

Internal carbon pricing for decision makers

Appendix - Literature Review



LITERATURE REVIEW
THE CURRENT STATE OF INTERNAL CARBON PRICING

EXECUTIVE SUMMARY

Many, if not all, organisations are factoring in climate change as a key risk or opportunity when it comes to current and future business strategy. In response to the increasing impacts of climate change, many organisations have or are in the process of developing a decarbonisation or net zero strategy.

Given the wide scope of individual factors that impact organisational decision making, it is not always clear what type of decarbonisation or net zero strategy fits an organisation best, can be scaled up or down to best suit business needs and can be tailored to an organisations specific goals and objectives.

One of the available solutions to incorporate decarbonisation into an organisation's strategy is to introduce a Carbon Investment Scheme (**CIS**). One key component of a CIS is the Internal Carbon Price (**ICP**). Applying an ICP works by internally charging a fee per unit of carbon emitted by an organisation. The funds generated by charging the fee are then pooled into an internal investment fund and disbursed in line with the fund's defined return mechanism, ultimately achieving objectives that align with the organisations decarbonisation or net zero strategy.

INTENDED USE OF THE LITERATURE REVIEW

The information provided in this research is intended to be used as a supplementary resource to the Internal Carbon Pricing for Decision Makers Playbook (**The Playbook**). While The Playbook sets out suggested approaches and sequences for implementing the ICP, the Literature Review provides an overview of some of the available literature supporting those approaches to assist Playbook users in making better informed decisions.

The Literature Review is not intended to provide a comprehensive summary of all available and current literature on the topic, and users are encouraged to conduct their own independent research. Please see the disclaimer for more information.

1. OVERVIEW

1.1. Purpose of the literature review

Carbon pricing, including the ICP, works to shift the cost of carbon from increased healthcare costs and exacerbated environmental damage to payment at the source of pollution. By doing so, it incentivises carbon emissions reductions and carbon-efficient development.¹

As companies face rising pressure from stakeholders to measure and report their carbon footprint, companies are also expected to demonstrate the ways in which they also identify, assess and manage risks and climate-related opportunities. Introducing a CIS communicates to stakeholders and investors alike, that a company is actively managing the shift from high-carbon to low-carbon.²

Evidence supports this shift, highlighted in the Carbon Disclosure Project (**CDP**) 2021 report on the state of internal carbon pricing by corporates around the world. The report indicated an 80% increase in the number of companies planning or using an ICP over the last 5 years.³

The overarching purpose of this Literature Review is to:

- provide a summary of the available literature regarding the ICP;
- provide an overview of how ICP drivers and implementation approaches have developed and continue to develop over time;
- summarise what is considered to be "Best Practice"; and
- Identify key gaps in ICP data and research.

"Best Practice" is defined by the CDP as approaches that contribute to a journey of bringing a company's business strategy in line with the transition to a low-carbon economy. By using best practice approaches when implementing an ICP, companies can embed the trajectory of the low-carbon transition into their daily decision making, determine the most effective strategy in changing market environments and stay ahead of the curve.⁴

1.2. Research by jurisdiction

According to the Yale University "Internal Carbon Pricing: Policy Framework and Case Studies" report, the majority of activity relating to internal carbon pricing schemes currently takes place in Europe, Japan, Korea, Australia and the United States.⁵

¹ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#) (page 4).

² C2ES, Manjot Ahluwalia, 'The Business Of Pricing Carbon: How Companies Are Pricing Carbon To Mitigate Risks And Prepare For A Low-Carbon Future' (September 2017).

³ CDP, 'Putting a Price on Carbon: The state of internal carbon pricing by corporates globally' (2021) <[CDP_Global_Carbon_Price_report_2021.pdf](#)> (page 4).

⁴ ECOFYS & Generation Foundation, 'How-To Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches' (December 2017) <[cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#)>.

⁵ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)> (page 5).

The CDP reported in 2021 that almost all regions reported an increase in the number of companies setting or planning to set a carbon price since 2018, citing Asia as having the largest increase in total number of companies using or planning to use an ICP.⁶

This Literature Review considers legislation, regulations, policies, guidelines, international agreements and regulatory outlooks across key jurisdictions to identify influences that organisations may need to consider when introducing an ICP. Whether organisations need to consider these external factors will depend on several factors, including the jurisdictional location of the organisation, international partnerships, international agreements that countries are party to, and the current and future regulatory landscape of those jurisdictions that may influence others.

1.3. Research by organisation

Approaches to the way a company designs and implements a CIS and an ICP will vary due to a range of factors. Some of these include revenue neutrality, information provision, incentive and pricing structures and level of carbon emissions.⁷ The CDP sets out an ICP decision tree, mapping an organisation's goals and objectives to multiple ICP approaches to determine the likely best fit.⁸

Table 1 (Organisational Overview) and **Table 2** (Organisational Overview: Internal Carbon Pricing Metrics) in this Literature Review illustrate a summary of organisations across CDP recognised industries with publicly available information in relation to their ICP approach.⁹ These tables demonstrate the varying approaches organisations take when implementing the ICP. These tables are intended to be used as guidance for organisations designing their own approaches to implementation.

1.4. ICP literature gaps

The ICP and CIS as a whole is not yet a widely used nor regulated strategy. As a result of this, elements of the literature available on these topics is limited. Key research limitations include:

- Inconsistent use of "Internal Carbon Pricing"
- Availability of detailed pricing and pricing review methodologies
- Availability of detailed and metric based results and outcomes of ICP implementation
- Availability of detailed methodologies for determining correct scope of ICP application
- Actual ICP figures used, therefore limiting ability to benchmark

1.5. How to develop the right approach

The most extensive guidance and literature sources available in relation to ICP implementation approaches are CDP, Microsoft and Yale. This Literature Review uses, but

⁶ CDP, 'Putting a Price on Carbon: The state of internal carbon pricing by corporates globally' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 4).

⁷ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

⁸ CDP, 'Putting a Price on Carbon: The state of internal carbon pricing by corporates globally' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 16).

⁹ CDP, Article: 'Nearly half of world's biggest companies factoring cost of carbon into business plans' (April 21 2021) <[Nearly half of world's biggest companies factoring cost of carbon into business plans - CDP](#)>.

does not limit itself to, these three organisations (across various sources) as a baseline for Best Practice.

ICP approaches will be tailored to each organisation based on a variety of factors. Some guidance based on such individual factors is illustrated in Yale's Internal Carbon Pricing Policy Framework and Case Studies Figure 1: Internal Carbon-Pricing Policy Framework.¹⁰

Based on Best Practice guidance, the ICP should set out to achieve three key objectives: drive low-carbon investment, drive energy efficiency, and change an organisation's internal behaviour.¹¹ The most mature guidance available relating to approach methodology is set out in the CDP report '*How-to Guide to Corporate Internal Carbon Pricing*'.¹² According to this methodology, there are four dimensions that should be considered when implementing an effective ICP, and the actions that an organisation will take with respect to each dimension depends upon the objectives they are seeking to achieve.¹³ These dimensions are: price level (height), greenhouse gas (**GHG**) emissions coverage (width), influence (depth), and time.¹⁴ The parameters of each dimension are summarised below along with the best practice ICP approaches:¹⁵

- **price level (height)** is the price level per unit of GHG emitted that a company uses in its business decisions. The best practice approach is to rise to a carbon price level that is capable of changing decisions in line with the ICP objectives;
- **GHG emissions coverage (width)** are the GHG emissions covered throughout the value chain by the ICP approach. The best practice approach is to be wide enough to cover all GHG emissions hotspots across an entire value chain;
- **influence (depth)** is concerned with the level of influence the ICP approach has on the business decisions of a company, including its value chain partners. The best practice approach is to allow the ICP approach to become increasingly influential to the extent that it materially impacts business decision making; and
- **time** measures the progress and development of the first three dimensions over time. Evidently, the progress of a company's ICP approaches should be regularly evaluated in order to bring the company's business strategy in line with a greener and lower-carbon economy.

When designing an ICP approach, it is common for companies to focus particularly on height and width dimensions.¹⁶

As a baseline, Best Practice illustrates that the below elements will need to be developed in order to create an effective ICP approach:

¹⁰ Yale School of Forestry & Environmental Studies, '*Internal Carbon Pricing: Policy Framework and Case Studies*' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

¹¹ CDP, '*Putting a Price on Carbon: The state of internal carbon pricing by corporates globally*' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 10).

¹² CDP, '*How-to Guide to Corporate Internal Carbon Pricing*' (December 2017) page 16-17 [cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#).

¹³ CDP, '*Putting a Price on Carbon: The state of internal carbon pricing by corporates globally*' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 9).

¹⁴ Ibid.

¹⁵ ECOFYS & Generation Foundation, '*How-To Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches*' (December 2017) <[cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#)>(page 6).

¹⁶ Ibid.

- **Active organisational engagement with ICP and its objectives.** This means that clear objectives across all business units should be set, along with a clear understanding of the business case for ICP.¹⁷
- **Approach to be aligned according to the specifics of the organisation itself including (but not limited to) industry, size, management and strategy.** This entails research or information gathering needed for the design, developing effective mechanisms of change to drive the approach, and setting the correct carbon price level.¹⁸
- **Testing of the ICP approach must be undertaken.** Pilot projects are recommended to allow the approach to be tested and evaluated before a full rollout.¹⁹
- **The ICP approach must be regularly monitored and evaluated.** This involves enforcement of the approach and regular evaluation of the approach.²⁰

1.6. The ICP and CIS

The ICP is just one component of the overarching strategy to reduce carbon emissions. For the purposes of this Literature Review, the strategy is referred to as a Carbon Investment Scheme. A CIS provide organisations with a mechanism for guiding decision-making processes regarding climate change impacts, risks and opportunities.²¹ These schemes allows organisations to discourage internal teams from incurring carbon emissions costs and raise income that can be deployed to meet certain environmental, social and governance objectives and goals. Unlike at the national level, where there is significant regulatory and policy guidance, there is limited regulatory instruction when it comes to implementing a CIS at the organisational level. Consequently, a CIS can take many forms and is designed to fit the needs and circumstances of a particular organisation, and its goals and requirements. To this end, not all schemes are alike. The implementation of a CIS requires decisions about revenue neutrality, information provision, incentive and pricing structures and carbon emissions measurement.²²

Some organisations implement a CIS to prepare for future regulatory carbon taxes or developments in environmental laws, while others implement these schemes to meet their decarbonisation commitments to the market or to support long-term research and development opportunities for new cost-effective and green innovations.²³

The Climate Leaders Coalition outlines a framework for understanding a CIS. Firstly, participating organisations calculate a carbon payment based on their emissions (that is, emissions multiplied by a set carbon price). Secondly, the carbon payment discourages internal teams from producing carbon emissions. Thirdly, the organisation invests the carbon payment into emissions reductions projects. Finally, investment profits provide a gain to the operating business – a carbon dividend.²⁴

¹⁷ ECOFYS & Generation Foundation, 'How-To Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches' (December 2017) <[cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#)> (page 7).

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ibid.

²¹ World Bank, "What is Carbon Pricing?", <[What is Carbon Pricing? | Carbon Pricing Dashboard \(worldbank.org\)](#)>.

²² Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

²³ Ibid.

²⁴ Climate Leaders Coalition, "Deep Dive: Carbon Investment Scheme"

1.7. Benefits of a CIS

The literature suggests that three key themes drive organisations' decisions to implement a CIS: preparing for future regulation, attracting environmentally aware investors and stakeholders, and motivating innovation and efficiency improvements in their operations.²⁵ Beyond these broad thematic areas, many organisations see CIS strategies as a way to position themselves as socially responsible and as a path to long-term profits and returns by leading in environmental and social issues. Organisations and external stakeholders alike see adopting a CIS as a method for providing competitive advantages in a future low-carbon economy.²⁶

Further, organisations that track their GHG emissions and implement an internal price on carbon are better prepared for a regulatory future in which carbon is priced. The global regulatory landscape featuring the negative externalities of carbon emissions is changing rapidly. From 2017, 42 national jurisdictions and more than 20 cities, states and regions had a price on carbon through either an emissions trading system or a carbon tax. Further, over half of the 180 countries that signed the Paris Agreement have committed to using carbon pricing instruments to implement their nationally determined contributions.²⁷ Organisations view implementing a CIS as a way to pre-empt, prepare for, and seize the opportunities stemming from a wave of international regulatory carbon pricing activity.

Organisations that sell, source and operate internationally are inevitably exposed to carbon pricing standards from governments all over the world. As such, any organisation intending to operate internationally stands to benefit from starting to calculate, track and price emissions to ease operations across international pricing policies.²⁸ Moreover, pricing carbon motivates innovation and efficiency improvements, provides a new lens for capital investment decisions, and spurs carbon-efficient technologies. Adopting internal carbon pricing policies makes emissions-intensive business practices more costly and pushes organisations to move away from these practices. These incentives move organisations forward towards operations and structures that are fit for purpose in a low-carbon economy.

1.8. Introducing a CIS in Australia

Australian law and regulation on carbon pricing is limited despite the introduction of the *Clean Energy Act 2011*, which sought to introduce a carbon pricing scheme. The initiative was intended to control emissions in the country, as well as support the growth of the economy through the development of clean energy technologies. However, the carbon tax (as it was known) was met with significant challenges from the then opposition Liberal National Party and the public.²⁹ Since the *Clean Energy Act 2011*, there has been limited government action with respect to pricing carbon in Australia. In spite of the limited regulatory and government action in Australia, there is a voluntary market for carbon-offset credits – administered by the Clean Energy Regulator – where individuals and companies purchase carbon offsets to compensate for their own GHG emissions, without being legally obligated to do so.³⁰ There is no current guidance, regulations or legislation in Australia relating to the ICP.

In November 2021, the price of Australian carbon credit units reached a record high of AUD\$36.50. One Australian carbon credit unit represents one metric tonne of carbon dioxide

²⁵ Yale School of Forestry & Environmental Studies, '*Internal Carbon Pricing: Policy Framework and Case Studies*' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Yale School of Forestry & Environmental Studies, '*Internal Carbon Pricing: Policy Framework and Case Studies*' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

²⁹ Centre for Public Impact, '*The Carbon Tax in Australia*' (5 May 2017) <[The Carbon Tax in Australia | Centre For Public Impact \(CPI\)](#)>.

³⁰ Clean Energy Regulator, Australian Carbon Exchange (8 August 2022) <[Australian Carbon Exchange \(cleanenergyregulator.gov.au\)](#)>.

equivalent GHG emissions stored or avoided. While this price peaked in Australia, it is still relatively low compared with international carbon markets – where the price of carbon can be as high as AUD\$100.00 per metric tonne in Europe. This illustrates the nascency of Australia's carbon market vis-a-vis other comparable nations and is also a reflection of the domestic political climate. Nevertheless, the federal government has committed to net zero emissions by 2050 and experts consider that greater regulatory action with respect to achieving this goal will likely take place.³¹ An example of this type of future regulatory action is the government's Emissions Reduction Fund – a scheme to incentivise businesses, households and landowners to proactively reduce their emissions.³²

2. ICP models

Carbon Pricing generally, as well as the ICP is used to reduce GHG emissions by using market mechanisms to pass the cost of emissions on to emitters.³³ Typically, an ICP will cost the carbon dioxide equivalent (CO₂e) emitted and will set a price that is determined by a specific calculation method. Some of these methods, and how ICPs are derived in the market, will be addressed in this Literature Review.

