



DATA AND AMBITION LOOPS FOR ENHANCED CLIMATE ACTION: POTENTIAL DRIVERS AND OPPORTUNITIES IN ASIA

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EXECUTIVE SUMMARY

Highlights

- Climate change cannot be addressed by governments alone; collaboration between governments and the private sector is necessary. If governments and the public are to understand climate action and progress toward climate goals, transparency of greenhouse gas emissions is critical.
- The private sector is an important data provider that governments often turn to for information to support climate policies, inform other decision-making processes, and fulfill international requirements under the Paris Agreement.
- This paper introduces the concept of a “data loop,” a relationship between governments and the private sector focused on enhancing data sharing, whereby the private sector engages in data reporting and responds to data-reporting arrangements, while governments facilitate mandatory reporting and offer incentives for participation in voluntary systems.
- The paper further explores how the “data loop” is relevant to policymaking and can build upon “ambition loops,” a concept that refers to the feedback cycle between the government and the private sector that can foster more ambitious climate action. The paper highlights examples to leverage the two to accelerate and strengthen climate action.
- Examples throughout the paper focus on the Asia region, but the lessons can be useful globally to strengthen the relationship between the private sector and governments for enhanced climate action.

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Context

The landmark Paris Agreement, adopted in December 2015, signaled a promising pathway for a low-carbon and climate-resilient future. Yet, the pace and scale of actions reflected in countries' climate plans are not enough to meet the Paris Agreement's long-term goals. The international community recognizes that governments alone will not get us where we need to be. Engagement between governments and nonstate actors—in particular the private sector—informed by improved data and a better understanding of opportunities and barriers to overcome, will be essential to realizing the goals of the Paris Agreement.

In December 2018, countries adopted the Paris Agreement's implementing guidelines, outlining how they will plan, implement, and review their climate action to fulfill the promise of the Paris Agreement in a more transparent and rigorous manner and at an accelerated pace. These implementing guidelines lay out important requirements for the Paris Agreement's enhanced transparency framework, which builds upon existing transparency arrangements under the United Nations Framework Convention on Climate Change. Many developing countries have struggled to fulfill their requirements under existing arrangements, and yet they must prepare to fulfill the new requirements under the Paris Agreement.

Transparency is a central element of the Paris Agreement and crucial in supporting enhanced climate action. To present accurate information about national greenhouse gas (GHG) emissions, trends, and climate action, governments need data inputs from nongovernment sources, including the private sector. GHG data from the private sector are critical for informing future government actions, plans, and projections. Government's ability to set up the right data collection and reporting processes and regulatory framework to obtain such data and demonstrate how the data will be used and will inform the decision-making process can incentivize the private sector to share data more frequently and accurately.

About This Working Paper

With a goal of supporting enhanced data and enhanced climate action, this paper first introduces the concept of a “data loop.” A data loop refers to a relationship between governments and the private sector, focused on enhancing data sharing, whereby the private sector engages in data reporting and responds to data-reporting arrangements, while governments facilitate mandatory reporting and offer incentives for participation in voluntary systems. Doing so could enable developing countries to significantly strengthen their domestic and international measurement, reporting, and verification systems, while ultimately encouraging more private sector action on climate change.

This paper also builds on the concept of an “ambition loop,” first introduced in Metzger et al. (2018). An ambition loop is a “positive feedback loop in which bold government policies and private sector leadership reinforce each other, and together take climate action to the next level” (Metzger et al. 2018). An ambition loop is ideally demonstrated by enhanced climate action when private sector efforts create the potential for governments to be bolder in adopting policies that further incentivize greater climate action from the private sector.

This paper explores the concepts of data and ambition loops operating together. Stronger information flows (e.g., activity data, national GHG inventory data) provide the evidence base needed for better government policy and incentive design, which in turn generate opportunities for private sector climate action and investments. When policies and initiatives leverage data and ambition loops together, countries may be in a position to present more ambitious national climate plans, known as nationally determined contributions (NDCs).

This paper is part of the Partnership to Strengthen Transparency for co-Innovation (PaSTI). PaSTI promotes the improvement of the national monitoring, reporting, and verification system, through better engagement of nonstate actors, such as private companies and local governments, with incentive mechanisms from the Asia region, and more specifically the Association of Southeast Asian Nations (ASEAN) countries. This initiative focuses primarily on mitigation efforts; hence, this paper does not cover efforts to enhance transparency and actions related to adaptation, beyond the reporting of climate risks from the private sector.

The paper therefore focuses primarily on examples from countries in Asia, although the lessons presented throughout this paper may also be applicable globally. The aim is to support policymakers and private sector leaders in developing a deeper understanding of opportunities for cooperation and engagement to promote better data sharing and aligned and enhanced climate action.

Conclusions

Countries can improve information flow and the data loop between the government and private sector with GHG disclosure and reporting schemes. In doing so, the following should be taken into account:

- Taking adequate measures to ensure confidentiality of commercially sensitive data, where appropriate
- Employing robust methodological standards to ensure data quality and consistency, in line with international reporting requirements
- Aligning methodological standards, processes, and data infrastructures with national policy objectives
- Streamlining and harmonizing GHG reporting with other reporting requirements, other jurisdictions' programs, or with the data needs of other policy areas (e.g., taking into account certain Sustainable Development Goals [SDGs], environmental quality, or sustainability reports) to minimize burden and avoid duplication
- Establishing clear legal architectures to ensure the scheme's sustainability, as appropriate

Initiatives and policy instruments, such as carbon pricing and science-based targets throughout the supply or value chain, are growing around the world. Forty-five countries and twenty-five cities, states, and provinces had a carbon price in place in 2018; similarly, in the past few years, there has been a marked increase in the number of companies using internal carbon prices, from 150 in 2014 to more than 1,400 today. Furthermore, more than 600 companies have committed to set a science-based target in line with the level of decarbonization required to reach the goals of the Paris Agreement. Singapore is the only country in ASEAN to have adopted a carbon price; however, interest is growing among other countries in the region, such as Thailand and Vietnam.

For these initiatives and policy instruments to work, they must be underpinned by robust data and associated information management systems. As governments begin to prepare their next round of national climate plans under the Paris Agreement, they will need adequate data to build robust projections, inform long-term goal setting, and prioritize near- and medium-term actions.

Political ownership and significant institutional, technical, human, and financial resources will be essential to effectively sustain such data and ambition loops. The paper focuses on institutional and technical considerations, and the need to ensure skilled staff are trained and mobilized over time to support the technical and nontechnical functions necessary for GHG accounting and reporting, at company level or through industry associations. Adequate financial resources to produce reliable GHG accounting and reporting will also be critical.

INTRODUCTION

The latest climate risk report, “Global Climate Risk Index 2019,” from think tank Germanwatch, ranked “extreme weather events” and “failure of climate change mitigation and adaptation” as the top two global risks, based on a survey of thousands of leaders in the public and private sector, academia, and civil society (Eckstein et al. 2018). The impacts of our changing climate are seriously jeopardizing the global economy, security, and public health. These impacts are being felt around the world and, together with the historic Paris Agreement, are already driving the global response—though not yet at the pace and scale required. The latest Intergovernmental Panel on Climate Change’s (IPCC’s) special report on “Global Warming of 1.5°C” emphasizes the urgency of accelerated policy implementation and investments, while making clear that net zero greenhouse gas (GHG) emissions by 2050 is both possible and necessary to achieve the Paris Agreement’s 1.5°C goal (Rogelj et al. 2018). Before unpacking the objectives of the paper, the first two sections of the introduction highlight two of the main drivers for enhanced data and climate action in Asia and globally: the promise of the Paris Agreement and the risks and opportunities of climate change in Asia.

Box 1 | About the Partnership to Strengthen Transparency for co-Innovation

The Partnership to Strengthen Transparency for co-Innovation (PaSTI) is an initiative of the Ministry of the Environment, Japan, and the World Resources Institute (WRI). PaSTI aims to promote the engagement of nonstate actors, including the private sector, in climate action; enhance the capacities and institutional structures in countries through national development strategies; and strengthen and streamline transparency at the regional, national, and subnational levels (OECD 2019). PaSTI's work is focused in the Asia region, with a particular focus on the Association of Southeast Asian Nations (ASEAN) countries.

Country-specific work is ongoing in Indonesia with the cooperation of WRI Indonesia and the Indonesian Ministry of National Development Planning (Kementerian PPN/BAPPENAS).

This paper places a particular focus on the Asia region because of the region's importance in addressing climate change and fulfilling the promise of the Paris Agreement, the climate risks and opportunities within the region, and this paper's contribution to the Partnership to Strengthen Transparency for co-Innovation (PaSTI) (see Box 1).

Fulfilling the Promise of the Paris Agreement

The global response to climate change is shaped by the landmark Paris Agreement, which requires countries to put forward their own national climate plans (known as “nationally determined contributions,” or NDCs), outlining their efforts to meet the Paris Agreement's long-term goals. The three long-term goals are to keep global temperature rise well below 2°C above preindustrial levels and pursue efforts to limit the temperature increase to 1.5°C; to increase the ability of countries to deal with the impacts of climate change; and to make finance flows consistent with a low GHG emissions and climate-resilient development pathway.

