WRI INDIA

WORKING PAPER

# REDUCING RISK, ADDRESSING CLIMATE CHANGE THROUGH INTERNAL CARBON PRICING: A PRIMER FOR INDIAN BUSINESS

CHIRAG GAJJAR AND VIVEK ADHIA

## EXECUTIVE SUMMARY

### Highlights

- A growing number of businesses around the world are turning to internal carbon pricing as a tool to manage climate-related risks and transition to a low-carbon economy. There are early signs that internal carbon pricing is also making inroads into forward-looking Indian businesses.
- While internal carbon pricing can support company efforts to reduce emissions and manage risk, Indian companies reported a need for targeted guidance on how to implement such schemes in a manner suitable to the Indian context.
- To help address this challenge, this primer provides a seven-step approach for developing and implementing an internal carbon-pricing scheme. The primer is based on the experience of five Indian companies with which WRI India engaged to develop carbon-pricing schemes, on a survey of 30 additional Indian companies, and on desk research.
- WRI India invites domestic and global companies interested in internal carbon pricing to implement this approach in support of their climate-related risk-mitigation and emission-reduction efforts. Based on companies' feedback and experiences implementing the approach, the primer will be refined and updated.

## CONTENTS





**Suggested Citation:** Gajjar Chirag and Adhia Vivek. 2018. "Reducing Risk, Addressing Climate Change through Internal Carbon Pricing: A Primer for Indian Business." Working Paper. Washington, DC: World Resources Institute. Available online at www.wri.org/publication/internal-carbon-pricing-primer.

SHAKTI SUSTAINABLE ENERGY FOUNDATION

## CARBON PRICING IN CONTEXT

**As countries and companies grapple with how to make the necessary transition to a low-carbon economy, carbon pricing is emerging as an important tool.** The 2015 Paris Agreement aims to limit the rise in average global temperatures this century to "well below" 2°C above preindustrial levels and to pursue efforts to limit the increase even further, to 1.5°C (UNFCCC 2015). To realize these ambitions, greenhouse gas (GHG) emissions must peak in the near future and then rapidly decline. According to the United Nations Environment Programme (UNEP), this requires the world to cut GHG emissions nearly 40 percent below where they will be in 2030 under the trajectory of current policies (UNEP 2017).

National governments are increasingly looking to carbon pricing as a way to reduce emissions and meet their Paris commitments. They are doing so through a range of approaches, including carbon taxes and emission trading systems. Once China's cap-and-trade scheme is fully implemented, up to 25 percent of total global GHG emissions will be covered by carbon pricing (World Bank et al. 2017).

Responding to the momentum, more companies are implementing carbon pricing, even when not required under law. They see it as a way to prepare for current and future policies and regulations, to reduce other climate-related risks, to respond to investor concerns, and to encourage innovation. For example, an influential report from the Financial Stability Board's task force on climate-related financial disclosures highlighted internal carbon pricing as a key metric for measuring the impact of climate-related risks (Task Force on Climate-Related Financial Disclosures 2017).

Forward-looking businesses are embracing carbon pricing with the help of coalitions such as the World Bank-led CPLC (Carbon Pricing Leadership Coalition), launched in Paris with the support of 21 governments and 90 companies (CPLC 2016). In 2017, 1,389 companies priced or were planning to price carbon internally across their operations or value chains, up 11 percent from the previous year (World Bank et al. 2017). Similarly, 23 percent more companies priced carbon in 2016 than in 2015 (World Bank 2016). These included more than 100 Fortune Global 500 companies with collective annual revenues of about US$7 trillion, according to CDP (the Carbon Disclosure Project, as it was formerly known). In India, 40 companies reported using or planning to price carbon internally (CDP 2017).

Carbon pricing is also becoming a more common choice for managing risk and meeting corporate emissions-reduction targets partly because it approaches emissions in business-relevant terms. Companies variously use the approach to meet strategic goals for risk mitigation, GHG emissions reductions, market development, or specific activity goals such as reducing business-related travel emissions.

### The India Context

Corporate adoption of internal carbon pricing in India varies by sector and geography in accordance with the extent of regulatory exposure (CDP 2017). The Indian government has signaled its intent to transition to a low carbon economy by committing under the Paris Agreement to have about 40 percent of non–fossil fuel-based electric power capacity in its energy mix by 2030. There is currently a carbon price for the coal sector, implemented through a tax known as the National Clean Environment Cess (Ministry of Finance 2015). The cess, currently priced at INR 400 ($6), is levied per ton of coal or peat purchased or imported by power producers. Additionally, programs such as clean energy and energy-efficiency standards (BEE 2012), renewable energy certificate schemes and renewables purchase obligations (MNRE 2016) also, in effect, impose a cost on carbon emissions.

It is not yet clear how Indian regulations will evolve as the nation works to reduce emissions. Nevertheless, the current regulatory landscape provides a favorable setting for increased corporate adoption of internal carbon pricing across sectors. A 2016 WRI India survey of companies found significant interest in exploring internal carbon pricing but also highlighted a lack of consistent guidance for the Indian context as an important barrier to widespread adoption. (For more on the Indian policy context, see Step 5: Set Cap or Estimate Price, page 23).

## About This Primer

**To help bridge this gap and support the expansion of internal carbon pricing both in India and globally, this publication provides guidance on how to design and implement such a scheme.** The seven-step approach that follows is based primarily on WRI India's collaboration with five companies at various stages of their carbon pricing journey: Arvind, Dalmia Bharat Cement, Essar Oil, Infosys, and Mahindra and Mahindra Ltd. WRI India approached these companies in 2015 with the goal of advancing bottom-up climate action by building a knowledge base about the implementations of an internal carbon price. The companies had various tools for pursuing carbon pricing and sought collaboration on certain elements or designs of schemes they had adopted. Although this primer is derived from engagement with these companies, it does not necessarily reflect specific processes used by one company, and the identified companies do not necessarily endorse this publication.

Table ES-1 below summarizes the motivation and approach of these five companies.

Table ES-1 | **At a Glance: Internal Carbon Pricing Case Study Companies**

| COMPANY | SECTOR | MOTIVATION FOR ADOPTING INTERNAL CARBON PRICING | INTERNAL CARBON PRICING APPROACH |
|---|---|---|---|
| Arvind | Textiles | Reduce energy consumption as a hedge against future energy cost increases. | Shadow pricing used to evaluate risks of electricity procurement from fossil fuel sources and clean energy sources. Helps promote investment in energy-efficiency projects. |
| Dalmia Bharat Cement | Cement | ■ Reduce emissions to lessen exposure to a clean environment tax or levy.<br>■ Create internal revenue streams to fund efficiency and abatement measures.<br>■ Meet renewable and efficiency goals. | Internal carbon tax of $11 per metric ton of $CO_2$ |
| Essar Oil | Oil and gas | ■ Manage climate-related risks.<br>■ Drive technological innovation.<br>■ Help company meet annual emissions reduction target of 1.6% by 2021. | Shadow price of $15 per metric ton of $CO_2$ |
| Infosys | Business consulting, information technology, outsourcing services | ■ Take leadership position on climate action.<br>■ Become carbon neutral by 2018.<br>■ Reduce per capita electricity consumption by 50% and use 100% renewable power by 2018. | Shadow price of $10.50 per metric ton of $CO_2e$ is used to help achieve carbon neutrality |
| Mahindra & Mahindra | Utility vehicle and tractor manufacturing | ■ Accelerate investment in low-carbon alternatives to reduce $CO_2$ emissions intensity of output by 25% between 2016 and 2019.<br>■ Double energy productivity between 2009 and 2030.<br>■ Reduce exposure to environmental taxes and other regulations. | Hybrid carbon pricing, which includes both an implicit price for the company's existing green investments, and a shadow price of $10 per metric ton of $CO_2$ |

*Sources:* Authors; The Climate Group 2016a; The Climate Group 2016b; CDP 2016a; CDP 2017.

WRI India also examined the experiences of global companies at the advanced stages of implementing an internal carbon price to inform this guide. Examples highlighted include Microsoft, Unilever, Statoil, and Swiss Re. To understand the specific needs and drivers of Indian companies, we also conducted a survey of domestic companies in sectors ranging from cement and manufacturing to financial services and aviation, and their responses informed our primer. Of these businesses, 27 percent have implemented carbon pricing or are planning to do so, and a further 60 percent are interested in exploring the idea. (The remaining 13 percent were not exploring an internal carbon price at the time.) Our stepwise approach seeks to help meet the concerns and needs of these companies looking to implement or improve internal carbon-pricing schemes.

Figure ES-1 | **At a Glance: Seven-Step Internal Carbon Pricing Primer**

| | | |
|---|---|---|
| FOUNDATIONAL PHASE |  | **Know Your GHG Emissions**<br>▪ Robust inventory of GHG emissions and data sources underpins carbon pricing. |
| DETERMINATION PHASE |  | **Identify Goals**<br>▪ Mitigate risks.<br>▪ Reduce GHGs, meet related targets.<br>▪ Develop new markets.<br>▪ Target specific activity, e.g., zero carbon facilities. |
| |  | **Determine Approach**<br>▪ Shadow price?<br>▪ Implicit price?<br>▪ Internal tax or fee?<br>▪ Internal emissions tracking scheme? |
| |  | **Set Boundaries, Select Activities**<br>▪ Choose business units and activities (e.g., product manufacture) covered by program.<br>▪ Decide whether to limit carbon pricing to operations or include transportation, supply chain, etc. |
| |  | **Set Cap or Estimate Price**<br>▪ Calculate and set a realistic price sufficient to drive internal low-carbon investment.<br>▪ Set an emissions cap on business units beyong which a fee is triggered. |
| SCHEME ROLLOUT AND REFINEMENT |  | **Operationalize Carbon Pricing**<br>▪ Socialize, train, and pilot with relevant business units.<br>▪ Use program to redirect processes and resources toward low-carbon operations and product development. |
| |  | **Track, Evaluate, and Disclose**<br>▪ Assess impacts and progress against goals.<br>▪ Report transparently and share learning.<br>▪ Correct course if needed, e.g., adjust price. |

*Source:* Authors.

## Recommendations: A Seven-Step Guide to Internal Carbon Pricing

**WRI India presents the following seven-step guide to help Indian companies pilot carbon pricing as a means to safeguard their business against climate-related risks and support the shift to a low-carbon economy.** The main challenges to undertaking carbon pricing cited by the companies in our survey were its perceived complexity and a general lack of guidance on how to adopt such a scheme and arrive at a fair carbon price or cap. The iterative stepwise approach summarized below is divided between a **price determination phase** and an **implementation phase in order to** bridge this gap. These steps follow a **foundational phase**, where companies are encouraged to complete an emissions inventory if they have not done so already.

Following this approach will help companies as they examine the emissions, boundaries, costs, savings, policies and risk mitigation, and innovation opportunities involved. It describes how to first set goals and boundaries for a carbon-pricing scheme and then set a realistic price or emissions cap sufficient to meet these goals. The implementation phase covers how to operationalize and socialize a carbon-pricing scheme and how to track, report, and evaluate its effectiveness and impact, enabling continual improvement and evolution.

By implementing carbon pricing, companies can support their existing climate-related goals while improving their understanding of how these mitigation opportunities may affect business strategy and development. Adding a value to GHG emissions will help companies gauge whether their strategy and operations reflect current and future climate-related risks while ensuring business continuity. Our research indicates that companies tend to use internal carbon pricing first as a tool to identify risks and opportunities and then build on the knowledge gained to shift investments in operational policies and processes and/or products. However, **we invite companies to apply this primer in accordance with their own over arching climate strategy and unique operational circumstances. The primer can be used by any company aiming to integrate internal carbon pricing as part of its climate strategy.**

While early days, all five case-study companies whose experiences influenced this guide report business benefits from their carbon-pricing schemes. These benefits include discovering and reducing climate-related risks and incentivizing the reallocation of resources toward low-carbon actions that support climate goals (such as GHG emissions-reduction targets) and operational efficiency.

We hope this practical primer will support other companies in India and beyond in molding strategies to integrate carbon pricing signals into their processes and decision-making in ways that benefit both their business and the global climate.

## METHODOLOGY AND TERMS

This report aims to inform Indian businesses about how to effectively calculate, set, and implement an internal carbon price. The report can also be used by any company aiming to integrate an internal carbon price as part of its climate strategy. Each company's circumstance is unique, and there is no single right or wrong approach to pricing carbon. However, there are some key principles, questions, and choices involved that are applicable to all companies and that our seven-step primer is designed to help companies navigate.

This primer is specifically informed by

- in-depth collaboration by WRI India with five Indian companies at various stages of implementing an internal carbon price;
- a survey of 30 additional Indian companies, covering 11 sectors, of which a majority already implement an internal carbon price or want to explore adopting such a scheme; and
- the well-documented experiences of four global, first-mover companies: Microsoft, Unilever, Statoil, and Swiss Re.

In addition, we drew on existing literature and research on corporate carbon pricing. The technical aspects draw heavily on the UN Global Compact's "Executive Guide to Carbon Pricing Leadership," produced by WRI, UN Environment, CDP, and other international organizations (UNGC et al. 2015). The authors also drew on the 2017 CDP report, *Putting a Price on Carbon: Integrating Climate Risk into Business Planning*, for global

carbon pricing disclosure and trends (CDP 2017), and on the Center for Climate and Energy Solutions report, *The Business of Pricing Carbon* (Manjyot Bhan 2017) for the business case for, and approaches to, the topic.

This working paper's new contribution to the corporate carbon-pricing literature is its focus on the Indian context, based on WRI India's direct engagement with domestic companies and knowledge of the national regulatory and business environment. The paper is also relevant beyond the Indian context in its synthesis of existing approaches used by companies globally.

