

Putting a Price on Carbon:

A Handbook for Indian Companies



Today,
1,389+
companies

companies are disclosing to CDP their plans or current practice of putting a price on carbon emissions because they understand that carbon risk management is a business imperative.

Globally, this represents an

11% increase

from 2016



Damandeep Singh,
 Director, CDP India

As companies prepare for the brave but uncertain future in the battle against climate change, CDP along with global partners are evolving several tools to help companies face the challenges. Of all the available tools, a price on carbon emissions is the only effective way the economy can internalize the otherwise invisible costs of greenhouse gas emissions.

Increased frequency of extreme weather events across the world, more so in India, demonstrate the risks of unbridled emissions to climate stability. Fortunately, technology, innovation and dedication have brought us to a point where several competitive low carbon alternatives exist. CDP has been tracking the corporate participation in emissions trading systems for many years and in 2013, we started tracking the corporate response to these signals through the adoption of an internal carbon price.

Internal carbon pricing is a key mechanism to help a company gauge whether its business strategy is sufficiently guarded against growing risk of climate disruptions, while being sufficiently farsighted to take advantage of new business opportunities inherent in addressing climate change through innovative technologies and practices.

In this Handbook to help companies make important decisions, CDP highlights key trends and best practices. We partnered with thought leaders like TERI who wrote the chapter on India Climate Policy Landscape.

CDP NA is grateful to the John D. and Catherine T. MacArthur Foundation for support. We hope this Handbook helps companies navigate and incorporate internal carbon pricing as key resource in addressing climate risk.

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This report's findings are based on disclosures of 6,086 companies who responded to CDP's 2017 climate change and supply chain information requests, made on behalf of investors with \$100 trillion in assets, and purchasing organizations with over \$2 trillion in spending power (only responses submitted prior to September 1, 2017). In this report, all price values are in US\$ unless otherwise stated; and all emissions are reported in metric tons.

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1. Introduction

1.1. CDP's Mission

CDP's mission is to focus investors, companies and cities on taking urgent action to build a truly sustainable economy by measuring and understanding their environmental impact.

The challenge is to act urgently to prevent dangerous climate change and environmental damage. Climate change, water scarcity and deforestation are unparalleled global challenges that require a systemic change in market behaviour. To achieve this, over the last 15 years CDP has created a global disclosure system that has resulted in unparalleled engagement on environmental issues between investors, companies, cities, states and regions worldwide. CDP has the most comprehensive collection of self-reported environmental data in the world, that helps raise awareness of the environmental impact so that investors, companies, cities and governments can make the right choices/decisions.

1.2. CDP's Work with Investors on Climate Risk

Investors are now starting to put vital environmental data at the heart of their decision-making to understand and reduce risks, protect investments and seize opportunities.

CDP's network of investors and purchasers

represent over \$100 trillion, along with policy makers around the globe, who use our data and insights to make better-informed decisions. Around 800 investor signatory members of CDP access the emissions data of companies and analyse the carbon action initiatives being undertaken. Through the carbon action initiatives, investors are urging companies to move beyond disclosure by taking three specific actions in response to climate change:

- ▲ Make emissions reductions;
- ▲ Disclose emissions reduction targets publicly; and
- ▲ Invest in emissions reduction projects with a positive return.

Thus, it has become more important than ever for organisations to not only disclose but also commit to actions that can lead to measurable positive impacts.

Setting an internal carbon price helps companies address climate risk and chart pathways to emissions reduction (ER) activities. While, levying a carbon fee on polluting business units, generates a separate fund to support climate actions, a shadow price on internal carbon emissions, can accurately assess the returns on low carbon projects. Companies thereby can select projects which give them maximum returns on their investment.



2. Global Trends and the Context of Carbon Pricing

Economists have widely debated the economic consequences of climate change and consider it as a market failure which will impose huge costs and risks on future generations, without these costs and risks being reflected in current market prices. It is widely agreed that introducing a carbon price is a critical part of the solution to reduce emissions, alongside other measures. This view is increasingly shared by investors and companies, who highlight that internal carbon pricing measures, as part of well-designed long-term plans, can support a smooth transition and avoid some of the economic shocks that conflicting and drastic regulation could bring.

2.1. Policy Overview from a Global Perspective

2.1.1. The Paris Agreement and the NDCs

To see how fast internal carbon pricing is spreading, one needs to look no further than the Paris Agreement. Paragraph 136 of the decision text¹ of the Paris Agreement elucidates, "providing incentives for emission reduction activities, including tools, such as domestic policies and carbon pricing". The final agreement recognized carbon pricing's importance as a powerful incentive to cut emissions by companies, and regional, state and local governments. Article 6.2 and 6.3 of the agreement² lays out the provisions to facilitate transfers of emission reduction units across international borders, using Internationally Transferred Mitigation Outcomes (ITMOs). These could potentially help countries to enter into bi-/multi-lateral agreements to form larger carbon markets. In turn, it will allow countries to reduce emissions targets set out in nationally determined contributions (NDCs) at a lower cost (using ITMOs) than from domestic mitigation efforts alone.

The tone of Paris Agreement is amplified by the

¹<http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>

²http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

³<http://documents.worldbank.org/curated/en/598811476464765822/pdf/109157-REVISED-PUBLIC-wb-report-2016-complete-161214-cc2015-screen.pdf>

⁴<https://openknowledge.worldbank.org/bitstream/handle/10986/26565/9781464811296.pdf?sequence=4&isAllowed=y>

powerful contributions from ambitious national plans submitted to UNFCCC, and major initiatives by businesses, investors, cities and regions. As on October 8th, 2017, 167 Parties have ratified the Paris Agreement, agreeing to limit global average temperature rise to well below 2°C compared with pre-industrial levels. According to a World Bank study, 101 governments plan to use carbon pricing and other market mechanisms to achieve their emissions reduction goals. The study notes that it is 32% cheaper to achieve NDCs with international trading³.

2.1.2. Carbon Pricing Policy Developments

While carbon pricing is far from uniform across the globe, a growing number of countries and regions have, or plan to have, carbon pricing systems in place, whether through cap-and-trade (often called an Emissions Trading System / ETS) or carbon taxes. These include several provinces in Canada, California, China, the European Union (EU), Singapore, South Africa, South Korea and Mexico. India too plans to have one in the next few years supported by the World Bank's Partnership for Market Readiness scheme.

Forty-six carbon pricing initiatives have been implemented or are scheduled for implementation as of 2017. This consists of 23 ETs, mostly in subnational jurisdictions and 23 carbon taxes primarily implemented on a national level. Together, these carbon pricing initiatives cover 8 gigatons of carbon dioxide equivalent (GtCO₂e) or 15% of global greenhouse gas (GHG) emissions. With several new systems in development, including the Chinese ETS, it is expected that 20–25% of global carbon emissions will soon be covered by a carbon price. The total value of ETs and carbon taxes in 2017 is US\$52 billion⁴.

The EU ETS, set up in 2005, is the world's first and biggest trading system, accounting for over three-quarters of international carbon trading. By putting a price on carbon, it placed climate change on the agenda of company boards across Europe, as well as multinationals around the world. Many regions have followed suit. One of these, the much-anticipated ETS in China, is set to dwarf the EU's system in size. Seven pilot ETS's are already in operation since 2013 in the cities of Beijing, Shanghai, Tianjin, Chongqing and Shenzhen, as well as the provinces Guangdong and Hubei. California has recently voted to extend its cap and trade programme through 2030, with links to Québec's system and Ontario's in the near-future. The Government of Canada in December 2016 launched the Pan-Canadian Framework on Clean Growth and Climate Change, pricing carbon pollution being central to the framework. British Columbia, Alberta, Ontario and Québec have already introduced carbon pricing systems. The federal option will apply in provinces without a provincial carbon pollution pricing system in place in 2018.

At the same time, Mexico seeks to implement the first Latin American ETS. Mexico already has a carbon tax on fossil fuel use and in August 2016, it signed a cooperation agreement to implement a voluntary ETS simulation for 60 major companies in the power generation, manufacturing, and

transport sector, and also a joint declaration on carbon markets collaboration with Québec and Ontario. The ETS simulation is creating public awareness and preparedness for a national level ETS to be launched in 2018. Additionally, Chile and Colombia have also introduced carbon taxes, albeit with different attributes. The most recent development on this front is the signing of the Cali Declaration at the Presidential Summit of Pacific Alliance countries of Chile, Colombia, Mexico and Peru, held in June 2017. This declaration seeks to strengthen regional climate action and cooperation towards a common regional carbon market.

India has implemented two types of policy instruments over the years which encompass domestic market mechanisms such as the renewable energy certificates markets (REC) and energy efficiency certificate markets (PAT), and; carbon pricing policies such as carbon tax in the form of coal cess which has grown from 50 a few years ago to 400 in 2016. The challenge now is to link such domestic measures, as well as the potential for linking with global carbon markets.