The international community recognizes that enhancing climate ambition is needed, and that this will require “all hands on-deck.” Indeed, engagement between governments and nonstate actors—including the private sector—will be essential to avoiding the worst impacts of climate change and to taking full advantage of the opportunities offered by the transition to zero-carbon economies.

For example, investors, motivated by the desire to avoid potential negative impacts—such as stranded assets, financial liabilities, and physical and reputational dam-

ages—and capitalize on the opportunities of the transition to a low-carbon economy, are sending strong signals to companies worldwide. In June 2019, nearly 500 investors with \$34 trillion in assets issued a collective call for governments to take more urgent climate action (The Investor Agenda 2019). This followed the surge of climate action and commitments showcased during the Global Climate Action Summit in September 2018. Momentum has continued to grow since. As highlighted in the International Finance Corporation (IFC) report, “Creating Markets for Climate Business” (2017b) and discussed throughout this paper, the private sector and investors play an important role in enhancing climate action and working to align financial flows. Countries can harness this and make their climate pledges a reality by providing the right signals and setting the policies and incentives that would mobilize trillions of dollars in private investments to transition toward a low-carbon and resilient economy.

Investors and companies are taking action, but they are certainly not alone. Cities, subnational governments, civil society, and others are finding ways in which they can address climate change. The UN's Global Climate Action online portal showcases more than 12,000 stakeholders who have shared their climate action.

Enhanced climate action is certainly not the responsibility of only national governments; all stakeholders—businesses, investors, subnational governments, and civil society—have a role to play. Exploring collaboration and mutually reinforcing action, particularly between the government and the private sector, is critical to help realize and fulfill the promise of the Paris Agreement.

Climate Risks and Opportunities in Asia

In Asia, climate change poses both risks and opportunities, and fulfilling the promise of the Paris Agreement requires efforts to reduce these risks and seize available opportunities. Climate change affects the social and economic development of all countries. Long coastlines and densely populated low-lying areas make Southeast Asia—home to more than 640 million people—extremely vulnerable to weather extremes and rising sea levels (Prakash 2018). According to the Global Climate Risk Index, 3 of the world's 10 most affected countries between 1998 and 2017 were in Southeast Asia—Myanmar, the Philippines, and Vietnam. Thailand was also in the top 10 for 2017 (Eckstein et al. 2018). The risks from climate change in Asia are not new, with many risks having been identified nearly a decade ago (Krechowicz et al. 2010; Venugopal et al. 2010).

Climate change has the potential to stall and even suppress the region's development, posing a serious threat to the attainment of global Sustainable Development Goals (SDGs), like zero hunger and the eradication of poverty. The economic impacts of climate change could be immense—the Asian Development Bank (ADB) estimates that unmitigated climate change could reduce the region's GDP by 11 percent by the end of the century (Prakash 2018). In the absence of technical breakthroughs, rice yields in Indonesia, the Philippines, Thailand, and Vietnam could drop by 50 percent from 1990 levels by the end of the century (Prakash 2018). In addition to the direct impacts of sea-level rise and more frequent extreme weather events, like threatened food security, ASEAN countries will also have to contend with new migration flows as sea-level rise, altered river flows, and droughts displace populations (Wijaya and Idris 2017).

Greenhouse gas emissions from carbon dioxide grew faster in Southeast Asia than in any other region, between 1990 and 2010, due to overreliance on fossil fuels (Prakash 2018). For ASEAN countries, this means significant efforts to develop sustainable land use and forestry, reduce fossil fuel subsidies, and increase the share of renewables in the energy mix. Driving these national transformations also offers major new economic opportunities and the chance for increased cooperation within the region. And, from an assessment of six countries in South Asia, meeting the goals and targets stated in those countries' climate plans could result in a \$3.4 trillion climate investment opportunity between 2018 and 2030 (IFC 2017a). Given that this assessment only included six countries and several key sectors, total investment opportunities across the region could be significantly higher.

In 2018, in the Philippines, CDP (formerly the Carbon Disclosure Project) convened companies and cities for the first time to explore ways to overcome barriers and identify solutions to challenges faced to address climate change (CDP 2019b). More recently, in January 2019, in Singapore, a multistakeholder platform, bringing together the finance industry, academia, and science-based organizations, launched the “Asia Sustainable Finance Initiative” to shift Asia's financial flows to deliver the Sustainable Development Goals and the Paris Agreement. This includes supporting the transition to sustainable food, energy, transport, and infrastructure systems.

Within the context of striving to fulfill the Paris Agreement and the risks and opportunities presented by climate change and the transition to a zero-carbon economy, Asia

presents a variety of cases to explore. As such, this paper draws on experiences and examples from the Asia region, and whenever possible ASEAN countries.

Objective of the Paper

This paper explores how countries can plan, implement, and review their climate action by engaging the private sector. In doing so, the paper looks at the power of feedback loops between the government and the private sector. Specifically, the paper examines feedback loops related to data that help countries understand their GHG emissions and climate action. The paper also expands on feedback loops that drive greater climate action and ambition. The interaction of these feedback loops can inform country efforts to enhance data management systems and associated institutional arrangements, evidence-based policy design, and climate action and investments from both the government and the private sector.

In this context, this paper introduces the concept of **data loop**, which is a positive feedback loop and relationship between governments and the private sector, whereby the private sector responds to data-reporting arrangements and engages in data reporting to provide some of the data needed by governments for measurement, reporting, and verification (MRV); and governments in turn seek to facilitate mandatory reporting and incentivize voluntary corporate reporting. In doing so, such a data loop can support enhanced climate action and greater collaboration between governments and the private sector. Failure to collect and manage data can preclude governments from attaining various objectives, whether in formulating evidence-based-sector and economy-wide policies or in supporting and building trust in carbon markets. Strengthening information flows between governments and the private sector is part of the solution.

After unpacking ways to secure a data loop, this paper explores the connection with the concept of an ambition loop, introduced by Metzger et al. (2018). An **ambition loop** is “a positive feedback loop in which business leadership fosters bold policy action that in turn accelerates further business action” (Metzger et al. 2018). Ambition loops “can unlock faster progress on national objectives and bigger market opportunities. For governments, the push comes from leading businesses as companies help demonstrate commercial demand and economic possibilities. . . . For businesses, the push comes from long-term, clear, consistent government policies. . . . For both, the loop continues as business investments and government policies strengthen, accelerating action and investment

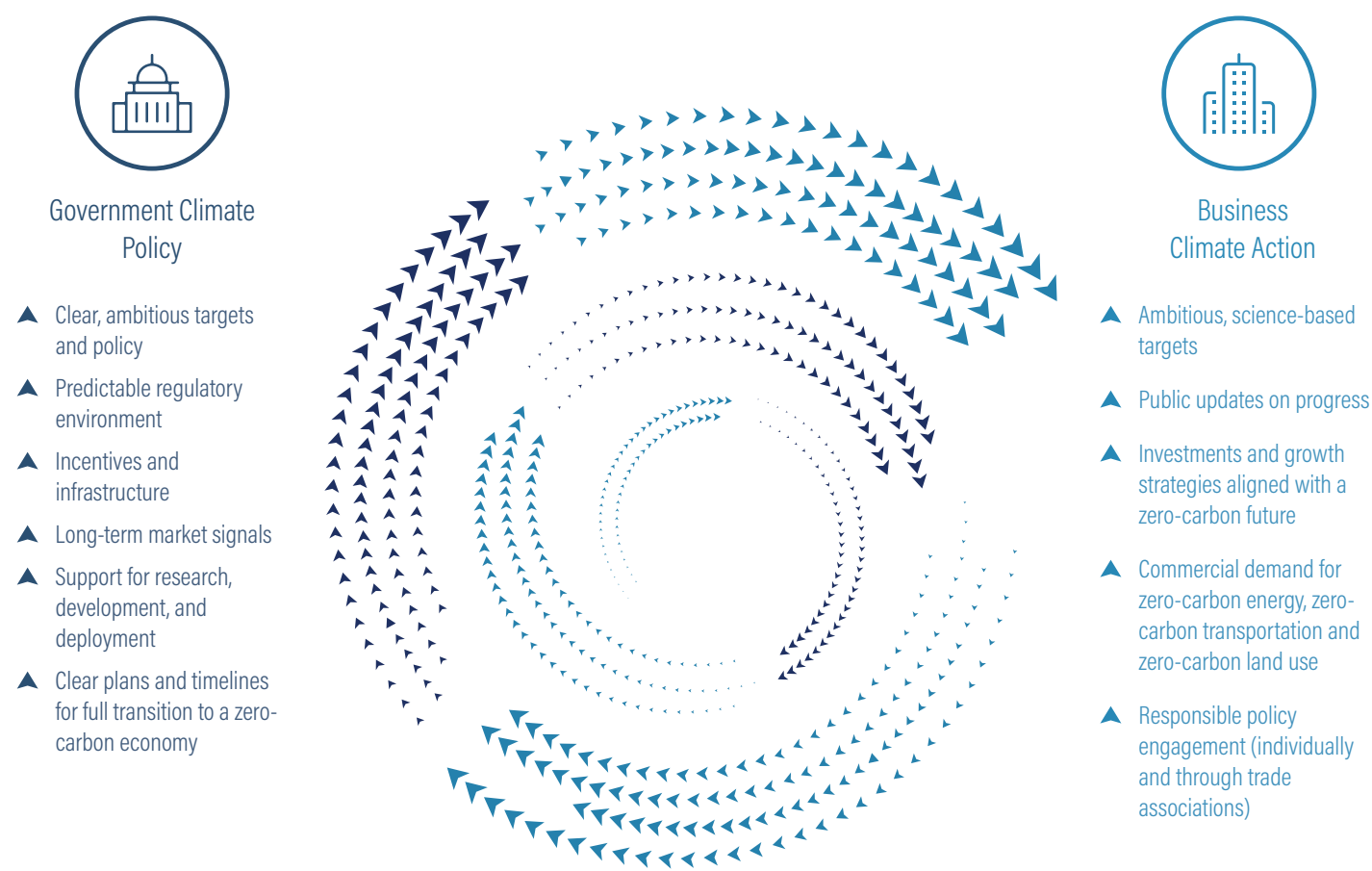
and unlocking further opportunities to achieve their goals sooner” (Metzger et al. 2018). Figure 1 illustrates the ambition loop. This paper explores how the ambition loop can leverage data and the data loop to further inform climate action.