To better understand internal carbon pricing by way of an example, Microsoft, a company with a mature and developed CIS, succinctly defines an internal carbon fee as a mechanism that internalises the external cost of carbon pollution within the financial structure of an organisation.³⁴ For Microsoft, its internal cost of energy use includes not only the price it pays a utility company for its energy, but also the price it pays to offset the carbon emissions associated with its energy use.³⁵

Often, ICPs are charged to the groups responsible for the resource consumption. For example, Yale University levies its ICP on each of its faculties against the GHGs emitted by the buildings and resources they use.³⁶

Microsoft proposes that at a high level an ICP model should take into account the following key considerations:³⁷

- **Calculating an organisation's carbon impact:** completing a full carbon inventory and using emissions and energy-tracking software to increase transparency;
- **Establishing a carbon reduction policy and developing an investment strategy:** who the accountable stakeholders are, what the internal carbon reduction policy is, what the carbon fee emissions boundary and allocation structure is to be, and how the income generated from the internal carbon fee will be distributed;
- **Determining an ICP:** setting an appropriate price and calculating projected costs per business unit or group;
- **Gaining approval and establishing governance and feedback loops:** such as an internal cross-organisational committee to provide ongoing input and guidance;

³¹ Clean Energy Regulator, Emissions Reduction Fund, <[Emissions Reduction Fund ERF \(cleanenergyregulator.gov.au\)](https://www.cleanenergyregulator.gov.au/ERF)>.

³² Ibid.

³³ CDP India, 'What Is Internal Carbon Pricing and How Can It Help Achieve Your Net-Zero Goal?' (DATE MISSING) <[ICP White paper Final \(1\).pdf \(cdp.net\)](#)>.

³⁴ Tamara "TJ" DiCaprio, 'The Microsoft Carbon Fee: Theory & Practice' (December 2013).

³⁵ Ibid.

³⁶ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

³⁷ Tamara "TJ" DiCaprio, 'The Microsoft Carbon Fee: Theory & Practice' (December 2013).

- **Administering the fee, communicating the results and evolving to increase impact:** allocating the carbon fee, communicating progress internally, reporting on emissions performance externally and planning for the future.

Another example is Société Générale's ICP implementation in 2011.

Société Générale was one of the first banks globally to introduce an internal carbon tax in 2011. This tax forms the basis for the bank's Carbon Reduction Program which aims to achieve its emissions reduction targets.³⁸

The mechanism involves each entity, defined either as a core business or corporate division, paying an internal carbon tax according to its respective carbon footprint. The various business entities of Société Générale take responsibility for setting their own action plan, which is guided by the bank's emissions targets and internal carbon tax.³⁹

Revenue from this tax gets distributed amongst internal environmental efficiency initiatives through their Carbon Reduction Program Environmental Efficiency Awards. This competition for awards further incentivises internal environmental efficiency behaviour.⁴⁰

The program is designed to encourage individual business entities to reduce GHG emissions, in order to lessen the amount of tax levied and to action energy efficiency initiatives.⁴¹

The Société Générale case study suggests how certain design elements from their program can be used effectively for other internal carbon-pricing schemes, particularly through friendly competition between business entities.⁴²

With respect to setting an appropriate ICP, an overly high charge will create economic burdens for internal business units within the organisation that will make it difficult for a CIS programme to be approved. Conversely, setting a price that is too low will be ineffective because business units will simply incur the ICP fee as cost without changing their operations, because it will be cheaper to do so.⁴³ Yale University, in its policy framework analysis of internal carbon pricing, argues that the charge needs to be low enough to be adopted by the decision maker while being high enough to motivate employees and business units to change their practices. One common metric deployed by organisations in setting an ICP is a country-specific estimate of the social cost of carbon (SCC). SCC is calculated using various discount rates that depend on a government's economic policies and is considered to be the social cost which organisations are paying for the environmental impacts they cause.⁴⁴

To provide further context on how prices can be set, the United Nations Global Compact calls on companies to set an internal price at a minimum of US\$100.00 per metric tonne of GHG emissions emitted over time.⁴⁵ The UN states that global investors are calling for internal prices on carbon and that, based on its work with 70 companies around the world, an internalised price on carbon of a minimum of US\$100.00 per metric tonne of GHG emissions will spur innovation, unlock investment and shift market signals to ultimately reduce global

³⁸ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)> (page 17).

³⁹ Ibid (page 18).

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid (page 22).

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ United Nations Global Compact, 'Put a Price on Carbon', <[Put a Price on Carbon | UN Global Compact](#)>.

GHG emissions in line with the 1.5 to 2 degrees Celsius target outlined in the Paris Agreement.

2.1. Types of ICP

There are two over-arching types of ICP, shadow price and internal fee. For the purposes of this Literature Review and the CIS, research is based on an actual fee or tax and charged to a unit of carbon actually emitted by an organisation. It is not used for forecasting or estimation methods and is an exact monetary price.

The most common form carbon pricing is the adoption of a shadow price. A shadow price is a hypothetical cost of carbon emissions that helps an organisation to better understand the impacts of climate-related risks such as technological shifts or the risk of future regulatory changes and action.⁴⁶ Shadow prices allow organisations to model or test how a range of carbon prices affect their divisions, capital investments and other planned projects. From an implementation perspective, shadow prices are typically added as a criterion to investment analysis during the calculation of the internal rate of return for certain capital projects or outlays.⁴⁷ The cost of GHG emissions is incorporated into each investment decision and the carbon price is assumed in the same way that other financial assumptions, about exchange rates for example, are factored into investment decisions.⁴⁸

A shadow price can also be applied in a form of an implicit price. This help quantify the capital investments required to meet climate-related targets. An implicit price helps organisations to understand their initial carbon footprint and is also used as a benchmark to implement a more strategic internal price.⁴⁹ Some organisations calculate implicit prices by assessing their emissions reduction or renewable energy targets and dividing the cost of abatement/procurement by the tons of CO₂e abated.⁵⁰

An internal fee can be used to implement an internal trading mechanism. Internal trading allows business units within an organisation to trade their allocated carbon credits based on respective emissions. Trading is driven by the allocation of a fixed number of GHG emissions allowances for individual business units. If a business unit exceeds its cap with respect to how many allowances it has been allocated, it must purchase additional allowances to offset its excess emissions.⁵¹ This arrangement is the intra-organisational equivalent of the European Union's Emissions Trading System (**EU ETS**)⁵². This market mechanism allows business units to cooperate, trade and optimise their GHG emissions via caps and allowances, like European nations do when they participate in the EU ETS. Alternatively, internal fee can be pooled to generate an internal fund to invest into energy efficiency, greener projects and further R&D.

3. Investment of the ICP funds

Principally, the purpose of levying a tax on business units is to raise money to invest in green initiatives, technologies, research and development and to reduce the production of existing carbon-intensive operations. Consequently, the way that income from internal carbon pricing is invested is integral to the functioning of an effective CIS. Companies like Volkswagen Group,⁵³

⁴⁶ Center for Climate and Energy Solutions, Internal Carbon Pricing, < [Internal Carbon Pricing - Center for Climate and Energy Solutions Center for Climate and Energy Solutions \(c2es.org\)](https://www.c2es.org/internal-carbon-pricing)>.

⁴⁷ CDP India, 'What Is Internal Carbon Pricing and How Can It Help Achieve Your Net-Zero Goal?' (2021) < [ICP White paper Final \(1\).pdf \(cdp.net\)](#)>.

⁴⁸ Ibid.

⁴⁹ Ibid.

⁵⁰ Ibid.

⁵¹ CDP India, 'What Is Internal Carbon Pricing and How Can It Help Achieve Your Net-Zero Goal?' (2021) < [ICP White paper Final \(1\).pdf \(cdp.net\)](#)>.

⁵² European Commission, EU Emissions Trading System (EU ETS), < [EU Emissions Trading System \(EU ETS\) \(europa.eu\)](#)>.

⁵³ Volkswagen, Volkswagen Sustainability Report (2021) < [Volkswagen Sustainability Report 2021](#)> (page 21).

Unilever⁵⁴ and Royal DSM⁵⁵ have all crafted complex investment strategies and funds to ensure that the money they derive from an ICP is effectively distributed to meet their decarbonisation goals. Microsoft's carbon pricing material literature states that the fees it collects from its ICP go into a central fund used to subsidise investments that enable Microsoft to reduce emissions and reach carbon neutrality⁵⁶. These include investments in internal efficiency, green power and carbon-offset projects. Carbon reduction targets, for example, are particularly valuable if an organisation plans to use its ICP to fund efficiency initiatives as they provide a basis to guide investments.⁵⁷

4. The CIS in detail

The below research outlines a non-exhaustive summary and guidance of Best Practice approaches and examples of how to successfully implement an ICP, and an overarching CIS. The above sections of this Literature Review explain why certain steps are important to design and implement. The below research outlines how an organisation might consider approaching these steps in detail through available literature and examples.

4.1. Engaging the business effectively

The below research and guidance has been summarised primarily using both the CDP *How-to Guide to Corporate Internal Carbon Pricing*⁵⁸ and *The Microsoft Carbon Fee: Theory & Practice*.⁵⁹ Refer to these sources for further detail.

Organisational change requires buy-in from board executives, managers, and analysts. Engaging leaders and stakeholders will require careful planning and execution of an end-to-end change management strategy. Strategy will vary in size and complexity depending on whether the CIS is introduced as a pilot program, partial program, or fully implemented program.

Having effective change management processes in place before mobilising the CIS will significantly increase the likelihood of project success. It outlines the required skills to implement the scheme, but also ensures that the organisation cultivates motivation, participation, and incentivises excitement and leadership amongst employees.

The organisation's change management plan should be one that best suits their size, industry, organisational structure, and their business strategy. Business units and teams across the organisation should be involved by setting clear and achievable objectives, engaging departments and value chain partners which the ICP could impact, garnering support from the board and relevant executives early on, and developing plans to implement an ICP that aligns with business strategy and decarbonisation strategy.

For this reason, it is critical that leaders and their teams are engaged and educated as early on in the process as possible with regular open communication. In particular, the overarching objectives driving the CIS should be clearly communicated to leaders and their teams.

Any critical skills and capabilities that may be needed should be outlined at inception in order to minimise knowledge gaps and remodelling. Further, feedback channels should be

⁵⁴ Unilever, Unilver Annual Report & Accounts 2021: Purpose-led & future fit (2021) <[Unilever Annual Report and Accounts 2021](#)> (page 59).

⁵⁵ United Nations Global Compact, 'Executive Guide to Carbon Pricing Leadership' (2021) <[Executive Guide to Carbon Pricing Leadership](#)> (page 22).

⁵⁶ Tamara "TJ" DiCaprio, 'The Microsoft Carbon Fee: Theory & Practice' (December 2013).

⁵⁷ Ibid.

⁵⁸ CDP, 'How-to Guide to Corporate Internal Carbon Pricing' (December 2017) page 16-17 [cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#).

⁵⁹ Tamara "TJ" DiCaprio, 'The Microsoft Carbon Fee: Theory & Practice' (December 2013).

encouraged, especially early on, to ensure that all employees understand their roles, the objectives, the drivers for change, and expectations.

Variables that may impact how this step is approached should also be outlined and addressed. Some variables include: expertise, resourcing, capability, reduction, incorrect assumptions, misaligned stakeholder interests, misaligned organisational culture, poor management, inadequate infrastructure, external factors, politics and media, and unintended consequences.

Further guidance from the Harvard Business School Online cites the use of KPIs and role allocation and empowering employees as crucial for implementing similar types of changes.⁶⁰ Similarly, the Harvard Business Review details key mitigation strategies for common change management challenges, highlighting the obstacles that many organisations face.⁶¹ The article presents evidence that two out of three transformation initiatives fail. To combat this, when implementing a CIS, companies need to focus on four measurable, communicable and easily influenced 'hard' factors. These are:

- **duration:** companies must ensure projects are of sufficient length and are reviewed frequently (from fortnightly to every eight weeks) to assess milestone impacts;
- **performance integrity:** companies must be able to rely on teams of managers, supervisors and staff to execute projects and clarify accountability;
- **commitment:** a project must be backed by both senior executives who foster enthusiasm and the people most affected by the new systems; and
- **effort:** project teams must ensure employee workload does not increase by more than 10% or resources will become overstretched and morale will fall.⁶²

4.2. Identifying and defining drivers and objectives

The drivers and objectives for implementing a CIS are crucial to strategy and implementation, as these objectives will define the way in which business units are engaged and the type(s) of return mechanism(s) used. The CDP's *How-to Guide to Corporate Internal Carbon Pricing* sets out a decision-making process to guide organisations in understanding their drivers and building an appropriate strategy.

Primary considerations should include an organisation's impact goals and whether the organisation might want to join a global consensus on climate action, gradually shift towards low-carbon investments or develop a more robust emissions capture and disclosure framework. Other goals might include demonstrating climate leadership by contributing to Paris Agreement efforts, following FSB-TCFD recommendations or capitalising on the transition to a net zero future.⁶³ Other goals or objectives may include, but are not limited to, preparing for future regulatory taxes and environmental laws, competitive advantage, capitalising on research and development, and investment opportunities.⁶⁴

The CDP's 2021 report "Putting a Price on Carbon" found that the primary objectives for introducing an ICP were to drive low-carbon investment, drive energy efficiency, change internal behaviour, identify and seize low-carbon opportunities, navigate GHG regulations,

⁶⁰ Harvard Business School Online, '5 Critical Steps In The Change Management Process' (19 March 2020) <<https://online.hbs.edu/blog/post/change-management-process>>.

⁶¹ Harvard Business Review, 'The Hard Side of Change Management' (October 2005) *The Hard Side of Change Management* (hbr.org).

⁶² Ibid.

⁶³ ECOFYS & Generation Foundation, 'How-To Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches' (December 2017) <[cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf](https://www.cdp.net/en/2017/12/13/12306/12306) (cdp.net)>(page 9).

⁶⁴ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf](https://www.yale.edu/forestry/wp-content/uploads/2019/02/Internal-Carbon-Pricing-Report-Feb-2019.pdf) (yale.edu)>(page 8).

stakeholder expectations, stress-testing of investments, and supplier engagement opportunities or requirements.⁶⁵

4.3. Scope of applying the ICP and emissions inventory

To plan for and implement a CIS, best practice indicates that organisations should first prepare a GHG emissions inventory in order to gauge the scope of emissions generated across the business and use this information to inform the CIS policy and investment strategy.⁶⁶

The emissions covered should ideally include Scope 1, 2 and 3 emissions. Scope 1 refers to all direct GHG emissions, Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat or steam and Scope 3 refers to all other indirect emissions not covered by Scope 2. Examples of Scope 3 include, but are not limited to, extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, and outsourced activities.⁶⁷

The Greenhouse Gas Protocol sets out best practice for inventory practices in the GHG Protocol Corporate Accounting and Reporting Standard (**The Standard**).⁶⁸ The Standard provides a standardised approach to developing a GHG emissions inventory to, among other things, provide organisations with GHG emissions data required to develop an effective CIS policy and framework.

The Standard is supported by the Corporate Value Chain Accounting Reporting Standard,⁶⁹ which provides additional guidance for organisations on capturing and recording Scope 3 emissions. Given that the majority of an organisation's GHG emissions can be accounted for in Scope 3,⁷⁰ both The Standard and the Corporate Value Chain Accounting Reporting Standard should be considered together when creating a GHG emissions inventory. Developing the inventory should not be limited to these two sources. Inclusion of Scope 1, 2 and 3 is currently being practised in organisations that have introduced an ICP, for example Microsoft, which introduced Scope 3 emissions in January 2021.⁷¹

In the future, forthcoming disclosure standards from the ISSB and regulators such as the US Securities and Exchange Commission (**SEC**) will require leading companies to report on Scope 3 emissions. Already, half of the ASX 100 companies in Australia currently do so. It is important to note that Scope 3 and Scope 1 emissions are interconnected. Working with strategic partners within an organisation's value chain to reduce emissions will become a key strategic emissions reduction objective creating an 'ecosystem' of emissions reduction opportunities across value chains supported by more widely applied disclosure standards and increasing transparency of Scope 3 emission profiles, which will drive business transformation.⁷²

⁶⁵ CDP, 'Putting a Price on Carbon: The state of internal carbon pricing by corporates globally' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 10).

⁶⁶ ECOFYS & Generation Foundation, 'How-To Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches' (December 2017) <[cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#)>.

⁶⁷ Ibid.

⁶⁸ World Business Council for Sustainable Development, A Corporate Accounting and Reporting Standard (2015) <[Corporate Standard | Greenhouse Gas Protocol \(ghgprotocol.org\)](#)>.

⁶⁹ GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard <[Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf \(ghgprotocol.org\)](#)>.

