

India's economic growth is backed by the need for holistic development and environmental sustainability. To ensure this, India has taken several voluntary initiatives to abate and alleviate climate change. With the GDP rising steadily, India has demonstrated unparalled vision and a strong political will in working towards climate change. the present policy framework includes a favourable environment for a massive increase in renewable energy, moving towards a low carbon pathway and adapting to the impacts of climate change. The project reflects that internal carbon pricing is still a very nascent tool for most of the corporate enterprises, though there is an increasing understanding of reporting their initiatives regarding reduction of GHG emissions through their sustainability reports. To have a nationwide impact of mechanisms like carbon pricing, a policy mandate shall be helpful like in the case of PAT scheme. To achieve massive national carbon emission reduction, CPLC can be a tool to spread awareness among the corporate sector, and an India chapter, supported by the government shall be useful to directly target the India relevant issues and opportunities. Peer learning, both intra sector and inter sector, is important to engage businesses and create a sense of ownership among them to take such initiatives forward. In 2015, 31 Indian companies made it to the CDP leadership Index that measures performance of companies on the level of action on climate change mitigation, adaptation and transparency, while the total number of registered companies are more than 15 lakh in the country. A large number of enterprises can benefit using the concept of carbon pricing as shadow pricing for undertaking strategic decisions for new investments, technology choices, skill upgradation and image building. Given the Indian scenario, we can look forward to more than half of the corporate enterprises using carbon pricing to internalise the external costs in the foreseeable future, keeping SDGs and the Paris Accord in mind. Also, half of the energy consumption in India is by MSMEs, and there is a need to identify possible options to help explore the usage of CPLC, where the scope for energy efficiency is immense specially in the Indian context. In the way forward, there are two tracks suggested to meet both the objectives.

Under the first track, it is proposed to tackle the issue of lack of awareness among corporate enterprises as also the non-corporate MSMEs. The issue of awareness is the first big stumbling block to its adoption as a management tool. This will require a concerted effort to engage with corporate enterprises directly and also through a wider range of stakeholders that in turn can not only understand the positive implications of this tool by themselves but also influence its usage in the industry. These stakeholders include policy makers, academic institutions, research bodies, media and chambers of commerce. This is expected to create a sufficiently large interest group from among them for further engagement. A champion group from among them should be identified to provide them together on a platform that helps them share their challenges in taking it further. The platform is intended to provide linkages with technical experts and institutions that can help them resolve their problems. This support should also be supplemented with individual hand-holding assistance to create a set of champions. Buzz shall be created with media linkages and sharing of information about the progress among the identified group as also non user corporate enterprises.

The second track should identify the key factors that can help MSMEs individually or in aggregates adopt carbon pricing a means to take strategic business decisions. Considering the fact that there has so far not been any initiative undertaken in this regard, greater flexibility will need to be provided to identify direct and indirect influencing stakeholders. Moreover the time horizon for strategic decision making among MSMEs is relatively shorter compared to large corporate enterprises. A business case dimension is therefore likely to be a significantly important factor among MSMEs in relatively shorter time frame.

Participant **Companies**
(Survey Respondents)

1. Arvind Ltd
2. Cairn India Ltd
3. CLP India Private Ltd
4. Customized Energy Solutions
5. Dalmia Cement (Bharat) Ltd
6. Danfoss India
7. GAIL (India) Ltd
8. Jain Irrigation Systems Ltd
9. KPIT Technologies Ltd
10. Lloyd Insulations India Ltd
11. Mahindra & Mahindra
12. Phoenix Products
13. PTC India Ltd
14. Rayon Energy Pvt Ltd
15. Shree Cement Ltd
16. Shreyans Energy P Ltd
17. Suzlon Energy Ltd
18. Tata Chemicals Ltd
19. Tata Cleantech Capital
20. Tata Power
21. Tata Steel Ltd
22. Vedanta Ltd
23. Wipro Ltd
24. Yes Bank

Survey based study of select Indian corporates

QUESTIONNAIRE

Name	
Organization	
Designation/Department	
Email	
Sector	
Turnover (INR 2015)	
Number of employees	

Section 1: Corporate Actions To Address Climate Change

1. Which of the following measures have been taken by your organization for addressing climate change and environmental related issues?
   a. Measure, manage and reduce GHG emissions
   b. Account energy consumption and reduce it over time
   c. Inventorize water usage and take conservation measures
   d. Minimize waste discharge
   e. Conduct life cycle assessment of products/Services
   f. None
   g. Others, please specify

2. Has your company undertaken an assessment of potential risks and opportunities associated with climate change?
   a. Yes
   b. No
3. Does your company have a public position supporting government action to address climate change?
   a. Yes
   b. No
4. What are the roadblocks when it comes to incorporating climate change mitigation plans into organizational strategy?
   a. Lack of interest from stakeholders
   b. Lack of strict regulations from government bodies
   c. Peers companies aren't involve in such initiatives
   d. Lack of guidance to know about climate change mitigation practices
   e. Others, please specify