This paper highlights a few critical considerations to set up or strengthen data and ambition loops and develop a deeper understanding of opportunities for cooperation and engagement that promote better data sharing and enhanced climate action, starting from a recognition of the new international transparency requirements and associated domestic data gaps and needs.

This paper sets out the global context for enhanced transparency and ambition of climate action and the need to better engage the private sector, both to help improve the

availability of high-quality data for decision-making and to accelerate progress toward national and global goals. Then, the paper defines the data loop and explores how both the private sector and governments can engage with and support the data loop. Further, the paper explores some of the key elements necessary to ensure the data loop remains relevant for public policy. It also explores opportunities to strengthen these arrangements through legislative, methodological (including technological), and/or institutional approaches. To build off the definition and concept of ambition loop highlighted earlier, the paper brings the data and ambition loop together and discusses different initiatives and policies—the Science Based Targets Initiative and carbon pricing—to illustrate how informed policy and bold business action can be mutually reinforcing.

Figure 1 | **The Ambition Loop**



Source: Reproduced from Metzger et al. 2018.

GLOBAL CONTEXT

This chapter will summarize the global context for climate transparency and measurement, reporting, and verification (MRV) systems and show how important these are for reviewing and upgrading countries' actions and mobilizing support accordingly.

International Transparency Requirements

A key component for implementing the Paris Agreement is the agreement's enhanced transparency framework. The enhanced transparency framework, building on previous international transparency arrangements, calls on countries to be more transparent about their climate action than ever before.

Under the Paris Agreement, countries committed to report on the following areas of climate action and support every two years:

- Their national GHG inventories (obligatory)
- Information necessary to track progress made in implementing and achieving their NDCs (obligatory)

- Climate change impacts and adaptation (voluntary)
- Financial, technology transfer, and capacity-building support provided and mobilized for developing country parties (obligation applies only to developed country parties, with other parties that provide support encouraged to report voluntarily)
- Financial, technology transfer, and capacity-building support needed and received by developing countries (voluntary) (UNFCCC 2015)

As part of the Paris Agreement's implementing guidelines, adopted in December 2018 at the 24th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP24) in Katowice, Poland, countries agreed on the guidelines for how these reporting commitments will be implemented. These guidelines apply to all countries but provide flexibility in implementing specific provisions for those developing countries that need it in light of their capacities.

Table 1 describes how the new modalities, procedures, and guidelines have been strengthened under the Paris Agreement, particularly for developing countries.

Table 1 | **The Enhanced Transparency Framework's Requirements**

ELEMENT OF THE ENHANCED TRANSPARENCY FRAMEWORK	HOW THE IMPLEMENTING GUIDELINES HAVE BEEN ENHANCED FROM THOSE UNDER THE CONVENTION
Greenhouse gas (GHG) inventories	Requirements for developing countries, particularly, have been enhanced. For example, all parties must use the 2006 IPCC* Guideline methodology and report additional GHGs. Flexibility is provided within some provisions.
Information necessary to track progress	Additional information is requested. Parties are required to report using a structured summary. Projections are required. Flexibility is provided within some provisions.
Information on climate change impacts and adaptation	Information on impacts and adaptation was not previously included in biennial reporting, but now it is a voluntary reporting requirement. Parties may now also voluntarily provide information on loss and damage.
Support provided and mobilized	More granular and new information is required under the Paris Agreement, especially on support mobilized.
Support received and needed	More granular and new information is requested under the Paris Agreement, including the creation of common tabular reporting formats for support needed and received.
Technical expert review	The newly adopted guidelines are similar to the existing system, except for the introduction of a simplified review, which does not strengthen the process.
Facilitative, multilateral consideration of progress (FMCP)	An online platform will allow for greater participation from experts unable to attend the session workshop. The FMCP may begin even if the technical expert review has not yet been completed.
Flexibility	Flexibility for those developing country parties that need it in light of their capacities is provided within provisions of the guidelines. Parties using flexibility must indicate the provision to which they have applied flexibility, clarify their capacity constraints, and provide self-determined estimated time frames for improvements. Parties are also asked to prepare an improvement plan.

Note: *IPCC = Intergovernmental Panel on Climate Change.

Source: Authors.

The outcomes of the enhanced transparency framework are also expected to inform the global stocktake, a mechanism established under the Paris Agreement to “ratchet up” climate action, based on the recognition that current climate commitments will not keep global temperature rise to 1.5° or 2°C, nor achieve net zero emissions by 2050. The first global stocktake will take place in 2023 and will assess collective efforts made to reduce emissions, build resilience, and align finance flows with the Paris goals. The stocktake will also examine how to address and minimize loss and damage from the impacts of climate change and the unintended consequences of mitigation action. This collective assessment will involve participation by non-state actors (UNFCCC 2015).

Some areas still require further refinement and detailed work to ensure environmental integrity, for instance, on rules regarding the use of carbon markets in an international context (Waskow et al. 2018). Decisions on these points were postponed to 2019 to develop agreement on robust rules that uphold the integrity of the Paris Agreement (Waskow et al. 2018).

Opportunities and Challenges for Improving Transparency and Generating Enhanced Data

The robust transparency and accountability rules under the Paris Agreement have implications for nonstate actors, in particular the corporate sector. Indeed, businesses’ ability and willingness to optimize their processes, reduce their carbon footprint, and shift their finance flows to climate-compatible investments and resilience strategies depend on how confident they are that the countries they operate in are taking serious measures to achieve their climate targets. Done right, transparency and accountability rules can help steer countries toward their climate goals, by enabling the governments to better provide clarity and confidence to the private sector in terms of climate action (Initiative for Climate Action Transparency 2016; Metzger et al. 2018). This can result in a reinforcing cycle of verified action that strengthens confidence and collaboration among governments, investors, and shareholders.

However, a key condition for successful implementation of the Paris Agreement’s transparency requirements is adequate and predictable financial support and capacity-building to help developing countries and relevant imple-

menting stakeholders transition to higher standards of information. More specifically, this means reducing gaps in the access, collection, storage, and analysis of data.

Developing countries face a number of challenges in meeting the international transparency requirements, and these challenges are exacerbated by the unavailability of high-quality data or difficulties in sustainably collecting, managing, and coordinating data (Dagnet et al. 2019). This can preclude governments from attaining various objectives, such as improving the accuracy of national GHG inventories or building trust in carbon markets. Improving governments’ capacity to collect, manage, and maintain data is paramount to overcoming this challenge; yet, also important are efforts to leverage the information collected by nonstate actors, including the private sector.

In the context of Asian developing countries, Umemiya et al. (2017) found that capacity to prepare a national GHG inventory can vary across countries. Seven countries are assessed to have established capacities for preparing GHG inventories on a regular basis, as the Paris Agreement envisions. Umemiya et al. (2017) also noted that 29 Asian developing countries have the highest priority need for capacity-building because they were assessed to have low capacity to produce national inventories, or they had not submitted more than one inventory to the UN Framework Convention on Climate Change (UNFCCC). The analysis also found that what matters most for building the capacity of GHG inventories is the “basic technical capacity available in a country (e.g., statistics and the scientific expertise)” (Umemiya et al. 2017).

Support and capacity-building for the climate transparency processes can be strengthened by leveraging opportunities for integration with SDGs and associated data (Dagnet et al. 2019). Although the paper focuses on mitigation data and actions, the authors acknowledge that developing synergies between different monitoring and reporting systems, such as for climate, sustainable development, and disaster risk reduction, could allow for improved efficiency in data collection. Alignment and integration could also potentially allow policymakers a deeper understanding of the linkages between climate and development (Dagnet et al. 2019).