⁷⁰ GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard <[Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf \(ghgprotocol.org\)](#)>.

⁷¹ Microsoft, 2021 Environmental Sustainability Report (2021) <[2021 Environmental Sustainability Report \(microsoft.com\)](#)>.

⁷² Climate Leaders Coalition, Scope 3 Roadmap (22 November 2022) <[Climate Leaders Coalition Scope 3 Roadmap](#)>.

Examples of the types of GHG emissions tracked include, but are not limited to, direct operations, electricity, procurement, supply chain, product energy use, business travel and employee commuting.⁷³

4.4. Policy and strategy foundations

In Yale's policy framework analysis of internal carbon pricing, the argument presented is that the carbon price needs to be low enough to be adopted by the decision maker while being high enough to motivate employees and business units to change their practices.⁷⁴ In addition, the policy should consider internalising the future cost of carbon in the long term, enabling the business decision makers to consider various options and strategic horizons, choosing the most virtuous and efficient policy setting to support their CIS objectives.⁷⁵

In determining the pricing policy and strategy, it is worthwhile considering how it should support corporate strategy and goal setting. This includes wider investment decisions and their implication for environmental, social and governance priorities for the organisation. In addition, leveraging the carbon price in support of wider business priorities and, even, a transformational change agenda, may not only meet carbon reduction objectives but also support employee engagement, leadership development, and foster employee wellbeing and employees' cultural connection to the business.⁷⁶

4.5. Setting the ICP price per unit

Setting an ICP price requires an organisation to balance between a high price, which may cause economic burdens for participating business units, and a low price which counteracts the purpose of introducing a CIS.⁷⁷

There are currently two primary methodologies for determining the unit price of GHG emissions: the social cost of carbon and a price determined by the organisation internally.

The SCC is calculated based on jurisdictional economic policy.⁷⁸ Domestically, the Australian Capital Territory is the first State in Australia to release an SCC figure at an interim price of A\$20 per tonne of GHG emissions.⁷⁹ The SCC price will be adjusted in accordance with regular reviews, and the SCC price an organisation adopts will vary depending on jurisdiction and frequency of pricing reviews.

The second methodology for determining an ICP price is set internally by the organisation and should be based on a number of considerations. The organisation should primarily consider current and historical emissions by developing a GHG emissions inventory which defines GHG emissions reduction targets and which should be priced in a way that incentivises behaviour change and facilitates meeting the CIS goals.⁸⁰ As a guide to setting the ICP price, the Carbon Pricing Leadership Coalition sets out key principles developed with

⁷³ Elizabeth Willmott, 'How Microsoft is using an internal carbon fee to reach its carbon negative goal' (24 March 2022) <[How Microsoft is using an internal carbon fee to reach its carbon negative goal - Microsoft Industry Blogs](#)>.

⁷⁴ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>

⁷⁵ CDP, 'Putting a Price on Carbon: The state of internal carbon pricing by corporates globally' (2021) <[CDP Global Carbon Price report 2021.pdf](#)> (page 10).

⁷⁶ Embedding Project, "Resources For Embedding Sustainability" <[Resources for Embedding Sustainability](#)>.

⁷⁷ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)> (page 9).

⁷⁸ Ibid.

⁷⁹ ACT Government Media Releases, 'Considering the social cost of carbon' (16 October 2021) <[Considering the 'social cost of carbon' - Chief Minister, Treasury and Economic Development Directorate \(act.gov.au\)](#)>.

⁸⁰ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)> (page 10).

the World Bank, Organisation for Economic Co-operation and Development based on learnings from various jurisdictions. Organisations setting their own internal carbon fee should consider factors such as fairness of costs and benefits, alignment of policies and objectives, stability and predictability, transparency, efficiency, cost-effectiveness and reliability, and environmental integrity.⁸¹ Further guidance on establishing a carbon price is outlined in the FASTER Principles for Successful Carbon Pricing authored by the World Bank.⁸²

Organisations can also consider applying different ICP prices to different types of GHG emissions. For example, in 2022, Microsoft announced an increase in the fee charged for Scope 3 emissions to better support the purchase of sustainable aviation fuel.⁸³

The CDP provides guidance on some pathways for how the ICP could be set initially, including:

- Initial low price to minimise impact on its competitive position and allow departments to familiarise themselves with the process. This could create the effect of high accountability and eventually, the price could increase to reflect a growing acceptance of ICP within the organisation.
- Initially set a high price for a small portion of the organisations operations which could limit the initial impact on the organisation while it acclimatises to the ICP. This approach may be used when there is insufficient data for other GHG emissions and limited expectations of climate regulations in certain jurisdictions. Eventually, this price can expand across the business to provide a greater impact when it is suitable to do so.
- Organisations could also conduct a test to determine how high a price would affect its whole value chain, either as part of the scenario analysis as recommended by the FSB-TCFD or as a voluntary price. The results can then be used to inform strategy.

4.6. When to charge the ICP to emissions

Microsoft indicates that the ICP could, as one method, be charged to business units yearly. Microsoft tracks all emissions across direct operations, electricity, procurement, supply chain, product energy use, plus categories such as business travel and employee commuting. It then aggregates GHG emissions and charges business groups a certain amount in carbon fees on a yearly basis. The amount Microsoft charges is cited to be 'enough to encourage meaningful change'.⁸⁴

Best Practice as to when and how often the ICP should be charged will likely depend on the corporate strategy, accounting methods and a range of other factors individual to different organisations.

4.7. Investing the ICP funds

Organisations will need to decide what to do with the money once it is pooled into a central fund. There are three options: return the revenue, keep it or a combination of both. Importantly, the underlying objectives of any returns strategy should be an ongoing reduction in carbon emissions and encouraging behavioural change.⁸⁵ Further, the drivers

⁸¹ Carbon Pricing Leadership Coalition, What is Carbon Pricing?, <[Understanding carbon pricing — Carbon Pricing Leadership Coalition](#)>.

⁸² The World Bank, 'The Faster Principles For Successful Carbon Pricing: an approach based on initial experience' (01 January 2015) <[The FASTER principles for successful carbon pricing : an approach based on initial experience \(worldbank.org\)](#)>.

⁸³ Elizabeth Willmott, 'How Microsoft is using an internal carbon fee to reach its carbon negative goal' (24 March 2022) <[How Microsoft is using an internal carbon fee to reach its carbon negative goal - Microsoft Industry Blogs](#)>.

⁸⁴ Ibid.

⁸⁵ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

for decision making in this area should be choosing whichever method holds the most power to incentivise emissions abatement.⁸⁶

Businesses are increasingly being asked by investors, regulators and advisers to incentivise performance on Environmental, Social and Governance (**ESG**) issues. ESG materiality is now more important than it ever has been and stakeholders are seeking assurances that executives are incentivised to meet expectations.⁸⁷ A challenge for directors is determining which aspects of sustainability, or ESG performance, should have priority — and be linked to pay incentives.⁸⁸

Microsoft, for example, ties a portion of its executive incentive plan to carbon reduction goals.⁸⁹ Microsoft believes that it requires the combined effort of the management team to drive the sustainability transformation across an organisation and that, by linking executive priorities and practices to ESG-driven incentives, the business will improve its ability to address this transformation, and the reduction of carbon emissions.⁹⁰

Microsoft's returns strategy is aligned to its "Pathway to Carbon Negative by 2030" strategy, which is grounded in the objectives to: (1) drive down Scope 1 and 2 emissions by 2025; (2) reduce Scope 3 emissions by more than half by 2030; and (3) remove the remaining emissions by 2030, and remove all historical emissions by 2050. These 3 core objectives are supported by a plan to purposely reduce emissions, remove carbon from the atmosphere and replace non-renewable energy consumptions with 100% renewable consumption. Microsoft charges business groups a carbon fee for their portion of emissions and invests the "returns" in emissions reductions, carbon removal and other sustainability objectives.⁹¹

The CDP *How-to Guide to Corporate Internal Carbon Pricing*⁹² also provides guidance on the multiple streams of returns (not limited to financial returns) a company can achieve by implementing a CIS. The key return mechanisms (based on organisational objectives) set out in the CDP guide are summarised below, as well as examples of return strategies to match those objectives:

- **Discovering new markets and revenue opportunities:** that could arise from the transition to a low-carbon economy, such as an improved competitive position for low-carbon products and increased demand for products that enable GHG emission reductions. **The returns strategy:** could involve developing new products and entering new markets. This could also involve the corporate strategy being reviewed, updated and generate new third party funding and investment.
- **Future proofing assets and investments against regulation:** which should include a scenario assuming the successful implementation of the Paris Agreement, for a company to meet fiduciary duty and shareholder demands. **The returns strategy:** likely no extra funding would be generated, however would form part of the organisation's broader strategy and compliance.
- **Accelerating the reduction of the company's GHG emissions and efficient use of clean energy:** by improving the business case for energy efficiency, renewable energy and emission reduction projects. **The returns strategy:** could involve investing

⁸⁶ Ibid.

⁸⁷ IR Magazine, 'Put your money where your values are' (2021) <[Put Your Money Where Your Values Are 2021](#)>.

⁸⁸ Seymour Burchman, Harvard Business Review, 'How to Tie Executive Compensation to Sustainability' (12 November 2018), <[How to Tie Executive Compensation to Sustainability \(Harvard Business Review\)](#)>.

⁸⁹ Microsoft, 2021 Environmental Sustainability Report (2021) <[2021 Environmental Sustainability Report \(microsoft.com\)](#)>.

⁹⁰ Microsoft, Executive Playbook: 2021 And Beyond (2021) <[Microsoft Executive Playbook 2021 and Beyond \(Microsoft.com\)](#)>.

⁹¹ Microsoft's Approach to Carbon Offsets Oct 2019 (internal document).

⁹² CDP, 'How-to Guide to Corporate Internal Carbon Pricing' (December 2017) page 16-17 [cpu-2017-how-to-guide-to-internal-carbon-pricing.pdf \(cdp.net\)](#).

in clean technology and replacing high carbon emitting technology with low or reduced carbon emitting technology.

- **Collaborating with suppliers to reduce the carbon footprint:** by financially incentivising or supporting measures to reduce GHG emissions from suppliers or purchasing goods that can make the company's operations more efficient. **The returns strategy:** choosing suppliers that align with your climate goals and paying a premium for products and services that have a low carbon footprint, in turn reducing the organisation's Scope 3 emissions.
- **Changing behaviour in the company:** to raise awareness of climate change. **The returns strategy:** may include rewarding and supporting climate focused decision making through 'performance bonus', remuneration, performance reviews and Business Unit rewards and internal competition incentives. This could also include rewarding the innovation of climate focused strategies and products (if applicable to the business).
- **Offsetting the carbon footprint and generating climate finance:** to meet a GHG reduction or carbon neutrality target and contribute to achieving the ambitions of the Paris Agreement. **The returns strategy:** could include purchasing offsets to meet (non-regulated and internally set) targets.
- **Developing innovative technologies, products, and services:** that allow the company to succeed in a low-carbon future. **The returns strategy:** could involve investing & developing new products and services, investing in research and new emerging markets.

Yale's research finds that due to fundamental differences between business units, baselines are often used as components of returns mechanisms, meaning different baselines may provide different marginal incentives across business units.⁹³ A baseline can be important to level the playing field for carbon-intensive business units so that incentives correspond to the marginal costs of abatement.

A degree of memory loss built into the baseline, or how many prior emissions years are considered in its determination can be used to measure this margin of difference.⁹⁴

4.8. Approvals, governance and feedback loops

As with any change within an organisation, the approach to change management, performance review and iterations to strategy will be specific to an organisation and varied depending on factors set out above. Organisations should align with internal change management processes while considering best practice approaches demonstrated by CDP, Yale and Microsoft.

As an example of effective progress reviews and feedback loops, Microsoft (more broadly) sets measurements and scorecards for each business group's sustainability commitments across the company and review progress twice a year, of which the ICP would form a part of. Microsoft has also established a Climate Council that includes senior business leaders from every business group to provide sustainability advice, collaborate, drive alignment, prioritise resources and funding, and review progress on commitments.⁹⁵

⁹³ Yale School of Forestry & Environmental Studies, 'Internal Carbon Pricing: Policy Framework and Case Studies' (20 February 2019) <[Internal Carbon Pricing Report Feb 2019.pdf \(yale.edu\)](#)>.

⁹⁴ Ibid.

⁹⁵ Microsoft, 2021 Environmental Sustainability Report (2021) <[2021 Environmental Sustainability Report \(microsoft.com\)](#)>.

5. Regulations across jurisdictions

Understanding the way GHG emissions are regulated in legislation, regulations, policies, guidelines and future regulatory commitments and outlooks help to inform what external material may need to be considered when developing a CIS and assigning an ICP, and helps to prepare companies for the evolution of mandatory disclosure and oversight.

This literature review covers a range of non-exhaustive existing and emerging legislation, regulations, policies, guidance, international agreements and statements made by policymakers as they relate to the capture of GHG emissions, disclosure, limits on GHG emissions and carbon pricing. The research is structured by jurisdiction, with a specific focus on Australia.

5.1. Australia

Australia does not currently tax GHG emissions directly, and does not operate an emissions trading system for the sale and purchase of GHG emissions.⁹⁶ The Australian government has, however, announced a target to achieve net zero emissions by 2050, with an interim target to reach a 35% reduction on 2005 levels, by 2030.⁹⁷ As a party to the Paris Agreement, Australia's net zero commitment has been submitted as Australia's most recent Nationally Determined Contribution (**NDC**) in 2022. Australia's next submission is due in 2025.

The 2030 and 2050 net zero commitments submitted through the Paris Agreement have recently been introduced into parliament through the *Climate Change Bill 2022* in July 2022.⁹⁸ The purpose of the bill is to legislate a 43% emissions reduction by 2030, and a net zero target by 2050, by tasking the Climate Change Authority to track progress and provide advice on new targets in line with the Paris Agreement, mandatory parliamentary reporting and by embedding these targets in the agendas of various government bodies, including AREA, CEFC, Infrastructure Australia and NAIF.⁹⁹ Among other powers, the key function of the *Climate Change Bill 2022* and the *Climate Change (Consequential Amendments) Bill 2022* mandates the updating of climate change laws to reference both Australia's domestic targets and the Paris Agreement targets so that policies governing carbon credits and the safeguard mechanism as well as the Climate Change Authority legislation both reference and deliver on Australia's commitments.

5.1.1. GHG emission disclosure requirements

Since 2007, under the National Greenhouse and Energy Reporting Scheme (NGERS), there is a requirement for disclosure by entities producing high quantities of carbon emissions. These disclosures include GHG emissions and energy production and consumption.¹⁰⁰ Reporting of emissions from activities under the operational control of the company including Scope 1 and Scope 2 emissions is required. At this stage, Scope 3 emissions are not required to be captured under the NGERS reporting requirements. However, recent insights support the increasing importance of business measuring and analysing Scope 3 emissions across the value chain. These measurements are critical to the decarbonisation of the economy more broadly. The International Sustainability Standards Board confirmed that Scope 3 disclosure requirements will be included in the first two standards, when finalised in early 2023. Therefore being in a position to report on, and disclose, Scope 3 emissions profiles is

⁹⁶ OECD, Carbon Pricing Background Notes (2021) <[Carbon pricing in times of COVID-19: Background Notes \(oecd.org\)](#)> (page 6).

⁹⁷ DCCEEW, 'Affirming Australia's Net Zero Emissions by 2050 target' (30 October 2021) <[Affirming Australia's net zero emissions by 2050 target - DCCEEW](#)>.

⁹⁸ [Climate Change Bill 2022 – Parliament of Australia \(aph.gov.au\)](#).

⁹⁹ Chris Bowen, DCCEEW, "Legislating to end climate and energy chaos" (26 July 2022) <[Legislating to end climate and energy chaos | Ministers \(dcceew.gov.au\)](#)>.