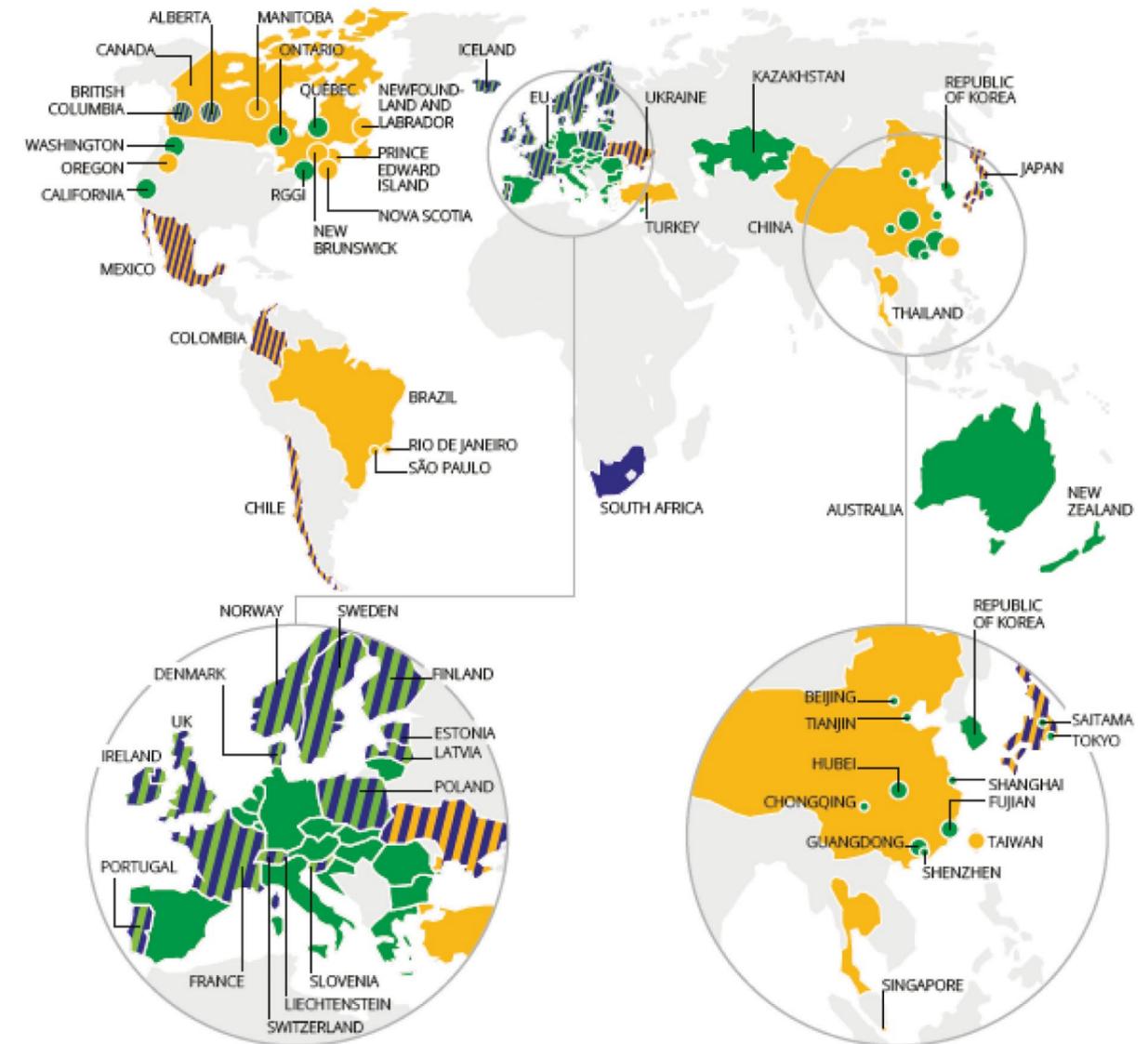
Further details of the international systems described in this section can be found at International Carbon Action Partnership (ICAP)⁵, World Bank-Carbon Pricing Watch⁶ and Cali declaration⁷.

Carbon pricing systems, such as those described above are known as explicit pricing systems. Explicit pricing refers to mechanisms, such as a tax or emissions trading scheme where carbon emissions are directly priced. There are usually two types of explicit pricing:

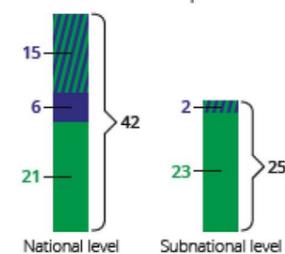
- ▲ Emissions Trading Scheme (ETS): sometimes referred to as a cap and trade system – caps the total level of greenhouse gas emissions and allows those industries with low emissions to sell their extra allowances to larger emitters.
- ▲ Carbon taxes: directly sets a price on carbon by defining a tax rate on greenhouse gas emissions or – more commonly – on the carbon content of fossil fuels.

CO₂e emissions can also be priced implicitly by government policies that encourage emissions reductions, such as energy efficiency standards and renewable energy subsidies. For example, the excise duty on petrol and diesel in India is an implicit carbon tax.

Figure 2: Global trends map - World Bank Carbon Watch 2017



Tally of carbon pricing Initiatives Implemented or scheduled for implementation



- ETS implemented or scheduled for implementation
- Carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled
- Carbon tax implemented or scheduled, ETS under consideration

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. Carbon pricing initiatives are considered "under consideration" if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources. The carbon pricing initiatives have been classified in ETSs and carbon taxes according to how they operate technically. ETS does not only refer to cap-and-trade systems, but also baseline-and-credit systems such as in British Columbia and baseline-and-offset systems such as in Australia. The authors recognize that other classifications are possible. Due to the dynamic approach to continuously improve data quality, changes to the map do not only reflect new developments, but also corrections following new information from official government sources, resulting in changes for Liechtenstein, Ukraine and Kyoto.

⁵<https://icapcarbonaction.com/en/>

⁶<https://openknowledge.worldbank.org/handle/10986/26565>

⁷<https://alianzapacifico.net/en/what-is-the-pacific-alliance/>

2.2. The Policy Landscape in India

India has instituted many domestic measures to tackle climate change. The key policy objective is to remove the “development deficit”, which will be achieved by simultaneously addressing climate change and development challenges, using a co-benefits approach. Poverty alleviation and socio-economic development remain priority areas for India. This need is reflected in the overall framework for climate policy in India under the National Environment Policy (2006) and the National Action Plan on Climate Change (NAPCC, 2008).

The NAPCC highlights India’s most pressing climate concerns and outlines several strategies for climate change action. It highlights key principles for protection of poor and vulnerable communities, effective implementation of policies, and promotion of sustainable development through market, regulatory and voluntary mechanisms. The action plan consists of 8 National Missions, namely, the National Solar Mission, the National Wind Energy Mission, the Energy Efficiency Mission, the Sustainable Habitat Mission, the Sustainable Agriculture Mission, the Mission on Sustainable Himalayan Eco-systems and the National Mission for a Green India. The Ministry of Environment, Forest and Climate Change (MOEF&CC) also envisages including new missions⁹ to address the impact of climate change on health, coastal zones and waste-to-energy. However, official announcement related to the launch of these new missions or any changes to the existing missions is yet to be formalised and published.

Each individual mission provides overarching adaptation and mitigation objectives in relevant economic sectors. After the launch of NAPCC, some existing policies were amended in order to strengthen individual missions.

Further, Indian government formulated new policies, identified capacity building and institutional needs, designed incentive structures and identified key stakeholders. Some of the policy instruments, identified to address climate change mitigation, were price instruments (such as the coal cess and feed-in-tariffs), regulatory instruments (legislations), market-based instruments (Renewable

Purchase Obligation (RPO), Renewable Energy Certificate (REC), Perform Achieve Trade (PAT), voluntary instruments (awareness building programs and labelling of appliances), targeted research and development (R&D) and policy support instruments for different sectors.

2.2.1. India’s NDC

India has also put forth an ambitious target of reducing its GHG emission intensity by 33-35% by 2030, relative to 2005, in its Nationally Determined Contributions (NDCs). To achieve this goal, India needs ambitious and aggressive domestic policies that facilitate a shift into low carbon societies and at the same time ensure that developmental priorities are met. In addition to regulations and policies, instruments like carbon pricing and ETS could be implemented.

Out of eight Nationally Determined Contributions (NDCs) ratified by India, there are three key quantifiable goals on climate change mitigation and adaptation, namely:

- ▲ Reduce the emissions intensity of its GDP by 33 to 35% by 2030 relative to 2005 levels;
- ▲ Achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030;
- ▲ Create an additional carbon sink of 2.5 to 3 billion tons of CO₂ equivalent through additional forest and tree cover by 2030;

In order to achieve these goals, India proposes a host of measures, including deepening and broadening the scope of its existing policies. In addition, India seeks support in the form of technology transfer and low cost climate finance, from international parties as well as sources, such as the Green Climate Fund (GCF).

2.2.2. Domestic Markets and Policy Landscape

As of now, India has not established either an explicit domestic carbon pricing policy or emission trading market. However, the two types of policy instruments implemented over the years, are:

- ▲ Domestic market mechanisms, such as the renewable energy certificates markets (REC) and energy efficiency certificate markets (PAT), and;

- ▲ Carbon pricing policies, such as carbon tax in the form of coal cess.

a) Perform, Achieve and Trade (PAT) Scheme

The PAT scheme was developed under the National Mission on Enhanced Energy Efficiency. The activities under this scheme provide opportunities for new markets as it devises cost effective energy efficient strategies for end-use demand-side management leading to ecological sustainability. The PAT scheme covers 478 plants (designated consumers) in eight energy-intensive industrial sectors accounting for one-third of total energy consumption in the country. The target for reduction in average specific energy consumption under PAT was 4.05% during PAT Cycle 1 (1st April 2012 to 31st March 2015).

BEE has set up the overall framework for PAT scheme and Energy Efficiency Services Limited (EESL), a body established under the National Mission for Enhanced Energy Efficiency (NMEEE), will work as an implementation and monitoring agency. ESCerts will be traded on a special trading platform to be created on two power exchanges operating in India: IEX or Indian Energy Exchange and PXIL or Power Exchange India.