## WRI India and Carbon Pricing

WRI India collaborated with the Shakti Sustainable Energy Foundation to produce this internal carbon-pricing primer. We acted in response to rising demand from Indian companies to understand this valuable GHG abatement tool and its role in business strategy.

The report leverages WRI India's research expertise in carbon pricing and our experience working with Indian companies that have implemented it. Since 2015, WRI India has pursued and expanded research activities on all aspects of carbon pricing at the national and international levels, while leading public debate and supporting capacity building in India. Since 2015, we have collaborated with the primary case-study companies in this report—Arvind, Dalmia Bharat Cement, Essar Oil, Infosys, and Mahindra and Mahindra—as they determine and implement their carbon-pricing schemes.

Box 1 | **Definition of Terms**

**Carbon pricing**
Carbon pricing is a tool to reflect the social, environmental, and economic costs of climate change on financial decisions (using *carbon* as shorthand for GHG emissions). Carbon pricing attaches a value or price to emissions in order to create incentives for low-carbon innovation (UNGC et al. 2015).

**Internal carbon price**
An internal carbon price is a value that companies set in order to internalize the economic cost of GHG emissions associated with their business activities. This report considers several voluntary internal carbon pricing approaches, including shadow prices, taxes or fees, cap-and-trade, and implicit carbon prices.

**Shadow price**
A notional value that companies attach to carbon emissions to assess the risks associated with business investments. This approach enables companies to better understand the potential impact of external carbon pricing on their operations.

**Internal carbon tax or fee**
A price that a company attaches to GHG emissions generated during business activity. The presence of the carbon tax or fee can help shift the attractiveness of high-emitting activities in favor of lower-emitting activities. Unlike regulatory tax or fee schemes, proceeds stay within the company and can be used to drive specific investments in low-carbon activity.

**Internal cap-and-trade**
A scheme that establishes an upper limit on the total amount of emissions from covered business activities. To provide flexibility for managers to find the lowest cost-abatement opportunities available, limits are not placed on individual activities but applied in the aggregate across all covered activities. The system is implemented by creating an allowance for each ton that can be emitted. Managers or operators can buy, sell, or trade those allowances among each other as long as they have enough to cover their total emissions. This results in a value or price being attached to emissions of GHGs.

**Implicit price**
A carbon price calculated based on the cost of a company's activities to achieve emissions-reduction goals, such as the amount spent on renewables purchases or energy-efficiency projects. Companies can use implicit carbon prices to evaluate recent investments and determine whether they are in line with their stated objectives. An implicit price can only be calculated retroactively after a company has made an investment and achieved emission reductions.

**Hybrid carbon pricing**
Some companies combine the options above, for example, by using both an internal carbon fee and a shadow price to meet GHG reduction goals and guide investment decisions.

## WHY CARBON PRICING?

Carbon pricing offers businesses a way to prepare for low-carbon policies and regulations and reduce related risk exposure. At the same time, by sending internal price signals that drive investments in low-carbon processes and, potentially, products, carbon pricing can offer opportunities for business efficiencies and for innovation.

The specific reasons why companies adopt carbon pricing and the way they apply it vary by company, sector, geography, and climate-related goals. For companies of all sizes and sectors, however, there is the potential to explore and benefit from carbon pricing within the following broad context.

### Toward a Low-Carbon Economy

At the 21st meeting of the Conference of Parties to the UN Framework Convention on Climate Change (UNFCCC) in December 2015, more than 190 countries agreed on the landmark Paris Agreement to combat climate change and accelerate progress toward universal low-carbon development. Subsequently, 81 Parties have submitted nationally determined contributions that include consideration of using carbon pricing as a tool to meet their Paris commitments (World Bank et al. 2017).

As of autumn 2017, 42 national and 25 subnational governments, including states, provinces, and cities, have implemented carbon-pricing mechanisms, and additional regimes are in the making (World Bank et al. 2017). These initiatives cover almost eight $GtCO_2e$ or about 15 percent of global emissions, with governments raising about $22 billion from carbon pricing in 2016 (World Bank et al. 2017) . Once China's pending carbon-pricing scheme comes into effect, up to 25 percent of $CO_2$ emissions globally will be covered by carbon pricing.

As a result, CEOs of companies worldwide increasingly anticipate that, sooner or later, domestic governments will price carbon through public policy to help meet their Paris Agreement GHG reduction targets. At the same time, companies face increasing pressure from investors to show that they are identifying and managing climate-related risks and opportunities. For example, through the Investor Forum for Climate Action, more than 400 investors representing over $25 trillion have urged governments to "provide stable, reliable, and economically meaningful carbon pricing that helps redirect investment commensurate with the scale of the climate change challenge" (UNGC et al. 2015). As a result, some companies have begun to internalize carbon prices to help them stay ahead of the curve and communicate to investors that they are transitioning from high-carbon to low-carbon activities (Manjyot Bhan 2017).

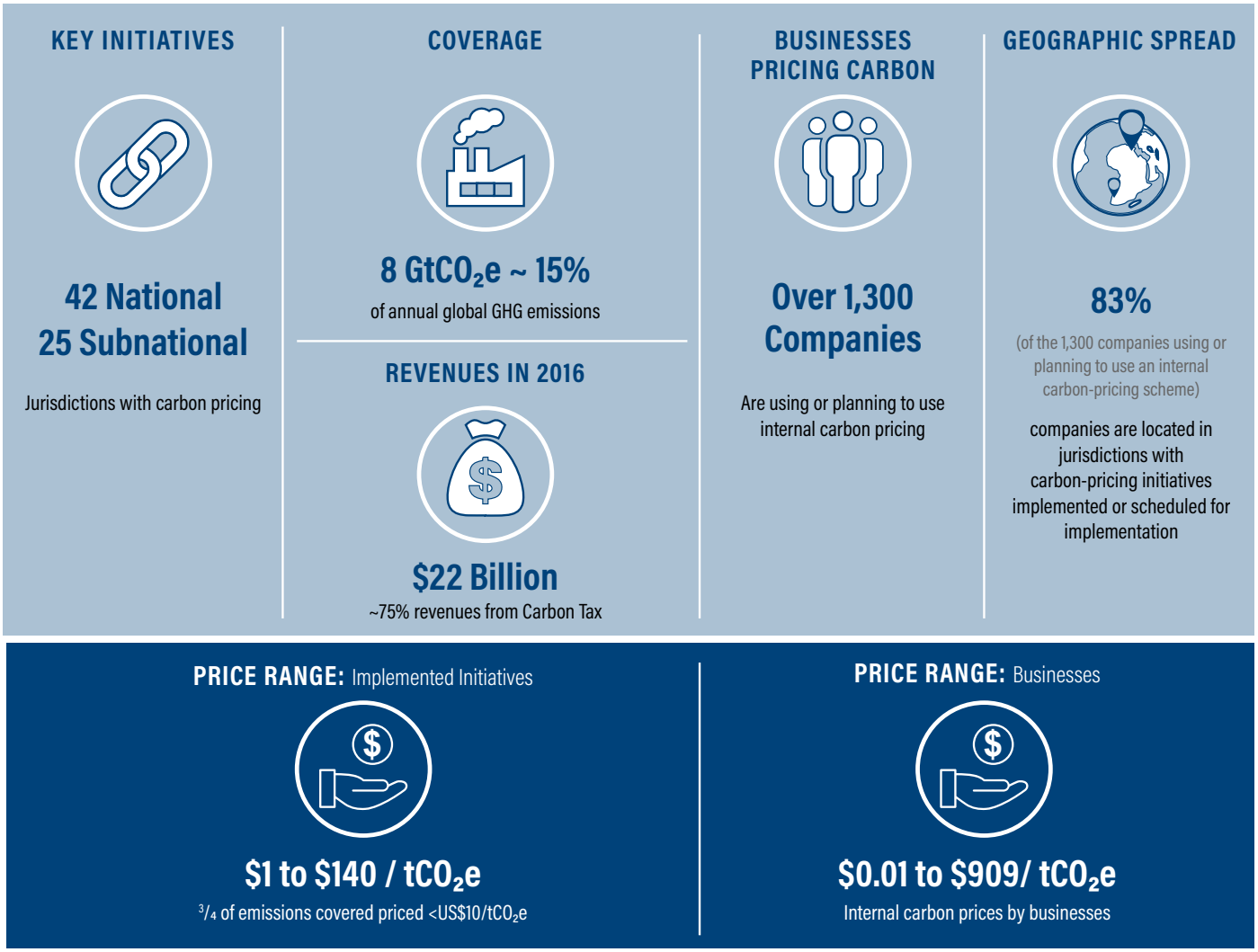
### State of Corporate Carbon Pricing

In 2017, 1,389 companies (see Figure 1) were pricing or planning to price carbon internally across their operations or value chains. This was an 11 percent increase from 2016 (World Bank et al. 2017), following a 23 percent increase between 2015 and 2016. These firms span the globe from North America and Europe to Brazil, China, India, Mexico, and Korea and include sectors ranging from telecommunications, materials, and finance to industrials, consumer goods, and health care (Manjyot Bhan 2017). In India, 40 companies disclosed to CDP in 2017 that they have either already put a price on carbon emissions or are in the process of doing so (CDP 2017).

Companies use various approaches to internal carbon pricing, and its level depends upon the intended use of this tool. Reported internal carbon prices by businesses are diverse, ranging from $0.01 to $909 per metric ton of $CO_2e$ (see Figure 1). While illustrative, it is worth noting that the upper and lower bounds are well outside the range of prices from regulatory programs (also see Figure 1) and thus appear to be somewhat anomalous.

Globally, many companies are pursuing internal carbon-pricing schemes in response to current or anticipated regulatory schemes. For CDP's 2017 report, *Putting a Price on Carbon*, nearly 500 companies disclosed that they are already affected or expect to be affected by carbon-pricing regulations and are "potentially vulnerable to its effects through their failure to internalize the cost into their business" (CDP 2017). Other forward-looking businesses are adopting carbon pricing based on a judgment that it can help prepare them for a low-carbon economy. This is partly because such schemes approach emission reductions in business-relevant terms, promoting flexibility, cost effectiveness, and innovation.

Figure 1 | **Carbon Pricing Trends by the Numbers**




*Source:* World Bank et al. 2017.

Whatever their motivation, companies variously use the approach to meet strategic goals for risk mitigation, GHG emissions reductions, and/or market development or to achieve specific activity goals such as reducing business travel emissions. We describe these benefits for businesses in greater detail below.

## Benefits for Business: Managing Climate Risks

"Failure of climate change mitigation and adaptation" was cited as one of the most significant challenges facing 21st century companies in the Global Risks Report published at the Davos World Economic Forum in 2016 (WEF 2016). Multiple climate-related risks, summarized below, threaten to undermine business-as-usual operations.

- **Regulatory risks:** Government requirements to reduce emissions can lead to shifts in the attractiveness of different investments as well as the business models that companies follow. In some cases, new regulations can lead to stranded assets.

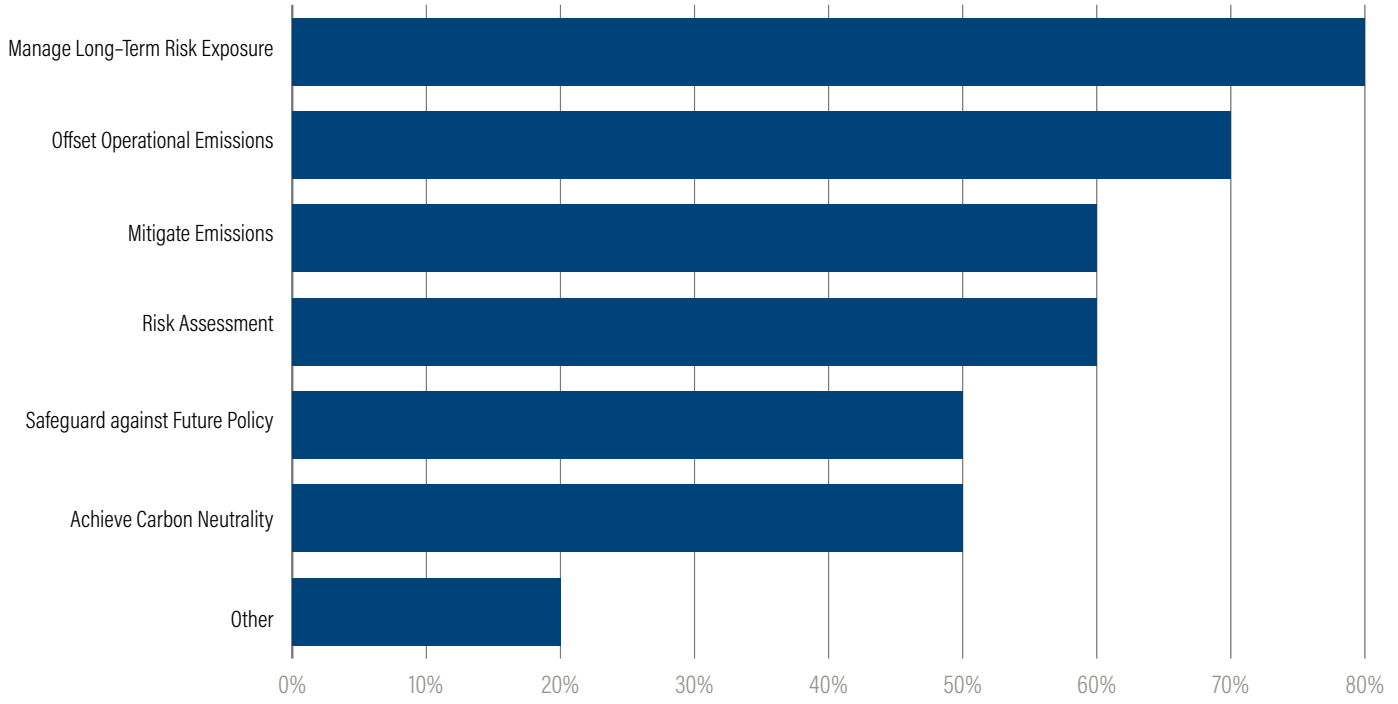
- **Market risks:** Existing markets can be affected by climate change in varied and complex ways. By factoring in climate risks, companies can seek to predict shifts in the supply and demand of commodities, products, or services in their sector.
- **Technology risks:** Technology transitions to support the shift to a low-carbon economy can have a significant impact on companies, bringing both risks and opportunities. For example, the development and use of emerging technologies, such as renewable energy, battery storage, energy efficiency, and carbon capture and storage, will affect the competitiveness and production and distribution costs of fossil fuel companies.
- **Physical risks:** The consequences of extreme events pose physical risks to companies' assets, disruption of supply chains, scarcity of resources such as water, and increased cost of protection and insurance.