FOSTERING AN EFFECTIVE DATA LOOP

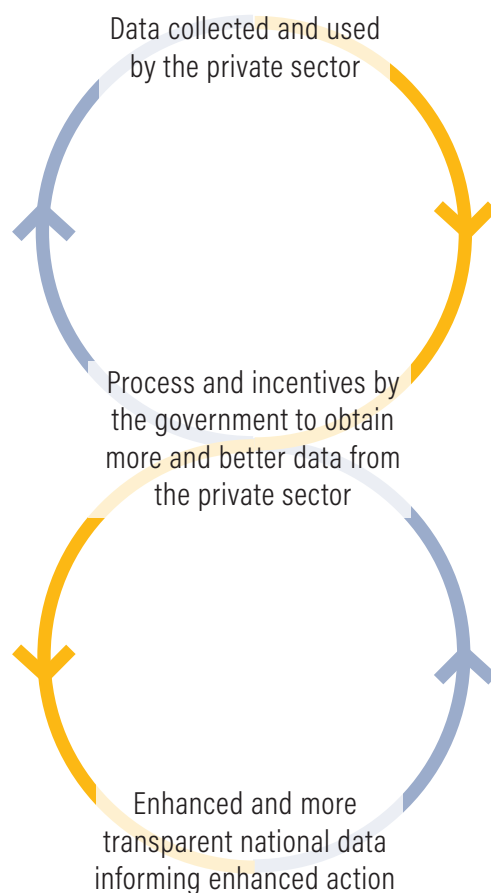
Because data are a core requirement to inform, sustain, and enhance climate action, and because most countries and stakeholders face challenges in accessing, sharing, and using data effectively, this paper focuses on opportunities and existing practices that countries and the private sector may leverage. To do so, this paper introduces the concept of a data loop, defined earlier and now depicted in Figure 2.

Elements of the data loop already exist and should be built upon. Most of the data loop is centered around the ability of the government and the private sector to share information, giving importance to corporate mitigation action accounting and reporting systems. While government reporting systems are driven by the internationally agreed reporting guidelines, there are several voluntary and mandatory GHG reporting programs that encourage reporting from private sector actors. As we will see in the following sections of this chapter, these programs and the associated methodologies have evolved over the past 20 years.

In terms of voluntary reporting programs, examples include Brazil's GHG Protocol program, the Science Based Targets initiative (SBTi), The Climate Registry, CDP's Climate Change Questionnaire, and voluntary sector-specific initiatives like the Cement Sustainability Initiative. Many of these global, voluntary initiatives have been brought together under the We Mean Business platform, which provides information on the companies that have committed to climate action, on what companies can do to engage with a particular pledge, as well as related resources. Further, these programs do not necessarily ask the private sector to report directly to the government but, rather, seek other public disclosures.

There are also specific national-level mandatory programs, where the government requires certain businesses to report back to the government. Examples of mandatory programs include Australia's National Greenhouse and Energy Reporting Scheme and the US Greenhouse Gas Reporting Program (Singh et al. 2014).

Figure 2 | **Illustrating the Data Loop**



Source: Authors.

This chapter explores the data loop in further detail, discussing how both the private sector and governments contribute to and leverage the loop, and what key elements or processes could be put in place to ensure that data loops are policy-relevant and that the information generated is of good quality. In particular, we describe how the private sector can enhance its voluntary data reporting by engaging with various initiatives and methodological standards, and how governments can support voluntary corporate reporting and facilitate mandatory reporting standards, and we explore key concepts to ensure that the data are accurate and policy-relevant.

How the Private Sector Contributes to and Leverages the Data Loop

A number of initiatives are emerging to trigger changes in corporate and individual behavior, and to enhance the data provided to governments and the public by the private sector. For example, private sector actors may engage in voluntary reporting initiatives under CDP or participate in the SBTi, among other initiatives. In 2018, 71 companies from Southeast Asia and Hong Kong responded to the CDP Climate Change Questionnaire at the request of investors—an increase from 66 companies in 2017 (CDP 2019b). As of January 2019, three companies in the ASEAN region had emissions-reduction targets approved by SBTi: City Developments Limited (CDL), HK Electric Investments, and Singtel.

Private sector actors across the world are also undertaking and reporting on actions with non-GHG focused targets. These may include, for example, targets related to deforestation or energy efficiency communicated through international initiatives or in corporate social responsibility strategies. For instance, the New York Declaration on Forests brings together businesses, governments, civil society, and Indigenous Peoples around a commitment to halve deforestation by 2020 and end it by 2030. Similarly, the Consumer Goods Forum—a network of consumer goods manufacturers, retailers, and other key stakeholders—mobilizes its membership toward the goal of zero net deforestation by 2020.

RE100 provides another example of corporate target-setting and reporting. Through this global initiative, companies set a public goal to source 100 percent of their global electricity consumption from renewable sources and to disclose their electricity data annually, while RE100 reports on their progress. More than 100 businesses around the world have joined RE100 to date (RE100 n.d.).

As the impacts of climate change become ever clearer, investors around the world are increasingly pursuing approaches, mindful of environmental, social, and governance factors—commonly known as sustainable investing (Pinchot and Christianson 2019). More specifically, assessing climate-related risks in investment decisions has been rising rapidly in the financial services agenda since adoption of the Paris Agreement in 2015 and, more recently, the release of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) (Husson-Traore et al. 2017). Since it released its recommendations in June 2017, the TCFD has received the support of more than 785 organizations, of which nearly half are financial organizations (TCFD 2019). As a result, there is mounting pressure on companies, both to disclose the information investors require to analyze climate-related risks and opportunities, as well as to communicate their approach to manage these risks. Similarly, CDP has gathered over 525 investor signatories to support integration of sustainability in the investment process.

The TCFD has recommended that both companies and investors disclose climate change information and has developed a framework of recommended disclosures applicable across sectors and industries. Specific recommended disclosures are broadly aligned with existing reporting frameworks and include GHG emissions, as well as metrics and targets used to manage climate risks and opportunities and to track performance against those targets (TCFD 2017).¹ The TCFD recommends that companies make their disclosures in mainstream (i.e., public) annual financial filings, or in other reports if the information is not deemed material (and therefore not appropriate for inclusion in financial filings) (TCFD 2017). Better access to consistent and reliable data will enhance how climate-related financial risks are assessed, priced, and managed (World Bank and Ecofys 2018).

Information reported voluntarily, whether in corporate reports or through multilateral initiatives, can vary in quality and consistency (Depoers et al. 2016; DEFRA 2011; Stanny 2018). For example, a review of French voluntary GHG disclosure practices found that the GHG information included in corporate reports varied widely in its frequency and quality (Depoers et al. 2016). Similarly, in a 2011 Impact Assessment of Options for Company GHG Reporting, the United Kingdom's Department of Environment, Food and Rural Affairs (DEFRA) noted that existing voluntary approaches had not led to a sufficiently high level or consistency of reporting (DEFRA 2011).

Voluntary initiatives with common standards, such as CDP, address this issue to some extent, but variable verification practices mean there is still a risk that the data will not be reliable or comparable over time or across reporting entities (Stanny 2018). CDP's scoring methodology incentivizes companies to have in place third-party verification of Scopes 1, 2, and 3 emissions; that is, companies will receive higher scores if they have independently verified data. Emission scopes refer to different types of emissions—direct, electricity indirect, and other indirect. Figure 3 provides an overview of the differences in emission scopes.

Global voluntary initiatives may report companies' information in aggregated reports or in company-specific case studies. Alternatively, a company may choose its own procedures when reporting on voluntary actions not tied to a specific initiative. While this contributes to overall transparency and builds trust in companies' actions and pledges, it may not effectively provide accurate and consistent data for national MRV and climate projections or facilitate efforts to harmonize practices across jurisdictions (Climate Disclosure Standards Board 2012).

The prescription of standards and methodologies remains critical to ensuring data quality and consistency. Likewise, some voluntary approaches may introduce consistent standards by providing guidance for voluntary disclosures or inviting the use of specific methodologies. Different methodologies and standards exist for emission scopes. For example, standards differ when estimating facility-level or value chain emissions. It is not within the scope of this paper to discuss or elaborate specific differences in methodological standards.

Examples of established accounting and reporting standards used by private sector actors include the GHG Protocol Corporate Standard and sector-specific standards like the cement sector's CO₂ Quantification Protocol, and the Roundtable for Sustainable Palm Oil's GHG calculator and GHG assessment procedure for new developments. The GHG Protocol Initiative further provides GHG calculation tools that are consistent with those proposed by the Intergovernmental Panel on Climate Change (IPCC) for compilation of emissions at the national level (WRI and WBCSD 2004).

Figure 3 | **Overview of Emission Scopes**

EMISSIONS TYPE	SCOPE	DEFINITION	EXAMPLES
DIRECT EMISSIONS	Scope 1	Emissions from operations that are owned or controlled by the reporting.	Emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.
	Scope 2	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company.	Use of purchased electricity, steam, heating, or cooling.
	Scope 3	All direct emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.	Production of purchased products, transportation of purchased products, or use of sold products.