Although the PAT scheme does not explicitly target carbon emission reduction, lower energy intensity will directly impact national emissions. The mechanism has now moved into its second cycle, i.e. PAT Cycle II (2016 – 2019), as notified by BEE on 31st March, 2016. In addition to the eight Designated Consumers (DCs) listed above, three new industries have been introduced – refinery, electricity distribution companies (DISCOMs) and railways, which will result in a total of 621 DCs for PAT Cycle II. The DCs from these 11 industrial sectors have to achieve a reduction of about 8.869 million tons of oil equivalent (mtoe) in their energy consumption during PAT Cycle II period. While, ESCerts trading is expected to begin by end of this year, the Central Electricity Regulatory Commission (CERC) already issued a regulation – CERC (Terms and Conditions for Dealing in Energy Savings Certificates) Regulations, 2016 on 27th May, 2016 and was

notified on 30th May, 2016. Important features of this Regulation are as follows⁹:

- ▲ Roles and responsibilities of Administrator, Registry, CERC and Power exchanges were defined
- ▲ Market price of ESCerts shall be discovered through bidding at power exchanges i.e. through closed double-sided uniform price auction
- ▲ Interested DCs to whom ESCerts have been either issued or are entitled to purchase by MoP have to register themselves with ‘Registry’ i.e. POSOCO to become eligible entity
- ▲ For trading in Power exchanges the DCs have to get themselves registered with any of the exchange (IEX and PXIL)

b) Renewable Energy Certificate (REC) Mechanism

This scheme is being implemented to promote further investment and development of renewable energy sources in India. This is complimentary to the state-wise targets for Renewable Purchase Obligation (RPOs) mandated by the Government with an aim to increase the share of renewable energy in India’s energy mix. The REC mechanism is a market-based instrument which can be traded and provides means for fulfilment of Renewable Purchase Obligations (RPO) by Obligated Entities. RECs are traded at power exchanges (IEX: Indian Energy Exchange and PXIL: Power Exchange India Limited) following a well-defined procedure for application and trading. 1,732 RE Generators have been registered under the REC mechanism and a total of 1,248 projects were accredited as of 31st August 2017¹⁰. The details of RECs issued and redeemed are available transparently to all stakeholders through a common web portal and the websites of the Power Exchanges.

c) Pilot cap and trade Schemes

India has already pilot tested a cap and trade scheme¹¹ that began in 2011 in three states – Gujarat, Tamil Nadu and Maharashtra. The states received government mandates to implement programs focusing on particulates,

⁹<http://www.thehindu.com/news/national/Climate-change-plan-to-get-new-missions/article17090498.ece>

⁹BEE presentation, can be accessed here: https://www.beeindia.gov.in/sites/default/files/Booklet_Achievements%20under%20PAT_May%202017.pdf

¹⁰Based on REC Registry data retrieved from www.recregistryindia.in

¹¹Ministry of Environment, Forest and Climate Change, Govt. of India (Detailed project report can be accessed at: <http://www.indiaenvironmentportal.org.in/files/file/Detailed%20Project%20Report-mfes.pdf>)

such as, SO₂, NO₂ and SPM. This pilot was launched by MOEFCC together with the country's Central Pollution Control Board (CPCB) and relevant State Pollution Control Boards (SPCB). Under this mechanism, SPCBs will determine pollutants to be regulated for industrial facilities based on targeted overall pollutant concentration. State regulators will distribute emission permits to capped facilities, which have the option of complying with their caps and selling extra permits or buying permits from the market. The objective of the scheme was to improve the air quality, incentivize facilities to reduce air pollution and help states meet their National Ambient Air Quality Standards (NAAQS). Under this scheme, all three capped states exceeded their prescribed NAAQS – 2009 norms. The system covered nearly 1,000 industrial facilities under the scheme where SPCB determined the eligibility criteria.

d) National Clean Energy and Environment Fund (NCEEF)

India has also established a carbon pricing instrument in the form of the National Clean Energy Fund (NCEF) through a levy on coal. The fund, established in 2010 was operationalised to provide viability gap funding to support clean energy technologies. Subsequently, the scope of the fund has been expanded to include clean environment initiatives (NCEEF). The clean energy cess on coal has been increased from about US\$ 0.75 in 2010 to about US\$ 6 per ton of coal produced in the Union budget 2016-17. An Inter-Ministerial Group (IMG) chaired by Finance Secretary approves the projects eligible for financing under the NCEEF. With the recent hike in the cess, the total size of the NCEEF is expected to increase to INR 260 billion (US\$ 3.89 billion) per year in 2016-17. Till date IMG has recommended 55 projects with total Viability Gap Funding (VGF) of INR 348.11 billion (US\$ 5.4 billion)¹².

However, the Goods and Services Tax (Compensation of States) Act 2017 notified in April 2017, provides that NCEEF along with other cess, will be utilized to compensate the States for potential losses on account of GST implementation for five years.

¹²Department of Expenditure, Ministry of Finance, Govt. of India http://doe.gov.in/sites/default/files/NCEF%20Brief_post_BE_2017-18.pdf

¹³<https://www.thepmr.org/>

e) Partnership for Market Readiness

India's participation in the Partnership for Market Readiness (PMR)¹³, a World Bank group initiative, is an integral part of the country's plan to meet its ambitious Nationally Determined Contribution (NDC). India submitted its Market Readiness Proposal (MRP) to the PMR secretariat in February 2017. During PMR's 16th assembly meeting held in New Delhi on March 22nd, a grant of US \$8 million has been announced for India to prepare for and pilot the use of carbon pricing instruments to help reduce GHG emissions.

India's MRP includes six building blocks including upstream policy work to implement market based mechanisms (MBMs) and implementation work including meta-registry development and piloting a market based instrument in one of the identified sectors.

f) Networked Carbon Markets

Heterogeneity in design of carbon markets prevail across and within jurisdictions. In India, heterogeneity across its domestically tradable markets set-up to achieve its renewable energy (through REC mechanism) and energy efficiency (through PAT scheme) targets lays out a peculiar circumstance. While it is well understood that in isolation, the two markets continue to operate within their own boundaries thereby delivering mitigation outcomes and associated climate benefits; it is expected that linking of the two markets will further deliver enhanced transparency and comparability of mitigation outcomes in the country. Not only this, a connected market for carbon will endure other market benefits, such as of increased demand for carbon certificates, wider flexibilities to market players, entail ease of tracking climate progress and reduce volatility in determined carbon price as the larger benefits of the linked markets.

Currently, TERI is conducting a scoping study to identify climate change mitigation and other developmental co-benefits of these schemes. The study will suggest next steps/ policy recommendations on how to track the progress, develop benchmarking and improve the robustness of the PAT and REC schemes in India.

2.2.3. Experience with International Carbon Markets

a) Clean Development Mechanism

Since 2005, India has been an active participant in the Clean Development Mechanism (CDM) and represents a significant component of the global CDM market, registering the second highest number of projects for any country. This represents 15.98% of CDM projects in Asia and 12.7% of global CDM projects. Industries like cement, energy generation and use, fossil fuel switch, HFC, hydro, wind and biomass energy registered most projects in the CDM market. Until 31st August 2017, a total of 2,090 projects have got registered from India under UNFCCC and over 236 million Certified Emission Reductions (CERs) were issued¹⁴.

b) Voluntary Carbon Market

Voluntary carbon markets (VCM) emerged in parallel with compliance markets, such as CDM. VCMs comprise all voluntary emissions trading schemes established either with the objective of mitigating emissions or with the objective of meeting corporate social responsibility goals, offering product or service differentiation, brand building etc. The participants in VCM range from private individuals and corporates to governments.

Few countries, including India, have received the most voluntary carbon finance over the years. Globally, popular offset supply countries include Brazil (US\$233 million), Turkey (US\$207 million), India (US\$205 million), Kenya (US\$154 million) and China (US\$153 million). As in the CDM, India has served as a primary source of offset supply. The reason for this was also closely tied to India's experience with compliance markets, as CDM project registration delays often led project developers to seek cash flows while waiting in line by certifying first to voluntary standards and selling to voluntary buyers.

2.2.4. Relevance of Deploying Internal Carbon Pricing Mechanism by Companies

With an increasing domestic policy push on renewable energy and rising fuel levies, as well as India's NDC goal of emission intensity reduction, companies are exploring

¹⁴CDM registry, UNFCCC: <https://cdm.unfccc.int/Registry/index.html>

tools – such as voluntarily applying an “internal” carbon price – to address risks and opportunities related to climate change policies. In addition, India Inc. is increasingly looking at carbon pricing as a good tool to make their investments future proof. An internal carbon pricing strategy could potentially accelerate the deployment of capital intensive low-carbon technology projects.

India estimates that at least USD 2.5 trillion (at 2014-15 prices) will be required for meeting India's climate change actions between now and 2030. While majority of climate mitigation actions can be made possible through support from international climate finance, a domestic carbon market mechanism can play a significant role in helping incentivize low-carbon initiatives, reducing abatement costs and meeting NDCs goals in a self-sustained environment.

In the Indian context, both voluntary and regulatory mitigation frameworks could play an important role in nation's low carbon development path. An internal carbon price can help in achieving emissions reductions and reducing investment related risks on low-carbon projects for companies that have taken up voluntary emission reduction targets. Similarly, companies participating in market based schemes (PAT and RPO) can leverage their actions using an internal carbon pricing metric and creating a new credit line (virtual or real) that can be tapped for implementation of low-carbon energy efficient projects. Internal carbon pricing will be discussed in more depth in the chapters following.