Not surprisingly, given the scale and breadth of climate-related risks, companies generally cite risk reduction as the top factor driving their interest in internal carbon pricing. For example, the 1,389 companies reporting to CDP that they already price carbon or plan to do so agreed that the practice "can help them better mitigate the risks posed by existing or emerging carbon pricing regulations" (CDP 2017).

## The India Context

In India, the government has signaled its clear intent to transition to a low-carbon economy by committing under the Paris Agreement to reach about 40 percent of electric power installed capacity from non–fossil fuel energy resources by 2030. National regulations to date explicitly signal a carbon price for power producers who use coal as a fuel through a tax known as the National Clean Environment Cess (Ministry of Finance 2015).[1] Additionally, companies must also comply with regulations, such as the Perform, Achieve, and Trade Scheme, which mandates that energy intensive sectors reduce energy consumption, with penalties for noncompliance (BEE 2012), and renewable energy certificate schemes that indirectly price carbon. Finally, electricity distribution companies and large power consumers must meet renewables purchase obligations (MNRE 2016).

Figure 2 | **Exploring Internal Carbon Pricing: Key Benefits Cited by Indian Companies**




*Source:* WRI India 2016.

Against this regulatory backdrop, the focus group of 30 companies convened by WRI India cited "managing risk exposure" as the top benefit they hoped to gain from implementing an internal carbon price, cited by 80 percent of companies surveyed (see Figure 2). Similarly, 96 percent of companies surveyed cited future regulations and associated costs as the key factor in their approach to arriving at an internal carbon price. Further context on policy considerations for Indian companies is provided under Step 5, page 23.

### Benefits for Business: Driving Innovation

Carbon pricing can help drive innovation across companies and sectors, delivering benefits in the areas described below. In 2016, 37 companies reported tangible benefits as a result of internalizing a cost on carbon, including shifting investments toward energy-efficiency measures and low-carbon energy purchases and development of low-carbon product offerings, according to CDP (CDP 2016b).

**Improve business efficiency while reducing GHG emissions:** Strong, clear, and robust signals from an internal carbon price can help drive reductions in GHG emissions across a company's operations and in its supply chain. Carbon pricing can help drive energy efficiency and circular economy investments, which can also reduce operating costs as well as risks related to natural resource scarcity.

**Drive a shift from carbon-intensive to low-carbon activities:** By sending price signals, which affect a company's investment decisions, internal carbon pricing can, over time, steer companies away from carbon-intensive and toward low-carbon processes, projects, and, in some cases, products. For example, internal carbon pricing can drive fuel switching and renewable energy deployment decisions.

**Enhance business sustainability and the bottom line:** Some companies deploy internal carbon pricing as a means to capitalize on changing economic, environmental, and political conditions by integrating climate risks and opportunities into business practices. Wielded effectively over time, carbon pricing can help drive operational and product innovation, which in turn supports business competitiveness. Ultimately, implementing an internal carbon price may significantly reshape an organization if the objective of decarbonizing business activities is integrated into larger business goals.

In the following sections, we provide step-by-step guidance and examples to help companies persuaded by the why of carbon pricing to navigate the how.

## GETTING STARTED: KEY CONSIDERATIONS

Once a company has decided to respond to regulatory environments or to risk-reduction and business opportunities by exploring internal carbon pricing, there are some initial prerequisites and actions to consider.

### Keys to Success: Strategic Leadership and Internal Buy-In

#### Leading from the front

Company leaders can play a vital role in creating an environment and culture that enables adoption and acceptance of an internal carbon price. GHG emissions are already a regulatory, financial, and sometimes reputational risk for many companies, drawing attention from investors, shareholders, and board members. Executive leadership can proactively address these risks by incorporating GHG emissions and the potential for related regulations into the risk analysis framework. They can then use carbon pricing as a tool to influence risk-management and strategic planning decisions, and ultimately to inform investment decisions that the company makes. When leaders embrace carbon pricing in these strategic terms, buy-in is more likely among the business units and managers tasked with implementing the scheme.

#### Socializing internal carbon-pricing schemes

Given that implementing an internal carbon-pricing scheme generally involves effort and expertise across disciplines and business units, the key to success is strong internal collaboration. Yet, uninformed managers could perceive it as a hindrance to achieving financial or operational performance goals. Building awareness among, and providing training for, all relevant teams throughout the process is therefore an important investment.

Figure 3 | **At a Glance: Seven-Step Internal Carbon Pricing Primer**

| | | |
|---|---|---|
| FOUNDATIONAL PHASE |  | **Know Your GHG Emissions**<br>▪ Robust inventory of GHG emissions and data sources underpins carbon pricing. |
| DETERMINATION PHASE |  | **Identify Goals**<br>▪ Mitigate risks.<br>▪ Reduce GHGs, meet related targets.<br>▪ Develop new markets.<br>▪ Target specific activity, e.g., zero carbon facilities. |
| |  | **Determine Approach**<br>▪ Shadow price?<br>▪ Implicit price?<br>▪ Internal tax or fee?<br>▪ Internal emissions tracking scheme? |
| |  | **Set Boundaries, Select Activities**<br>▪ Choose business units and activities (e.g., product manufacture) covered by program.<br>▪ Decide whether to limit carbon pricing to operations or include transportation, supply chain, etc. |
| |  | **Set Cap or Estimate Price**<br>▪ Calculate and set a realistic price sufficient to drive internal low-carbon investment.<br>▪ Set an emissions cap on business units beyong which a fee is triggered. |
| SCHEME ROLLOUT AND REFINEMENT |  | **Operationalize Carbon Pricing**<br>▪ Socialize, train, and pilot with relevant business units.<br>▪ Use program to redirect processes and resources toward low-carbon operations and product development. |
| |  | **Track, Evaluate, and Disclose**<br>▪ Assess impacts and progress against goals.<br>▪ Report transparently and share learning.<br>▪ Correct course if needed, e.g., adjust price. |

*Source:* Authors.

To gain internal buy-in and understanding for the scheme and its goals, companies may also find it helpful to involve key senior managers from across affected parts of the business from the outset. Specifically, it can be useful to set up a cross-functional advisory committee that provides input on the scheme's development and implementation and internal and external communication. Companies that have set up such committees generally include members of senior corporate management, the finance division, energy and environment/sustainability departments and relevant functional divisions, as well as corporate communications.

### Engaging stakeholders

Engaging with a wide range of both internal and external stakeholders helps companies craft, plan, and communicate the business case for their internal carbon-pricing scheme. Engaging early with stakeholders during the price-discovery or cap-setting phase can also help in sending the right price signal on carbon to achieve a company's goals. Periodic engagement with stakeholders around scheme performance can also help increase support for the scheme, which may help the company realize its goals and facilitate increased ambition over time. In each of our five case studies, Indian companies benefited from engaging with employees, shareholders, and board members as well as investors, industry peers, and trade associations.

Investors, in particular, are a key constituency. The transition to a low-carbon economy may affect the financial viability of some companies. Climate-related risks put pressure on return on investments and portfolios held by investors. By communicating early and often with investors on the strategic benefits of an internal carbon price, executives can assuage shareholder concerns over climate-related risks. Investors are increasingly becoming aware of such risks and applying a shadow price to their new investments. This emerging practice may have a significant impact on the internal carbon-pricing schemes adopted by companies that are looking for financing.

### No One-Size-Fits-All Approach to Carbon Pricing

It is also important for companies to recognize up front that no single approach to carbon pricing is right or wrong. Every company's circumstance is unique. The aim of this report is not to advocate for one approach over another but, rather, to point out the key decisions companies need to make and the factors they should take into account while making those decisions.
Many business leaders tend to perceive carbon pricing as complex and uncertain. Therefore, our goal is to help companies identify and navigate the key steps for implementing a carbon-pricing scheme that is consistent with their goals. In the primer that follows, case studies demonstrate how Indian companies have approached different stages of the process. The primer was developed in collaboration with Indian companies and provides additional India-specific regulatory context to guide domestic businesses. However, the generic primer below, which also draws on global corporate experience, is suitable for trial by companies anywhere.

Our seven-step guidance is divided into two phases: Price Determination and Scheme Rollout and Refinement. A summary is provided above in Figure 3.

## STEP 1: KNOW YOUR GHG EMISSIONS

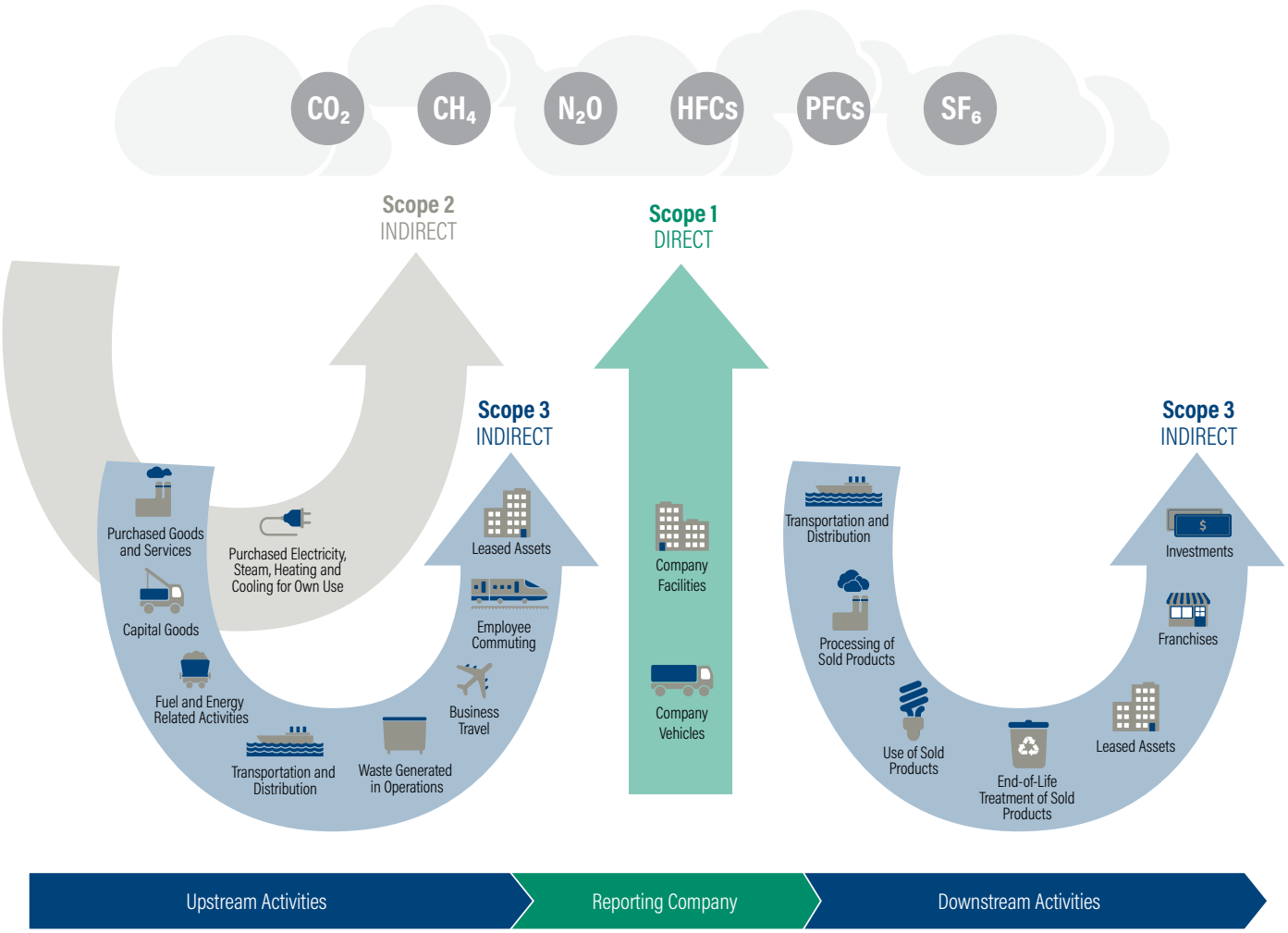
A comprehensive, reliable, and accurate understanding of GHG emissions is crucial for the design, implementation, evaluation, and reporting of an internal carbon-pricing scheme. This foundational information will inform companies when making critical decisions about the scheme, such as what activities or sectors to prioritize and where to draw scheme boundaries. Managers who do not know their emissions before scheme implementation begins are at a severe disadvantage as they cannot adequately gauge their risk exposure or assess the relative value of different mitigation strategies. Companies will also need historical GHG emissions data to properly evaluate the impact of the carbon-pricing scheme after it goes into effect. Finally, transparent GHG data can boost companies' credibility when reporting the scheme publicly.

To facilitate the compilation and disclosure of robust, comprehensive, and transparent GHG emissions data, companies should set up a system to measure, report, and verify their GHG emissions. Many companies do so by joining existing GHG programs, such as the India GHG program, an industry-led voluntary framework to measure and manage GHG emissions. Companies can also do so by using the Greenhouse Gas Protocol standards, including the Corporate Standard, Scope 2 guidance, and the Corporate Value Chain (Scope 3) Standard.