¹⁰⁰ Australian Government, Framework for reporting carbon risk in Australia, <[Chapter 3 – Parliament of Australia \(aph.gov.au\)](#)>.

encouraged as financial and regulatory bodies indicate the expansion of emissions reporting requirements in the near future.¹⁰¹

Annual Reporting requirements under the *Corporations Act 2001* contain general disclosure provisions for contents of annual reports, for both directors (s299(1)) and listed entities (s299A(1)). The Australian Securities and Investments Commission (**ASIC**) is responsible for providing guidance as to the operation of these provisions.¹⁰²

Further, company directors have broad duties arising under the *Corporations Act 2001* and general law. A recent legal opinion by Noel Hutley SC and Sebastian Hartford-Davis, obtained by the Centre for Policy Development, found that company directors who fail to consider and disclose foreseeable carbon risks to their business could be held to be in breach of their duty of due care and diligence.¹⁰³

Banks, various financial bodies and superannuation funds are subject to Australian Prudential Regulatory Authority (**APRA**) prudential regulations, and are expected to report on climate risks given APRA's view that climate risks impact credit, market investment, liquidity, insurance, operational and strategic and business risks.¹⁰⁴

In accordance with ASX Rules, listed entities are also required to disclose material exposure to economic, environmental and social sustainability risks and how it manages and plans to manage those risks.¹⁰⁵

5.1.2. Application of international standards in Australia

Best practice disclosure requirements, while not currently mandatory in Australia, are key to understanding the standard for GHG emission disclosures, domestically as well as internationally. Given the introduction of the *Climate Change Bill 2022* and the expected evolution of laws following its introduction, companies required to capture and disclose GHG emissions may consider at a minimum the standards and guidelines set out within international frameworks giving consideration to cross border dealings and emerging restrictions on partnerships and minimum standards. Such frameworks and organisations include:

- The Global Reporting Initiative;
- The Climate Disclosure Standards Board;
- The Greenhouse Gas Protocol;
- The United Nations Principles for Responsible Investment;
- The United Nations Environment Programme Finance Initiative;
- The Montreal Pledge;
- The Asset Owners Disclosure Project; and
- The International Integrated Reporting Council framework.¹⁰⁶

¹⁰¹ Climate Leaders Coalition, Scope 3 Roadmap (22 November 2022) <[Climate Leaders Coalition Scope 3 Roadmap](#)>.

¹⁰² Australian Government, Framework for reporting carbon risk in Australia, <[Chapter 3 – Parliament of Australia \(aph.gov.au\)](#)>.

¹⁰³ [Ibid.](#)

¹⁰⁴ [Ibid.](#)

¹⁰⁵ Australian Government, Framework for reporting carbon risk in Australia, <[Chapter 3 – Parliament of Australia \(aph.gov.au\)](#)>.

¹⁰⁶ [Ibid.](#)

Although not yet mandatory in Australia, both ASIC and APRA have cited the Taskforce on Climate-Related Financial Disclosures (**TCFD**) recommendations as Best Practice. It is forecasted that the TCFD recommendations will be woven into future laws and regulations in Australia. The objective of the TCFD recommendations is to assist organisations to understand, disclose and manage their exposure to climate-related risks. The TCFD recognises carbon pricing as a key metric in conducting scenario analysis. Should organisations introduce an ICP, the TCFD recommends the following disclosure metrics:

- Assumptions in relation to the development of the carbon price over time in line with tax and/or emissions frameworks;
- Geographic scope of the carbon price application;
- Whether the carbon price would be applied at margin or base cost;
- Whether the carbon price applies to some or all business units within the organisation, and details of its application;
- Whether a common carbon price is used at multiple points in time or differentiated prices (for example Microsoft's introduction of a higher ICP in 2022 for Scope 3 GHG emissions only)¹⁰⁷; and
- Assumptions about scope and modality of a GHG emissions price via tax or trading scheme.¹⁰⁸

The expectations businesses now face regarding disclosure requirements are driven by clear policy signals from government that there is a need to scale up low-carbon investments at national, regional and organisational levels to meet emission reduction objectives. The Paris Agreement has been instrumental in setting a framework for all levels to adopt as a foundation upon which to build their emission reduction aspirations. For example, in Australia, emission reduction expectations are driven by the policy settings relating to national emissions reduction targets and are being captured by the Nationally Determined Contribution (**NDC**), which in turn materialise at the programme level. This includes for example, building energy performance standards, fuel emissions standards and the Safeguard Mechanism. In addition, coalitions of stakeholders, such as those in evidence in the 'We Mean Business' global non-profit coalition, are leveraging global and domestic policy drivers in their work with the world's most influential businesses, assisting them to take action on climate change through improved emissions disclosures, emission limits, pricing carbon into decision-making and setting limits on emissions with net zero targets as an expanding strategic approach for many leading organisations.¹⁰⁹

5.2. United States

The United States has committed to a reduction in GHG emissions of 50-52% on 2005 levels, by 2030.¹¹⁰ Limits on GHG emissions have, historically, been regulated and controlled by the Environmental Protection Agency. The Environmental Protection Agency regulates engine emissions, and is currently the only government body tasked with GHG emission regulation. In June 2022, the US Supreme Court issued a ruling stating that the Environmental Protection Agency cannot put state-level caps on carbon emissions under

¹⁰⁷ Elizabeth Willmott, 'How Microsoft is using an internal carbon fee to reach its carbon negative goal' (24 March 2022) <[How Microsoft is using an internal carbon fee to reach its carbon negative goal - Microsoft Industry Blogs](#)>.

¹⁰⁸ CDP India, 'What Is Internal Carbon Pricing and How Can It Help Achieve Your Net-Zero Goal?' (2021) <[ICP White paper Final \(1\).pdf\(cdp.net\)](#)>.

¹⁰⁹ Climate Policy Tracker, Climate Policy Tracker for Business Version 1.0, <[Climate Policy Tracker](#)>.

¹¹⁰ The United States Government, 'The Long-Term Strategy Of The United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050' (November 2021) <[The Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050 \(whitehouse.gov\)](#)>..

the governing legislation, the *Clean Air Act 1970*.¹¹¹ This ruling, however, does not restrict federal, state or local government action on climate change and legislative actions to reduce and regulate GHG emissions in the US.¹¹² The Regional Greenhouse Gas Initiative (**RGGI**) sets a GHG emissions limit on participating states using a cap and invest method. The RGGI objective is to reduce GHG emissions over time and generate funds to be reinvested into local communities.¹¹³

The regulation of GHG emissions disclosures is evolving in the US. The SEC announced in March 2022 regulations that it would, among other things, require organisations to disclose Scope 1 and 2 emissions, and Scope 3 emissions if those emissions are material or if the organisation has a target or goal which includes Scope 3 emissions.¹¹⁴

5.3. United Kingdom

In 2008, the United Kingdom enacted the *Climate Change Act 2008*.¹¹⁵ This formed the basis for the UK's approach to responding to climate change and committed the UK government, by law, to reducing GHG emissions by at least 100% compared with 1990 levels, by 2050.¹¹⁶ The Act established the Committee on Climate Change to ensure that emissions targets are evidence-based and independently assessed. In addition, the Act creates a "Carbon Budget" regime to set legally binding commitments, acting as stepping stones to the 2050 target.¹¹⁷ Under the regime, the government is required to publish climate change risk assessments every 5 years and to develop a National Adoption Programme to response to the risk assessments.¹¹⁸

To facilitate the commitments made in the Climate Change Act 2008, the UK introduced an Emissions Trading Scheme (**UK ETS**) in January 2021.¹¹⁹ The scheme was designed to replace the UK's involvement in the EU ETS and set a domestic UK price on carbon.¹²⁰ The UK ETS is regulated by the Climate Change Act 2008 (2050 Target Amendment) Order 2019 and the Greenhouse Gas Emissions Trading Scheme Order 2020.¹²¹

The UK ETS is a cap and trade regime covering energy-intensive industries, namely the power sector and aviation within the UK and the European area.¹²² The scheme works by allowing companies to purchase permits that are auctioned by the UK government, and covers a third of total UK emissions.¹²³ Auctions are held twice monthly and commenced in

¹¹¹ Harvard TH Chan School Of Public Health, Article: '*The Supreme Court curbed EPA's power to regulate carbon emissions from power plants*' (19 July 2022) <[Supreme Court limits EPA's power to curb emissions | News | Harvard T.H. Chan School of Public Health](#)>.

¹¹² Ibid.

¹¹³ RGGI, Regional Greenhouse Gas Initiative Fact Sheet (January 2023) <[RGGI 101 Fact Sheet](#)>.

¹¹⁴ U.S Securities & Exchange Commission, Press release: '*SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors*' (21 March 2022) <[SEC.gov | SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors](#)>.

¹¹⁵ The United Kingdom Climate Change Act (2008) <[Climate Change Act 2008 \(legislation.gov.uk\)](#)>.

¹¹⁶ Ibid.

¹¹⁷ UK Climate Change Committee, '*A legal duty to act*' (2008) <[A legal duty to act - Climate Change Committee \(theccc.org.uk\)](#)>.

¹¹⁸ OECD, The United Kingdom's pioneering Climate Change Act (6 October 2021) <[The United Kingdom's pioneering Climate Change Act \(oecd.org\)](#)>.

¹¹⁹ United Kingdom Government, UK Emissions Trading Scheme Markets (28 October 2022) <[UK Emissions Trading Scheme markets - GOV.UK \(www.gov.uk\)](#)>.

¹²⁰ Ibid.

¹²¹ The United Kingdom Climate Change Act (2008) Target Amendment (2019) <[The Climate Change Act 2008 \(2050 Target Amendment\) Order 2019 \(legislation.gov.uk\)](#)>.

¹²² United Kingdom Government, Participating in the UK ETS (18 October 2022) <[Participating in the UK ETS - GOV.UK \(www.gov.uk\)](#)>.

¹²³ The City of London & Norton Rose Fulbright '*Discussing EU and UK approaches to carbon pricing as a tool towards net-zero emission targets*' (2021) <[Discussing EU and UK approaches to carbon pricing as a tool towards net-zero emission targets: \(cityoflondon.gov.uk\)](#)>.

May 2021.¹²⁴ In addition, a number of allowances are allocated for free to industrial participants at risk of carbon leakage – or to those arranging their affairs to shift to jurisdictions with fewer GHG emission restrictions.¹²⁵ The UK ETS operates in a manner that is largely the same as the EU ETS.¹²⁶ The UK government is open to the possibility of linking the UK ETS to other carbon trading schemes internationally – indicating that greater global cooperation with respect to pricing carbon could form part of the broader regulatory landscape.¹²⁷

Looking more broadly beyond the UK ETS and price on carbon, in 2013, the UK introduced regulations under the *Companies Act 2006* requiring medium and large businesses to publish a strategic report that outlines the impact of a company's operations on the environment.¹²⁸ Further, the regulations required that a director's report disclose the GHG emissions from a company's direct activities and the purchase of electricity, heat, steam and cooling services.¹²⁹

Building upon these disclosure requirements, the *Companies (Strategic Report) (Climate-Related Financial Disclosure) Regulations 2022* will impact over 1,300 of the largest UK-registered companies and financial institutions – including private companies with over 500 employees and £500 million in turnover.¹³⁰ These regulations require companies to disclose a description of their governance arrangements in relation to assessing and managing climate-related risks, a description of their overall climate-related risk management processes and a description of the key performance indicators they use to assess their progress against key targets used to manage climate-related risks.¹³¹

Adding to this regulatory trend, energy companies in the UK are subject to the UK's Renewables Obligation (**RO**). The RO places an obligation on licensed electricity suppliers in the UK to source a proportion of their supply to customers from eligible renewable sources.¹³² The obligation is set annually by the Department of Business, Energy and Industrial Strategy. The RO works by predicting the amount of electricity that will be supplied in the UK and the number of Renewables Obligation Certificates that will be issued to eligible renewable generators.¹³³ Electricity suppliers can meet their annual obligation by presenting Renewables Obligation Certificates or by making a payment into a buyout fund (or a combination of the two methods).¹³⁴

5.4. European Union

Established in 2005, the EU ETS is the world's first international emissions trading system that places a price on carbon.¹³⁵ The rules governing the EU ETS are set out in the European Parliament's EU ETS Directive. Article 10(3) states that at least 50% of the revenues

¹²⁴ United Kingdom Government, UK Emissions Trading Scheme Markets (28 October 2022) <[UK Emissions Trading Scheme markets - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/uk-emissions-trading-scheme-markets)>.

¹²⁵ ICAP, Emissions Trading Worldwide Status Report (2022) <[Emissions Trading Worldwide – International Carbon Action Partnership \(ICAP\) Status Report 2022 \(icapcarbonaction.com\)](https://www.icapcarbonaction.com/reports/emissions-trading-worldwide-status-report-2022)>.

¹²⁶ United Kingdom Government, Participating in the UK ETS (18 October 2022) <[Participating in the UK ETS - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/participating-in-the-uk-ets)>.

¹²⁷ Ibid.

¹²⁸ Australian Government, Framework for reporting carbon risk in Australia, <[Chapter 3 – Parliament of Australia \(aph.gov.au\)](https://www.aph.gov.au/parliamentary_business/committees/standing_committees/committee_on_environmental_and_sustainable_development/reports/2017-18/chapter-3)>.

¹²⁹ Ibid.

¹³⁰ United Kingdom Government, The Companies (Strategic Report) (Climate-related Financial Disclosure) Regulations 2022 <[The Companies \(Strategic Report\) \(Climate-related Financial Disclosure\) Regulations 2022 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uksi/2022/1000/contents/made)>.

¹³¹ Ibid.

¹³² OFGEM, Renewables Obligation, <[Renewables Obligation \(RO\) - Energy suppliers | Ofgem](https://www.ofgem.gov.uk/renewables-obligation)>.

¹³³ Ibid.

¹³⁴ Ibid.

¹³⁵ European Commission, EU Emissions Trading System <[EU Emissions Trading System \(EU ETS\) \(europa.eu\)](https://ec.europa.eu/eu-ets)>.

generated from the auctioning of allowances under the scheme should be used to combat climate change in the EU and internationally.¹³⁶ The scheme recognises that in order to meet the EU's climate and energy targets for 2030 and reach the objectives of the European Green Deal, market-based solutions that allow firms to address the impacts of their emissions in cost-effective ways are key.¹³⁷

The scheme operates on a cap and trade principle. A cap is set on the total amount of certain GHGs that can be emitted by scheme participants. Within the cap, participants can buy or receive emissions allowances, which they can trade with one another as needed.¹³⁸ Trading allows companies to determine the most cost-effective method of meeting their cap. The EU ETS covers GHG emissions from electricity and heat generation, energy-intensive industry sectors (including oil refineries, steel works, production of metals) and commercial aviation with the European Economic Area.¹³⁹

In 2019, the European Commission presented its EU Green Deal, which detailed ambitious targets to tackle climate change.¹⁴⁰ The program specified a commitment to zero net emissions of GHGs by 2050, economic growth decoupled from resource use and "no person and no place left behind".¹⁴¹ To facilitate these goals, the EU introduced a taxonomy of sustainable activities to scale up sustainable investment and implement the EU Green Deal.¹⁴² What followed was the EU Taxonomy Climate Delegated Act – regulation that aimed to tackle "greenwashing" by specifying criteria to determine whether an activity is environmentally friendly.¹⁴³

The EU introduced the Sustainable Finance Disclosure Regulation (**SFDR**).¹⁴⁴ This regulation captured financial market participants that operate in Europe. The SFDR was tactically deployed in conjunction with the *EU Taxonomy: Complementary Climate Delegated Act* and the EU's Low Carbon Benchmarks Regulation (all part of the EU's sustainable finance action plan).¹⁴⁵ The SFDR requires products to be classified in a certain way depending on the role that ESG plays in how the financial product is promoted, the investment strategy that underpins the product and the purpose of the product.¹⁴⁶ The goal is to allow investors to properly compare and assess investments in a standardised way with respect to ESG. In addition to the SFDR, a Green Bond Standard was enacted (allowing those issuing bonds to apply the standard if they comply with certain green requirements) as well as a Corporate Sustainability Reporting Directive (**CSRD**).¹⁴⁷ The CSRD requires certain large companies to disclose information on the way they operate and manage social and environmental challenges. The objective of this piece of regulation is to enable stakeholders, investors and policymakers to make non-financial performance assessments of EU companies – encouraging more responsible approaches to business.¹⁴⁸

¹³⁶ European Commission, EU ETS Handbook, <[ets_handbook_en.pdf \(europa.eu\)](#)>.