2.3. Carbon Pricing in the Finance Sector

2.3.1. TCFD, Financial Stability and Momentum of Investors

There is growing focus from central banks and investors on the financial risks of climate change – both in terms of the physical risks, as well as the risks inherent in the transition to a low-carbon economy. In 2015, the G20 created two significant bodies -- the Green Finance Study Group, created by China and the Task Force on Climate-related Financial Disclosures (TCFD), created by the Financial Stability Board.

Both these bodies are working closely with

The TCFD defines an internal carbon price as “an internally developed estimated cost of carbon emissions. Internal carbon pricing can be used as a planning tool to help identify revenue opportunities and risks, as an incentive to drive energy efficiencies to reduce costs, and to guide capital investment decisions.

central banks and the private sector to focus on the measurement, management and disclosure of climate risks; the standardizing of low-carbon financial products and bringing climate risk and opportunity more into the mainstream within capital markets.

The TCFD specifically lists internal carbon pricing as a key metric to assess climate-related risks and opportunities in line with its strategy and risk management process. “Where relevant, organizations should provide their internal carbon prices as well as climate-related opportunity metrics, such as revenue from products and services designed for a low-carbon economy”¹⁵. The technical supplement¹⁶ document of the TCFD states that organisations should document and disclose the range of scenarios used to inform management’s assessment of climate change, including key inputs, assumptions, and analytical methods and outputs. Carbon price is one key metric for scenario analysis and this should include “what assumptions are made about how carbon price(s) would develop over time (within tax and/or emissions trading frameworks), geographic scope of implementation, whether the carbon price would apply only at the margin or as a base cost, whether it is applied to specific economic sectors or across the whole economy and in what regions? Is a common carbon price used (at multiple points in time?) or differentiated prices? What assumptions are made about scope and modality of a CO₂ price via tax or trading scheme?” The TCFD also recommends that carbon pricing be included in income statements.

Simultaneously, investors’ concern about climate risk is on the rise, from major institutional investors to the biggest players in the asset management world. Even the passive funds are increasing their engagement within the last year. The world’s two largest issuers of

passive funds, BlackRock (\$5.1 trillion in Assets Under Management) and Vanguard (\$4.4 trillion in Assets Under Management), both voted against the management of ExxonMobil and Occidental, and instructed the oil giants to report on the impact of global measures designed to keep climate change to 2°C¹⁷. Both asset management firms have indicated that this will be a focus area moving forward.¹⁸

This interest comes on the back of increasing concern about the financial implications of climate risk. In a 2016 paper by BlackRock Investment Institute, the firm notes that they believe “climate factors have been under-appreciated and underpriced...” however, this could change as the effects of climate change become more visible.¹⁹ They show that a group of global companies that reduced their carbon footprints indeed outperformed companies which did not, albeit in time-limited and small sample size tests.

BlackRock Investment Institute goes on to note that climate change factors play out in different time horizons, with regulatory factors often having an immediate effect, while technological factors affect companies in the medium-term, and physical impacts becoming more significant in the long-term. These risks are clearly noted in the TCFD’s recommendations, as highlighted in this report.

Carbon pricing and its ripple effects are also moving up the agenda for investors as factors that companies must consider in decision-making. A recent model, the “Carbon Value at Risk” (Carbon VaR) framework²⁰, developed by Schroders, shows that “almost half of listed global companies would face a rise or fall of more than 20% in earnings if carbon prices rose to \$100 a tonne”.

Additionally, in a recent paper²¹, State Street Global Advisors asked companies in high-impact sector companies to disclose their

¹⁵<https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf>
¹⁶<https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Technical-Supplement-062917.pdf>
¹⁷https://www.washingtonpost.com/news/energy-environment/wp/2017/05/31/exxonmobil-is-trying-to-foend-off-a-shareholder-rebellion-over-climate-change/?utm_term=.bb7e824485a5
¹⁸<https://www.ft.com/content/717e8f1a-8db3-11e7-a352-e46f43c5825d>
<http://www.independent.co.uk/news/business/news/climate-change-blackrock-manager-threatensdirectors-ignore-global-warming-a7631266.html>
¹⁹<https://www.blackrock.com/investing/literature/whitepaper/bii-climate-change-2016-us.pdf>
²⁰<http://www.schroders.com/en/hk/institutional-service/insights/video-webcast/how-rising-carbon-prices-could-cut-company-profits/>
²¹<https://www.ssga.com/investment-topics/environmental-social-governance/2017/perspectives-on-effective-climate-change-disclosure.pdf>

Carbon disclosure and pricing are two sides of the same coin, together they enable an assessment of risk and where required a reallocation of capital.

- Stuart Gulliver, CEO of HSBC-WEF January 2017

Carbon pricing has the potential to serve as a uniform, globally understood metric.

- Carbon Pricing Corridors- The Market View, CDP, May 2017

assumptions about the range and average carbon price they include in their planning.

2.4. Public-Private Collaboration

2.4.1. Carbon Pricing Leadership Coalition

The global action for climate change is not only being led by investors but also by leading industries through a wide collaborative platform of the Carbon Pricing Leadership Coalition (CPLC) which brings together leaders across national and sub-national governments, the private sector, and civil society with the goal of putting effective carbon pricing policies that maintain competitiveness, create jobs, encourage innovation, and deliver meaningful emissions reductions. The Coalition aims to drive action through knowledge sharing, targeted technical analysis and public-private dialogues that guide successful carbon pricing policy adoption and accelerate implementation. The CPLC has set ambitious targets to double the percentage of global emissions covered by explicit carbon prices to 25% by 2020, and to double it again to 50% within a decade.

Launched at COP 21 in 2015, the CPLC as of 2017 has more than 25 national and sub-national government partners, 150+ private sector partners from a range of regions and sectors, and 30+ strategic partners representing NGOs, business organizations, and universities.

Coalition partners agree to advance the carbon pricing agenda by working with each other towards the long-term objective of a carbon price applied throughout the global economy by:

- ▲ strengthening carbon pricing policies to redirect investment commensurate with the scale of the climate challenge;
- ▲ bringing forward and strengthening the implementation of existing carbon pricing policies to better manage investment risks and opportunities; and
- ▲ enhancing cooperation to share information, expertise and lessons learned on developing and implementing carbon pricing through various “readiness” platforms

2.4.2. Carbon Pricing Corridors Initiative

Private and public stakeholders within the CPLC have expressed a clear need for an informed view of how carbon-based price signals need to develop to deliver a sub 2° C world as defined by the Paris Agreement. Investors engaging with the TCFD are also calling for reference scenarios against which portfolios can be benchmarked.

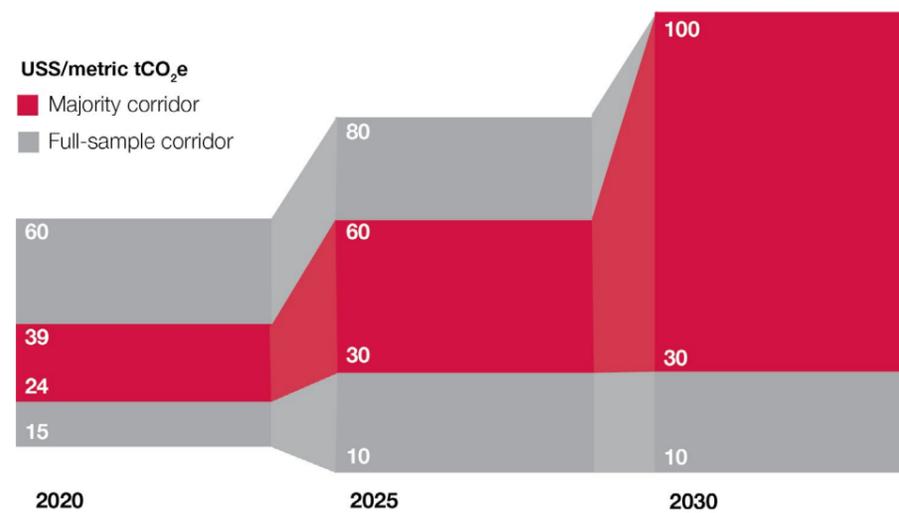
As a result, the We Mean Business Coalition and CDP launched the Carbon Pricing Corridors: an industry-led initiative aimed at defining the carbon prices needed for industry to meet the Paris Agreement. It is being delivered through an ongoing inquiry of the Corridors High-level Panel – a select group of leaders of industry, the investment community, and international experts that represent the G20. Over the next two years, they will shape and create an informed view of the range of investment-grade carbon-related price signals that are needed to decarbonize electricity generation and heavy industry through short to medium-term (2020, 2025 and 2030).

The resulting carbon price corridors will be published at regular intervals, providing a projection of future carbon-related price signals that deliver on the ambitions of the Paris Agreement. It will also begin to highlight the drivers in the economy which provide the price signals that make high-carbon activities more expensive and/or catalyse lower costs of capital for low carbon investments. In its initial report, ‘The Market View’, released in May 2017, the corridor is focused on the power sector, with its next report expanding to include high-emitting industries.

Figure 3 shows what the panel members deem to be the necessary price levels by 2020, 2025 and 2030 to decarbonize the power sector by 2050 and meet the targets under the Paris Agreement. 50% of the Panel’s responses fall within the ‘majority corridor’ shown in the red color below. The grey color represents the full sample of responses by the panelist.