Regardless of the scope of a company's goals or internal carbon-pricing scheme, it is helpful to develop an inventory that extends across the entire value chain. This will enable companies to track shifts in investments, emissions, and risk exposure more comprehensively over time. As a result, the inventory can help companies develop effective strategies for managing and/or reducing emissions and associated risks throughout the value chain and better equip them to engage upstream actors in understanding the impact of their decisions.

Figure 4 below, from the Greenhouse Gas Protocol, shows common sources of direct and indirect GHG emissions across a typical value chain. The Corporate Value Chain (Scope 3) Standard and relevant tools provide further guidance on how to measure, report, and verify Scope 3 emissions. In Step 5, we explore considerations for companies in including these categories of emission sources in a carbon-pricing scheme.

Figure 4 | **Overview of Greenhouse Gas Scope and Emissions across a Company's Value Chain**




*Source:* WRI and WBCSD 2011.

Box 2 | **Case Study: Infosys Targets Carbon Neutrality**

Infosys, a global technology services company with a significant footprint in India, seeks to become carbon neutral. This business goal drives the company's adoption of internal carbon pricing.

**Background**

Infosys has a three-pronged approach to reducing its GHG emissions and achieving carbon neutrality. First, it aims to reduce its overall electricity requirement by 50 percent (on a per capita basis). Second, it intends to switch to green power for the remaining electricity demand. Third, it intends to invest in offset projects for the remaining GHG footprint.

**Approach**

As a first step, the company collaborated with WRI India in 2016 as it explored the potential implications of, and approaches to, internal carbon pricing. Given that most of the company's emissions arise from purchased electricity (Scope 2 emissions), the company used the following approach to arrive at an internal carbon price of $10.50 per metric ton of $CO_2e$.

- First, it mapped the cost of procuring electricity across its facilities within India.
- Second, it mapped the cost of energy efficiency and renewable-energy measures the company was already implementing and calculated the implicit carbon price associated with these measures.
- Third, it mapped the costs of procuring offsets from existing market mechanisms.

Infosys modeled these identified costs against facility-level electricity requirements to screen cost-effective green electricity procurement options. The company is now using the pricing mechanism to encourage its business units to make the required shift in energy procurement investments to meet its goal of purchasing 100 percent of electricity from renewable sources. The scheme is too early in its adoption to report outcomes.

# STEP 2: IDENTIFY GOALS FOR THE CARBON-PRICING SCHEME

This step identifies four broad categories of goals that can be served by introducing an internal carbon-pricing scheme and shows how a company can develop an internal carbon-pricing scheme that can help achieve those goals. A carbon-pricing scheme is a means to an end, not an end in itself. Thus, in setting a goal or goals for the scheme, a company's starting point should be its existing climate-related goals and how carbon pricing can help achieve these goals.

For example, more than 2,000 companies have now set GHG reduction goals (UNFCCC 2015). A growing number of global companies, such as Unilever (UNFCCC 2017a) and Philips Lighting (UNFCCC 2017b), have set targets for developing low-carbon products. Some first-mover companies have set multiple, often overlapping, goals to reduce emissions, use renewable energy, increase energy efficiency or energy productivity, and so on. Well-designed internal carbon-pricing schemes can help accelerate progress toward more than one of these corporate goals.

Below, we describe the types of goals companies commonly set for carbon-pricing schemes on the basis of broader corporate goals. It is important to note that the type of goal chosen can influence the type of carbon-pricing scheme—internal tax/fee, shadow price, or implicit price—that is best suited to achieving its objective, as described in Step 2.

## Goal Options

Goals for carbon-pricing schemes that companies can choose fall broadly into four categories: **company-wide GHG reduction goals**, **activity goals**, **risk mitigation goals**, and **market development goals**.

### Company-wide GHG reduction goals

Companies around the world have set GHG-reduction goals that seek to achieve either an absolute reduction in their operational or value chain emissions or a reduction in emissions intensity. Some set ambitious company-wide goals of zero absolute emissions, often referred to as carbon neutrality goals. Some establish science-based targets that align emissions-reduction goals with the level of decarbonization required to keep global tem-

perature rise below 2°C. Such goals can be influenced by a company's own assessment of its emissions, external influences such as sector-based initiatives, or studies and/or regulatory policies in the geography of its operations.

Companies for whom such goals are key drivers of corporate policy and reputation can use internal carbon pricing to advance progress in reducing emissions. Specifically, a carbon price can help business units integrate and work toward GHG reductions goals by

- driving energy efficiency;
- reducing the emissions intensity of power generation and heating, such as by increasing the share of renewables; and
- providing a mechanism for offsetting remaining emissions.

## Activity or sector-specific goals

These are generally targets that companies set for a specific area of their operations or a broader value chain that affects climate action. Activity goals are a subset of overall GHG reduction goals, allowing companies to use an internal carbon-pricing scheme to strategically target and mitigate GHG-intensive activities. Goals that businesses can consider trying to meet through carbon pricing initiatives include

- renewable-energy targets (for example, as part of RE 100 or the Renewable Energy Buyers Alliance), where a member company's goal is procuring a certain percentage of renewable energy;
- energy-efficiency targets for electricity consumption;
- reduced emissions from shipping;
- energy-productivity targets;
- reduced emissions from employee business travel; or
- reducing emissions from refrigeration or cooling requirements.

Using carbon pricing in this way can help companies identify specific activities that contribute most to their GHG emissions and prioritize efforts to shift to low-carbon alternatives.

## Risk-mitigation goals

Given the growing political momentum globally to reduce GHG emissions, businesses are increasingly assessing risks from potential new regulatory measures such as carbon taxes and cap-and-trade systems, as well as from climate-change impacts, on their operations. Some of the risk-mitigation goals that can be taken into account when designing internal carbon pricing mechanisms include

- assessing the resilience of investments to future climate-related domestic and regional regulations, such as an emission trading scheme or carbon tax;
- testing sensitivities of business projects under various carbon-pricing scenarios;
- steering research and development toward products or services that help a company reduce its emissions and hence exposure to climate-related risks; and
- diversifying portfolios to include low-carbon products in order to build a more robust supply chain.

Essar Oil was one of the first Indian companies to internalize the price of carbon in 2010. To reduce climate-risk exposure, the company conducted a study to model future prices of certified emission reductions in 2020 under Kyoto Protocol's Clean Development Mechanism. Essar then adopted this as a shadow carbon price and applied it in investment decisions at its facilities.

## Market-development goals

Some companies are exploring linking carbon-pricing schemes to market-development goals. The concept involves using a carbon price to create, test, and expand new products and services suited to the low-carbon economy on the horizon. Companies that have business goals centered on low-carbon product development may wish to consider using carbon pricing to evaluate R&D investments, develop product innovations, and improve market positioning or first-mover advantage.

When setting a goal or goals for an internal carbon-pricing scheme, a key factor for companies to consider is the time frame over which they aim to achieve their goals. This will help companies establish a realistic timeline for introduction and implementation of an internal carbon-pricing scheme. It will also help them determine whether and how to adjust prices or caps over time so that they can meet those goals.

Box 3 | **Case Study: Mahindra and Mahindra Drives Investment with Hybrid Carbon-Pricing Scheme**

This major utility vehicle and farm solutions company determined the implicit internal carbon price commensurate with costs of abating GHGs from initiatives implemented and then used it to establish a shadow price to reduce its policy exposure and meet energy-efficiency and renewable obligations. Set at $10 per metric ton of $CO_2$, the shadow price is high enough to materially affect internal investment decisions, driving investment in low-carbon projects.

**Background**

Mahindra and Mahindra (Mahindra) is the flagship company of the Mahindra Group. The group's sustainability strategy is driven by its Promise Statement 2019, which commits to reduce company-wide emissions intensity 25 percent by 2019, compared to 2016. Mahindra was also the first Indian company to sign on to the global EP 100 initiative, committing to keep operational energy consumption at its 2009 levels while doubling production by 2030 (The Climate Group 2016a). Carbon pricing is considered a key tool to help meet these commitments and reduce climate-related policy and regulatory risk.

**Approach**

Mahindra collaborated with WRI India to structure its internal carbon-pricing scheme by evaluating the financial implications of carbon emissions. The approach involved estimating the implicit price within the company's existing green investments and energy-efficiency obligations, as well as policy exposure to measures such as India's clean environment tax and excise duties on gasoline and diesel. Combining current green investment costs and the estimated costs to abate GHGs using a range of levers led to an internal carbon price of $10 per metric ton of $CO_2$ emitted. After establishing this implicit price as a benchmark, Mahindra then adopted it as a shadow price to incorporate into investment decisions—a hybrid approach.

To operationalize its shadow carbon price, Mahindra assesses its relevant business operations and associated investment decisions, such as procurement of appliances or equipment or investment in energy projects, against the $10 per metric ton of $CO_2$ implicit price. As a result, new projects that result in significant GHG emissions look less attractive financially, which can shift investments toward less carbon-intensive alternatives.

# STEP 3: DETERMINE APPROACH

This step builds on the goals identified in Step 2. This step helps companies determine which of the five commonly used carbon-pricing approaches is most relevant for their chosen goal. It introduces high-level strategic questions and considerations to help companies navigate this decision-making process.

Once a company has established the goal or goals it wants to meet with an internal carbon-pricing scheme—GHG reduction, specific activity focus, risk mitigation, market development—the next step is to explore which approach can best achieve these aims. For example, a company whose goal is to reduce emissions to meet ambitious science-based targets should consider options in terms of the activities that will best reduce GHG emissions from its operations.

Below, we summarize four options available to companies for implementing internal carbon pricing. These have different implications for financial flows within a company and may affect operations, capital expenditure, and future investments differently. Shadow pricing, internal tax, fees or cap-and-trade, and implicit pricing are commonly used approaches, as described in the *Executive Guide to Carbon-Pricing Leadership* authored by the UN Global Compact, WRI, and others (UNGC et al. 2015). We also explore hybrid pricing schemes where companies use a combination of approaches to meet their climate-related goals.

We then provide more context on the cost implications, strengths, and challenges of each approach.

## Internal Carbon Pricing Options

All carbon pricing approaches aim to reduce greenhouse gases in the atmosphere by imposing a cost on their emissions, usually per metric ton of carbon dioxide equivalent emitted. The five common approaches adopted by companies to internalize the cost of emissions associated with a given business activity are summarized below. **While each company's circumstances are unique, we make suggestions on the options companies should consider based on existing practice and their goals for internal carbon pricing.**

## Option 1: Shadow price

Shadow prices, such as those implemented by Mahindra and Mahindra in the case study above, are notional values that companies attach to carbon emissions to assess the risks associated with new business investments. This approach enables companies to better understand the potential impact of external carbon pricing on their operations.

Shadow pricing helps companies consider the long-term viability of a potential investment in a carbon-constrained world by calculating the company's return on investment under an assumed cost of carbon. Shadow prices are typically based on the estimated costs or carbon prices expected under future government policy or regulations. The scope for shadow pricing may include new projects, R&D projects, or a strategic activity, such as acquiring a new company. Companies that view a shadow price either as a risk-management or strategic planning tool are essentially making carbon emissions relevant to decision-making over the long term.

The effectiveness of such schemes depends on the price assigned to carbon emissions as well as the influence companies assign to the carbon price in informing decision-making, compared to other variables that they routinely factor into strategic planning, risk management, and capital investment decisions. For example, Norwegian-owned oil company Statoil uses a shadow carbon price of $50 per metric ton of $CO_2$ (CDP 2016a) to make investment decisions and incentivize technology innovation that cost-effectively drives emission reduction through approaches such as carbon capture and storage.

*Implement if the main goal is to understand and incorporate the impact of future emissions regulations on business activity.*

## Option 2: Cap-and-trade systems

Cap-and-trade provides clear investment signals across operational and investment decisions while delivering emissions certainty.

Companies can set up internal cap-and-trade schemes, which establish an upper limit on the total amount of emissions from covered business activities. To provide flexibility for managers to find the lowest cost-abatement opportunities available, limits are not placed on individual activities but are applied in the aggregate across all covered activities. The system is implemented by creating an allowance for each metric ton $CO_2e$ that can be emitted. Managers or operators can buy, sell, or trade these allowances among each other as long as they have enough to cover their total emissions. This results in a value or price being attached to emissions of GHGs, which in turn will affect operational and investment decisions so long as the cap is ambitious enough to require shifts in business practices.

*Implement if the main objective is to provide certainty around the level of emissions reduction the scheme will achieve.*

## Option 3: Internal tax or fee

Taxes and fees impose a specific price on company emissions, which can affect current operational decisions as well as future investments. Taxes and fees provide cost certainty.

A tax or fee scheme attaches a price to GHG emissions generated from a particular business activity. The presence of the carbon tax or fee can help shift the attractiveness of high-emitting activities in favor of lower-emitting activities so long as the internal carbon price is high enough. Unlike regulatory tax or fee schemes, proceeds stay within the company and can drive investments in low-carbon projects or activities. Some companies channel revenue from carbon taxes and fees into funds to invest in low-carbon projects. Among our case studies, only Dalmia has chosen this option. Dalmia mapped out costs implications in implementation of low carbon projects such as energy efficiency, renewable energy, and process upgradation and modeled such costs to arrive at an internal carbon fee.

*Implement if the main goal is to drive emissions reductions throughout current operational decisions and future investments while ensuring cost certainty.*

## Option 4: Implicit price

Implicit prices, such as those calculated by Mahindra and Mahindra in Box 3, are a carbon value determined by examining the cost of a company's activities to

achieve GHG emissions-reduction goals, such as the amount spent on renewables purchases or energy-efficiency projects.