Source: Reproduced from WRI and WBCSD 2011.

Compiling and communicating GHG data using established standards can support such efforts to assess and integrate the impact of private sector actors in national planning processes.

Standard methodologies are also important for the quantification and communication of non-GHG-focused actions. Initiatives that encourage the setting and reporting of non-GHG targets often have specific standards, such as RE100's Reporting Spreadsheet and the Roundtable on Sustainable Palm Oil's Principles and Criteria. The CDP Climate Change Questionnaire also offers a framework for the disclosure of both GHG and non-GHG targets and performance.

How Governments Contribute to and Leverage the Data Loop

Governments can support the data loop by encouraging voluntary reporting and by examining ways to develop mandatory reporting systems. These components—and efforts to support the data loop at large—are vital to build and facilitate trust between the government and the private sector. This section explores both of these questions with a view to supporting government engagement with private sector data reporting.

Supporting and incentivizing voluntary reporting

Award or certification schemes could be one way in which governments and others encourage or incentivize business and private sector actors to share their data. Award schemes can bring value to a business by bringing reputational benefits and driving improvements in core performance (Corporate Citizenship 2013). They can take many forms, from global indexes to national awards and industry rankings. It is important to consider, however, that the broader sustainability landscape (i.e., not limited to climate or GHG performance) is crowded with recognition schemes, which can be overwhelming for companies and reduce their meaningfulness.

Participating in initiatives like awards, certification processes, and rankings can help governments to engage with staff, streamline data collection, and improve performance (Corporate Citizenship 2013). The specific benefits to companies vary from scheme to scheme, but may include the following:

- Bringing attention to material issues (in this case, sources of GHG emissions and climate risks)
- Raising awareness and strengthen buy-in internally

- Benchmarking with peers and competitors
- Improving performance by regularly collecting data, streamlining processes, and measuring performance on key issues

This is especially true when the schemes provide a systematic and standardized measurement framework that allows companies to capture performance over time (Corporate Citizenship 2013).

For companies, participating in award schemes, certifications, or rankings can imply a process similar to participating in GHG reporting initiatives (i.e., collecting data, preparing submissions, complying with specific standards). In considering the use of awards, certifications, or rankings as a way to strengthen private sector engagement in climate action, governments should pay close attention to any existing reporting requirements or guidance and build on these. For example, if governments were to encourage companies to participate in award or certification programs, they should first consider whether there are already existing initiatives in place, and whether new initiatives can build upon existing reporting requirements or standards. The award, certification, or ranking can therefore be a complement to the reporting initiative. This is the approach taken by CDP, for instance. CDP scores businesses from A to D—based on climate-related disclosures, targets, and performance, as reported in the companies' response to the CDP Climate Change Questionnaire (CDP 2019a). Recurring awards and rankings may be more effective in generating improvement over time. But ad hoc, or special awards like “The Big Ideas Competition for Climate Action: Using Data Innovation” can spur cooperation, which could also have longer-term effects.²

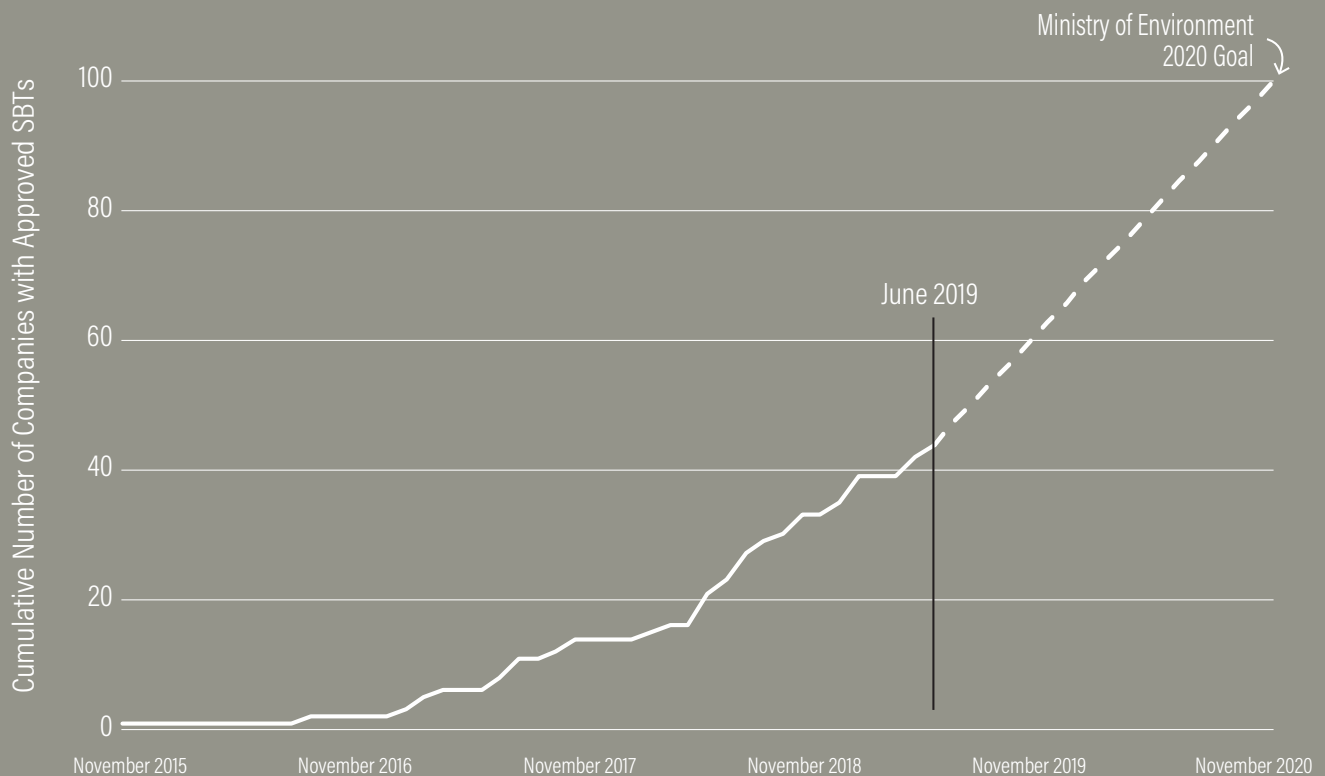
There are already a number of award schemes for corporate sustainability and social responsibility in the ASEAN region, though none specifically dedicated to climate change. These include the Singapore Apex Corporate Sustainability Awards, recognizing achievements across all 10 of the UN Global Compact's sustainability principles; the Asia Corporate Excellence & Sustainability Awards; and the ASEAN Business Awards, which include a category for Corporate Social Responsibility. In Indonesia, the Indonesia Business Council for Sustainable Development, Ministry of National Development Planning (BAPPENAS), PricewaterhouseCoopers, and others host the annual Sustainable Business Awards to recognize businesses in a number of different categories, including energy management and UN SDGs (IBCSA 2019).

Box 2 | Japan's Support for the Science Based Targets Initiative

Japan has one of the highest number of companies participating in the Science Based Targets initiative (SBTi). In fact, as of July 2019, 46 Japanese companies have set science-based targets (SBTs) and have had those targets approved by the SBTi. Another 32 companies have committed to set targets. The 46 companies with approved targets cover 20 unique sectors, and include the first SBTi-approved target for the chemical sector.

The Japanese Ministry of the Environment sought to encourage greater participation in the SBTi and began a support program to help companies develop their SBTs, including with a dedicated budget (Aden 2019). Companies can apply to the Ministry of the Environment for assistance and, if selected, will receive individual personalized advice from consultants. The program was first only available to large companies, but is now also available to small- and medium-size businesses (Aden 2019). In Japan in Fiscal Year 2019, approximately 150 million yen (\$1.4 million) were dedicated to this program. The support program aims to help the Japanese companies reach the Ministry of the Environment's goal of 100 Japanese companies with approved SBTs by 2020.

FIGURE B2.1: GROWTH IN JAPANESE COMPANIES SETTING SCIENCE-BASED TARGETS



This is an example where the government has supported and encouraged participation in a voluntary private sector program. Though the SBTi is a target-setting program and not a reporting program, similar lessons could apply. Governments could take similar approaches and apply them with a view to supporting the data loop.

Source: Reproduced from Aden (2019). Original sources: SBTi, Japan Ministry of the Environment.

Building mandatory reporting systems

Mandatory reporting programs are a key way in which governments engage with the private sector. However, it is important that governments build trust with the private sector when utilizing mandatory programs. Governments can explore ways to build trust when designing mandatory reporting programs through enhancing their legislative and institutional arrangements, and by exploring secure new technologies, like blockchain. Additionally, by inscribing the collection and communication of GHG data into law, mandatory provisions send an important signal to the private sector regarding the importance of GHG emissions to government policy and the government's commitment to meeting climate targets.