This initiative comes at a critical moment when there is an increasing focus from the financial community on the tangible links between climate risk and corporate balance sheets. Investors and companies need stability, via clear and credible price signals, in order to make large enough investments in clean

Figure 3: Carbon pricing corridor for the power sector (Carbon Pricing Corridors-the Market View, 2017)



energy and new technologies to radically drive emissions reductions. If carbon pricing policies are to be put to their most productive use to meet mitigation and adaptation goals, governments need to critically consider the signals their policies send to markets. Business and investors who are seeking to make strategic decisions consistent with a low-carbon economy, but who struggle with a lack of information about the risks and opportunities involved in the transition can use the corridors as an analysing and benchmarking tool to consider the potential financial, strategic and business impact of the Paris agreement. On

the other hand, policy makers can use the corridors to assess the efficacy of the explicit carbon pricing systems that are already in place or are being developed. Carbon pricing corridors can be used by all stakeholders for: asset optimisation, investment decisions, portfolio risk assessments, R&D decisions, public procurement and policy design. We summarize this in the following stakeholder matrix indicating how the 2020, 2025 and 2030 corridors established in this report could be used. Examples of questions these different groups of stakeholders could answer with the corridors are provided in Figure 4.

Figure 4: User matrix, how investors, industry and governments can use the Carbon Pricing Corridors (Carbon Pricing Corridors-the Market View, 2017)

	ASSET OPTIMIZATION			INVESTMENT DECISIONS			PORTFOLIO STRESS TESTING			R&D AND LONG-TERM STRATEGIC PLANNING			POLICY DESIGN AND PUBLIC PROCUREMENT		
INVESTORS AND THE FINANCIAL SECTOR				✓	✓		✓	✓							
UTILITIES	✓			✓	✓		✓	✓				✓			
OTHER ELECTRICITY MARKET PLAYERS AND INDUSTRY				✓	✓		✓	✓				✓			
GOVERNMENTS AND POLICYMAKERS												✓	✓	✓	✓

✓ 2020
 ✓ 2025
 ✓ 2030

3. How Companies are Responding - Globally and in India

Internal carbon pricing has emerged as a powerful approach to assessing and managing carbon-related risks and opportunities that may arise with the transition to a low-carbon economy. For many organizations, the most significant impacts of these risks will emerge over time and their magnitude is uncertain. Assigning a monetary value to the cost of carbon helps companies monitor and adapt their strategies and financial planning to real-time and potential future shifts in the external market.

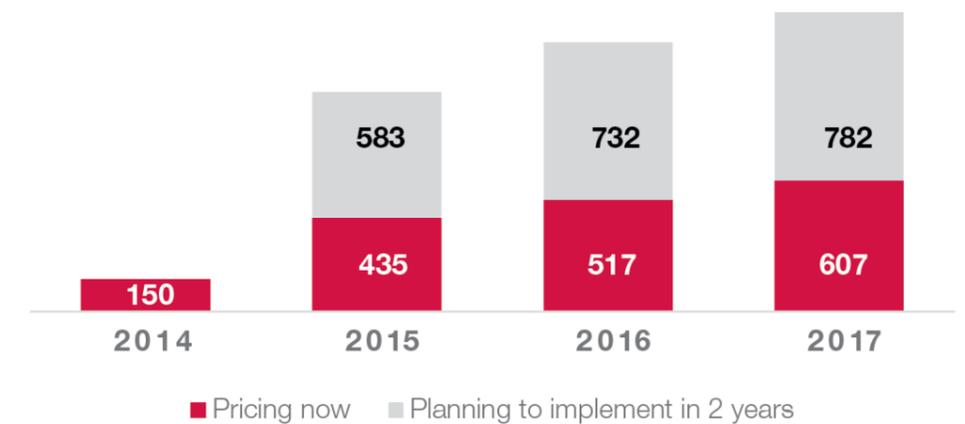
There is a distinction between the carbon prices (external carbon prices) mentioned in Chapter 2 and an internal carbon price used by companies. An internal carbon price (ICP) is a voluntarily determined price used within a

company to value the cost of a unit of CO₂e emission. This price tends to reflect the market prices of the regions where the company trades, although some companies may set theirs differently, based on the objectives they are aiming to achieve.

Over the past few years, CDP has been tracking a steady increase in the number of companies embedding an internal carbon price into their business strategies. The first publication of this information came in 2014, showing a remarkable 150 global companies using internal carbon pricing to assess and manage carbon-related risks. This information was new to the marketplace and the trend has increased annually at a remarkable rate, with over 600 companies having an internal price on carbon in 2017.

Figure 5: ICP statistics - Global

Headline number of companies pricing now + planning



In India too, there is an impressive growth in the adoption of carbon pricing by companies: from 2 companies in 2015 to currently 14²² companies in 2017. A total of 27, 44 and 40 Indian companies responded in 2015, 2016 and 2017 respectively to CDP's question on ICP and stated that they either have an ICP or intend to have one in place within next two years. In 2015, this number was 7% of total responding Indian companies, which grew to 18% in 2016 and 35% in 2017.

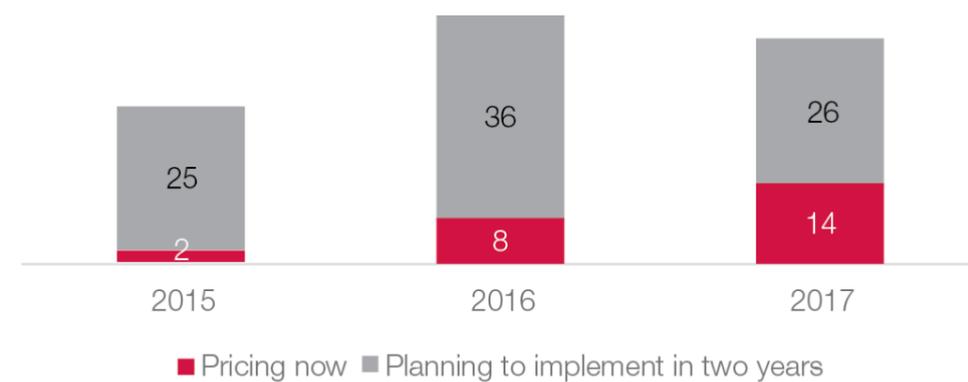
This year we saw a decrease in the number of responding companies to CDP India. However,

despite this drop we witnessed an increase in the number of companies incorporating carbon price in their climate risk matrix.

The drop in response rate was on account of two concurrent factors. First, the deadline for response was advanced to June 30 which squeezed the time available for companies. CDP had to enforce the deadline strictly to ensure delivery as a part of an agreement with our scoring partners. Secondly, the deadline coincided with the Government's launch of a new tax, the revolutionary Goods & Services Tax (GST), which absorbed a lot of companies' human resources.

Figure 6: ICP statistics- India

Headline number of Indian companies pricing now + planning



Companies are increasingly disclosing their price levels. In 2017, 7 out of 14 companies who have an internal price on carbon disclosed their actual price level. This is a growing trend as in 2015, only one company had disclosed its price level which doubled in 2016. Price levels range from ~US\$2-US\$30.



²²CDP request disclosure from companies in two ways- a investor led approach and a supply chain member approach. While many of the companies respond to both investors and their supply chain members, many also choose to respond to Supply chain only. In total 14 companies from both these samples in 2017 responded that they have an internal price on carbon. The carbon pricing numbers mentioned in this report accounts for both investor-led and supply chain samples.

Figure 7: Growth of ICP across GICS sectors - Global²³

Yearly total (pricing/planning)

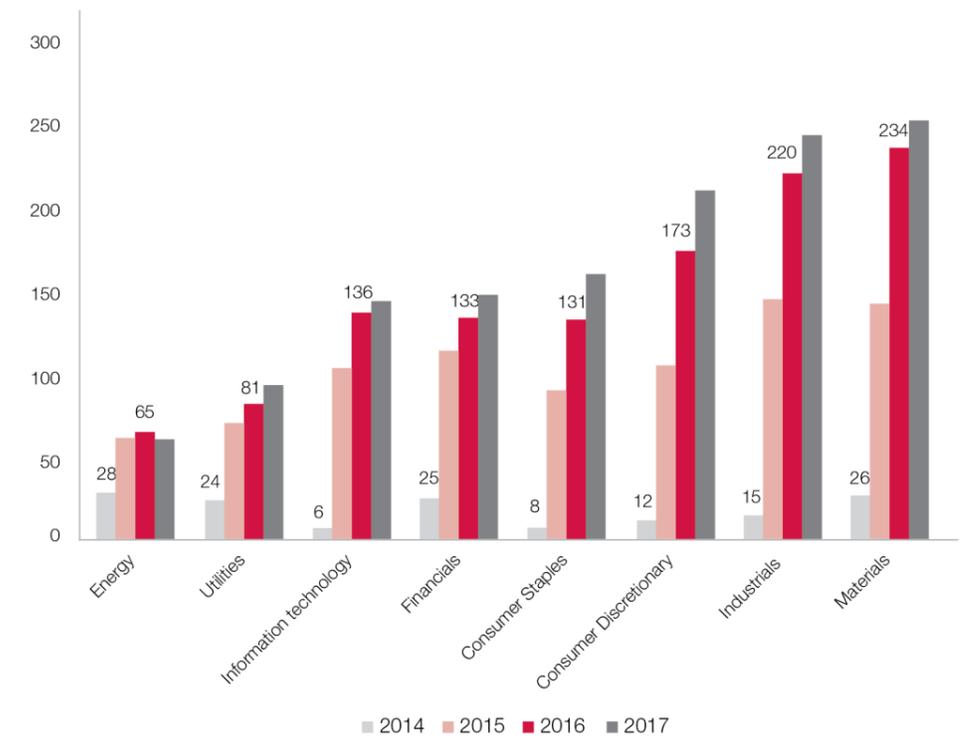
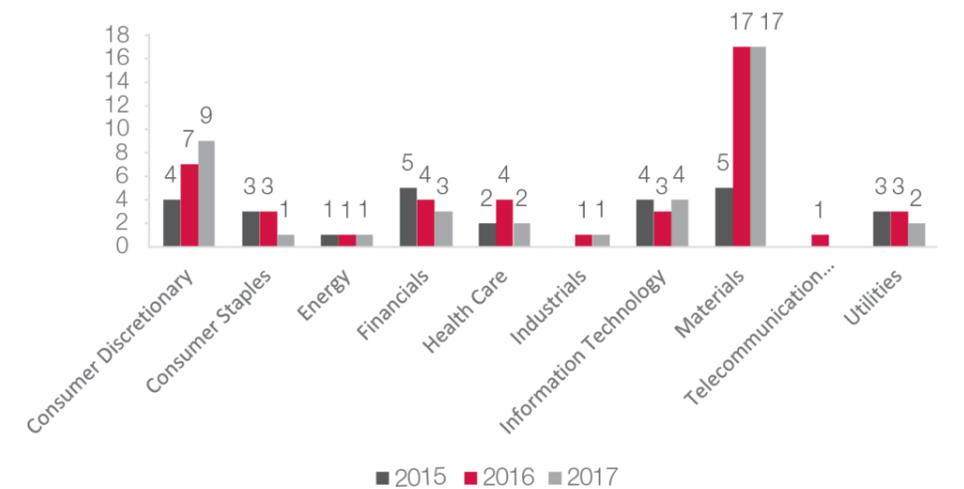