The implicit price, typically expressed in metric tons of carbon dioxide equivalent emitted, is determined by comparing the cost of these activities to the emissions reductions achieved. Companies can use implicit carbon prices to evaluate recent investments and determine whether these prices are in line with their stated objectives. For example, if a company's implicit carbon price is very low, then it may decide to ratchet up the ambition of its targets and investments. If the implicit carbon price is higher than desired, the company may decide to scale back investments or consider shifting its mitigation strategy into lower-cost options.

*Implement if the main goal is to evaluate the effectiveness and ambition of ongoing mitigation efforts.*

### Option 5: Hybrid carbon pricing

Some companies combine the options above, for example, by using a shadow price to guide investment decisions combined with an internal carbon fee to raise revenue for low-carbon investments. For example, Mahindra and Mahindra calculated the implicit price of its ongoing and anticipated investments to set a shadow price for future investments (see Box 3). This sort of framework can allow companies to advance low-cost reduction strategies in the near term while preparing themselves for a future where greater emissions reduction may be required and regulatory carbon prices may be higher.

Another prominent example is Unilever, a Dutch-British company with a global footprint and varied portfolio including food, beverages, cleaning agents, and personal care products. Unilever's climate targets include eliminating coal from its energy mix by 2020 and sourcing 100 percent of purchased grid electricity from renewables. To support these goals, the company calculated the implicit price associated with ongoing investments and used it to set a shadow price to evaluate the business case for new investments, including manufacturing facilities, plants, and equipment. In 2017, it created a clean energy fund, financed by an internal levy, that will invest in renewable energy projects at manufacturing sites.

*Implement once undergoing a carbon pricing process if results suggest that adopting more than one approach will be useful for improving outcomes.*

## Choosing an Option: Key Considerations

While a company's choice of a carbon-pricing approach should be primarily guided by its goals, there are knock-on effects that will flow from its decision and should be taken into account. Below, we provide more context on how each option affects business decision-making and costs, as well as the strengths and weaknesses of each, based on corporate experience with carbon pricing to date. See Table 1 on page 19.

As companies work through this primer, we encourage them to do so in an iterative manner, testing the interactions between the carbon pricing approach selected in this step and choices made in later steps. Through that process, companies may ultimately find that certain combinations of pricing approaches, boundaries, and activity selection are more appropriate for their unique circumstances and business strategy.

In addition, companies should bear in mind how their current climate and carbon-pricing scheme goals and related strategy and resources may evolve over time. Thinking ahead helps companies screen their present choice of approach. For example, companies looking to target current emissions may favor a carbon fee or tax, whereas they may pursue a shadow price if they only wish to influence new capital investment projects.

Table 1 | **Evaluating Internal Carbon Pricing Approaches: Business Impacts, Strengths, and Challenges**

| | SHADOW PRICE | INTERNAL TAXES, FEES, CAP-AND-TRADE | IMPLICIT PRICE |
|---|---|---|---|
| Impacts on business decisions | Used to help companies evaluate the climate risks of new investments. This evaluation can be part of the final bottom line or considered as part of the long-term risk profile. | Used to impose a direct cost on emissions of GHGs, which can drive shifts in current operations as well as future investments. | Used by companies to evaluate and refine ongoing investments in emissions-reduction activities. |
| Implications for cash flow | None. Risk assessment of future projects/ capital investments | These schemes result in financial transfers within the company, which may be used for financing internal projects relating to GHG reductions, offsetting GHG emissions by purchasing offset credits, or improving the financial position of operations that significantly reduce their emissions. | None. Provides an evaluation of the effective cost of recent investments and actions |
| Strengths | ■ Assesses resilience of investments and supports preparation of a pipeline of low-carbon options.<br>■ Helps in testing investments' internal rate of return to improve risk management relating to future regulations. | Sends a clear price signal to business units, investors, and shareholders. Internal taxes and fees also can provide a dedicated revenue stream/fund to pay for projects that help meet a company's GHG emissions targets. | ■ Helps a company assess the cost of existing decarbonization initiatives.<br>■ Can be used as a benchmark for calculating and introducing an internal carbon-pricing system. |
| Challenges | Unless the company sets clear guidelines that require managers to incorporate the notional shadow price into investment decisions, it will not automatically trigger a shift in investment. | ■ Internal buy-in may become challenging since emissions-intensive business units will bear the financial cost.<br>■ Companies will need to adjust accounting processes to reflect shifts in cash flows due to the scheme. | ■ The implicit price can only be calculated retroactively, based on the measures and initiatives already implemented by the company.<br>■ Does not create direct incentives to shift operations or investments as the other two approaches do. |

*Source:* Authors.

## STEP 4: SET BOUNDARIES, SELECT ACTIVITIES

A company's business operations and units vary in their legal and organizational structures. When applying internal carbon pricing, companies need to identify which parts of the organization (organizational boundaries) and which types of emissions and sources (operational boundaries) they want the scheme to cover. It is critical for companies to set clear boundaries around which parts of the organization and which emission sources are covered in order to effectively monitor and track implementation. Defining boundaries in a manner consistent with a company's overall goals for its internal carbon-pricing scheme (identified in Step 2) and pricing approach (Step 3) makes achieving those goals more likely. As noted in Step 3 above, this should be done in an iterative manner.

In providing guidance on boundary-setting, this step draws on chapters 3 and 4 of the GHG Protocol Corporate Accounting and Reporting Standard (WRI and WBCSD 2004), the most widely used standard for corporate GHG emissions accounting and reporting among Fortunate 500 companies. Once companies have set goals and decided on a pricing approach, the next step toward operationalization is to set boundaries and select activities that will optimize effectiveness in meeting those goals.

Pricing schemes can help drive change in those operations and activities to which it is applied. Many pricing schemes cover a company's global businesses, while others apply a price only to business operations with the most significant GHG impacts. For example, Mahindra and Mahindra, a large automobile manufacturer, focuses on emissions-reduction opportunities, such as energy-efficiency improvements, within its facilities. Infosys focuses on reduced per capita emissions from electricity demand through purchasing carbon offsets.

Generally, companies apply an internal carbon price to emissions from business activities over which they exert control. However, as indirect emissions across the supply chain become more commonly measured and managed, companies are exploring ways to expand their existing or prospective internal carbon-pricing schemes, objectives, and impacts.

### Box 4 | Case Study: Arvind: A Focus on Energy Productivity

A leading Indian denim manufacturer, Arvind has committed to continually improve energy performance across all business units. To strengthen existing energy-productivity initiatives, it made energy purchases the focus of activity (operational boundary) for its internal carbon-pricing scheme. Introducing a shadow price has led to approval for more than 30 new energy-efficiency projects, helping the company reduce related operational GHG emissions by close to 12 percent between 2013 and 2015.

**Background**

As a manufacturing company, Arvind's carbon strategy is to reduce its emissions associated with the electricity, heat, and steam that it generates and purchases (Scope 1 and 2 emissions). The company therefore looked to design an internal carbon-pricing system that would accelerate energy-efficiency investments and influence electricity procurement.

**Approach**

With electricity use accounting for almost half the company's carbon footprint, Arvind focused the scheme's **operational boundary** on direct emissions and electricity purchases from those units—Scope 1 and Scope 2 in GHG Protocol terminology. In setting up the scheme, the company first conducted an analysis of its manufacturing facilities across India, which revealed a disparity in electricity prices paid by up to 25 percent at any given time. The company then set an internal carbon price based on the highest electricity tariff paid by its business units in order to exploit this variation in electricity prices to drive internal investments in renewables-based electricity generation. This internal carbon price is applied to the emissions associated with available electricity procurement options for covered business units as well as direct emissions by onsite facilities.

In setting **organizational boundaries**, Arvind included in the pricing scheme all business units over which it had direct operational control. The shift in business units' investments driven by the internal carbon price has led to the energy efficiencies described above, reducing climate-related risk for the company.

In determining the scope or boundaries of a scheme, companies make decisions in three areas:

- Greenhouse gases that the scheme will cover
- Organizational boundaries that need to be set, based on the degree of ownership (equity share) or control they exercise over relevant parts of the business. For example, pricing schemes could cover manufacturing, office, or other facilities, specified geographic locations, business operations, or business processes.
- Operational boundaries to cover within those organizational boundaries (for example, on-site emissions, electricity purchases, or other indirect emissions). These establish the scope of direct and indirect emissions sources to be covered by an internal carbon price.

In each case, as discussed in the chapter on "Getting Started," making these decisions requires a comprehensive GHG emissions inventory and knowledge of GHG coverage, ideally across the value chain, and of emission-intensive areas of company activity, in order to identify the most effective scope for an internal carbon-pricing scheme.

## Deciding Greenhouse Gas Coverage

Companies should determine GHG coverage for their pricing mechanism in accordance with their corporate sustainability strategy and priorities as well as expectations for future external climate-related regulations and restrictions. Any of the major GHGs can be included, although companies tend to limit carbon-pricing schemes to those that account for large components of their GHG inventory—often carbon dioxide. There may be exceptions, however. For example, a company may decide that certain emissions sources are best controlled through mandated operational changes rather than pricing signals. Companies should also bear in mind that carbon-pricing schemes rely on reliable high-quality emissions data for effective implementation, as it is difficult to properly price what one cannot accurately measure. As a result, fugitive methane emissions are generally considered less attractive candidates for inclusion. Ultimately, sufficient quality of data ensures that the inventory is relevant and robust and reflects the company's GHG emissions. Focusing resources on collecting high quality data for priority activities is critical for development of inventory and, in turn, the implementation of a carbon-pricing scheme.

## Setting Organizational Boundaries

Companies should try to select organizational boundaries for their pricing schemes that are consistent with their corporate climate goals and carbon-pricing objectives. These can be established at the business unit, facility, or installation levels, or more broadly across the value chain by, for example, including subsidiaries, supplier operations, or franchises. The effectiveness of a scheme is largely dependent on the company's ability to influence change over the operations or the activities targeted. Therefore, most companies employ a control or ownership (equity share) screen to help decide which business units, installations, or facilities should be covered to maximize outcomes.

For example, Microsoft's commitments to make its data centers, software development labs, and offices carbon neutral dictated that these directly controlled parts of the business be included in the pricing scheme's organizational boundaries. Each business group bears the cost of reducing or compensating for its emissions, with the fees collected channeled into a central fund that invests in efficiency initiatives, green power, and carbon offset projects.

Not all companies have commitments that direct where organizational boundaries should be set. In such cases, especially when internal carbon-pricing schemes are envisaged at a group level for complex and sprawling businesses, companies can maximize their effectiveness by conducting screening exercises. These exercises can consider which business units have the highest impact in terms of emissions in addition to those that are under greatest company control.

After conducting such an exercise, the Mahindra Group parent company employed an internal carbon price only on its utility and tractor manufacturing business, Mahindra and Mahindra, which was responsible for 60 percent of Mahindra Group's emissions.

## Setting Operational Boundaries

Once the organizational boundaries are set, the next step is to establish operational boundaries that determine the direct and indirect GHG emissions sources covered under the pricing scheme. Using the categorization in the GHG Protocol Corporate Accounting and Reporting Standard (WRI and WBCSD 2004), schemes can be limited to direct on-site emissions (Scope 1) or also include indirect upstream emissions from electricity purchases (Scope 2) and other upstream emissions (Scope 3). The internal carbon price is applied to sources of these emissions in the business operations and activities identified by the organizational boundaries.

The choices made should flow from a company's overall climate goals, anticipated risk exposure, and where emissions are concentrated. For example, if the company is mainly focused on reducing emissions from employee travel, then the internal carbon-pricing scheme should cover these Scope 3 emissions. How-

ever, setting operational boundaries is also dependent on the practicality of measuring and controlling such emissions. For example, Scope 3 emissions, including those generated by suppliers, may make up the bulk of a company's carbon footprint but may provide more limited options for influence.

In general, companies in the early stages of implementing internal carbon pricing tend to gravitate to Scope 1 and 2 boundaries. In our survey of 30 Indian businesses, some 87 percent of companies that were implementing internal carbon pricing, planning to do so, or were exploring opportunities viewed Scope 1 (fuel purchase, process, and operations) and Scope 2 (power purchase) as easier to integrate into a carbon-pricing scheme. The prospect of including Scope 3 activities, such as transportation and consumer engagement, received less traction from the surveyed companies (see Figure 5).

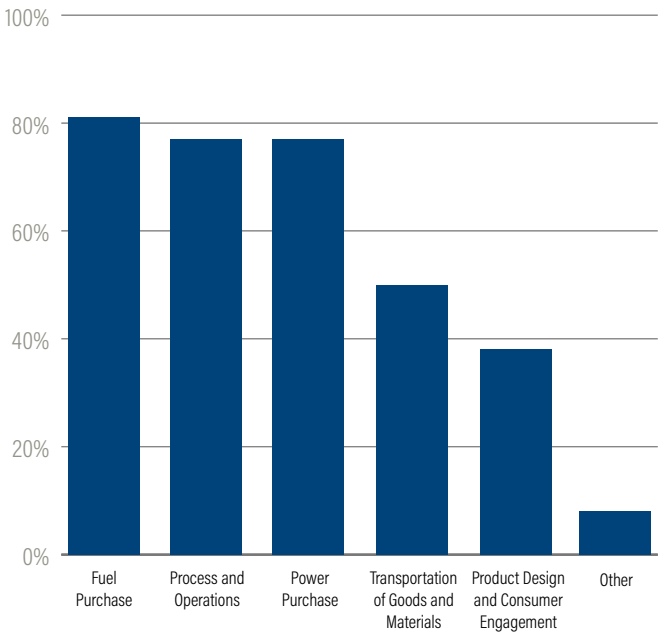
Among our in-depth case studies, Dalmia Cement, one of the largest Indian companies in its sector, conducted a pilot pricing initiative which established boundaries focused on procurement of equipment and other technology that would reduce emissions from its own operations. A credit line created from carbon pricing is being invested in waste heat-recovery projects that lessen Scope 1 and 2 emissions.