5. Does your organization report its GHG performance in the public domain?
   a. Yes
   b. No

5.1. Where does your organization reflect its GHG related information? < <Answer if option 'Yes' is selected in the question 5> >

a. Sustainability/CSR Reports

b. Company website

c. Annual Report

d. Others please specify and provide source/link

5.2. Does your organization plan to report in the next year? ? < <Answer if option 'No' is selected in the question 5> >

a. Yes

b. No

Section 2: Internal carbon pricing

6. Do you know what carbon pricing is?

a. Yes

b. No

c. Partially

7. Are you aware about the following carbon pricing mechanisms?

a. National Clean Environment Cess on coal, lignite and peat

b. Clean Development Mechanism (CDM)

c. Voluntary Emission Reduction (VER)

d. EU Emission Trading System (EU ETS)

e. Others, please specify

8. Are you aware of the Carbon Pricing Leadership Coalition [1](CPLC), managed by the World Bank Group?

a. Yes

b. No

c. Partially

9. Does your organization put an internal price to carbon?

a. Yes

b. No

c. Plan to do it in the next 1-2 years

9.1. Out of the following internal carbon pricing methods, which of the method is your organization following? < <Answer if option 'Yes' is selected in the question 9> >

a. Shadow Pricing

b. Implicit Pricing

[1] Help text:

The Carbon Pricing Leadership Coalition (CPLC), managed by the World Bank Group, aims to advance well-designed climate and carbon pricing policies around the world by bringing together public, private and civil society leaders to collect the evidence base, mobilize business support for well-designed policies, and convene leadership dialogues around the world.

c. Explicit Pricing

d. None

e. Any other, please specify

9.2. Out of the following internal carbon pricing methods, which of the method is your organization planning to follow? < <Answer if option 'Plan to do it in the next 1-2 years' is selected in the question 9> >

a. Shadow Pricing

b. Implicit Pricing

c. Explicit Pricing

d. Not planning to price carbon anytime soon

e. Other

9.3. What according to you are the factors that motivate an organization to put an internal price to carbon? **< <Answer if option 'Yes' or 'Plan to do it in the next 1-2 years' is selected in the question 9> >**

a. Helps translate carbon into business-relevant terms and engage internally

b. Increase support and investment for energy efficiency projects

c. Helps the company achieve ambitious GHG reduction targets

d. Others, please specify

10. What according to you are the key challenges in putting an internal cost on carbon? < <Answer if option 'No' is selected in the question 9> >

a. Lack of common method to price carbon

b. Lack of technical guidance to set a carbon price

c. Lack of clarity and uncertainty in country's climate policies

d. Difficulty arriving at the "right price[2]"

e. Not on company's priority agenda/Management buy-in

f. Others (please specify)

11. Do you think internal carbon pricing can help manage future risks in terms of investments within your organization?

a. Yes

b. No

c. Don't know

[2] that is neither too high to be reasonably implemented nor too low and ineffective in shifting investment decisions

12. Is Carbon pricing a good tool to internalize social costs[3] of carbon?

    a. Yes

    b. No

    c. A more centralized mechanism is needed from the government's side to monetize social costs

Section 3: Policy and advocacy

13. Are you aware about the following national regulatory schemes on renewable energy and energy efficiency?

    a. Renewable Purchase Obligation (RPO) << answer 13.4, 13.5, 13.6, 13.7>>

    b. Perform, Achieve and Trade (PAT) <<answer 13.1, 13.2, 13.3>>

    c. Others, please specify

13.1. Is your organization identified as a Designated Consumer (DC) under the PAT scheme?

    d. Yes

    e. No

13.2. Do you think PAT scheme has been useful for the businesses in cutting down their emissions?

    a. Yes

    b. No

13.3. Do you think the PAT scheme should be extended to all sectors?

    c. Yes

    d. No

    e. If yes, please specify sector (s)

13.4. Is your organization identified as an obligated entity under Renewable Purchase Obligation (RPO)?

    a. Yes <<answer 13.4.1>>

    b. No <<go to 13.5>>

13.4.1. Does your organization fulfill the obligation under defined timelines?

    a. Yes

    b. No

13.5. Out of your organization total electricity consumption, what is the percentage contribution of the following sources?

	% contribution (enter numeric value only)
Thermal Power Plants	
Renewable Power Plants	
Waste heat recovery	
Diesel generator (DG) sets	
Others, please specify	

[3] The Social Cost of CO2 is meant to be a comprehensive estimate of climate change damages and includes changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning.