Figure 8: Growth of ICP across GICS sectors - India

Yearly total (Pricing/planning)



²³2014 numbers only include the number of companies that disclosed "Yes" to using an internal carbon price, whereas 2015-2017 also include companies that disclosed plans to use an internal carbon price within 2 years

Over the past four years, all GICS sector groups experienced an increase in the number of companies reporting the use of an internal carbon price or plan to price in the next two years. Part of this increase can be attributed to an increase in the number of companies disclosing to CDP year-on-year; however, there

has been a clear adoption of ICP across sector groups. In India, the GICS Materials Sector shows highest adoption of carbon pricing as well as highest price for carbon over the years. Companies are responding to very real price signals in the economy as well as seeking to use an internal carbon price as a mechanism to drive behaviour change within the company.



4. Internal Carbon Pricing – Emerging Best Practice

4.1. Why Companies are using an Internal Carbon Price

Companies, across all industries and geographies, have identified internal carbon pricing as an approach to building prudent buffers into their business models in preparation for a carbon-constrained future. The most sought-after benefits are that a company can use internal carbon pricing both as risk management tool and as part of its

decarbonization strategy.

In many cases, companies report multiple objectives for using an ICP – particularly as internal and external developments occur that require a readjustment of the ICP approach to maximize its effectiveness. Table 1 shows the three common purposes for implementing internal carbon pricing and the associated objectives/outcomes.

Table 1: Objectives for an internal carbon price

Purpose	Potential Objectives/Outcomes
Tool to assess and manage carbon-related risks	<ul style="list-style-type: none"> - Assess risk exposure - Inform strategic response and future-proof assets and investments against regulatory risk, including investment in new technologies or energy efficiency to decrease cost - Demonstrate management of risk to shareholders
Tool to identify carbon-related opportunities	<ul style="list-style-type: none"> - Reveal cost-cutting and resiliency investment opportunities throughout value chain - Change employee and supplier behaviour - Discover new market and revenue opportunities - Influence R&D investment decisions
Transition tool	<ul style="list-style-type: none"> - Align investment strategy with 2-degree scenario/align business with the Paris Agreement - Accelerate reduction of GHG emissions - Drive investment in energy efficiency initiatives, renewable energy procurement, R&D of low-carbon products/services - Generate revenue to re-invest in low-carbon activities

Internal carbon pricing can be an effective means to address the risks—regulatory, reputational and financial—associated with external carbon prices.

- 1) Manage risks:** Companies internalize the existing, expected or potential price of carbon—from an ETS, carbon tax, or implicit carbon pricing policy—to assess its risk exposure to regulations that affect the cost of emitting CO₂e.
- 2) Reveal opportunities:** Companies also use an internal carbon price as a tool to reveal potential opportunities that may emerge with the transition to the low-carbon economy. As policy and legal, market, technological and reputational factors shift, they also present opportunities for companies to seize. When used as a generic proxy in this way, an internal carbon price can help guide strategic decisions, such as low-carbon R&D to create the products and services of the future.
- 3) Transition Tool:** A smaller number of organizations deliberately use an ICP to drive emissions reductions and incentivize support low-carbon activities – such as investments in energy efficiencies, clean energy, R&D of green products/services – in order facilitate a company-wide low-carbon transition. This includes companies who utilize the voluntary carbon markets to offset their emissions, although increasingly the focus has been on driving down emissions within the company.

4.2. How Companies are Approaching using the Tool

4.2.1. Scope of GHG Emissions Covered by the Internal Carbon Pricing Mechanism

Each company has both a unique GHG emissions profile and a unique decision-making process. In combination, these determine the degree of influence that individual business units have over GHG emissions spread throughout the value chain. Examples of how different GHG emissions relate to different types of business decisions are provided in table 2.

Table 2: ICP & GHG emissions mapping

GHG Emissions	Examples of Relevant Decisions
Scope 1	Investment and production decisions
Scope 2	Energy purchasing decisions
Scope 3 upstream	Materials sourcing and procurement decisions
Scope 3 downstream	R&D decisions for innovative products for the current/future market

4.2.2. Carbon Price Level

Companies disclose a variety of approaches to determining an internal carbon price level(s) depending on the intended objective for its use as a tool. Due to competitiveness concerns, some companies do not disclose the actual price level(s) used; however, investors seek information which indicates the scale of the prices used, as well as the methodology used to determine the price. Common methodologies are outlined below:

Common Price Determination Methods ²⁴	
For Scenario Analysis/ Assessment of risk Based on price projections from existing or emerging carbon pricing regulations Based on a benchmark against peers within a sector	For a Transition Tool that Drives Decarbonization Based on internal consultation (to determine price level needed to influence business-decisions, or accelerate decarbonization) Based on technical analyses of investment needed to achieve a specific climate-related objective (MAC curve)

The information on price levels can help an investor gauge the efficacy of a company's application of the metric in terms of meeting its objectives, for example, an evolutionary price highlights that a company is planning sufficiently for the future. A framework²⁵ and set of examples for the common types of pricing are outlined below.

- ▲ **Uniform pricing:** a single price that is applied throughout the company independent of geography, business unit or type of decision
- ▲ **Differentiated pricing:** a price that varies by region, business unit or type of decision
- ▲ **Static pricing:** a price that is constant over-time

- ▲ **Evolutionary pricing:** a price that develops over-time

4.2.3. Business Application and Influence

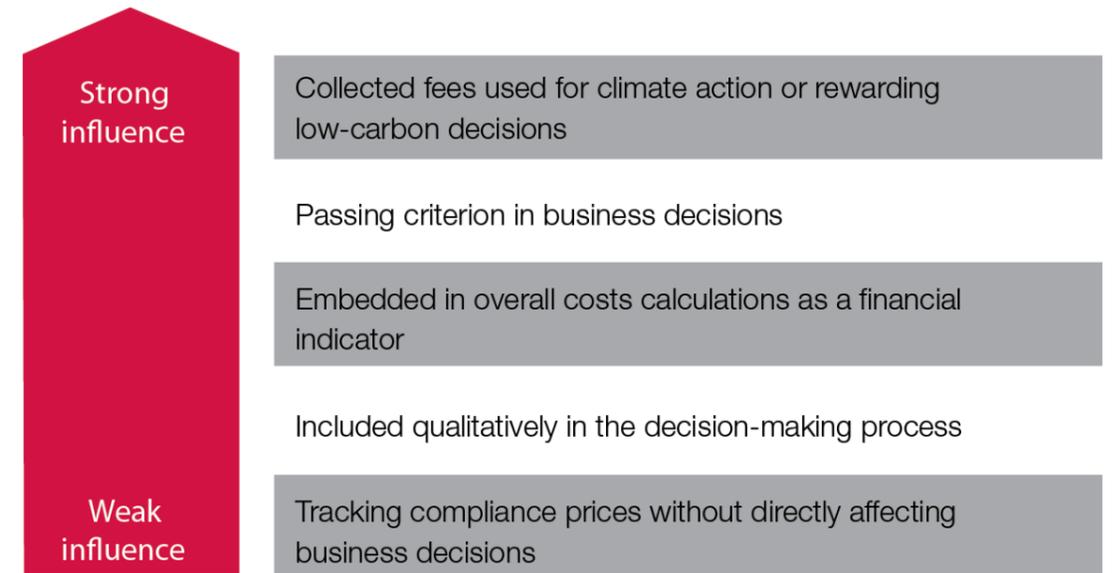
An ICP mechanism can be integrated into a company's business decision-making process in a variety of ways. Each company has a unique application approach, based on multiple factors, such as their internal corporate governance structure, emissions profile, position in the value chain and intended objective(s). In fact, some companies deploy multiple mechanisms within their organization to achieve distinctly different outcomes.