SYSTEM DESIGN

Mandatory programs that have emerged in the past 20 years at international, national, and subnational levels tend to be prescriptive in their requirements (for example, with regard to calculation or quality-management methods), potentially bringing greater accuracy and consistency to the reported data and increasing stakeholder confidence in the information provided (Singh et al. 2015). How prescriptive these methods are will depend on a program's objectives (e.g., to support an emissions trading scheme or to contribute to the national inventory) and the reporters' capacity and preparedness (Singh et al. 2015). The level of prescription must be balanced between the need to ensure consistent and reliable data for a particular objective and the flexibility needed by reporters to meet those requirements. Ensuring that the reporting program's methods and processes are and remain well aligned with other requirements or policies is an important way of avoiding duplication and facilitating private sector engagement. For example, the reporting frequency prescribed in a French program was modified in 2015 to match the energy audit requirements of a new law (Singh et al. 2015).

Depending on context and policy objectives, it may be desirable to harmonize domestic and international transparency priorities or harmonize reporting practices with those used in other countries or jurisdictions. For example, the United States adopted a 25,000 metric ton of carbon dioxide equivalent (tCO₂e) threshold to determine whether reporting is required, as that was the threshold used by the existing Californian program. Similarly, Turkey adopted the same applicability requirement as the European Union (EU) reporting program, to achieve harmonization in requirements. To support the national inventory, the Australian program requires that enough

information be provided to classify facility-level data into categories used by the IPCC (Singh et al. 2015). More broadly, reporting programs should complement international GHG reporting systems and be "policy neutral," providing a flexible architecture for incorporation of or alignment with other programs, such as subnational programs or international systems that could benefit domestic priorities (National Research Council 2010).

ENHANCING LEGISLATIVE AND INSTITUTIONAL ARRANGEMENTS

Governments can take steps to improve institutional arrangements to facilitate the engagement of private sector actors in GHG accounting and reporting. Approaches to improve institutional arrangements for MRV include the use of coordinating mechanisms, and streamlined requirements and processes, and ensuring capacity-building opportunities for reporting entities.

The following four elements have an important role to play in creating an enabling environment for the successful functioning of GHG reporting programs and disclosure provisions:

- **Establishing clear legal infrastructures.** Establishing clear legal architectures can be a lengthy process but is an important component of the enabling environment for mandatory reporting. In some cases, it may be possible to implement GHG reporting provisions using an existing law (as has been done in the United Kingdom and Japan, for instance) or new legislation (as was the case in Australia and Mexico).³ In either case, it is important to take advantage of and align with established systems, procedures, compliance, and enforcement measures to build on existing capacities and minimize additional burdens on reporting entities (Singh et al. 2015).
- **Stakeholder engagement.** Early stakeholder engagement enhances trust between policymakers and stakeholders, promoting compliance and improved data quality through capacity-building support for reporting entities, and resolving conflicts and generating stakeholder consensus and buy-in. As a result, this can strengthen reporting. The Republic of Korea's GHG and Energy Target Management System (TMS), for instance, was developed through in-depth consultations between the government and private sector actors. This promoted cooperation and ensured ownership of the program by key stakeholders (Shrivastava 2015).
- **Coordinating mechanisms.** Strengthening the data loop between the private and public sectors depends in no small part on effective and coordi-

nated institutional arrangements that can support the development of guidance and capacity-building for reporting entities, undertake stakeholder engagement processes, streamline and coordinate requirements to reduce reporting and administrative burdens, and effectively organize and analyze reported data. Some countries' experiences in the development of national MRV systems highlight the role that such coordinating mechanisms can play in enhancing the collection, exchange, storage, and use of data by facilitating information flows both within governments and with private sector actors. Japan offers an example of a well-established and robust institutional structure for GHG inventories that includes clear roles, responsibilities, and information-exchange processes for a broad range of actors across government and including the private sector. Built over time, this structure has enabled the government of Japan to encourage Japanese private entities to review their emissions and revisit climate change countermeasures throughout the value chain (Dagnet et al. 2019). But it is important to note that building such an institutional structure takes time and requires an iterative process to reach these levels of sophistication and maturity. As highlighted in Dagnet et al. (2019), countries need to think of it as a continuous improvement process and invest in institutional capacity-building.

- **Streamlining reporting requirements and processes.** Elements of a streamlined approach for GHG data exchange between private and public sector actors deserve a special reminder, given that overburdensome or duplicative reporting requirements—with similar information required by various ministries or departments, at different times, through different reporting platforms, and for different purposes—can stall cooperation from the private sector and hamper efficient information flows. One potential way to mitigate this issue—and to ascertain the effectiveness of solutions—is to carry out in-depth consultations with relevant private sector actors to address the perceived barriers and identify solutions that enhance cooperation and buy-in (Dagnet et al. 2019).

EXPLORING EMERGING BLOCKCHAIN TECHNOLOGY

Blockchain technology deserves a special mention as a new area of research and development, whose application to GHG data management systems could help build trust in emissions registries. As mentioned earlier, the reliability of reported GHG data is paramount to its usability for a range of purposes, but especially for supporting carbon-

pricing mechanisms, as the reported data are fundamental to determining an entity's liability. To encourage exploration and eventual use of this technology to support climate action, the UN Climate Change secretariat initiated and facilitated the creation of the Climate Chain Coalition, a multistakeholder group of 32 members (UNFCCC 2018).

Blockchain can play a role in a number of emerging digital technologies, including

- digitizing and automating MRV systems;
- securing data exchange and transactions; and
- supporting decentralized access to finance (Füssler et al. 2018).

Although this technology is not yet mature, there are already some examples of exploratory applications to climate-related MRV (Cage 2019). For instance, in Thailand, the Siam Solar Energy project is using blockchain to accelerate the data verification process, allowing real-time tracking of GHG carbon inventories and automated issuance of carbon credits. This could significantly reduce the cost and time associated with the issuance of carbon credits (South Pole 2018). Similarly, in Costa Rica, the Ministry of Environment and Energy intends to develop an open-source blockchain registry to track national offset units traded in market-based mechanisms. This registry is intended to be a proof of concept of blockchain solutions for international cooperative approaches under Article 6 of the Paris Agreement (Füssler et al. 2018).

Blockchain technology can contribute a trust protocol for enhanced data security, but, at this stage, still requires further screening to determine whether it fits the technological needs of MRV better than other options (Cage 2019). Some countries are pioneering its use to strengthen their MRV systems (e.g., Chile), and regional projects are emerging.⁴ There are definitely many important elements to be considered before blockchain technology could be applied in an extensive manner, including necessary outreach, training, and technology support to the private sector on how to utilize these systems.

Overarching Elements of the Data Loop

The previous sections have explored how the private sector and governments can interact with data loops. It is also important to explore a few elements that can ensure the data loops are able to effectively inform public policy. For example, for the data loop to inform policy, data must be incorporated into a system useful for policymakers and

have the necessary quality assurance and verification. This section explores these two overarching concepts in relation to utilizing the data loop for policymaking.

DATA MANAGEMENT SYSTEM

In mandatory reporting programs, GHG emissions and related data are reported directly to the program administrator according to established procedures regarding the specific types of information to be reported, the frequency of reporting, deadlines, and the reporting platforms to be used (Singh et al. 2015). A reporting platform can provide the foundation for a data management system that facilitates the collection, organization, storage, and analysis of reported data (Grant et al. 2013).

Not all mandatory approaches require the use of data management systems. Corporate governance disclosure requirements, in particular, may prescribe the disclosure of GHG data in specific company reports (e.g., director's report, strategic report) without compiling it in a centralized reporting platform or registry. This approach is commonly associated with the intent to inform investors and other stakeholders regarding companies' climate-related risks, risk management, and governance strategies, and to help the companies themselves gain a better understanding of opportunities to reduce emissions (TCFD 2017; Singh et al. 2015; DEFRA and BEIS 2019). However, it is important to consider the uses that can be supported with or without a centralized reporting platform. If the intended use is to enable companies to gain greater awareness of areas for improvement, or to inform investors and other stakeholders, a centralized registry may not be necessary. However, if the intention is to support complementary policies to help drive mitigation ambition, like carbon-pricing mechanisms and green procurement or award schemes, a centralized reporting platform is necessary.

Both mandatory and voluntary reporting programs must address confidentiality of commercially sensitive data, without sacrificing the transparency and usability of reported information. Program administrators and voluntary initiatives may consider specific activity and process-related data to be commercially sensitive and will therefore not disclose them publicly. This is the approach used in the United States, for instance (Singh et al. 2015). Both mandatory reporting programs and corporate governance-disclosure provisions may also allow reporting entities to request that certain data be treated as confidential, given

appropriate justification. This approach is used in Canada, Japan, and the United Kingdom (Singh et al. 2015; Carbon Trust 2019b).

Data supply agreements with specific private sector actors, such as through multiyear Memoranda of Understanding, can help ensure the availability of key datasets (Pang et al. 2016). Data supply agreements may be a useful option in instances where concerns over data confidentiality hamper effective information flows. As described in the section on enhancing legislative and institutional arrangements, countries should specify how their institutions address data supply agreements, and whether there should be a central coordinating mechanism responsible for processing these agreements and managing associated data.