¹³⁷ European Commission, EU Emissions Trading System, <[EU Emissions Trading System \(EU ETS\) \(europa.eu\)](#)>.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ European Commission, A European Green New Deal, <[A European Green Deal | European Commission \(europa.eu\)](#)>.

¹⁴¹ Ibid.

¹⁴² European Commission, EU taxonomy for sustainable activities, <[EU taxonomy for sustainable activities \(europa.eu\)](#)>.

¹⁴³ European Commission, Sustainable finance package (21 April 2021), <[Sustainable finance package \(europa.eu\)](#)>.

¹⁴⁴ European Commission, Sustainability-related disclosure in the financial services sector, <[Sustainability-related disclosure in the financial services sector \(europa.eu\)](#)>.

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

¹⁴⁷ European Commission, Corporate Sustainability Reporting, <[Corporate sustainability reporting \(europa.eu\)](#)>.

¹⁴⁸ Ibid.

As evidenced by these advancements, the EU has made significant steps to increase the attractiveness of disclosing successful non-financial performance indicators. For Australian companies looking to attract EU investors, maintaining a focus on how these regulations will impact behaviour and capital flows will be integral. EU investors may consider re-allocating more of their capital to green investments to respond to these regulatory developments. Further, if Australian companies have operations in Europe, these regulations will impact their reporting requirements.

Beyond the EU's significant regulatory push toward sustainable finance, in 2018/2019 an overhaul of the EU energy policy framework took place.¹⁴⁹ A clean energy package was announced with eight new laws to support a transition away from fossil fuel energy sources.¹⁵⁰ Notably, the Renewable Energy Directive set a target of 32% renewable energy across the EU's total energy consumption, by 2030.¹⁵¹ In May 2022, the European Commission reaffirmed this commitment and proposed to further increase this target to 45% by 2030.¹⁵² To help achieve this, the Clean Energy Package will see the introduction of innovation quotas for the expansion of innovative renewable energy technologies.¹⁵³ Member states will be required to set indicative targets of at least 5% of newly installed renewable energy capacity being recognised as innovative technologies by 2030.¹⁵⁴ To this end, companies may be incentivised to reinvest returns from internal carbon pricing schemes, or other green initiatives and funds, to develop new innovative technologies to meet the demand created by this regulatory intervention.

5.5. Asia

China's national ETS was implemented in 2021 and is the world's largest in terms of covered emissions. It builds on the subnational pilot carbon markets implemented in eight regions. Compliance obligations apply to entities in the power sector that emit over 26,000 t CO₂ annually. The compliance cycle started on 1 January 2021 and covers 2,162 entities, with the national market covering over four billion MtCO₂. Entities regulated under the national system do not face compliance obligations under the pilot ETS, however revisions of the national ETS trading platform and the GHG emissions allowance registry is ongoing.¹⁵⁵ China has pledged that carbon dioxide emissions will peak by 2030, with best efforts to peak earlier. China has also pledged to source 20% of its energy from low-carbon sources by 2030 and to cut emissions per unit of GDP by 60–65% on 2005 levels by 2030, potentially putting it on course to peak by 2027.¹⁵⁶

The Republic of Korea launched its national ETS (**Korea ETS**) in 2015, the first national cap-and-trade system in operation in East Asia. The Korea ETS plays an essential role in meeting Korea's 2030 NDC target. Phase 3 commenced in 2021 with a stricter cap, and an increased proportion of allowances distributed via auction. Phase 3 has also seen third-party participation, with the government approving 20 financial institutions to enter the market for the first time.¹⁵⁷ In 2017, Korea pledged to reduce by 24.4% the total national GHG emissions, which is 709.1 MtCO₂e, by 2030. This is an absolute emissions reduction target. Korea also pledged carbon neutrality by 2050, and will update its nationally

¹⁴⁹ European Commission, Clean Energy for all Europeans Package, <[Clean energy for all Europeans package \(europa.eu\)](#)>.

¹⁵⁰ Ibid.

¹⁵¹ European Commission, Renewable Energy Directive, <[Renewable energy directive \(europa.eu\)](#)>.

¹⁵² European Commission, Parliament Communication (18 March 2022) <[resource.html \(europa.eu\)](#)>.

¹⁵³ Ibid.

¹⁵⁴ Ibid.

¹⁵⁵ ICAP, China National ETS (2021) <<https://icapcarbonaction.com/en/ets/china-national-ets>>.

¹⁵⁶ Reuters, China Submits Updated Climate Pledges to United Nations (29 October 2021) <<https://www.reuters.com/business/cop/china-submits-updated-climate-pledges-united-nations-2021-10-28/>>.

¹⁵⁷ ICAP, Korean Emissions Trading Scheme (2015) <<https://icapcarbonaction.com/en/ets/korea-emissions-trading-scheme>>.

determined contributions again before 2025. Korea has increased its share of domestic emission reduction, including LULUCF to achieve its target. This includes adaptation actions.¹⁵⁸

Japan's carbon tax, the Tax for Climate Change Mitigation, aims to put an economy-wide fair burden on the use of all fossil fuels based on their GHG emissions content to realise a decarbonised society and strengthen climate change mitigation. Japan has pledged a 26% reduction in emissions on 2013 levels by 2030, and carbon neutrality by 2050. This includes precise information on how it will generate its power by 2030.¹⁵⁹

In October 2021, Indonesia passed a law to introduce a carbon tax on coal-fired power plants, with the potential to expand to other sectors based on a readiness assessment in 2025. The carbon tax was initially set to commence in April 2022, but was pushed back to commence in July in light of rising energy commodity prices. The initial carbon tax rate is IDR 30,000 per metric tonne of CO₂e (approximately USD\$2.1/t CO₂e).¹⁶⁰ Indonesia had pledged a 29% reduction in emissions by 2030, compared with current emissions levels. Indonesia says it will increase its reduction goal to 41%, conditional on support from international cooperation. This includes a section on adaptation.¹⁶¹

Singapore introduced a carbon price in 2019, through the Carbon Pricing Act (CPA), at 5\$ per tonne of GHG emissions (tCO₂e). The carbon tax will incentivise emissions reduction across all sectors and support the transition to a low-carbon economy. There are no exemptions for covered facilities, in order to maintain a transparent, fair and consistent price signal across the economy.¹⁶² Singapore has pledged that GHG emissions will peak at 65 MtCO₂e circa 2030, consistent with a 36% reduction in emissions intensity compared with 2005 levels. This contains information on adaptation actions.¹⁶³

Additionally, the following countries are considering implementing an ETS: Japan, Vietnam, Taiwan, Thailand, Malaysia and Indonesia.

5.6. International

International carbon pricing was introduced using flexibility mechanisms under the Kyoto Protocol. Adopted at the third Conference of the Parties (**COP**) to the United Nations Framework Convention on Climate Change (**UNFCCC**) held in Kyoto, Japan, in December 1997, the Kyoto Protocol committed industrialised country signatories (so-called Annex I countries) to collectively reducing their GHG emissions by at least 5.2% below 1990 levels on average, over 2008–2012. Annex I countries could fulfil their commitments through domestic actions or the use of three flexibility mechanisms: International Emissions Trading, JI and CDM. The amendment adopted in Doha, Qatar, in December 2012 provided a basis for the three Kyoto mechanisms to continue for 2013–2020. The IET, JI and CDM were of significant relevance in the creation of cross-boundary carbon markets.¹⁶⁴

The Paris Agreement, often referred to as the Paris Accords or the Paris Climate Accords, is an international treaty on climate change, adopted in 2015. It covers climate change mitigation, adaptation and finance.¹⁶⁵ The Paris Agreement was adopted by 196 parties at COP21 in Paris, on 12 December 2015 and entered into force on 4 November 2016.¹⁶⁶ The

¹⁵⁸ Fiscal Policies to Address Climate Change in Asia and the Pacific, International Monetary Fund No. 21/07.

¹⁵⁹ Ibid.

¹⁶⁰ ICAP, Indonesia Emissions Trading Scheme (under development), <<https://icapcarbonaction.com/en/ets/indonesia>>.

¹⁶¹ Fiscal Policies to Address Climate Change in Asia and the Pacific, International Monetary Fund No. 21/07.

¹⁶² MSE, Carbon Pricing Act (2019) <<https://www.mse.gov.sg/policies/climate-change/cpa>>.

¹⁶³ Fiscal Policies to Address Climate Change in Asia and the Pacific, International Monetary Fund No. 21/07.

¹⁶⁴ The World Bank, What is carbon pricing, <<https://carbonpricingdashboard.worldbank.org/what-carbon-pricing>>.

¹⁶⁵ UNFCCC, The Paris Agreement (12 December 2015) <<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>>.

¹⁶⁶ Ibid.

Paris Agreement works on a 5-year cycle of increasingly ambitious climate action carried out by countries. By 2020, countries submitted their plans for climate action, known as nationally determined contributions (**NDCs**).¹⁶⁷ Article 6 of the Paris Agreement provides a basis for facilitating international recognition of cooperative carbon pricing approaches and identifies new concepts that may pave the way for this cooperation to be pursued.¹⁶⁸

Member States of the International Civil Aviation Organization (**ICAO**) adopted the first global sectoral carbon pricing initiative — the Carbon Offsetting and Reduction Scheme for International Aviation (**CORSIA**) on 7 October, 2016. This is a global carbon offsetting initiative that aims to stabilise net emissions from international aviation at 2020 levels; any additional emissions above 2020 levels will have to be offset. According to researchers and analysts, the CORSIA has the potential to generate demand for carbon assets of about 2.5 GtCO₂e between 2021 and 2035, which is comparable to the cumulative volume of Kyoto credits issued so far.

The World Bank's Partnership for Market Readiness (**PMR**) published the *Carbon Tax Guide: A Handbook for Policy Makers*. The guide serves as practical tool to help policymakers determine whether a carbon tax is the right instrument to achieve national policy goals. Additionally, it is a resource to support the design and implementation of a tax that is best suited to the specific needs, circumstances and objectives of national policy.¹⁶⁹

The TCFD is aligned with the CDP investor request for disclosure. The Financial Stability Board created the TCFD to improve and increase reporting of climate-related financial information.¹⁷⁰ The disclosure recommendations are structured based on four areas: governance, strategy, risk management, and metrics and targets. The four recommendations are interrelated and supported by 11 recommended disclosures that build on the framework and assist organisations in thinking about and assessing climate-related risks and opportunities.¹⁷¹ The Task Force considered existing voluntary and mandatory climate-related reporting frameworks in developing its recommendations, including those developed by the CDP (formerly the Carbon Disclosure Project), Climate Disclosure Standards Board (**CDSB**), the Global Reporting Initiative (**GRI**), the International Integrated Reporting Council (**IIRC**), and the Sustainability Accounting Standards Board (**SASB**), with the Task Force's recommended disclosures.¹⁷²

6. Use of example organisational ICP approaches

Table 1 (Organisational Overview) and **Table 2** (Organisational Overview: Internal Carbon Pricing Metrics) set out a list of organisations across CDP defined industries that have implemented an ICP. For the purposes of this research, the review within the tables has included all scopes of ICP (i.e. shadow, implicit) to allow organisations to determine differences and similarities between their own organisations characteristics and those in the tables below, and ultimately select an ICP path that is best suited to them. The list of organisations and research contained within the tables is not intended to be exhaustive.

¹⁶⁷ Ibid.

¹⁶⁸ The World Bank, What is carbon pricing, <<https://carbonpricingdashboard.worldbank.org/what-carbon-pricing>>.

¹⁶⁹ Ibid.

¹⁷⁰ TCFD, 'Climate change presents financial risk to the global economy' <<https://www.fsb-tcfd.org/>>.

¹⁷¹ Ibid.

¹⁷² Ibid.

Table 1: Organisational Overview

	COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
	<i>Company name and link to company website</i>	<i>Small / Medium / Large (as defined by the Australian Bureau of Statistics)</i>	<i>Defined list of industries:</i> <ul style="list-style-type: none"> • Apparel • Biotech, health care & pharma • Financial services • Food, beverage & agriculture • Fossil Fuels • Hospitality • Infrastructure • Manufacturing • Materials • Other services • Power • Retail • Transportation services 	<i>What are the key drivers for the company to implement the internal carbon price?</i> <i>Drivers can include the need to meet decarbonisation goals, transition to net zero commitments, public perception, competitive advantage etc.</i>	<i>eg ETS, Cap & Trade or Carbon Tax</i>	<i>Sources accessed in addition to information published on organisational website.</i>
1.	Abengoa	Large	Infrastructure	<ul style="list-style-type: none"> • Incentivise and fund GHG reductions across its business units to achieve a GHG reduction goal • Navigate GHG regulations • Stakeholder expectations. 	No, the ICP procedure intends to measure the risk of the potential inclusion of certain activities of Abengoa in upcoming emission tax systems.	https://www.abengoa.com/export/sites/abengoa_corp/resources/gestion_noticias/pdf/20160810-NP-Precios-carbono-en.pdf (accessed on 29 August 2022) https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FEnvironment%2Fclimate%2FCarbonPricingExecutiveGuide.pdf (accessed on 29 August 2022)
2.	Air Canada	Large	Transportation Services	<ul style="list-style-type: none"> • Identify and seize low-carbon opportunities • Net zero by 2050. 	Yes, Air Canada is regulated by the Canadian government's carbon tax (Canada Federal Output Based Pricing System (OBPS) ETS). The current cost per tonne is CAD 40 (as of 1 April 2021).	N/A
3.	Braskem	Large	Manufacturing (Chemicals)	<ul style="list-style-type: none"> • Drive low-carbon investment. 	No.	N/A

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
4. Ben & Jerry's	Large	Food, beverage & agriculture	<ul style="list-style-type: none"> Stakeholder expectations Change internal behaviour Drive energy efficiency Drive low-carbon investment Identify and seize low-carbon opportunities Transition to a low-carbon economy & drive innovation. 	No.	https://www.unilever.com/files/d075fa00-5b54-4b00-9642-954662c9d070/unilever-cdp-climate-response.pdf (accessed on 30 August 2022)
5. Cemex	Large	Materials	<ul style="list-style-type: none"> Navigate GHG regulations Change internal behaviour Drive energy efficiency Drive low-carbon investment Stress-test investments Identify and seize low-carbon opportunities. 	Yes, Cemex was prepared when the EU ETS began and has leveraged the market to drive investments in alternative fuels and renewable energy. Cemex is also regulated by the California ETS.	https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FEnvironment%2Fclimate%2FCarbonPricingExecutiveGuide.pdf (accessed on 29 August 2022)
6. ConocoPhillips	Large	Fossil Fuels	<ul style="list-style-type: none"> ConocoPhillips believes a well-designed pricing regime on carbon emissions is the most effective tool to reduce GHG emissions A carbon price can support the implementation of current economic emission reduction projects and provide support for innovation to encourage the development of currently uneconomic projects. 	Yes, ConocoPhillips is regulated by: <ul style="list-style-type: none"> European Emissions Trading Scheme; UK Emissions Trading Scheme; Norwegian Carbon Fee; Alberta Technology Innovation and Emissions Reduction; and British Columbia and Alberta Carbon Tax. 	ConocoPhillips, 'Carbon Pricing' (accessed on 30 August 2022)
7. Danone	Large	Food, beverage & agriculture	<ul style="list-style-type: none"> Reducing GHG emissions in line with Paris Agreement Danone aims to act as a social innovator Foster "carbon positive" solutions – Danone aims to fix carbon in agriculture Danone's goal is to target net zero emissions in its full scope of emissions in the long term. 	Yes, Danone is regulated by the EU ETS.	Danone, 'Climate Policy' (accessed 30 August 2022) Danone Annual Integrated report 2020: Methodology Note (accessed 30 August 2022)
8. Delta	Large	Transportation services	<ul style="list-style-type: none"> Delta believes it has a social responsibility to protect the environment 	Yes, Delta is regulated by the: <ul style="list-style-type: none"> Carbon Offsetting; and 	Delta, New Campaign Shines Light on Delta's Carbon Neutrality (accessed on 30 August 2022)