Assessing a company's ICP approach involves understanding how the tool is applied to business decisions, and the level of influence it has on the decision-making process (i.e. to what degree does a company enforce the use of the ICP).

Commonly disclosed operational applications include:

- ▲ Capital expenditure decisions
- ▲ Operational decisions
- ▲ Procurement decisions
- ▲ Product and R&D decisions
- ▲ Remuneration decisions

Figure 9 Level of influence of ICP



Degrees of enforcement range significantly from including the ICP in cost calculations as a passive indicator to imposing it as a passing criterion in project decisions. Figure 9 shows examples of different applications of an internal carbon pricing mechanism and the associated level of influence on day-to-day business decisions.²⁶

Popular 'types' of internal carbon pricing approaches have emerged in recent years and are commonly referenced in corporate disclosure. Definitions of the two are outlined below.

- ▲ **Shadow price:** Most companies utilize a shadow price—attaching a hypothetical cost of carbon to each tonne of CO₂e—as a tool to reveal hidden risks and opportunities throughout its operations and supply chain and to support strategic

decision-making related to future capital investments. Some companies with emissions reduction or renewable energy targets calculate their 'implicit carbon price' by dividing the cost of abatement/procurement by the tonnes of CO₂e abated. This calculation helps quantify the capital investments required to meet climate-related targets and is frequently used as a benchmark for implementing a more strategic internal carbon price.

- ▲ **Internal fee:** Internal fee mechanisms take this approach a step further by charging responsible business units for their carbon emissions. These programs frequently reinvest the collected revenue back into clean technologies and other activities that help transition the entire company to low-carbon.

²⁴Ecofys, The Generation Foundation and CDP, How-to guide to corporate internal carbon pricing – Four dimensions to best practice approaches, Consultation Draft, September 2017.

²⁵Ecofys, The Generation Foundation and CDP, How-to guide to corporate internal carbon pricing – Four dimensions to best practice approaches, Consultation Draft, September 2017.

²⁶Ecofys, The Generation Foundation and CDP, How-to guide to corporate internal carbon pricing – Four dimensions to best practice approaches, Consultation Draft, September 2017.

The combination of the type of pricing system used and the degree of influence it has can give a clear indication of the degree to which it affects decision-making within the company, and therefore of its effectiveness in terms of achieving the outcome sought.

4.3. Tools for Embedding a Price- How to Design and Implement an ICP

ICP is a multifaceted tool that can support companies in identifying and acting on the risks and opportunities that accompany this transition, as also recommended by the FSB-TCFD. However, the full potential of internal carbon pricing is insufficiently embedded in the daily decision-making process of most

companies. Based on findings from the Carbon Pricing Unlocked²⁷ research partnership, Ecofys, a Navigant company, the Generation Foundation and CDP published practical guidance to enable a wider use of best practice approaches to ICP globally.

The how-to guide provides step-by-step guidance for designing and implementing an ICP approach, while a special C-suite version helps board members to identify the most appropriate solution to their company. The guides complement existing research by providing a new 4D framework to approach ICP, combined with the latest insights and experiences gathered through interviews with leading companies²⁸. Read the full guide for more information.



HOW-TO GUIDE TO CORPORATE INTERNAL CARBON PRICING

Four Dimensions to Best Practice Approaches

CONSULTATION DRAFT



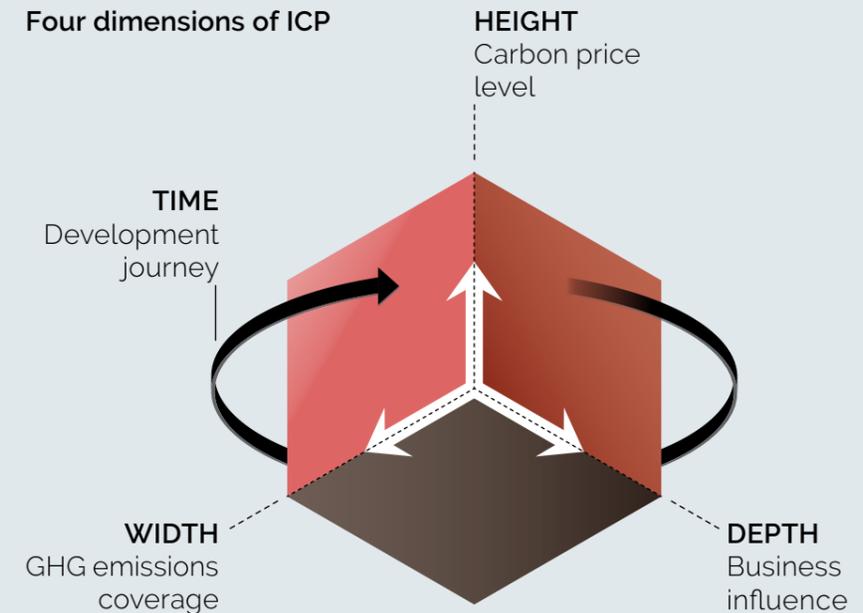
²⁷<http://www.ecofys.com/en/projects/carbon-pricing-unlocked/>

²⁸<http://www.ecofys.com/en/news/>



How-to Guide to Corporate Internal Carbon Pricing

Four dimensions of ICP



A how-to guide gives concrete guidance for designing and implementing an internal carbon pricing approach, while a special C-suite version helps board members to identify the most appropriate solution to their company. The guides complement existing research by providing a new 4D framework to approach internal carbon pricing, combined with the latest insights and experiences gathered through interviews with leading companies in the food industry value chain.

Four dimensions to design a best practice

A four-dimensional framework (4D framework) was developed to support the implementation of best practice approaches to internal carbon pricing. The 4D framework presented in the figure above provides companies with a structure to align their existing approach to best practices or establish their internal carbon pricing approach in a best practice way from the outset, as described in the table below. A best practice internal carbon pricing approach must have clear objectives and find the optimal combination of the four dimensions of internal carbon pricing. This forms the 4D shape of the internal carbon pricing approach.

Four dimensions and how to shape best practice ICP approaches

DIMENSION	ICP PARAMETER	BEST PRACTICE ICP APPROACH
Height	Price level per unit of GHG emitted (e.g. US\$/tCO ₂) that the company uses in business decisions	Rise to a carbon price capable of changing decisions in line with the ICP objectives
Width	The GHG emissions covered throughout the value chain by the ICP approach	Grow to cover all GHG emissions hotspots in the entire value chain that can be influenced
Depth	The level of influence the ICP approach has on the business decisions of a company and its value chain partners	Become increasingly influential to have a material impact on business decisions
Time	The development of the first three dimensions over time	Be evaluated regularly to bring the company's business strategy in line with a low-carbon economy

5. Case Studies - India

Mahindra & Mahindra

Headquarters: Mumbai

Internal price on carbon: One price, US\$10 per ton of carbon. Plans to have a second price in the future

GICS sector: Consumer Discretionary

Net Revenue : US \$ 6463.9 million (2017)

Emissions reduction target	Reduction of carbon intensity by 25% until 2019 against base year 2016	
Reported emissions (2017)	Scope 1	35,843 metric tonnes CO ₂ e
	Scope 2 (location-based)	158,185 metric tonnes CO ₂ e
Baseline emissions (2016)	Scope 1	32,622 metric tonnes CO ₂ e
	Scope 2 (location-based)	157,542 metric tonnes CO ₂ e

M&M, a premier utility vehicle (UV) and farm equipment maker in India, discloses that the ultimate objective for the adoption of a carbon price is to enable reduction of the company's carbon footprint as per its business goal. It has committed to reduce its carbon intensity by 25% until 2019 against base year 2016 and the investments through the carbon pricing mechanism will help it achieve its goal.

M&M highlights that it expects an internal price on carbon to deliver the following benefits:

- ▲ Create funds for low carbon projects deployment
- ▲ Informed management decision on investing in low carbon projects
- ▲ Achieve effective emission reduction targets
- ▲ Align operations and investment with the transition to a low carbon economy

The company discloses that they would use a hybrid approach i.e. a combination of explicit price (that uses real investment) and shadow price (that materially influences decision making), which would not only affect the decision-making frameworks for capital and operating expenditure outlays but also involve potential mechanisms for financial incentives.

The process of internal carbon pricing started when Mr. Anand Mahindra was invited to join the Carbon Pricing Leadership Panel in 2015 and proceeded through multiple conversations in meetings around the world. They started the price determination process by mapping the initial ratio of annual green investments compared to overall emissions. Estimating and disclosing emissions over several years made it easier to analyse data across an extended timeline through the preceding years. Armed and confident with their dataset, the price came out to US \$ 6-7. Mahindra decided to determine the additional cost that would be required each year to reduce its emissions and plotted the maximum price that it would incur per ton of emissions by mapping out various abatement options in its unique case. This raised the carbon price to US \$10 per ton.

The current price of US \$10 currently covers Scope 1 and Scope 2 and M&M is using it by levying the cost of carbon (carbon fee) on business operations for each unit of CO₂e emitted and also a shadow price, through which the company has got a sense of the investments required in technologies that will help achieve its emission reduction goals. This in turn, is helping investment decision in capital budgeting for green projects.

M&M is currently involved in finding the price on carbon for other Mahindra Group companies and will soon have internal carbon pricing among other business groups.