DATA VERIFICATION

Quality assurance or verification refers to periodic reviews of the emissions report by independent experts (Singh et al. 2015). These assessments verify that the reported information represents the best possible emissions estimates, given available data, and they build confidence that reported results are complete, consistent, accurate, transparent, and relevant (Singh et al. 2015). Both mandatory and voluntary programs can employ one or more of the following methods for verification: self-certification by the reporting entity, review by program administrators (for mandatory approaches), and third-party verification (Singh et al. 2015).

The method, or combination, that is used depends on policy objectives, costs, and existing capacity and resources. For instance, programs that underpin emissions trading mechanisms tend to favor third-party verification, given the need for a high degree of confidence in the accuracy and completeness of the data. Most emissions trading programs review the reported data themselves or require third-party verification in addition to self-certification (Singh et al. 2015). Reviews by the program administrator are less costly to the reporter than third-party verification, but they require more time and resources on the part of the program administrator. Under third-party verification, independent verifiers assess the accuracy of the emissions report. A rigorous and accountable system for third-party verification requires the development of verification and accreditation standards to ensure that verifiers are appropriately qualified (Singh et al. 2015).

According to CDP's 2019 report for Hong Kong and the Southeast Asia region, 33 companies (46 percent of respondents) reported having third-party verification for Scopes 1 and 2 emissions data in 2018 (CDP 2019b). However, a smaller number of companies (30 percent of respondents) reported third-party verification of Scope 3 emissions. While the number of countries with third-party verification is increasing from previous years, the number of companies verifying their Scope 3 emissions data are stagnating (CDP 2019b). As noted earlier, the international review process under the Paris Agreement is quite thorough and can be leveraged by countries as an international audit to enhance trust among national stakeholders.

LEVERAGING DATA LOOPS AND AMBITION LOOPS TOGETHER

Data loops reflect a relationship between governments and the private sector that provides governments and public decision-makers with the data necessary to inform their understanding of GHG emissions and climate action. Data loops can be especially powerful when linked with efforts to mobilize climate action and meet the goals of the Paris Agreement. With accurate, reliable, and high-quality data, governments are better prepared to plan public policies and the efforts necessary for low-emissions, climate-resilient development.

Governments and the private sector are not only focusing on sharing data but are also exploring opportunities to collaborate to enhance climate action. For example, many governments are stepping up efforts to reach their climate and development targets in the context of the Paris Agreement and the 2030 Agenda for Sustainable Development. Meanwhile, many companies are looking for clarity to plan investments in a zero-carbon future. Many governments and private sector entities recognize that achieving these goals requires reducing GHG emissions and adapting to the inevitable impacts of climate change. Together they can harness the opportunities offered by the transition to zero-carbon, climate-resilient development (Metzger et al. 2018).

The mutual relationship between bold business leadership and bold government policies drives another positive feedback loop—known as the “ambition loop” (Metzger et al. 2018). Business action can help foster the conditions for governments to take action. And to plan and invest in low-carbon opportunities, companies and investors need clear signals from governments on how they intend to

address climate change and achieve national climate and sustainable development goals.

National-level action is critical to unlocking bolder private investment and fostering ambition loops (Metzger et al. 2018). Policies that include specific or streamlined rules and time lines, or accessible, consistent information and enforcement mechanisms, provide **clarity**. Government policies that provide strong market signals and long-term regulatory certainty build **confidence** (Metzger et al. 2018). With clarity and confidence from governments, businesses can take ambitious climate action.

Leveraging data loops and ambition loops together could provide opportunities for greater climate action. Effective implementation of some public policies and initiatives requires strong data foundations. When these policies and initiatives are designed to build clarity and confidence for businesses, data and ambition loops can intersect and leverage the feedback mechanisms between them to drive greater data sharing and enhanced climate action.

Over time, governments need to generate high-quality, reliable data. Indeed, consistent information and enforcement mechanisms, long-term policy and regulatory frameworks, and supportive infrastructure investments all require that governments have a clear picture of GHG emissions and risks in the country and robust projections into the future. While we appreciate the challenges faced by most developing countries, and recognize that such an outcome may not happen over time, it is still one to aim for, especially for those countries aspiring to use market mechanisms. For instance, in the case of emissions trading systems, better data to inform emission projections in participating sectors and improved projections of the drivers of emissions support regulators and policymakers in addressing overallocation of emissions permits (World Bank and Ecofys 2018).

This is supported by studies and country experiences that show that simply reporting on emissions and climate risks may not necessarily move companies to act to mitigate those emissions and risks. In this case, the reporting activity has little influence on organizational performance beyond demonstrating compliance with reporting requirements, wider social norms, and competitor's behavior (Tang and Demeritt 2018). Rather, it is in cases of financial or regulatory incentives or penalties (for instance, a carbon market or a tax on energy consumption) that reporting is more systematically used to drive mitigation

actions (Tang and Demeritt 2018). Reporting can therefore serve other substantive policy goals, which in turn provide the strong signal—the clarity and confidence—needed by businesses to take bolder climate action. This works in two important ways: first, better, more consistent data allow governments to design better incentives, long-term regulatory frameworks, and market signals. And second, they allow companies to make better use of those incentives in a context of transparency and accountability.

This chapter explores carbon-pricing efforts and the Science Based Targets initiative to illustrate how the data loop and ambition loop can work together cooperatively to leverage enhanced climate action. These two examples illustrate the importance and provision of data to further drive climate ambition.

Carbon pricing

Carbon pricing offers a good example of an incentive framework that can drive concerted climate action in the public and private sectors. A carbon price captures what are known as the external costs of carbon emissions—costs the public pays in other ways, such as from damage to crops and increased health care expenditures from heat waves and droughts, or damage to property from flooding and sea-level rise—and ties them back to their sources (Carbon Pricing Leadership Coalition 2018).

Carbon-pricing policies are emerging in markets across the globe, from Mexico to South Africa, Singapore, and China. There are two main types of carbon pricing:

- **Emissions trading system (ETS):** An ETS caps the total level of emissions (within a preallocated carbon budget) and allows those industries with lower emissions to sell their extra allowances to larger emitters (Carbon Pricing Leadership Coalition 2018).
- **Carbon tax:** A carbon tax defines a tax rate on GHG emissions or, more commonly, on the carbon content of fossil fuels. It is different from an ETS in that it guarantees the carbon price, not the emissions-reduction outcome (Carbon Pricing Leadership Coalition 2018).

Other types of carbon pricing include offset mechanisms, results-based climate finance, and internal carbon prices set by organizations.

ESTABLISHING THE DATA LOOP

Establishing a robust data collection and monitoring system is a prerequisite for carbon pricing and trading. Improving data accuracy and reliability is indeed a common challenge for the effective implementation of carbon-pricing initiatives (World Bank and Ecofys 2018). Efforts to promote carbon pricing should therefore be coupled with strategies to improve data quality and availability where needed. Carbon tax schemes require strong data, especially at the point of taxation; that is, if the tax is levied based on facility-level GHG emissions, it is extremely important to ensure companies are able to report accurate data on their facility-level emissions. In essence, if it is not counted, it cannot be taxed. Countries and companies unable to accurately measure their greenhouse gas emissions may struggle to ascertain their exposure to risks, and fail to evaluate the impact of their carbon-pricing scheme. Having in place a reliable and transparent measurement, reporting, and verification system could also enhance companies' and government's credibility (Gajjar and Adhia 2018).

To support the development of China's national ETS, companies from the eight sectors to be covered under the system were asked to formulate and submit their monitoring plans and GHG emissions inventories for 2016 and 2017. The ETS is expected to come into force for all sectors in 2020 (World Bank and Ecofys 2018). The lack of a measurement, reporting, and verification system that could produce complete and consistent GHG information had previously been noted as a challenge to the development of a carbon market in China (Lo 2016).

In another instance, preparing for the future use of market-based mechanisms to reduce emissions in the shipping industry, the International Maritime Organization (IMO) and the EU each began implementing relevant data-collection measures in 2018 (World Bank and Ecofys 2018).

In addition, for an ETS, a lack of accurate data for the projection of GHG emissions and their drivers can lead to a mismatch between the amount of allowances issued and the actual emissions, resulting in a market imbalance and potentially undermining the effectiveness of the system in driving emissions reductions.

BUILDING THE AMBITION LOOP

The Organisation for Economic Co-operation and Development (OECD) notes that “the introduction or strengthening of carbon prices signals strong policy commitment, creating certainty for investors that it pays to invest in carbon-neutral technologies” (OECD 2018). A strong carbon-pricing policy adds clarity to the time lines for achieving mitigation targets and gives companies the confidence and financial support they need to invest in long-term mitigation actions (Metzger et al. 2018). A growing number of countries and companies are using carbon pricing to inform decision-making and promote low-carbon investments.