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
			<ul style="list-style-type: none"> Delta aims to build a more sustainable model for aviation – and aims to become the first carbon-neutral airline in the world. 	<p>Reduction Scheme for International Aviation (CORSA).</p> <p>Delta is also anticipating compliance requirements for regional or global airline operation.</p>	
9.	Walt Disney Company	Large	Other	<ul style="list-style-type: none"> Stakeholder expectations Change internal behaviour Drive energy efficiency Drive low-carbon investment Identify and seize low-carbon opportunities Aim to achieve net zero emissions for direct operations by 2030. 	<p>Yes, Disney is regulated by the EU ETS.</p> <p>The Walt Disney Company, Environmental Sustainability (accessed on 30 August 2022)</p>
10.	E.ON	Large	Power	<ul style="list-style-type: none"> Navigate GHG regulations Drive energy efficiency Drive low-carbon investment Stress-test investments Identify and seize low-carbon opportunities Change internal behaviour E.ON aims to be climate neutral in its own operations by 2040. 	<p>Yes, E.ON is regulated by the EU ETS and Sweden carbon tax.</p> <p>E.ON, Sustainability Report 2021 (accessed on 30 August 2022)</p>
11.	EDF	Large	Fossil Fuels/Power	<ul style="list-style-type: none"> EDF aims to continue reducing GHG emissions beyond legal requirements EDF to continue to invest in renewable energy. 	<p>Yes, EDF is regulated by the EU ETS and Sweden carbon tax.</p> <p>https://www.edf.fr/sites/groupe/files/2022-04/edfgroup_bilan-ges_groupe-edf_2021_va.pdf (accessed on 30 August 2022)</p>
12.	Eskom Holdings Soc Limited	Large	Power	<ul style="list-style-type: none"> Drive energy efficiency Drive low-carbon investment Stress test investments Identify and seize low-carbon opportunities. 	<p>Yes, Eskom is regulated by the South Africa carbon tax.</p> <p>Carbon Footprint Report 2020 (accessed on 30 August 2022)</p> <p>Eskom Sustainability Report 31 March 2020 (accessed on 30 August 2022)</p>

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
13. Equinor	Large	Fossil Fuels	<ul style="list-style-type: none"> Mitigating risks arising out of emerging regulation, and ensuring cost of compliance is considered in investment decisions Ensuring that investment is redirected towards assets that have a relatively low-carbon intensity in line with its net zero ambitions. 	Yes, Statoil is regulated by the EU ETS and the Norwegian ETS.	UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 29 August 2022) Equinor CDP Climate Change Questionnaire (accessed on 30 August 2022)
14. Google	Large	Other services (Technology)	Carbon pricing used as part of risk assessment to support strategic decision-making related to future capital investments.	Yes, Google is regulated by the California CaT-ETS.	Carbon brief (accessed on 30 August 2022)
15. Hitachi Chemical Company	Medium	Manufacturing	<ul style="list-style-type: none"> Change internal behaviour Drive energy efficiency Drive low-carbon investment. 	No.	N/A
16. LafargeHolcim	Large	Manufacturing	<ul style="list-style-type: none"> Commitment to net zero emissions by 2050 Navigate GHG regulations Stakeholder expectations Change internal behaviour Drive energy efficiency Drive low-carbon investment Stress-test investments Identify and seize low-carbon opportunities. 	Yes, LafargeHolcim is regulated by: <ul style="list-style-type: none"> (Alberta) Carbon Competitiveness Incentive Regulation (CCIR) – ETS; BC carbon tax; Canada's federal Output-Based Pricing System (OBPS) – ETS; Colombia carbon tax; EU ETS; Mexico carbon tax; Québec CaT – ETS; and Switzerland ETS. 	https://www.holcim.com/sites/holcim/files/documents/lafargeholcim_cdp_climate_change_2020.pdf (accessed on 29 August 2022)
17. LG Electronics	Large	Manufacturing	<ul style="list-style-type: none"> Navigate GHG regulations Drive low-carbon investment 	Yes, LG is regulated by the Korea ETS.	N/A
18. Microsoft	Large	Technology	<ul style="list-style-type: none"> Change internal behaviour Drive energy efficiency Drive low-carbon investment Identify and seize low-carbon opportunities Supplier engagement 	Yes, Microsoft is regulated by the Beijing pilot ETS.	N/A

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
19. Mitsubishi Corporation	Large	Transportation and Manufacturing	<ul style="list-style-type: none"> • Change internal behaviour • Drive energy efficiency • Drive low-carbon investment • Stress-test investments • Used to develop cost management strategies, carbon-tax burden analysed when assessing new investment and loan proposals as well as existing portfolio companies' annual business plans, and carbon management measures in response are discussed as necessary at the Investment Committee. 	Yes, Mitsubishi is regulated by the EU ETS and California CaT - ETS.	https://s3-ap-northeast-1.amazonaws.com/sustainability-cms-mitsubishicorp-s3/pdf/cdp_2021_Climate_Change.pdf (accessed on 31 August 2022)
20. National Grid	Large	Electricity and Gas	To inform investment decision-making and meet the UK's climate commitments.	Yes, National Grid's is regulated by the UK-ETS.	https://www.accountingforsustainability.org/content/dam/a4s/corporate/home/KnowledgeHub/casestudies/National%20Grid%20-%20Embedding%20a%20carbon%20price%20into%20investment%20decisions.pdf.downloadasset.pdf https://www.nationalgrid.com/about-us (accessed on 30 August 2022)
21. Novartis	Large	Pharmaceutical	<ul style="list-style-type: none"> • Navigate GHG regulations • Stakeholder expectations • Change internal behaviour • Drive energy efficiency • Drive low-carbon investment • Stress-test investments • Identify and seize low-carbon opportunities. 	Yes, Novartis is regulated by the EU ETS.	https://www.novartis.com/sites/novartis_com/files/cdp-2021-climate-change-information-request-response.pdf (accessed on 30 August 2022)
22. Orsted	Large	Power	To drive energy efficiency and low-carbon investment.	Yes, Orsted is regulated by the EU ETS.	N/A
23. Owens Corning	Large	Materials	<ul style="list-style-type: none"> • Increase low-carbon energy consumption and production • Switch to 100% renewable electricity by 2030. 	Yes, Owens Corning is regulated by: <ul style="list-style-type: none"> • (Alberta) Carbon Competitiveness Incentive Regulation (CCIR) – ETS; 	https://www.owenscorning.com/en-us/corporate/sustainability/docs/2020/2020-CDP-Climate-Response.pdf (accessed on 31 August 2022)

	COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
					<ul style="list-style-type: none"> California CaT – ETS; Canada's federal Output-Based Pricing System (OBPS) – ETS; EU ETS; Korea ETS; and Québec CaT – ETS. 	
24.	Qantas	Large	Transportation services	Qantas has implemented an internal carbon price to ensure investment decisions align with progress towards its 2030 Interim Targets of 25% emissions reduction (and net zero by 2050).	Yes, all airlines operating in the European Union Emissions (EU ETS) are required to report carbon dioxide emissions and purchase compliance offsets if they exceed their tradeable allowances. The internal carbon price also aims to meet industry-wide regulation from the International Civil Aviation Organization (ICAO).	https://cbey.yale.edu/sites/default/files/2019-09/Internal%20Carbon%20Pricing%20Report%20Feb%202019.pdf (accessed on 25 August 2022) https://www.qantas.com/content/dam/qantas/pdfs/about-us/environment/qantas-group-climate-action-plan.pdf (accessed on 30 August 2022)
25.	Renault	Large	Manufacturing	The Renault Group uses a shadow mechanism to drive the reduction in its CO _{2e} emissions and internalise the economic cost of its greenhouse gas emissions.	<p>Yes, Renault is regulated by the EU-ETS quota exchange system.</p> <p>Vehicle internal carbon pricing takes into account regulations on emissions use, such as Corporate Average Fuel Economy (CAFE) regulations in the United States, and GHG-related taxation.</p>	https://www.renaultgroup.com/wp-content/uploads/2021/04/220421_climate-report-renault-group_8mb.pdf (accessed on 30 August 2022)
26.	Rio Tinto	Large	Fossil Fuels	To drive improvements in energy efficiency across assets and to identify new abatement projects. These are likely to be smaller projects or changes in operating practices that can reduce energy costs and Rio Tinto's emissions.	<p>Yes, Rio Tinto is regulated by the:</p> <ul style="list-style-type: none"> EU ETS; California CaT; NZ ETS; Québec ETS; and the Australian ERF Safeguard mechanism. 	https://www.greengrowthknowledge.org/sites/default/files/downloads/best-practices/PMR_Carbon_pricing_case_study_companies.pdf - accessed 25/08/2022 (accessed on 30 August 2022) https://www.accr.org.au/research/rio-tinto-group-ltd-plc-assessment-of-2021-climate-change-action-plan/#:~:text=MACC%20projects%3A%2027%25%20of%202030%20target&text=In%20assessing%20MAC%20an

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
					d%20energy,US%2475%2FtCO2%2De (accessed on 30 August 2022)
27.	Royal DSM	Large	Biotech, health care & pharma	<ul style="list-style-type: none"> • Navigate GHG regulations • Stakeholder expectations • Change internal behaviour • Drive energy efficiency • Drive low-carbon investment • Stress-test investments • Identify and seize low-carbon opportunities. 	<p>Yes, Royal DSM is regulated by the EU ETS and Switzerland ETS.</p> <p>https://d306pr3pise04h.cloudfront.net/docs/issues_doc%2FEnvironment%2Fclimate%2FCarbonPricingExecutiveGuide.pdf (accessed on 30 August 2022)</p> <p>https://www.dsm.com/corporate/sustainability/climate-energy.html (accessed on 30 August 2022)</p> <p>https://www.dsm.com/corporate/sustainability/climate-energy/improving-our-carbon-footprint.html (accessed on 30 August 2022)</p>
28.	Samsung	Large	Manufacturing	With a large amount of their operations relating to manufacturing, Samsung sees particular risk from carbon taxes, GHG emissions trading and product energy efficiency regulations and is implementing steps to mitigate these risks. They are also aiming to respond to consumer demand for eco-conscious products and achieve reputational benefits.	<p>Yes, Korean Emissions Trading System (K-ETS).</p> <p>Samsung – Climate Change Risk and Opportunity Factors (accessed on 30 August 2022)</p> <p>Samsung Sustainability Report 2021 (accessed on 30 August 2022)</p>
29.	Shell	Large	Fossil Fuels	<p>The ICP helps Shell meet the requirements of current compliance regimes and prepare for future compliance requirements.</p> <p>Carbon pricing allows Shell to assess project investment decisions and potential GHG emissions regulatory exposure, anticipate potential risks, and incentivise greater energy efficiency in the design of projects.</p>	<p>Yes, Royal Dutch Shell is regulated by the (Alberta) Carbon Competitiveness Incentive Regulation (CCIR)-ETS and the EU ETS.</p> <p>https://www.greengrowthknowledge.org/sites/default/files/downloads/best-practices/PMR_Carbon_pricing_case_study_companies.pdf (accessed on 25 August 2022)</p>
30.	Société Générale	Large	Financial Services	<ul style="list-style-type: none"> • Navigate GHG regulations • Change internal behaviour 	<p>Yes, Société Générale is regulated by the EU ETS.</p> <p>Yale Report – Internal Carbon Pricing (accessed on 28 August 2022)</p>

COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED	
			<ul style="list-style-type: none"> Stress-test investments Identify and seize low-carbon opportunities. 		<p>Press Release – Disclosure and Decarbonisation (accessed on 29 August 2022)</p> <p>Press Release – Société Générale Joins the Net-Zero Banking Alliance (accessed on 29 August 2022)</p>	
31.	Sony Corporation	Large	Manufacturing and other services	To make the transition to net zero in line with their commitments and public perception, as well as mitigation of risks such as adoption of carbon taxes, regional expansion of emissions trading schemes, stronger regulation of energy efficiency standards for products, and market changes driven by shifting consumer attitudes.	Yes, Sony is regulated by the Tokyo CaT ETS.	<p>Press Release – Carbon Neutrality by 2040 (accessed on 30 August 2022)</p> <p>Sony Sustainability Report 2022 (accessed on 30 August 2022)</p> <p>Article – Sony Road to Zero Targets (accessed on 30 August 2022)</p>
32.	SUEZ environnement	Large	Other Services (Water and waste management)	<ul style="list-style-type: none"> SUEZ's aims in implementing a carbon price include alignment with future regulations and transition to net zero commitments SUEZ has pursued leadership in this area to differentiate itself from competitors and to help customers comply with GHG regulators and reduce compliance costs, particularly those that have compliance obligations under the EU ETS. 	Yes, SUEZ is regulated by the EU ETS.	<p>UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 29 August 2022)</p> <p>SUEZ – Our Solutions and Commitments for the Climate (accessed on 29 August 2022)</p>
33.	Tata Cleantech Capital Ltd	Medium	Financial Services	Tata has implemented a shadow price on carbon predominantly to evaluate investment decisions, as they operate in the green financing space.	No.	UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 29 August 2022)
34.	Tata Steel	Large	Materials	Tata Steel aims to achieve emission intensity <2 tCO ₂ /tcs by 2025 while maintaining competitiveness.	N/A	https://www.tatasteel.com/tata-steel-brochure/sustainability.html (accessed 14 September 2022)
35.	Unilever	Large	Retail	<ul style="list-style-type: none"> Stakeholder expectations Change internal behaviour 	Yes, Unilever is regulated by EU ETS.	Unilever Annual Report and Accounts 2021 (accessed on 30 August 2022)

	COMPANY NAME	SIZE	INDUSTRY	ICP OBJECTIVE(S)	OPERATIONS/ACTIVITIES REGULATED BY A CARBON PRICING SYSTEM?	OTHER SOURCES AND DATE ACCESSED
				<ul style="list-style-type: none"> • Drive energy efficiency • Drive low-carbon investment • Identify and seize low-carbon opportunities • Transition to a low-carbon economy and drive innovation. <p>Goals:</p> <ul style="list-style-type: none"> • Reducing in absolute terms its operational (Scope 1 and 2) emissions by 100% by 2030, against a 2015 baseline; • Halving the full value chain emissions of its products on a per consumer basis by 2030, against a 2010 baseline; and • Achieving net zero emissions covering Scope 1, 2 and 3 emissions by 2039. 		
36.	Volkswagen	Large	Transportation services	Volkswagen Group implemented an internal carbon price to achieve its decarbonisation goals and to maintain its position as a progressive and forward-moving automotive industry player. This forms part of its broader corporate strategy and its commitments to the market.	<p>Yes, Volkswagen Group is regulated by the EU ETS, and specifically Germany's carbon price.</p> <p>Volkswagen Group is also informed by the commitments made in the Paris Agreement.</p>	Sustainability Report 2021 Volkswagen (accessed on 30 August 2022)
37.	Yale University	Large	Other services	<ul style="list-style-type: none"> • Contribute to the global understanding of effective carbon pricing approaches • Incorporate the societal costs of climate change into university investment decisions to reduce campus energy costs and greenhouse gas emissions • Provide financial support for on-campus emissions reduction. 	No.	What is Yale's Carbon Charge? (accessed on 30 August 2022)

Table 2: Organisational Overview – Internal Carbon Pricing Metrics

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
1.	Abengoa	EUR 15.88	Not disclosed	Scope 1, 2 and 3 emissions	Shadow price	Yes, quarterly check-ins to get progress reports from business units and adapt its approach as needed. A uniform price applicable to every new project.	N/A	<p>The initiative consists of the inclusion of the need to calculate the costs derived from the potential GHG emissions of potential new medium, and long-term projects, using the internal carbon price defined by the company. The economic impact is assessed as a risk factor, so it is included in the general risk assessment for new projects. The economic impact over the project budget is measured and assessed and, depending on the risk level, it impacts the decision taken, which takes into account its acceptance, transference or avoidance. This carbon pricing procedure, which is still in the initial phase of development, measures the risk of the potential inclusion of certain activities of Abengoa in upcoming emissions tax systems.</p>	<p>https://www.abengoa.com/web/en/gestion_responsable/principales_iniciativas/medioambientales/ri-esgos-opportunidades-cambio-climatico/ (accessed on 30 August 2022)</p> <p>https://cdn.cdp.net/cdp-production/cms/reports/documents/000/000/918/original/carbon-pricing-in-the-corporate-world.pdf?1472456914 (CDP report dated September 2015)</p>