13.5.1. What are the renewable/clean sources of your organization's total energy consumption? <<Answer if 'Renewable Power Plants' selected above>>

	% contribution (enter numeric value only)
Solar	
Wind	
Biomass	
Hydro	
Waste heat recovery	
Others, please specify	

13.6. Do you think RPO has been successful and has achieved the scheme objectives? If not, please specify the reason

14. In your opinion, what are the co-benefits of PAT and RPO schemes?

Section 4: Experience with GHG inventories

15. Which standard/protocol is used by your organization to measure carbon emissions?

a. GHG Protocol Corporate Accounting and Reporting Standard

b. ISO 14064-1

c. Internal guidelines/Standard

d. Others (please specify)

15.1. Which of the following scope/s of GHG protocol does your organization cover in its organizational boundary? <<Answer this if option (a) above is selected>>

e. Scope 1

f. Scope 2

g. Scope 3

h. None of the above

16. In your organization's GHG emissions inventory, what is the percentage (%) contribution of the following?

	Facility	% contribution (out of 100)
❖	Corporate office	
❖	Manufacturing units	
❖	Captive power plants	
❖	Sales/marketing offices	
❖	Others, please specify	

17. Does your organization benchmark its GHG performance?

    a. Yes, our organization benchmark its GHG performance internally (with other units)
    b. Yes, our organization benchmark its GHG performance with Indian peer companies
    c. Yes, our organization benchmark its GHG performance across other sectors
    d. Yes, our organization benchmark its GHG performance with Global companies
    e. No, our organization is planning to initiate GHG performance benchmarking
    f. Others, please specify

18. What are the drivers for measuring GHG emissions?

    a. Regulatory pressures
    b. Stakeholder demand
    c. To attain operational efficiency
    d. Competitor response/Peer pressure
    e. Brand building
    f. Others, please specify

Section 5: GHG reduction targets

19. Does your organization have an annual GHG reduction target?

    a. Yes, we have an absolute GHG emissions reduction target
    b. Yes, we have a GHG intensity reduction target
    c. Both a) and b)
    d. No, we plan to set a GHG reduction target next year
    e. No plans to set a target
    f. Don't know how to put a GHG reduction target
    g. Yes, confidential to the organization
    h. Others, please specify

19.1. Please provide details of your organization's GHG reduction target:

Type of target	Base year	Target year
❖ Absolute reduction of GHG emissions		
❖ Intensity reduction of GHG emissions		

19.2. Did your company achieve the set GHG emission reduction target? << answer this if option (a), (b) and (c) in 19, is selected >>

    a. Yes
    b. No, partially

20. What measures are being taken by your organization to reduce its GHG emissions?
    a. Energy efficiency measures
    b. Operational efficiency measures
    c. Purchase of Carbon Offsets (CERs/VERs)
    d. Use of cleaner/renewable sources of energy
    e. Putting an internal price on carbon
    f. Others, please specify

21. Does your organization plan an investment for reducing GHG emissions in line with your GHG reduction target year?
    a. Yes
    b. No
    c. Don't Know

22. Does your organization have an annual energy reduction target?
    a. Yes, we have an absolute energy reduction target
    b. Yes, we have an energy intensity reduction target
    c. Both a) and b)
    d. No, we plan to set an energy reduction target next year
    e. No plans to set a target
    f. Don't know how to put an energy reduction target
    g. Yes, confidential to the organization
    h. Others, please specify

22.1. Please provide details of your organization's energy reduction target:

Type of target	Base year	Target year
❖ Absolute energy reduction		
❖ Energy intensity reduction		

22.2. Did your company achieve the set energy emission reduction target? < <Answer this if option (a), (b) and (c) in 22, is selected> >
    a. Yes
    b. No, partially

23. What measures are being taken by your organization to reduce its energy consumption?
    a. Energy efficiency measures
    b. Operational efficiency measures
    c. Purchase of Carbon Offsets (CERs/VERs)
    d. Use of cleaner/renewable sources of energy
    e. Putting an internal price on carbon
    f. Others, please specify

24. Does your organization have any planned investments in Energy Efficiency and Renewable Energy?
    a. Yes
    b. No
    c. Don't Know

Section 6: CASE STUDY TEMPLATE

Mention a site-specific initiative towards GHG emission reduction (putting an internal cost to the emissions, if available)

Date of Submission

Site of Intervention	**Type of Intervention**

Title of the Case Study

Objective of the Case Study

Summary (100 words)

Choosing the Intervention – Motivation (80 words)

Description of the Intervention (150 words)

- Investments made on technology up gradation/ alternative business practice

Picture Resolution: Min. 300 Dpi Format: PNG	Picture Resolution: Min. 300 Dpi Format: PNG	Picture Resolution: Min. 300 Dpi Format: PNG
Brief Description of Picture	Brief Description of Picture	Brief Description of Picture

Intangible or Tangible Benefit (100 words)

- Monetary savings and payback period

Company Profile (50 words)	High Resolution Logo (Min. 300 dpi)

Council for Business Sustainability

http://cbs.teriin.org/energy-costs.php

/teriin /teriin /user/teri /company/the-energy-and-resources-institute