By contrast, Microsoft has adopted a carbon fee scheme that covers Scope 1, Scope 2, and Scope 3 emissions from air travel. The global technology giant took this broad approach in order to meet its commitments to make its data centers, software development labs, offices, and employee air travel all carbon neutral.

Box 5 | **Operational Boundaries for Companies to Choose from and Examples of Covered Activity**

- Direct Scope 1 emissions: Emissions generated by sources, such as stationary or mobile facilities, that are owned or controlled by a company.
- Indirect Scope 2 emissions: Emissions generated by the consumption of purchased electricity, heat, or steam or by heating or cooling requirements, for a company's business activities.
- Indirect Scope 3 emissions: Other indirect emissions relating to a company's business activities that are not owned or controlled by the company, such as the purchase of raw materials, employee travel, and waste management.

Figure 5 | **Areas of Coverage Fall under the Purview of an Internal Price on Carbon**




*Sources:* Authors; WRI India 2016.

**Considerations for Attaching an Internal Carbon Price to Scope 2 Emissions**

Internal carbon pricing for Scope 2 emissions can help encourage investments in energy efficiency by increasing the effective cost of electricity purchases. It can also be used to incentivize a shift to lower-emitting providers of electricity. However, a company's ability to do so can sometimes be constrained by regional legal and regulatory structures. We encourage companies exploring this route to consult the GHG Protocol Scope 2 guidance for further information on how to estimate emissions associated with their electricity purchases, and how to ensure that any shift in electricity purchases results in the desired emission reductions within organizational and operational boundaries.

## STEP 5: SET CAP OR ESTIMATE PRICE

This step describes key considerations for companies to take into account when estimating a price or setting a cap. There are various approaches to determining a price on carbon, and the right price for any particular company will depend on its broader climate objectives. Below, we summarize some of the commonly used metrics for estimating an internal carbon price or cap. Companies should view this primer as merely a starting point. Neither the options profiled here nor the choices facing each individual organization are rigid, and some companies may choose alternative approaches not highlighted below.

### Considerations for Setting a Cap or Target

In emissions trading scheme parlance, the cap or GHG target represents the upper limit of GHG emissions available to covered entities under a carbon-pricing mechanism. The starting point for setting such a cap should be alignment to achieve the company's carbon pricing and broader climate goals, as discussed in Steps 1 and 2. Because these investments are long-term in nature, companies may choose to evaluate them using a higher carbon price (for example, through a shadow price) if they anticipate a more carbon-constrained world in the future (CDP 2017).

Companies seeking certainty around emissions reductions may wish to consider setting an emissions cap. One approach, often adopted by companies that set absolute reduction targets, is a simple process of reducing emissions over time until they meet their goal. Others pursue a cap-and-trade scheme through a more complex and nuanced cap-setting process. This is often the case with companies that are going through considerable growth, making substantial acquisitions, or have set relative reduction targets (for example, to make their operations 50 percent less emissions-intensive).

Cap or target-setting can include the following useful approaches:

- Understanding the key drivers affecting GHG emissions. In addition to analyzing their GHG inventories, companies can get a handle on this by examining the relationship, within covered facilities or activities, between GHG emissions and key business metrics such as production, square footage of manufacturing space, and number of employees.
- Benchmarking company GHG emissions with other companies in the same sector.

Box 6 | **Case Study: Essar Oil: Future Proofing with an Effective Carbon Price**

As an oil and gas company, Essar Oil potentially faces significant future risks related to stranded assets in a low-carbon economy. To help mitigate this risk and encourage renewables investments, the company introduced a carbon price in 2010 that has helped drive more efficient technology use and lower energy use and related GHG emissions. Essar conducted a detailed study to model future prices and arrive at an expected carbon price by factoring in the price per barrel of oil.

**Background**

Based in India, Essar Oil is a fully integrated oil and gas company with a presence across the hydrocarbon value chain from exploration and production to refining and oil retail. The company's portfolio of onshore and offshore oil and gas blocks includes about 1.7 billion barrels of oil equivalent in reserves and resources. To mitigate its carbon-related risks, Essar seeks to reduce operational emissions by 441,000 $tCO_2e$ by 2021 from 2016 levels and to invest in low-carbon technologies and natural gas as well as explore diversification into new business opportunities.

**Approach**

To address the future risk of assets' becoming stranded, Essar sought to set up an internal pricing scheme that would drive emission reductions and technology innovation. To establish a price that was materially high enough to shift internal investments, the company decided to set a carbon price in line with the expected compliance cost of schemes that allow credits under the Kyoto Protocol's CDM (Clean Development Mechanism). To this end, in 2010, Essar Oil conducted an internal study to model predicted prices of offsets (certified emissions reductions) in 2020 under the CDM. This research revealed an implied cost of carbon of $15 per metric ton of $CO_2$, which translates to $5 per barrel of oil. Essar then adopted $15 as a shadow carbon price and applied it to investment decisions to drive technology innovation in energy conservation. The internal carbon price is one of a range of tools that Essar uses to achieve its sustainability targets and drive diversification activities such as investing in renewables and coal bed methane.

- Evaluating existing, medium-, and long-term climate strategies, capital investments, and product/service development plans that could potential affect company GHG emissions.
- Considering science-based target-setting methods aligned with a level of decarbonization required to contribute to global efforts to limit global temperature rise to 1.5 or 2°C (Science Based Targets Initiative).
- Factoring in economic growth, sales targets, or internal rate of return criteria that drive investment strategies.
- Using all this information to map reduction opportunities and set a cap that would maximize these opportunities and drive reduction strategies.

## Considerations for Estimating a Tax, Fee, or Shadow Price

The appropriate carbon price for any particular company will vary based on its goals for the scheme. As noted earlier, there is no single "right price." However, there are reference points or benchmarks a company can draw from, as described further below. First, we summarize considerations for setting an internal carbon price depending on the type of internal carbon-pricing scheme envisaged.

### When the goal is managing regulatory risk

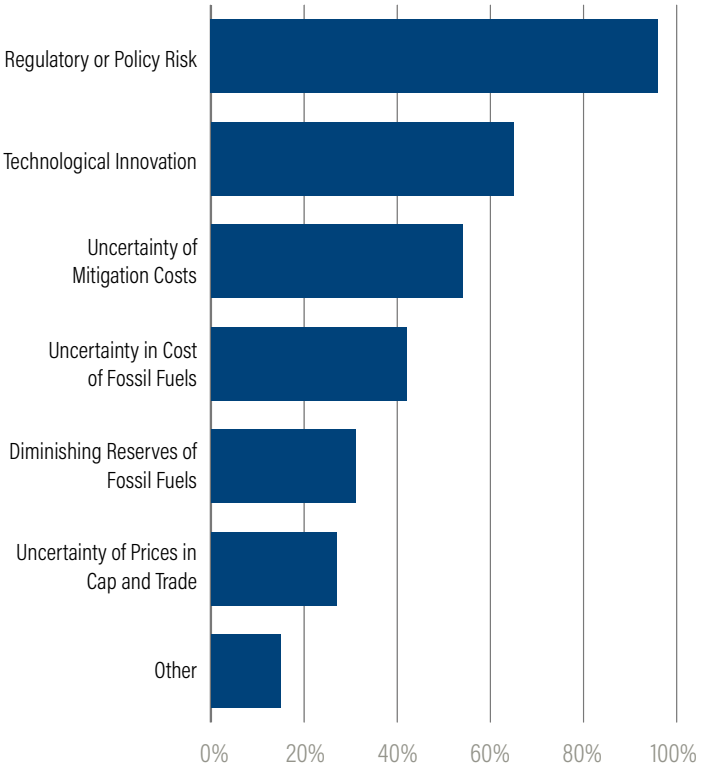
As observed earlier, risk reduction is perhaps the biggest key driver for businesses adopting carbon pricing. This is certainly the case among our snapshot survey of 30 Indian companies, which cover 11 sectors ranging from cement and manufacturing to financial services and aviation. Of these companies, 27 percent are already implementing an internal carbon price or planning to do so, and an additional 60 percent want to explore the concept. As shown in Figure 6 below, the vast majority cited future regulations and associated costs as the key factor in their approach to calculating an internal carbon price.

When developing a pricing scheme to manage the risk of future regulations, a company should investigate options for estimating the price that those regulations will likely impose over a period of time. The starting point is to identify existing or planned regulatory measures in locations where the company operates or where its suppliers or customers are based.

Options for estimating a price that those regulations will likely impose could include consideration of

- current carbon prices in geographies where carbon pricing has already been introduced as regulations or in implicit form due to regulations on clean energy, energy efficiency, or fossil fuels;
- the range of potential prices where carbon pricing is scheduled to be introduced as predicted through rigorous modeling exercises;
- how prices for those schemes are expected to change over time; and
- estimates of the current and future economic impact of GHG emissions, expressed as the social cost of carbon.

Figure 6 | **Estimating a Carbon Price: Key Drivers for Surveyed Indian Companies**




*Source:* WRI India 2016.

Such data can help establish a range of values for the carbon-pricing scheme. For example, a company exposed to a planned emissions trading scheme or tax may use such a price as a reference point in its price calculation.

### When the goal is mitigating GHG emissions

When developing carbon-pricing to meet GHG reduction goals by driving specific projects or changes across its business, a company should consider metrics that estimate the price responsiveness of its activities. The first step in this process is usually to examine the price responsiveness of operations. This can involve reviewing the average reported cost of reducing emissions for similar types of companies, the projected cost of abatement from published peer-reviewed studies, and the projected cost of abatement from company-specific analysis.

Taking this approach will help a company ascertain a price that is materially high enough to drive internal low-carbon investment as it aligns with the mitigation cost of activities.

### When the goal is driving specific low-carbon investments

Some companies seek to use carbon pricing to generate revenue that can be used for specific low-carbon investments (for example, by fees or taxes). Those companies should set the prices for those fees or taxes based on how much money they need to raise across company operations to meet the desired investments. To maximize the impact of those funds, some companies have used those revenues to seed an investment fund that is replenished and reinvested over time. For example, Dalmia uses its internal carbon fee to create an internal investment fund. This fund is used to provide an internal credit line to facilitate implementation of low-carbon technology projects.

## Considerations for Estimating an Implicit Price

Companies can use implicit carbon prices to evaluate their recent investments and determine whether they are in line with the goals they want the internal carbon pricing scheme to achieve. The implicit price is typically based on the average abatement cost, although in some instances companies may find it helpful to also consider their marginal abatement cost. When determining whether the implicit price is too high, too low, or just right, a company may wish to compare it to any of the price-calculation options discussed in Considerations for Estimating a Tax, Fee, or Shadow Price on page 24.

## Benchmarks to Consider When Estimating a Carbon Price

Companies adopting an internal carbon price to help ensure that they are well-prepared for future regulatory actions face the difficult prospect of attempting to accurately predict future carbon prices. In setting a price based on regulatory exposure, it can be useful to consider the direction of other carbon-pricing schemes either locally or around the world or to consider other metrics, such as the social cost of carbon. Globally, the adoption of carbon-pricing policies is accelerating, according to the Institute for Climate Economics (Métivier et al. 2017). The price per metric ton of $CO_2$ varies between $1 and $140, depending on the jurisdiction, but more than 75 percent of emissions covered by carbon-pricing schemes globally are regulated by a price of less than $10 per metric ton of $CO_2$.

### The Indian context

Companies based in India may consider placing particular weight on prices imposed by the following Indian regulatory programs:

- Cess (tax) on coal production or consumption: The National Clean Environment Cess levied on coal and peat purchased or imported by power producers directly affects the unit price of electricity procured or generated from these sources. The cess has risen eightfold since its introduction in 2010 (Ministry of Finance 2010), and organizations looking to manage regulatory risk may wish to consider the implications of likely continued increases over time.
- Price on petroleum products: A Ministry of Finance survey in 2014–15 confirmed that Indian economic and energy policy is moving from a carbon (fossil fuel)-subsidizing regime to a carbon-taxation regime. This shift, the ministry concluded, has been driven by an excise duty on petrol and diesel (Ministry of Finance 2015). In 2015, the carbon price for petrol and diesel stood at $140 and $64 per metric ton of $CO_2$, respectively.
- Perform Achieve and Trade (BEE 2012): This is a regulatory measure under the National Mission for Enhanced Energy Efficiency that aims to strengthen India's energy-efficiency market by fostering innovative and sustainable business models. The measure requires energy-intensive sectors to reduce specific energy consumption, and noncompliance results in a penalty. Companies identified under the program may want to consider the cost of complying with this program when developing their carbon-pricing scheme.
- RPO (Renewable Purchase Obligation) (CERC 2010): This refers to the obligation imposed by law on some entities either to buy electricity generated by specified green sources or to buy renewable energy certificates from the market. The obligated entities are mostly electricity distribution companies and large consumers of power. The RPO supports the government's policy goal of expanding renewable-energy generation, which specifies a solar RPO of 8 percent by 2022 by Indian states. Companies with a presence in one or more states that procure electricity from the state grid should factor future, state-specific, RPO-induced prices for electricity purchase into their internal carbon-pricing schemes (MNRE 2016).

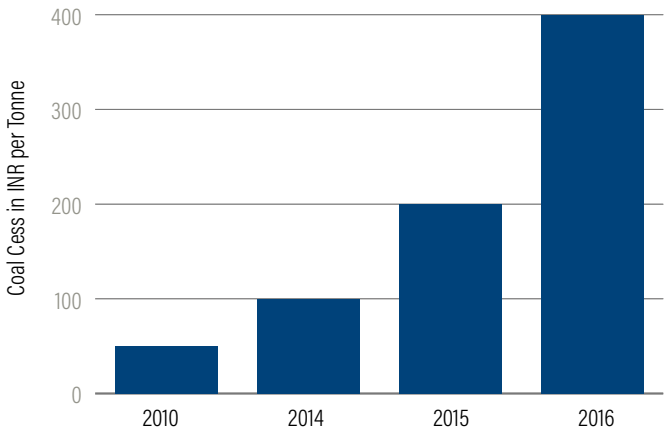
## Global context

A company may also choose to apply prices that are commensurate with different regulations in different geographies, depending on the countries or regions where the company operates or the decision-making time frame. This approach is particularly applicable for shadow prices, allowing companies to adjust the price level in the context of each investment. In the absence of such a price signal, two of our case study companies, Dalmia and Essar, used the price of offsets issued under the Kyoto Protocol CDM to help establish their internal carbon price.