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
2.	Air Canada	<p>Domestic flights: CAD 40</p> <p>International flights: CAD 20</p>	<p>Domestic: Based on the carbon tax applied by the Canadian government.</p> <p>International: The 2021 CO₂ estimated costs were estimated based on the 2020 CO₂ price projections from the 2013 International Energy Agency (IEA) World Energy Outlook. According to those projections, the price is expected to vary from CAD 11 per tonne and CAD 28 per tonne in 2021 and 2022.</p>	Scope 1 emissions	Shadow price	Yes, the price will be updated based on changes to the carbon tax determined by the Canadian government.	N/A	<p>For internal decision-making and risk analysis associated with the changing and uncertain regulatory landscape internationally, Air Canada placed an economic value on carbon emissions to help frame and quantify the potential impact of current or future climate change regulation on the company's business.</p> <p>In 2020, the company's carbon costs estimate for domestic flights was based on Canadian carbon taxes applied in provinces and for international flights, its estimate was based on CORSIA. Sustainable aviation fuels (SAF) are not currently available in commercial quantities nor are they currently economically viable. Future carbon pricing schemes and funding for clean growth through SAF development are considered in internal analysis that is used to guide future Air Canada investment in SAF projects.</p>	N/A

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
3.	Braskem	BRL 200 (Brazilian Real)	Braskem's price is calculated by considering the potential impacts associated with regulatory risk and mandatory emissions reduction associated with a carbon tax, which might insert new costs into Braskem's operations.	Scope 1 and 2 emissions	Shadow price (Implicit price)	Once a virtual carbon price is calculated, the process enters a monitoring phase to evaluate the effectiveness of the defined price in relation to its impact on the eligibility of projects in the decision-making process.	N/A	<p>Braskem has been using an implicit pricing process that has been incorporated into its investment decision-flow.</p> <p>Braskem is also exploring internal shadow pricing options that will help inform where and how the company invests in future projects.</p>	<p>https://www.braskem.com.br/combatingclimatechange (accessed on 29 August 2022)</p> <p>https://d306pr3pise04h.cloudfront.net/docs/issuess_doc%2FEnvironment%2Fclimate%2FCarbonPricingExecutiveGuide.pdf (accessed on 29 August 2022)</p>

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
4.	Ben & Jerry's	USD 10	Not disclosed	Scope 1, 2 and 3 emissions	Internal fee (Carbon Investment Scheme, CIS)	Not disclosed	<p>Funds raised from the ICP go towards an internal Low Carbon Fund for energy and low-carbon projects at its manufacturing sites around the world.</p> <p>42% of the company's ice cream lifecycle emissions come from dairy so the company works with farmers to implement GHG footprint-reducing strategies, including manure separators that turn methane into bedding for cows.</p>	<p>Additional measures include investing in solar panels at the Vermont ice cream factory, and installing electric vehicle charging stations at its facilities.</p> <p>The Low Carbon Fund is being replaced with an explicit commitment to ensure that future capital expenditure is aligned with the Paris Agreement's objective of limiting global average temperature rise to 1.5 degrees above pre-industrial levels.</p>	<p>https://www.unilever.com/files/d075fa00-5b54-4b00-9642-954662c9d070/unilever-cdp-climate-response.pdf (accessed on 30 August 2022)</p>
5.	Cemex	<p>Europe (regulated) 2022: USD 46</p> <p>Outside Europe (non-</p>	<p>Europe (regulated) Cemex uses a reference price which scales up over time.</p>	Scope 1 and 2 emissions	Shadow price	Not disclosed	N/A	<p>The internal price on carbon allows CEMEX to:</p> <p>(i) Identify cost-effective CO₂ reduction opportunities in those countries in</p>	<p>https://d306pr3pise04h.cloudfront.net/docs/issue_s_doc%2FEnvironment%2Fclimate%2FCarbonPricingExecutiveGuide.pdf (accessed on 30 August 2022)</p>

COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
	regulated + California ETS) 2022: USD 19	<p>2020: USD 30 2021: USD 42 2022: USD 46 2025: USD 65 2030: USD 87</p> <p>Outside Europe (non-regulated + California ETS) Cemex uses a reference price for all non-regulated countries, as well as for California ETS which is the carbon floor in California. 2020: USD 17 2021: USD 18 2022: USD 19 2025: USD 23 2030: USD 33</p>					<p>which there is no compliance carbon price in place, but which are exposed to increased risks under an external carbon pricing scenario.</p> <p>(ii) Raise awareness across the organisation of CEMEX's potential exposure to external carbon pricing (financial impact of the risk).</p> <p>(iii) Apply the internal carbon price to Cemex's monthly results (EBITDA impact) and raise awareness of the importance of the CO₂ strategy for the company, and, at the same time, it facilitates the site management team understanding of the potential impact of their daily decisions.</p> <p>Example of the impact and implications: Alternative Fuel increased investment in a site in Colombia: the evaluation of the investment w/o</p>	

COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
							considering a CO ₂ price showed a payback of 6 years. The execution of the project provides for a carbon intensity reduction of 25 kgCO ₂ /clinker tonne; taking the CO ₂ 2020 reference price for non-regulated countries of USD 17/tonne the company gets to reduce the payback to 4 years.	
6.	ConocoPhillips	USD 40	ConocoPhillips is guided by GHG price regulation in the relevant jurisdiction.	Scope 1 and 2 emissions	Shadow price Annually – ConocoPhillips releases a sustainability report annually. Despite being reviewed annually, ConocoPhillips has already confirmed that the internal carbon price will be USD 60 per tCO ₂ at the start of 2024.	N/A	For all qualifying project decisions, ConocoPhillips either builds a carbon price into the base case economic evaluation and/or tests the sensitivity of its projects against possible future carbon pricing. The economic analysis is used to evaluate future project opportunities. For example, in 2017 ConocoPhillips evaluated an international gas development opportunity in a discovered field. The field had high native CO ₂ content, so when the company tested it against the USD 40/tonne sensitivity	ConocoPhillips, Plan for the Net-Zero Energy Transition (accessed on 30 August 2022) ConocoPhillips, 2021 Sustainability Report (accessed on 30 August 2022) ConocoPhillips - Climate Change 2021 (accessed on 30 August 2022)

COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED	
							price, it was economically challenged. There were no practical offsets to apply, nor did the environment lend itself to Carbon Capture and Storage. As a result of a number of factors, including carbon price sensitivity, the company decided not to move forward with the project.		
7.	Danone	EUR 35	Danone's price is corroborated by the cost per tonne of carbon on the regulated ETS markets, on the voluntary carbon credit market, and by a benchmark of companies that provide information on cost per ton of carbon.	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	<p>The shadow price is applied to all GHG emissions associated with a CAPEX decision, including the procurement of energy and materials used for the project. Danone is also considering the use of the shadow price in procurement decisions of existing assets, to find alternative sourcing options and strategies for energy and materials in a world where carbon pricing regulations continue to develop and grow.</p> <p>Part of Danone's strategy to reduce its GHG emissions by 30% between 2008 and 2012</p>	<p>Danone, 'Climate Policy' (date accessed 30 August 2022)</p> <p>Danone Annual Integrated report 2020: Methodology Note (accessed on 30 August 2022)</p> <p>Carbon Pricing Unlocked. How-to guide to corporate internal carbon pricing (December 2017) (accessed on 30 August 2022)</p>

COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
							was to link 30% of every plant manager's bonus to the carbon reductions achieved. This approach contributed to Danone achieving a 42% reduction in GHG emissions in 2012. Currently, the achievement of GHG emission reduction targets is one of the factors that determine the bonus payments of C-suite executives and managers. This linkage incentivises alignment of management behaviour with the company's climate change strategy.	
8.	Delta	Not disclosed	Delta uses evolutionary pricing, which assumes the cost of carbon increases with time.	Scope 1 and 3 emissions	Shadow price	Not disclosed	N/A	Delta uses the shadow price to evaluate future routes, project schedules and investment opportunities. Delta Air Lines - Climate Change 2021 (accessed on 30 August 2022) New Campaign Shines Light on Delta's Carbon Neutrality (accessed on 31 August 2022)

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
9.	Walt Disney Company	Disney has a uniform internal price on carbon ranging from USD 10 to USD 20	Not disclosed	Scope 1 and 2 emissions	Internal fee	Not disclosed	Not disclosed	<p>Disney places an internal price on carbon, which allows the business units to more accurately determine cost-effective efficiency projects to undertake.</p> <p>The costs of the carbon credits are charged back to individual business units at a rate proportionate to their contribution to Disney's overall carbon footprint. Thus, Disney's businesses are now exposed to an internal carbon price.</p>	The Walt Disney Company - Climate Change 2021 (accessed on 31 August 2022)
10.	E.ON	<p>Scope 1 and 2: EUR 30</p> <p>Scope 3: EUR 20</p>	Not disclosed	Scope 1, 2 and 3 emissions	<p>Shadow price for Scope 1 and 2 emissions of EUR 20/t CO₂ as a base case and EUR 40/t CO₂ for the alternative case is used.</p> <p>Internal fee for Scope 3 emissions is applied to emissions from the Employee Car Fleet.</p>	Not disclosed	Not disclosed	N/A	N/A

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11.	EDF	EUR 47 to EUR 150	Expected real CO ₂ price	Scope 1 emissions	Other (Expected Real Price)	Annually	Not disclosed	EDF uses the Expected Real Price for investment decisions in new generation capacities and strategic review through value tests of existing assets in geographical areas where a public climate policy has been set up through implementation of taxes or cap and trade systems as in the EU.	N/A

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12.	Eskom Holdings Soc Limited	ZAR 127 (South African Rand)	Not disclosed	Scope 1 emissions	Shadow price and offsets	Not disclosed	N/A	South Africa is stripping tax-free allowances for businesses with the program's second phase commencing in 2023. It is estimated that Eskom's annual carbon tax bill will be about ZAR 11.5 billion.	Bloomberg article (accessed on 30 August 2022)

	COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED
13.	Equinor	USD 56	Equinor applies a shadow price of USD 56/tCO ₂ e in markets where an external carbon price is lower or does not exist, and applies the existing carbon price in markets where the price is greater than USD 56/tCO ₂ e.	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	<p>The shadow price is used to assess potential investments and Equinor requires that this price is incorporated into all investment cases. The shadow price is also included as part of break-even calculations.</p> <p>Equinor applies a higher shadow price than the price in IEA's Sustainable Development Scenarios to ensure that its portfolio is robust in the face of potential external increases in carbon pricing/tax.</p>	<p>Statoil CEO: We know carbon pricing actually works (accessed on 30 August 2022)</p> <p>Statoil Climate Roadmap 2030 (accessed on 30 August 2022)</p> <p>Equinor Sustainability Report 2021 (accessed on 30 August 2022)</p> <p>Equinor Climate Risk and Resilience (accessed on 30 August 2022)</p> <p>UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 30 August 2022)</p> <p>Equinor CDP Climate Change Questionnaire (accessed on 30 August 2022)</p>
14.	Google	Not disclosed	Not disclosed	Scope 2 emissions	Shadow price	Annually	N/A	Google uses carbon prices as part of its risk assessment model, to support strategic decision-making related to future capital investments. Risk assessments at	Carbon brief (accessed on 30 August 2022)

COMPANY NAME	CURRENT PRICE (PER METRIC TONNE OF CO ₂)	BASIS FOR CARBON PRICE	SCOPE	SHADOW PRICE / INTERNAL FEE	REVIEW OF CARBON PRICING	RETURNS MECHANISM	APPLICATION / FURTHER INFORMATION	OTHER SOURCES AND DATE ACCESSED	
							individual data centre facilities include using a shadow price to estimate expected future energy costs. Google purchases high-quality carbon offsets for any remaining emissions that the company hasn't yet eliminated.		
15.	Hitachi Chemical Company	USD 106.38 (converted from Japanese yen at a conversion factor of 120.32)	Not disclosed	Scope 1 and 2 emissions	Shadow price	Not disclosed	N/A	Hitachi Chemical Company use carbon pricing in the evaluation of profit and loss in major segment production in Japan.	N/A
16.	LafargeHolcim	USD 35	LafargeHolcim based its figure on a combination of reports, including the Stern review (assuming USD 25/t in 2007), analysis made by the Environmental Protection Agency (taking the midpoint of 3% and 5% discount rates in 2019 and inflating this number for 2019 to USD 34/t),	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	Holcim 2020 CDP Climate Change Report (accessed on 29 August 2022)	

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			combined with prevalent assumptions used by governments that internalise the cost of CO ₂ . Notably, for the purposes of comparison, the company considered, in its impact assessment of the Emissions Trading Directive, that the European Commission assumed a range of prices between CHF 25 and CHF 50.						
17.	LG Electronics	KRW 28,445	LG applies the market price applied to Korea ETS as its internal carbon price. KRW 28,445 per ton CO ₂ e was the average price in the 2020 Korea ETS market.	Scope 1 and 2 emissions	Internal fee (Carbon Investment Scheme)	Quarterly	LG Electronics on the balance applies the market price at the time to the recovery period; and conducts an effective price analysis when it invests in the greenhouse gas reduction facility or energy efficiency improvement.	In many cases, internal carbon prices are reflected in the assessment of revenue from greenhouse gas emission allowances when reviewing and making decisions on all investments using LG Electronics' carbon funds, and when the scale of risks/analyses effects the investments and securing emission allowances.	LG Website - Carbon Neutrality (accessed on 30 August 2022)

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18.	Microsoft	USD 15.00	<p>Cost of environmental initiatives portfolio (\$) = Cost of internal initiatives (\$) + Cost of green power purchases (\$) + Cost of carbon offsets (\$)</p> <p>Internal carbon price (per mtCO₂e) = Cost of environmental initiatives portfolio (\$ from above)/Total emissions (mtCO₂e)</p>	Scope 1, 2 and 3 emissions	Internal fee (Carbon Investment Scheme)	Carbon charge is assessed annually	<p>The fee is paid by each division in the business based on its carbon emissions, and the funds are used to pay for sustainability improvements:</p> <ul style="list-style-type: none"> • Central Carbon Fee Fund; • investments in internal efficiency; • green power; and • carbon offsets projects. 		<p>https://cbey.yale.edu/sites/default/files/2019-09/Internal%20Carbon%20Pricing%20Report%20Feb%202019.pdf (accessed on 30 August 2022)</p>
19.	Mitsubishi Corporation	JPY 14,000	Not disclosed	Scope 1 and 2 emissions	Shadow price	Not disclosed	N/A	<p>Mitsubishi Corporation introduced a new process in FY2019 for projects with relatively high exposure to climate-related transition risks. In this process, the projected carbon tax burden under a 2°C scenario is analysed when assessing new investment and loan proposals, as well as existing portfolio companies' annual business plans, and</p>	<p>https://s3-ap-northeast-1.amazonaws.com/sustainability-cms-mitsubishicorp-s3/pdf/cdp_2021_Climate_Change.pdf (accessed on 31 August 2022)</p>