Infosys Limited

Headquarters: Bengaluru

Internal price on carbon: One price, US\$10.5 per ton of carbon

GICS sector: Information Technology

Annual Net Sales: US \$ 10.21 billion (2017)

Emissions reduction target	2 Absolute targets:	
		30% reduction in baseline emissions (2008) by 2022
	50% reduction in baseline emissions (2008) by 2036	
Reported emissions (2017)	Scope 1	16,165 metric tonnes CO ₂ e
	Scope 2 (location-based)	117,641 metric tonnes CO ₂ e
Baseline emissions (2008)	Scope 1	12,142 metric tonnes CO ₂ e
	Scope 2 (location-based)	167,268 metric tonnes CO ₂ e

Infosys is a global leader in consulting, technology, outsourcing and next-generation services. It is the first IT company in the world to make a commitment in the UN to become carbon neutral across all three scopes of emissions. Infosys states that its carbon price represents the cost to completely decarbonize under the carbon neutral commitment. While Infosys has recently declared that they are facing various hurdles to implement renewable power projects, it is still working towards their goal, in the near future.

Infosys highlights that it expects an internal price on carbon to deliver the following benefits:

- ▲ Informed management decision on investing in lowcarbon projects
- ▲ Achieve effectively emission reduction targets
- ▲ Align operations and investment with the transition to a low carbon economy

Infosys assessed its emissions profile across all scopes and significant geographies to understand the sources and the scale of its greenhouse gas emissions. Accordingly, Infosys developed a three-pathway strategy, consisting of energy efficiency, renewable energy and carbon offsets, to become carbon neutral. Infosys then derived an internal price of carbon based on the three pathways chosen and the corresponding cost of decarbonisation.

- ▲ Infosys analysed its past and potential future investments in various energy efficiency projects in areas, such as HVAC system, Building Management systems, UPS systems and Lighting systems. Cost of emission reduction and payback periods were key considerations in energy efficiency projects. With 51% reduction in per-capita energy consumption already achieved, Infosys discovered a relatively higher carbon price under this pathway going forward.
- ▲ Further, Infosys evaluated its investments in renewable electricity projects as well as its third-party renewable power procurement agreements. By considering the power requirements at various locations, the prevailing grid power tariff and the levelized costs of captive and purchased renewable power, Infosys derived a cost of carbon under the renewable power pathway.
- ▲ Infosys estimated the cost of offsetting emissions that cannot be avoided. The current investments in carbon offset projects along with a study of the current carbon markets helped Infosys arrive at the carbon price through the offset pathway.
- ▲ Infosys arrived at a weighted average carbon price of US\$10.5 per t CO₂e, based on the investment potential for each of the levers above.

The current carbon price is applicable to all relevant emissions under Scope 1, 2 and 3. It is being used as a shadow price by integrating a cost of carbon into strategic planning of future projects to optimize investments in available options for emission reduction. If needed, Infosys would use the carbon price to raise funds internally from their different units following the 'polluter pays principle' and use the money to implement emission reduction projects. Infosys expects to revisit its carbon price again in 2019 to reflect changes in the national and/or state policies, carbon markets, investment options for energy efficiency and renewable energy and other relevant factors.

<p>Shree Cement</p>	<p>Shree Cement was the first Indian cement company to join WBCSD's Cement Sustainability Initiative and is also a participant in CSI's Low Carbon Technology Partnership Initiative (LCTPI) to advance towards a Low Carbon Economy. SCL anticipates that internal carbon pricing will supplement the company's efforts towards fulfilling its contribution in LCTPI as well as aligning its operations and investment with the transition to a low carbon economy.</p> <p>SCL states that ICP is a practical tool to devise financial modelling and pricing and provides a consistent and accurate mapping towards GHG emission reduction trends.</p> <p>SCL has calculated an implicit price on carbon as the cost associated with carbon emission during the manufacturing or production process, i.e. on the basis of carbon emission per tonne of cement and production cost of per tonne of cement, which amounts to US\$2.2. per tonne of CO₂e.</p> <p>SCL is currently developing its approach to integrate Internal Carbon Pricing into its business model and exploring the future scenarios towards GHG emissions and business sustainability. SCL is also considering the holistic approach of combing ICP and science based targets wherein ICP can contribute to the achievement of the latter.</p>
<p>Ambuja Cements</p>	<p>At Ambuja, triple bottom-line is the core strategy for sustainable business and achieving a competitive edge. The company is progressing in its goal of reducing 33% emissions intensity in 2020 over the base year 1990 and has achieved 29.7% reduction until 2016 over 1990. Ambuja's True Value project initiated in 2013, considers internal price of carbon and the company is in the process of aligning with the Lafarge Holcim's approach on internal carbon pricing, thus normalizing the Group's approach to Indian conditions and calculating the internal price of carbon for all their manufacturing locations. In 2016, the implicit internal price of carbon was US\$ 29.41.</p>
<p>Essar Oil</p>	<p>Essar Oil, a fully integrated oil and gas company owning India's second largest single site refinery at Vadinar, Gujarat, states that the cost of carbon is one of the most important risks to the oil industry and an internal price on carbon is one of the tools to achieve their objective of risk mitigation and energy use optimization. Essar Oil was one of the first Indian companies to voluntarily set an internal price on carbon. The process started in the year 2010, when Essar calculated an implicit price based on the certified emissions reduction (CER) price of the time, the implied cost of carbon on refinery gasoline and an external carbon price, and arrived at the value of US\$15 per tonne of CO₂e. The current scope of this price is the Vadinar facility, a 20 MMTPA facility. Essar is currently using it as a shadow price to drive investment for low carbon options including renewables, natural gas and coal bed methane in its operations. Essar Oil is also using an internal carbon price to explore options, such as the diversification into new business opportunities.</p>
<p>Tata Chemicals</p>	<p>Tata Chemicals is using an internal shadow price of \$20/ton CO₂ in its group company Tata Chemicals Europe for assessing its investment cases. It also pays for carbon emissions in a number of ways already- via EU-ETS, Europe's internal carbon market. UK also has a carbon tax known as Carbon Price Support. This tax applies to fossil fuel consumption related to the generation of electricity and is currently \$4.04/MWh "non-good quality" electricity. Climate change taxes are also applied to waste products.</p>

<p>Tech Mahindra</p>	<p>Tech Mahindra has built an internal tool for their facilities & finance procurement team for internal carbon price. Tech Mahindra is exploring opportunities to price internally, explicitly or create a shadow price to reduce their emissions and grow the pool of green investments. In 2016-17, the company had an internal spend of under \$10 per ton of carbon to reduce our emissions for year 2016-17.</p>
<p>Mindtree Ltd.</p>	<p>Mindtree intends to have an internal price on carbon in the next two years. Currently, the company is at a conceptual stage and discussions are undergoing within board members, Environment and Sustainability team members as well as finance department. Mindtree envisages to integrating a cost of carbon into strategic planning of future projects and expects to achieve the benefits of- Informed management decision on investing in low carbon projects and effective achievement of emission reduction targets.</p>
<p>YES BANK Limited</p>	<p>YES BANK intends to have an internal price on carbon in the next two years and views it as an important tool to defining future business decisions. The company states that an internal carbon price will help the bank learn and better assess its carbon liability in a macroeconomic scenario; optimise operations and de-risk investment decisions, select carbon free assets and practices to build portfolio resilience and achieve innovation. Thus, Yes Bank expects to be in a better position to support its clients in reducing their climate risks. The methodology adopted is to estimate the green infrastructure investment required for its operation till 2025 to achieve the Bank's ambitious emission intensity reduction target of 10% year-on-year and decide the price per ton of absolute carbon emission. The scope of coverage at the strategy level is the entire infrastructure and network management team and finance team managing internal assets spread across 950+ branches and 1650+ ATM network.</p>

Carbon pricing is a critical tool in the global fight against climate change. A standardised mechanism to price carbon will enable business to recognize the cost of greenhouse gas emissions from their business activities, and thus catalyze industry-wide decarbonisation. Carbon Pricing Corridors provides financial institutions like YES Bank, who are committed to climate action, an opportunity to integrate carbon pricing into investment decisions, optimize operational performance and mobilize finance towards a low-carbon future.

- Rana Kapoor,
MD and CEO, YES Bank

Appendix 1

ICP Disclosure by GICS Sector (India 2017)

14
companies
in India
are pricing
carbon now

GICS Sector	Company	Price (US\$/tonne)
Consumer Discretionary	Mahindra & Mahindra	10
	Sundram Fasteners Limited	
Energy	Essar Oil	15
Information Technology	Infosys Limited	10.5
	Tech Mahindra	10
Materials	ACC	
	Ambuja Cements	29.41
	Creative Group of Industries	
	Dalmia Bharat Ltd.	
	Gulshan Polyols Limited	
	JSW Steel	
	Shree Cement	2.12
	Tata Chemicals	20
	Tata Steel	

Companies
that
anticipate
using an
internal price
on carbon in
the next two
years

GICS Sector	Company
Consumer Discretionary	ARVIND Ltd
	Bharat Forge
	Indian Hotels Co.
	Indo Count Industries Ltd.
	JK Tyres & Industries
	Shahi Exports Pvt. Ltd.
	Tata Motors
Consumer Staples	Godrej Consumer Products
Financials	Mahindra & Mahindra Financial Services
	Mahindra Lifespace Developers Limited
	YES Bank Limited
Health Care	Dr. Reddy's Laboratories
	Piramal Enterprises
Industrials	Jubilant Life Sciences Ltd.
Information Technology	Mindtree Ltd.
	Wipro
Materials	Essar Steel Limited
	Galaxy Surfactants Ltd.
	Godrej Industries
	Hindustan Zinc
	Mahindra Sanyo Special Steel Pvt. Ltd.
	Parksons Packaging Limited Chakan
	Uflex Limited
	Unique Polypack
	Utilities
JSW Energy	

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