## Anticipating the price necessary to drive the desired goals

As described above, companies using carbon taxes or fees to meet GHG abatement or activity-based goals need to ensure that those prices are sufficient to achieve them. Below, we outline four approaches that companies are using to determine an effective internal carbon price.

Figure 7 | **Increase in National Clean Environment Cess in India**




*Source:* Authors.

AVERAGE REPORTED COST OF ABATEMENT BY SIMILAR COMPANIES =

$$\frac{\text{Annual Expenditures on Emission Reduction Activities}}{\text{Annual Emission Reductions Achieved}}$$

Companies may also wish to look at the average abatement costs of similar companies in the same industry or sector. This information can often be derived from annual sustainability reports that contain total annual green investments made and associated emission reductions.

### PROJECTED COST OF ABATEMENT FROM PUBLISHED STUDIES

Estimating the costs of additional steps that companies are considering to reduce emissions requires an understanding of abatement curves. Companies can use published studies to refer to sector-specific abatement curves for medium- to long-term objectives.

### PROJECTED COST OF ABATEMENT FROM COMPANY-SPECIFIC ANALYSIS

Where resources permit, a company may wish to go further by conducting a more targeted internal assessment of abatement opportunities and costs. This can give business units a head start when the time comes to comply with the internal carbon-pricing scheme.

### CROSS-CUTTING CONSIDERATIONS FOR SETTING A PRICE TO MEET MARKET DEVELOPMENT GOALS

Companies estimating a price for market development goals may wish to consider anticipated regulatory carbon-price levels within target geographies and time frames. Over time, such a price can be used to support corporate efforts to drive innovation for new low-carbon technologies or products. For example, taking this approach may enable companies to determine which competing technologies or products are worth supporting through research, development, and deployment efforts. Because these investments are long-term in nature, companies may choose to evaluate them using a higher carbon price (for example, through a shadow price) if they anticipate a more carbon-constrained world in the future (CDP 2016a).

## STEP 6: OPERATIONALIZE CARBON PRICING

After completing Steps 1–5, companies are primed to implement their carbon-pricing scheme. This phase, which we call scheme rollout and refinement, comes in two stages: operationalization and then tracking, evaluating, and disclosing the scheme's impact.

Step 6 aims to help companies successfully operationalize their scheme by shedding light on how to build internal support by socializing and training relevant staff. Tasking a company-wide steering committee with a coordinating role, as described in the chapter titled "Getting Started," can help ensure a smooth transition process.

Once a scheme is under way, tracking its impact on driving internal investments is critical to refining the pricing mechanism and improving outcomes. Reporting on a company's carbon-pricing journey and progress is valuable for stakeholders, including investors, and demonstrates transparency. These aspects are covered in Step 7.

### Building Internal Support

Whether operationalizing a shadow price, implicit price, tax, fee, or cap-and-trade scheme, businesses frequently find it helpful to coordinate and build wide-ranging internal support for and understanding of the pricing scheme. Since carbon pricing is fundamentally a change management tool, cross-functional internal teams can be important stakeholders. These teams can benefit from understanding the impact of external climate regulations and company goals on business activities, and related risks and opportunities. In addition, teams involved in a scheme's implementation need to understand the mechanics, objectives, and expected outcomes.

Similar to any other economic tool, internal carbon pricing will have impacts on decision-making at different levels of the business. Companies should clearly communicate to staff the areas where changes can be expected as a result of implementation. These may include guidelines for assessing investments affected by a shadow price, reporting performance indicators, and internal or external communications.

Box 7 | **Case Study: Dalmia Bharat Cement: Reducing Emissions through Carbon Pricing Fund**

Leading Indian cement manufacturer Dalmia introduced a carbon fee in 2015 to raise supplemental funds for low-carbon projects. After successfully using these funds to make such projects viable, the company is now reevaluating its internal carbon price with the goal of scaling up investments in low-carbon technology.

**Background**

Dalmia has committed to using 100 percent renewable energy for its operations. The company set an interim target of increasing renewables in its electricity mix to 28 percent by 2030, up from 7 percent in 2015. It also aims to double the energy productivity of its operations between 2010 and 2030.

**Approach**

The scope and boundary of the company's carbon tax include direct and indirect emissions/activities within its control across its operations (Scope 1 and Scope 2 emissions). Having made several investments in energy efficiency, renewable energy, and process upgrades, Dalmia mapped out a range of cost implications for implementing more low-carbon technology and projects. Based on this modeling, the company arrived at a price of $11 per metric ton of $CO_2$. For verification, this price was measured against existing carbon regulations in India, including taxes on coal consumption, gasoline, and diesel (see Step 5).

Dalmia put this carbon tax into effect in 2015. The company reports that the incentive created by the fee has already begun to help it gradually reduce its use of energy-intensive goods and services. In addition, revenue generated from the carbon tax is being deposited in a fund that was created to invest in low-carbon technologies. The fund's investments are guided by Dalmia's targets for renewables and energy productivity.

An example of the scheme's operationalization was the installation of a 10 MW waste heat recovery power plant at an integrated cement and captive power plant in Rajgangpur, Odisha, operated by OCL India Limited, a Dalmia subsidiary. Given the low cost of power generation at the captive power plant, the project's feasibility was very low with a long payback period on investment. Money invested from the carbon-pricing fund brought down the payback period and bridged the viability gap, enabling approval and implementation. The waste heat recovery plant will reduce the site's emissions by nearly 80,000 metric tons of $CO_2e$ annually.

### Training

Effective implementation of an internal carbon-pricing scheme requires investment in awareness building and training for all employee teams directly or indirectly affected by its introduction. Different pricing approaches require different training. A carbon tax, fee, or cap-and-trade scheme, for example, has a very real and immediate impact on business units' or facilities' decision-making and costs/revenue, and relevant personnel need to be prepared to handle this. In contrast, shadow pricing is used as a risk-assessment tool for future investments and has little or no impact over existing infrastructure or operation of existing assets.

### Advisory Committee Role

As discussed under "Getting Started," setting up an advisory committee with senior representatives of all divisions that will be affected by a carbon-pricing scheme supports effective design. It also makes a coordinated scheme rollout easier and encourages company-wide acceptance. Senior management commitment and support from divisions, including energy, sustainability, finance, communications, and functional divisions, played a key role in companies that have successfully introduced an internal carbon-pricing scheme.

For example, Mahindra and Mahindra set up a small team of senior and middle managers to first explore the concept and identify implications of introducing such a practice into their business. The chief sustainability officer of the parent company, Mahindra Group, led this team, which also included members of the group sustainability and risk departments and representatives of relevant business units. Once the scheme was approved, the team was tasked with its design and coordination, including estimating the price, socializing the scheme across relevant departments, and developing and driving an implementation plan.

### Trial Implementation

Once the internal carbon price is estimated, companies may choose to conduct a trial before formally launching the scheme. This helps fine-tune the system before rollout based on assessment and review of results. A trial also enables the advisory committee to capture and assess the reactions of affected staff and adjust communications around the scheme as needed. A trial run can be based on a few facilities or a few activities before being rolled out across the entire planned scope of the pricing scheme.

## STEP 7: TRACK, EVALUATE, AND DISCLOSE

This step enables a company to assess the degree to which goals set for the carbon-pricing scheme have been achieved and then make any needed adjustments. It underlines the importance of developing indicators to track progress and sheds light on the benefits of disclosing outcomes linked to the scheme's goals.

Companies should closely monitor their pricing scheme's effectiveness in driving the hoped-for shifts in investments and operations toward achieving the scheme's goals. Impact assessments should be periodically conducted across relevant parts of the business and the findings evaluated in order to drive improvements. In addition, companies are encouraged to disclose their carbon price and the scheme's progress in order to engage and inform stakeholders, such as investors, and to demonstrate transparency and good corporate governance.

In this step, companies should set up a robust measurement, reporting, and verification system to ensure the integrity of the carbon-pricing scheme, enhance transparency, and boost company executives' and external stakeholders' confidence in the reported results.

### Tracking

Tracking a carbon-pricing scheme's progress can also help to communicate the price signal internally and deepen buy-in and accountability among relevant parts of the business. This, in turn, drives activity toward meeting the company's carbon-pricing goals.

In measuring progress, each organization needs to define indicators specific to the design and goals of its internal carbon-pricing scheme. However, to maximize their usefulness, we suggest that companies identify indicators that meet the following five broad criteria or progress:

- **Specificity**: The indicator should be specific and clear enough to gauge the progress of the scheme appropriately.
- **Measurability:** The measurability of the indicator must be appropriate in the given context.
- **Achievability:** The indicator should be able to measure and map realistic, attainable progress and changes.
- **Relevance:** The indicator should be relevant to the policy's objectives and expected outcomes.

- **Limited duration:** The cost of estimation and measurement should be reasonable and attainable for the organization to conduct periodic assessments.

Progress indicators that enable a scheme's assessment against targeted goals may be either quantitative or qualitative. Companies should consider tracking a wide range of indicators to give them a detailed understanding of how the scheme is affecting emissions and influencing business decisions in the context of scheme's goals. Below is a partial list of relevant indicators:

- Current and historic GHG inventory data should be disaggregated in a way that corresponds to the carbon-pricing scheme design (for example, business unit, activities, and/or investment portfolio). Companies should refer to Step 1 for more information on emissions inventories.
- Other information should be used to track progress against goals of the scheme (for example, investment in high- and low-carbon technologies, energy, and other related expenditures for specific activities covered in the scheme, number, and percentage of low-carbon product and/or service offerings).
- For carbon-pricing schemes using the shadow price option, companies should also collect data on the percentage, number, and amount of funding for projects approved or refused due to a shadow price, these projects' GHG impacts, as well as average return on investment for projects considered low-carbon and high-carbon.
- For carbon-pricing schemes using the cap and trade option, companies should also collect data on the percentage of business units that are in compliance with the trading scheme, trading volume, and price range for the traded emissions allowance.
- For carbon-pricing schemes using the tax/fee option, companies should also collect data on the amount of funds raised, number and types of projects supported through the fund, and the GHG impacts of the funded projects.
- For carbon-pricing schemes using the implicit pricing option, companies should continue to assess all factors related to the assessment of the implicit price, including the extent to which they reduce emissions by replacing carbon-intensive activities with low-carbon initiatives and the cost and savings associated with those investments.

Companies should articulate and document responsibilities, methods, and data quality control procedures for relevant indicators, building on business metrics systems already in place.

## Evaluation and Course Correction

All business policies and programs rely on impact assessment to measure outcomes, and carbon pricing is no exception. Companies already operating carbon-pricing schemes employ such assessments and often use the results to revise the scheme, ensuring that it is predictable and/or better targeted toward driving climate and business objectives.

### Evaluating impacts of the carbon-pricing scheme

Evaluation of the effectiveness of a carbon-pricing scheme should include an assessment of its impact on GHG emissions, business decisions, and other goals. Impact on GHG emissions can be estimated by calculating change in current or future emissions against would-be emissions without a carbon-pricing scheme. (See GHG Protocol Policy and Action Standard for more guidance.) Companies should also evaluate the carbon-pricing scheme's effectiveness toward other scheme goals by comparing what would have happened and what happened. For example, the effectiveness of schemes to increase renewable procurement can be assessed by comparing how much renewable generation would have been procured without the carbon price and how much was actually procured. Companies should track changes in implicit price inputs such as regulatory prices, tariffs, or introduction of new regulations that ultimately trigger the evaluation. Companies should transparently document the assumptions, methodologies, and data used for the assessments.

### Course correction when needed

Carbon-pricing schemes are not static, and the business, policy, and regulatory contexts in which they are applied all evolve. When needed, adjustments can be made in the pricing level, cap, and/or the scope of application to improve effectiveness toward the stated company goal of the scheme.

For example, Norway-based Statoil operates in markets around the world where external carbon prices have been in place since the early 1990s. The company proactively updates its approach based on the emergence of carbon pricing in new markets. In recent years, the

Box 8 | **Estimating the GHG Impact of an Internal Carbon-Pricing Scheme**

As companies work to understand and account for the impact of carbon-pricing schemes, they should consider changes in measured emissions as well as the estimated change in emissions due to the program. In both cases, companies should consider and separately report offsite reductions that result from purchased offsets or projects funded by the internal carbon tax or fee.

Companies can estimate the change in emissions due to the program by comparing actual emissions to those under a counter factual reference scenario, where the carbon-pricing scheme does not exist but other factors are the same. To construct the reference scenario, companies may adopt complex models or use less robust but simpler methods as an imprecise proxy. For example, companies may survey managers about how the carbon price has affected their behavior (for example, how many more GHG-emitting activities would have taken place without the carbon price?) or extrapolate emissions based on past carbon productivity or emission trends. Because this exercise can be complex and the outcomes will depend on various assumption and methodology choices, it is important to acknowledge uncertainty and limitations of the estimate in relevant communications.

company has simplified its previous approach of building scenarios and using modeling to anticipate prices in various markets. In 2015, it instead began applying a shadow price of $50 per metric ton of $CO_2$ equivalent in investment analysis in markets where national or subnational regulations do not impose an equivalent or greater price. Statoil applies the existing carbon price in investment analysis in markets where regulations establish a price higher than $50 per metric ton of $CO_2$ equivalent (UNGC et al. 2015).