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							carbon management measures in response are discussed as necessary at the Investment Committee.	
20.	National Grid	GBP 45/ USD 60	To set an internal carbon price, National Grid gathered relevant information on carbon prices through its regulatory incentives and traded markets, such as the UK emissions trading scheme.	Scope 1, 2 and 3 emissions	Shadow price	Every 2 years	N/A	<p>National Grid integrated carbon data into its existing cost estimation tool to inform investment decision making. To do this, it developed a carbon database that aligned carbon data with the specific assets that it uses on its electricity transmission network. Its investment engineers use the tool in pricing investments, multiplying estimated carbon emissions by the internal carbon price to monetise the carbon impact. This feeds into its options analysis: it uses it to calculate net present value assessments and discounted cash flows.</p> <p>https://www.accountingforsustainability.org/content/dam/a4s/corporate/home/KnowledgeHub/casestudies/National%20Grid%20-%20Embedding%20a%20carbon%20price%20into%20investment%20decisions.pdf.downloadasset.pdf (accessed on 30 August 2022)</p> <p>https://www.nationalgrid.com/document/137791/download (accessed on 30 August 2022)</p> <p>https://www.environmentalleader.com/2021/06/national-grid-embeds-carbon-pricing-into-investment-decisions-to-achieve-net-zero-goals/ (accessed on 30 August 2022)</p>
21.	Novartis	USD 100	The price is based on the World Bank's estimated cost of climate change to society.	Scope 1 and 2 emissions	Shadow price	The price will be reviewed on an ad hoc basis but is expected to increase in 2025 and 2030.	N/A	<p>The shadow price is used to determine the financial impact of climate emissions from significant investments.</p> <p>https://www.cdp.net/en/articles/climate/case-study-novartis (accessed on 30 August 2022)</p>

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							<p>Shadow price is applied to capital investments coming for review at the investment committees for the Real Estate and Facilities Services and for Novartis Technical Operations. These projects are then reviewed by the Executive Committee of Novartis, with the shadow price of carbon added into the net present value calculations so the decision makers can understand the long-term impact of choices related to carbon footprint. Starting in 2019, the CFO directed that all CAPEX projects above 20 million USD are required to have a full environmental sustainability review and endorsement that the project will contribute to carbon, water or waste targets before it can proceed to the Executive Committee of Novartis (ECN) for approval, and the shadow price of USD 100 per tonne is part of this review calculation.</p>	<p>https://www.novartis.com/esg/environmental-sustainability/climate (accessed on 30 August 2022)</p> <p>https://www.novartis.com/sites/novartis_com/files/cdp-2021-climate-change-information-request-response.pdf (accessed on 30 August 2022)</p>

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22.	Orsted	EUR 100	The applied price on carbon is in line with best-practice recommendations by the UN Global Compact.	Scope 1	Shadow price	Not disclosed	N/A	<p>The shadow price is applied to all business cases to inform decisions on both the vessel type and the specific model.</p> <p>As a case study, Orsted has tested the implementation of an shadow price on carbon at a tender for a Crew Transfer Vessel (CTV) for the company's Borssele 1 and 2 wind farms. While the carbon price was not used directly to evaluate the vessels in the tender, it was used as a test case to mature the company's approach to implementing an internal carbon price on carbon in future investments in Offshore. The outcome of the Borssele tender was a decision to charter a hybrid CTV as one of the two vessels for operations and maintenance at the site. Based on an estimate of 200 sailing days per year, this leads to savings of 100m³ fuel per year, when compared with a standard CTV. The</p>	Nil

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							corresponding CO ₂ savings are approximately 300 tonnes of CO ₂ e per year.	
23. Owens Corning	USD 100 (internal analytics used from \$10/metric ton to a high of \$100/metric ton)	Not disclosed	Scope 1, 2 and 3 emissions Scope 3 emissions for business travel only for a total of 3,341,037 MT CO ₂ e.	Shadow price	Annually	N/A	In internal decision making and risk analysis, Owens Corning places an economic value on carbon emissions to help frame the challenges and opportunities in monetary, more broadly understood terms than simple tonnes of emissions. This includes considering the impact on its operations and supply chain. In the event that a price is put on carbon in regions around the world where a current price or trading scheme is not in place, quantifying these added costs provides additional insight into the company's business decisions.	https://www.owenscorning.com/en-us/corporate/sustainability/docs/2021/2021-CDP-Climate-Response.pdf (accessed on 31 August 2022) https://www.owenscorning.com/en-us/corporate/sustainability/docs/2020/2020-CDP-Climate-Response.pdf (accessed on 31 August 2022)
24. Qantas	Not disclosed	Not disclosed	Not disclosed	Shadow price	Not disclosed	N/A	The Qantas case study demonstrates the benefits of an internal carbon pricing scheme as a form of regulatory preparedness or advanced/anticipated compliance.	https://cbey.yale.edu/sites/default/files/2019-09/Internal%20Carbon%20Pricing%20Report%20Feb%202019.pdf (accessed on 30 August 2022)

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							Qantas's shadow price is voluntarily applied either as a direct pass-through of carbon pricing regimes established in various jurisdictions to airlines' applicable business units or as payment towards potential future carbon pricing emissions.	https://www.qantas.com/content/dam/qantas/pdfs/about-us/environment/qantas-group-climate-action-plan.pdf (accessed on 30 August 2022)	
25.	Renault	EUR 450	For vehicle projects, the price takes into account regulations on emissions in use, such as CAFE, and GHG emissions - related taxation. For industrial installations, the ICP takes into account multiple factors such as expected changes in the energy market and CO ₂ e emissions quotas. An ICP for the supply of parts and materials will be introduced in the near future.	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	Nil	https://www.renaultgroup.com/wp-content/uploads/2021/04/220421_climate-report-renault-group_8mb.pdf (accessed on 30 August 2022)

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26. Rio Tinto	USD 75	The price is developed by region over various time periods using a model based on assumptions about development of climate legislation, policy and markets in each jurisdiction. The process to develop and update the price includes short-term market data, price forecasts and scenarios, and input from experts within and outside Rio Tinto.	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	Nil	PMR Preparing for Carbon Pricing – Rio Tinto Case study (accessed on 30 August 2022) Rio Tinto Climate change Report 2021 (accessed on 30 August 2022)
27. Royal DSM	EUR 100	Not disclosed	Scope 1 and 2 emissions	Shadow price	Not disclosed	Not disclosed	<p>The shadow price is required to be included in all investment business cases.</p> <p>DSM uses the shadow price in two ways:</p> <p>(i) The shadow price is included in calculations for business cases for new investments/</p>	Yale Centre for Business and the Environment article on DSM (accessed on 29 August 2022) DSM Press Release - Emission Reduction Targets (accessed on 30 August 2022) Improving our own carbon footprint DSM

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							<p>acquisitions (CAPEX); and</p> <p>(ii) A carbon penalty calculated in the profit and loss statements (OPEX). The penalty is calculated at EUR 100 multiplied by the actual emissions in the previous period. The charge is included only in internal management reporting.</p>	<p>(accessed on 30 August 2022)</p> <p>CDP India handbook 2020 (accessed on 30 August 2022)</p>
28. Samsung	KRW 18,000	The carbon price reflects the price of carbon credits traded in the Korea ETS. The excess and shortage of emission credits for each business sector are then calculated.	Scope 1 and 2 emissions	Shadow price and Internal fee (internal trading)	Not disclosed	Samsung internally classifies emission facilities and allocates emission rights for each facility. Credits are internally traded to cover shortages and external credits may be purchased.	<p>Samsung uses shadow pricing considerations to inform the acquisition of carbon credits through external emissions reduction projects and R&D investments in carbon reduction technologies in furtherance of its goals relating to risk mitigation and meeting climate targets.</p>	<p>CPD – Carbon Pricing in the Corporate World (accessed on 29 August 2022)</p> <p>CPD – Putting a Price on Carbon (accessed on 30 August 2022)</p> <p>Samsung – Climate Change Risk and Opportunity Factors (accessed on 30 August 2022)</p>

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								Samsung Sustainability Report 2021 (accessed on 30 August 2022)
29. Shell	USD 100	Shell's shadow price was developed using short-term policy outlooks and long-term scenario forecasts, which reflect the current nationally determined contributions (NDCs) committed by countries under the Paris Agreement.	Scope 1 and 2 emissions	Shadow price	Annually	N/A	Shell assesses portfolio decisions, including investments and divestments, against the potential impacts of the energy transition to the use of lower-carbon energy. These include higher regulatory costs linked to carbon emissions and lower demand for oil and gas. Projects under development that are expected to have a material GHG footprint must meet the company's internal carbon performance standards or industry benchmarks. These assessments can lead to projects being stopped or designs being changed.	PMR Preparing for Carbon Pricing – Royal Dutch Shell case study (accessed on 30 August 2022)
30. Société Générale	EUR 25	Not disclosed	Scope 1, 2 and 3 emissions	Internal fee	Levied annually, however there is no formal review process.	Revenue collected through the internal carbon tax is redistributed as rewards through the	Société Générale makes considerable disclosures relating to its internal carbon price and was one of the first banks in the world to introduce an internal carbon tax in 2011.	Yale Report – Internal Carbon Pricing (accessed on 28 August 2022) Climate Disclosure Report – Dec 2021 (accessed on 29 August 2022)

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						<p>Environmental Efficiency Awards for the best internal environmental efficiency initiatives developed by staff to further the objectives of environmental and financial efficiency.</p> <p>This adds a competition element, and allows the ICP to operate as a dual-incentive scheme by motivating business entities to reduce emissions to lessen the amount of tax paid, as well as encouraging entities to implement energy efficiency initiatives through the award scheme.</p>	<p>The Group's carbon tax raised EUR 2.2 million in 2020 (EUR 3.2 million at end of 2019).</p>	<p>Press Release – Disclosure and Decarbonisation (accessed on 29 August 2022)</p> <p>World Bank IFI Framework for GHG Accounting (accessed on 30 August 2022)</p>

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31.	Sony Corporation	No company-wide price	Sony has not set a company-wide unified ICP. The carbon pricing is decided and reviewed separately for each business unit according to its business condition and status, such as the degree of environmental impact, energy pricing, business size, budget and management status.	Scope 1 and 2 emissions	Shadow price	Not disclosed	N/A	When making investment decisions on environment-related equipment for each business unit, Sony incorporates carbon pricing as one of the important factors before the final decision made. As for who the final decision maker is for each individual investment, it depends on the equipment and the amount of money invested.	Global CDP Report 2021 (accessed on 29 August 2022) Sony Sustainability Report 2022 (accessed on 30 August 2022) Article – Sony Road to Zero Targets (accessed on 30 August 2022) New Climate Institute – Corporate Climate Responsibility Monitor (accessed on 30 August 2022) Press Release – Carbon Neutrality by 2040 (accessed on 30 August 2022) Politico – What is the Cost of Carbon (accessed on 30 August 2022) Sony Innovation Fund ESG Initiative (accessed on 30 August 2022)
32.	SUEZ environnement	EUR 30 – investment projects EUR 50 – low carbon solutions	SUEZ's shadow price uses pricing trends taken from domestic regulations and the EU ETS as a	Scope 1, 2 and 3 emissions	Shadow price	Not disclosed	N/A	SUEZ has incorporated a shadow price for its investment projects and R&D activities to assess future carbon-related	SUEZ – Our Solutions and Commitments for the Climate (accessed on 29 August 2022)

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			reference carbon price. SUEZ uses a higher ICP for low-carbon solutions to favour low-carbon innovation.				costs and revenues of a project.	UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 29 August 2022) CDP Global Carbon Price Report 2021 (accessed on 29 August 2022) Article – SUEZ Tackles Emissions through Waste and Water Action (accessed on 30 August 2022)	
33.	Tata Cleantech Capital Ltd	Not disclosed	Tata Cleantech Capital Ltd has used cost per tCO ₂ eq as an E&S impact metric/indicator in the evaluation of green investments, such as the rooftop solar project undertaken in collaboration with the Green Climate Fund.	Not disclosed	Shadow price	Not disclosed	N/A	<p>Tata Cleantech Capital Ltd is a joint venture between Tata Capital Limited (part of the Tata Group) and International Finance Corporation.</p> <p>As Tata Cleantech Capital Ltd has a focus on investing in green projects, incorporating a shadow price to assess potential investments and evaluate projects throughout their life cycle suits both their business objectives and climate ambitions.</p>	Carbon Pricing Leadership Blog Post (accessed on 29 August 2022) UN Global Compact – Executive Guide to Carbon Pricing Leadership (accessed on 29 August 2022) Green Climate Fund – Rooftop Solar APR (accessed on 30 August 2022) Tata Cleantech Capital Ltd Annual Report FY21 (pg 12) (accessed on 30 August 2022)

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34.	Tata Steel	USD 35 – Europe operations USD 15 – India operations	Tata's Europe ICP is calculated based on EU ETS and emissions allocations. Tata's Indian ICP is calculated assessing Worldsteel Annual CO ₂ data collection methodology with country-specific emission factors.	Scope 1 (Europe) Scope 1, 2 and 3 (India)	Shadow price	Monthly	N/A	Tata Steel uses its shadow price across internal processes. Shadow price assumptions are built into annual forecasts, including to technically and economically evaluate iron & steel making processes. The shadow price is considered in strategic planning, including large-scale capital projects. Tata Steel plans to roll out its shadow carbon price to subsidiaries, as well as suppliers and customers.	Tata Steel Sustainability Brochure (accessed on 30 August 2022) Tata Steel Natural Capital Report 2021 (accessed on 30 August 2022) Tata Steel Integrated Annual Reports 2021 (accessed on 30 August 2022) How Indian Companies Use Carbon Pricing (accessed on 30 August 2022)
35.	Unilever	EUR 50	Unilever uses multiple carbon pricing schemes across direct operations.	Scope 1, 2 and 3 emissions	Shadow price	Annually	The internal carbon price supports Unilever's "Climate & Nature Fund" – a fund worth approximately EUR 50 million a year that invests in projects that positively address climate	A shadow price is applied to the cash flow analysis of all capital expenditure decisions over EUR 1 million. Implicit pricing is also used to evaluate the business case for newer investments.	Unilever Annual Report and Accounts 2021 (accessed on 30 August 2022) Using our voice for a zero carbon future Unilever (accessed on 30 August 2022) Explainer: what is carbon pricing and why is it important? Unilever

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						change and protect nature.		(accessed on 30 August 2022) Unilever: Using Carbon Pricing to Achieve Corporate Goals – Carbon Pricing Leadership Coalition (accessed on 30 August 2022) Internal carbon pricing (brc.org.uk) (accessed on 30 August 2022) Unilever Internal Carbon Pricing Case Study (accessed on 30 August 2022)
36.	Volkswagen Volkswagen has committed to a minimum price of EUR 60 starting in 2023.	EUR 20 Not disclosed	Scope 3 emissions	Shadow price and internal fee (internal trading)	Annually, based on target achievement and adjusted by resolution of the Board of Management.	N/A	With respect to funds from the internal CO ₂ fund, all Volkswagen Group brands can apply for these financial resources. The prerequisite is that they must submit projects that reduce CO ₂ emissions, improve energy efficiency or generate other savings. The aim is also to accelerate innovation and strengthen new business models, promote cross-divisional	Sustainability Report 2021 Volkswagen Sustainability Report 2021 (accessed on 30 August 2022) Chairman of the Board of Management of Volkswagen Group Article November 2020 (accessed on 30 August 2022) Volkswagen Groups' Carbon Fund (accessed on 30 August 2022)

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								cooperation and improve the Group's reputation through projects with high-level impact and visibility.	
37.	Yale University	USD 20 (FY23)	Yale is informed by the social cost of carbon (information published by the White House) in determining its price. Future pricing: USD 35 (FY24) USD 50 (FY25)	Scope 1 and 2 emissions	Shadow price and Internal Fee (Carbon Investment Scheme)	Yale will re-evaluate its internal carbon price and rate periodically as its understanding of the social cost of carbon evolves.	Buildings are compared to the group's overall percentage change in emissions from a baseline. The buildings incur charges or receive rebates based on performance above or below the baseline. Administrators and operations staff will receive a monthly building-energy report and will be responsible for net carbon-charge payments and returns at the end of the fiscal year.	Beginning in FY23, Yale will use revenue collected from the carbon charge as one important source of funding for the investments required to eliminate emissions of carbon from campus.	What is Yale's Carbon Charge? (accessed on 30 August 2022) Yale Carbon Charge Pilot - Did it work? (accessed on 30 August 2022) Yale: Internal Carbon Pricing (Policy Framework and Case Studies) (accessed on 30 August 2022) Yale Carbon Charge - History (accessed on 30 August 2022)