A formal, periodic evaluation process gives companies the opportunity to learn from their experiences and, as appropriate, adopt more comprehensive and/or more ambitious approaches as they move forward. Course corrections made as a result can help accelerate technology innovation, broaden business goals, and enable greater impact through better managing or increasing the scope of the pricing scheme. For example, companies that began with a Scope 1 emissions boundary may feel comfortable over time expanding pricing to cover Scope 3 emissions in the supply chain.

## Disclosing Carbon Price and Scheme Progress

Voluntary disclosure of the progress of carbon pricing and other related schemes, while it can be sensitive, brings multiple benefits to companies. It helps strengthen internal buy-in and accountability for the scheme. It can also boost a company's reputation, validate claims it may make about green innovation or climate risk management, and serve the needs of stakeholders, including investors, looking for signals that the organization is being proactive in positioning for a low-carbon economy.

Hundreds of companies already disclose their internal carbon price (or price range), along with other information about their carbon-pricing schemes. They are doing so either independently or through reporting mechanisms like CDP or coalitions such as the World Bank's Carbon Pricing Leadership Coalition (UNGC et al. 2015). Organizations that intend to disclose their internal carbon price and scheme progress should consider including the following elements:

- Goal or objective of the scheme: This sends a clear message to stakeholders and the public about the ambition of the scheme, why the scheme was adopted, and what activities it will cover. This may also include an announcement about how the company expects the scheme to affect the bottom line.
- Approach and scheme design: Detailing these elements will help investors and shareholders evaluate the scheme, allowing them to understand how the company will incorporate a carbon price into its business. For example, a company may assess the profitability of investments that have been approved under the shadow price and compared to what it would have been without the price. In the case of carbon taxes or fees, companies should provide clarity on how the revenue collected will be used, for example, to fund clean energy projects.
- Scheme performance: Regular, transparent, and comprehensive reporting on scheme progress can help provide confidence to stakeholders that the scheme will help the company meet intended goals. Companies should, where possible, develop and use metrics to track and disclose scheme performance to their target audience.

Beyond information about their carbon-pricing scheme, companies are also encouraged to disclose their positions and broader efforts to put a price on carbon. Table 2 below provides a working draft of guidance on carbon pricing public disclosure, adopted from the "Executive Guide to Carbon Pricing Leadership," authored by the UN Global Compact, World Resources Institute, and other leading organizations (UNGC et al. 2015).

Conducting an internal assurance or external assurance can increase both management and external stakeholders' confidence in reported information. Internal assurance is performed by staff from within the reporting companies who were not involved in the carbon-pricing reporting process. Such evaluations can help companies identify and correct errors and further strengthen quality control measures before the report is disclosed publicly or before external assurance is sought. In certain circumstances, companies may want to seek external assurance for a high degree of confidence in reported information, given that assurance finding can help improve the companies' internal measurement, reporting, and verification system.

Table 2 | **Reporting Guidance for Carbon-Pricing Corporate Champions**

| | |
|---|---|
| **INFORMATION REGARDING A COMPANY'S INTERNAL CARBON-PRICING SCHEME** | |
| Companies are strongly encouraged to disclose | ■ Pricing scheme objectives (GHG reduction, risk mitigation, differentiation strategy, etc.)<br>■ Approach and scheme design (e.g., emissions boundary and activities covered by the scheme, carbon price, emissions cap, etc.)<br>■ GHG inventory based on GHG Protocol Corporate Standards, as applicable, and other progress indicators (as discussed in Tracking above) |
| Companies may also disclose | ■ Scheme impacts in relation to the corporate goal. Companies can use GHGP Policy and Action Standard if applicable. In case companies are reporting scheme impacts they may also disclose methodology, assumptions, and data sources used to quantify the impacts as per internationally consistent practices.<br>■ Cost and other nonfinancial inputs to the carbon-pricing scheme<br>■ Plans to review and potentially adjust scheme<br>■ The type of assurance performed (first or third party), the relevant competencies of the assurance provider(s), and the opinion issued by the assurance provider |
| **INFORMATION REGARDING COMPANY POSITIONS AND BROADER EFFORTS TO PUT A PRICE ON CARBON** | |
| Companies are strongly encouraged to disclose | ■ Public statement (or link to statement) explaining general position on policy objectives for carbon pricing<br>■ Advocacy positions taken (by the company or its major trade associations) and whether they align with the company's public statement<br>■ Top carbon-pricing policy objectives and any related outcomes and policies |
| Companies may also disclose | ■ List of coalitions, activities, and countries in which the company is actively involved (e.g., Carbon Pricing Leadership Coalition)<br>■ Results of internal audit of alignment between public and private, direct and indirect policy influences<br>■ Financial expenditures related to policy engagement on carbon pricing |

*Sources:* Authors; UNGC et al. 2015.

## CONCLUSION

At a time when many countries have set targets to reduce emissions by 2030 as part of their nationally determined contributions, the importance of the role played by corporations in driving sustainable business models that supplement global efforts is greater than ever before.

- Internal carbon pricing is gaining momentum as an effective tool for companies to safeguard against future risk exposure due to emissions and support the shift to low-carbon economies.
- Internalizing the cost of GHG emissions offers the potential to help companies navigate future policies, manage regulatory risks including stranded assets, prepare for new markets and services, and respond to customer and investor interests.
- WRI India's desk research, survey of 30 companies, and in-depth collaboration with five Indian businesses suggests that companies want to use internal carbon pricing initially as a tool to identify and mitigate risks and subsequently as a driver of innovation and opportunity that can shift investments and position them for a low-carbon future.
- All five case studies presented here illustrate successful design or implementation of internal carbon pricing at various stages in the process. We believe these companies' experiences, in which WRI India has been closely engaged, provide a firm basis for the road map we have developed for other Indian businesses to follow.

This working paper seeks to help organizations navigate carbon-price discovery and implementation while building an understanding of the boundaries, costs, savings, policies, and risk mitigation and innovation opportunities involved. WRI India invites Indian businesses in all sectors to test the preliminary seven-step approach outlined above and share their learnings. Moving forward, we will refine the primer as needed, based on companies' experiences testing this approach. We welcome feedback and questions on the method at CGajjar@wri.org.

# REFERENCES


BEE (Bureau of Energy Efficiency). 2012. "Perform, Achieve and Trade (PAT)." https://beenet.gov.in/(S(uxbvfa3t3vl2yjbdkf40cj4i))/UI_Forms/Registry/Registry_Doc/PAT_Rules_English.pdf.

CDP (Carbon Disclosure Project). 2016a. "CDP's 2016 Climate Change Information Request." https://www.cdp.net/Documents/Guidance/2016/internal-carbon-pricing-guidance.pdf.

CDP. 2016b. *Embedding a Carbon Price into Business Strategy*. https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/001/132/original/CDP_Carbon_Price_2016_Report.pdf?1474269757.

CDP. 2017. *Putting a Price on Carbon: Integrating Climate Risk into Business Planning*. https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/002/738/original/Putting-a-price-on-carbon-CDP-Report-2017.pdf?1507739326. Accessed February 15.

CERC (Central Electricity Regulatory Commission). 2010. "CERC Announces Renewable Energy Certificate (REC) Regulation—A Step Forward for Green Energy Promotion." Press Release. http://www.cercind.gov.in/Regulations/REC_PRESS_RELEASE_2010.pdf.

The Climate Group. 2016a. "EP100 Members." https://www.theclimategroup.org/EP100-members.

The Climate Group. 2016b. "Dalmia Cement." https://www.theclimategroup.org/partner/dalmia-cement.

CPLC (Carbon Pricing Leadership Coalition). 2016. "Carbon Pricing Leadership Coalition Official Launch Event and Work Plan." https://www.carbonpricingleadership.org/news/2016/1/29/carbon-pricing-leadership-coalition-official-launch-report.

Manjyot Bhan, A. 2017. *The Business of Pricing Carbon—How Companies Are Pricing Carbon to Mitigate Risks and Prepare for a Low-Carbon Future*. Center for Climate and Energy Solutions. https://www.c2es.org/document/the-business-of-pricing-carbon-how-companies-are-pricing-carbon-to-mitigate-risks-and-prepare-for-a-low-carbon-future/.

Métivier, C., S. Postic, E. Alberola, and M. Vinnakota. 2017. *Global Panorama of Carbon Prices in 2017.* Paris: Institute for Climate Economics. https://www.i4ce.org/wp-core/wp-content/uploads/2017/10/Global-Panorama-Carbon-prices-2017_FINAL_5p-2.pdf.

Ministry of Finance. 2010. "Union Budget of India, 2010–2011." http://indiabudget.nic.in/ub2010-11/ubmain.htm.

Ministry of Finance. 2015. "Economic Survey, 2014–15, Volume I." http://indiabudget.nic.in/es2014-15/echapter-vol1.pdf.

MNRE (Ministry of New and Renewable Energy). 2016. "RPO Targets up to 2022." http://mnre.gov.in/file-manager/UserFiles/RPO-Targets-upto-2022.pdf.

Science Based Targets Initiative. "Methods." Science Based Targets. http://sciencebasedtargets.org/methods/.

Task Force on Climate-Related Financial Disclosures. 2017. "Recommendations of the Task Force on Climate-Related Financial Disclosures." https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Report-062817.pdf.

UNEP (United Nations Environment Programme). 2017. "Emissions Gap Report." https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf?sequence=1&isAllowed=y.

UNFCCC (United Nations Framework Convention on Climate Change). 2015. "Paris Agreement." http://unfccc.int/paris_agreement/items/9485.php.

UNFCCC. 2015. "Global Climate Action." http://climateaction.unfccc.int/.

UNFCCC. 2017a. "Unilever PLC." http://climateaction.unfccc.int/company/unilever-plc.

UNFCCC. 2017b. "Philips Lighting." http://climateaction.unfccc.int/company/philips-lighting.

UNGC (United Nations Global Compact), UNEP, and WRI (World Resources Institute). 2015. *Executive Guide to Carbon-Pricing Leadership: A Caring for Climate Report*. https://www.unglobalcompact.org/docs/issues_doc/Environment/climate/CarbonPricingExecutiveGuide.pdf.

WEF (World Economic Forum). 2016. *The Global Risks Report* 2016, 11th ed. Geneva: World Economic Forum. https://www.weforum.org/reports/the-global-risks-report-2016.

World Bank. 2016. *State and Trends of Carbon Pricing*. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/598811476464765822/State-and-trends-of-carbon-pricing.

World Bank, Ecofys, and Vivid Economics. 2017. *State and Trends of Carbon Pricing 2017*. Washington DC: World Bank. https://openknowledge.worldbank.org/handle/10986/26565.

WRI (World Resources Institute) and WBCSD (World Business Council for Sustainable Development). 2004. "A Corporate Accounting and Reporting Standard: The Greenhouse Gas Protocol." http://www.ghgprotocol.org/corporate-standard.

WRI and WBCSD. 2011. "Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard." https://www.wri.org/publication/greenhouse-gas-protocol-corporate-value-chain-scope-3-accounting-and-reporting-standard.

WRI India. 2016. "Internal Carbon Price Survey." https://docs.google.com/forms/d/e/1FAIpQLSct85yDy2k2YZZx-wKN92dKFdz-UPwnkDfiUK9JoQU6CGXbYw/viewform.

## ENDNOTES

1. Such as fossil fuel tax, mandatory direct or indirect emission trading schemes, or subsidies to renewable sources.
2. A cess is a tax that is levied by the Indian government to raise funds for a specific purpose.

## ACKNOWLEDGMENTS

We are pleased to acknowledge our institutional strategic partner, Shakti Sustainable Energy Foundation, which provides core funding to WRI.

The authors would like to thank several colleagues whose reviews and feedback contributed greatly to this publication, including Nicolette Bartlett (CDP), Manjyot Bhan (C2ES), Abhishek Goyal (Tata), Aman Gupta (Shakti), Aditi Maheshwari (IFC), Kunal Sharma (Shakti), Deeksha Vats (Aditya Birla), as well as the following colleagues at the World Resources Institute: Surbhi Arul, Pankaja Balaji, Pankaj Bhatia, Subrata Chakrabarty, Daryl Ditz, Sean Gilbert, Noah Kaufman, Emily Matthews, Eliot Metzger, Ranping Song, Srinivasan Sunderasan, and Shengyin Xu.

The authors would like to convey special thanks to the following case-study authors and liaisons: Anupam Badola (Dalmia), Abhishek Bansal (Arvind), Dr. Purandar Chakravarty (Essar Oil), Anirban Ghosh (Mahindra and Mahindra), Hitesh Kataria (Mahindra and Mahindra), Mathsy Kutty (Infosys), Mahendra Singhi (Dalmia), Bose Koorliyil Varghese (Infosys), as well as our colleague at the World Resources Institute, Ashwini Hingne.


## ABOUT THE AUTHORS


**Chirag Gajjar** is a Senior Manager with WRI's Climate program in India.
Contact: cgajjar@wri.org

**Vivek Adhia** heads business engagement at WRI India.
Contact: vadhia@wri.org


## KEY CONTRIBUTORS


**Nicholas Bianco**, knowledge products lead for WRI's NDC Partnership, provided invaluable support and guidance on the content and direction of the report.

**Polly Ghazi** led the content writing and editing, and Gayathri Vaidyanathan provide the copyedits.


## ABOUT WRI INDIA

WRI India's mission is to move human society to live in ways that protect Earth's environment and its capacity to provide for the needs and aspirations of current and future generations.

**Our Challenge**
Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

**Our Vision**
We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

**Our Approach**
COUNT IT
We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT
We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT
We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

## ABOUT SHAKTI SUSTAINABLE ENERGY FOUNDATION

Shakti Sustainable Energy Foundation works to strengthen the energy security of the country by aiding the design and implementation of policies that encourage renewable energy, energy efficiency and sustainable transport solutions.