As of 2018, 45 countries and 25 cities, states, and provinces already had carbon-pricing mechanisms in place, with more planning to implement them in the future (World Bank and Ecofys 2018). Initial experiences with carbon pricing in Europe and Canada suggest that these frameworks provide essential clarity and confidence. Most of these countries and cities have a robust data-management system and rely on a strong data loop to inform the design and type of carbon pricing (Partnership for Market Readiness 2019).

While the main objective of implementing carbon-pricing initiatives is to stimulate cost-effective emissions reductions, such initiatives can also help achieve other outcomes. For example, the China national ETS, ETSs in Korea and Québec, and Singapore’s carbon tax cite the stimulation of low-carbon innovation as an additional objective. Many Chinese subnational ETS pilots also mention the improvement of production processes and optimization of their industrial structures as complementary objectives. The Tianjin pilot ETS intends to raise awareness among companies on GHG emissions and their impacts. In Argentina, the carbon tax was the result of an integrated taxation reform and fiscal rationalization. Similarly, the carbon tax in Chile is part of wider reforms aimed at lowering taxes for individuals and increasing them on large businesses (World Bank and Ecofys 2018). Carbon-pricing initiatives may also tackle environmental issues other than climate change, such as air pollution (for example, in Beijing) (World Bank and Ecofys 2018).

Companies are increasingly interested in carbon pricing and are more frequently considering “internal carbon prices.” An internal carbon price “is a value that companies set in order to internalize the economic cost of GHG emissions associated with their business activities” and includes several different approaches, such as shadow prices, taxes and fees, implicit prices, or cap-and-trade (Gajjar and Adhia 2018). There has been a marked increase in the number of companies using internal carbon prices to evaluate investment risks and opportunities. In 2014, 150 companies reported using an internal carbon price. More than 1,300 companies are using or are planning to use an internal carbon price in 2018–2019 (World Bank and Ecofys 2018).

Companies also increasingly advocate for carbon-pricing policies. Mahindra & Mahindra was the first Indian company to announce a carbon price in 2016—a hybrid carbon price, including both an implicit price for the company’s existing green investments, and a shadow price of \$10 per metric ton of CO₂ (Carbon Pricing Leadership Coalition 2016; Gajjar and Adhia 2018). More than 70 companies committed to the UN Global Compact’s Business Leadership Criteria on Carbon Pricing. One hundred sixty companies are partners in the Carbon Pricing Leadership Coalition, a platform advancing carbon pricing around the world. Meanwhile, the Carbon Pricing Corridors initiative brings business leaders together to collect insights on the level of carbon pricing needed to drive change in their industries. Carbon pricing is not, however, the sole solution, but rather a single tool for communicating with the market. A carbon price must also be high enough to impact private sector decision-making. Leaders from the power sector have suggested that a price would need to be in the range of \$24 to \$35/ton in the short term, while rising to \$38 to \$100 by 2035 to spur the necessary investments. While leaders from the chemical sector thought that a price would need to be \$30 to \$50/ton in the short term, increasing to \$50 to \$100/ton by 2035. While these numbers reflect a few industry estimates, the IPCC’s recent report on global warming of 1.5°C suggests that carbon prices may need to be \$135 or greater by 2030 to remain on a pathway consistent with limiting warming to 1.5°C (Rogelj et al. 2018). Bold, ambitious carbon-pricing policies, especially those consistent with limiting warming to 1.5°C, could provide the confidence and clarity business needs to drive change (Metzger et al. 2018).

CARBON PRICING IN THE ASEAN REGION

To date, the climate and energy policy portfolios of most ASEAN countries are dominated by various energy savings measures and targeted support for renewable energy. While these policies have shown some positive effects, they are not always cost effective and do not always have the scaling potential to drive a broad transition toward a lower carbon future (Paltsev et al. 2018).

Singapore is the only country in the region to have adopted a carbon price, although interest is growing among other ASEAN countries. Singapore's carbon tax was announced in 2018 to start in 2019, with a \$3.8/tCO₂e (S\$5) tax on GHG emissions on 30 to 40 energy-intensive companies, covering 80 percent of Singapore's emissions (Rana and Kerr 2018). The government plans to increase the tax to \$7.6 to \$11.4/tCO₂e by 2030 (Rana and Kerr 2018). Overall, however, development of carbon-pricing instruments in the region has been halting (Paltsev et al. 2018). Efforts to build adequate administrative and technical capacities—for instance, through more robust MRV and strengthened engagement and capacities across the private sector—should be a priority for future development of carbon-pricing policies.

On the private sector side, though, there is growth in the use of carbon pricing. According to CDP's "Hong Kong & Southeast Asia Report 2018" (CDP 2019b), more companies in the region have started to use internal carbon pricing to enable them to best assess climate risks and opportunities in a changing regulatory and market environment (CDP 2019b). However, only 8 companies currently have internal carbon prices; though another 16 plan to adopt internal carbon pricing over the next two years. Thailand-based Indorama Ventures PCL, a petrochemical producer and a wool yarn manufacturer, has been exploring different carbon price assumptions based on varying climate policy scenarios.

Countries across the region offer some strong foundations to build upon. Feed-in tariffs, for instance, are in place in several ASEAN countries, such as Malaysia and Thailand, and renewable energy auctions are also becoming more common (Paltsev et al. 2018). Such measures can be more successful in building coalitions of support for ambitious climate policies, and in generating domestic supply chains and expertise needed for clean technology markets (Paltsev et al. 2018). As capacities grow, such measures should be reviewed and—as appropriate—gradually phased out,

while more cost-effective measures (like carbon pricing) are scaled up (Paltsev et al. 2018).

Science Based Targets Initiative

The Science Based Targets initiative (SBTi) promotes science-based target-setting as an effective means of increasing companies' competitive advantage in the transition to a low-carbon and climate-resilient economy. It is a collaborative effort between leading organizations, including CDP, the United Nations Global Compact (UNGC), World Resources Institute (WRI), and the World Wide Fund for Nature (WWF), and is one of the We Mean Business Coalition commitments.

The SBTi aims to spur a ramping-up of ambition by supporting business leadership in the transition to a low-carbon economy. The initiative promotes best practice in the setting of science-based targets; independently assesses companies' targets; provides technical assistance through workshops, targeted guidance, and other resources; and builds awareness of companies' efforts.⁵ SBTi's overall aim is to embed science-based targets in standard business practice as a way to transform the private sector into a leader of climate action globally (Science Based Targets n.d.). As of July 30, 2019, more than 600 companies had committed to set science-based emissions-reduction targets to do their part to limit warming to below 2°C at a minimum (Science Based Targets n.d.). Companies are driven by calls from customers, investors, and employees to capture new market opportunities, by the many economic and social benefits of a 1.5°C world, and the need to prepare for risks in a changing climate (Metzger et al. 2018).

ESTABLISHING THE DATA LOOP

A core component of setting a science-based target and participating in the SBTi is understanding company-wide Scopes 1 and 2 emissions and including all relevant GHGs, as defined in the GHG Protocol Corporate Standard. Companies must also publicly report their GHG emissions data and progress against targets each year. Therefore, maintaining annual GHG emissions data underscores the importance of data to the SBTi. Inventories are not necessarily submitted to the government, but they must be made publicly available—through annual reports, CDP, or other places of the company's choosing—and are thus available to governments, but not necessarily in a format that governments could easily use to inform policymaking.

BUILDING THE AMBITION LOOP

Engaging with the SBTi demonstrates the private sector's commitment to addressing climate change. For instance, Levi Strauss & Co., an American company known for denim jeans, has set a science-based target to reduce emissions from its supply chain by 40 percent by 2025, from a 2016 baseline. To achieve this target, Levi's is working with the Partnership for Cleaner Textile on a pilot project to reduce emissions from suppliers in Bangladesh, India, Sri Lanka, and Vietnam (Peters 2018). These efforts illustrate the importance of engaging supply chains in emissions reductions, and they further the potential for suppliers to engage their own governments in support of ambition loops, including, for example, renewable energy options. As an additional example, Yunus Textile Mills, Pakistan's biggest exporter of home textile products and a supplier for Walmart, became the first Pakistani company to commit to setting a science-based target following Walmart's own Scope 3 reduction targets (Cummis and Akopian 2017). These examples illustrate how more robust data collection and reporting from suppliers can help brands with SBTs to access high-quality data and thus better monitor and reduce emissions. This could be a good "business benefit" selling point for some companies and further support the development and planning of emissions-reduction targets. Ambitious science-based targets and zero-carbon investments throughout the supply chain illustrate business climate action.

Governments also use participation in SBTi to understand how the private sector in their countries is engaged in emissions-reduction measures. For instance, the government of Japan encouraged companies to set and communicate ambitious carbon-reduction goals consistent with the Paris Agreement. In fact, the Japanese government has set a target for the number of Japanese companies with science-based targets: aiming to have 100 companies with science-based targets by 2020 (Carbon Trust 2019a). Overall, governments are receiving a strong signal from the 500+ companies setting SBTs, and this can further encourage and enhance climate ambition in public policy.

SBTi IN THE ASEAN REGION

Despite continued momentum and uptake, very few ASEAN companies have participated so far. As noted earlier, only three companies headquartered in ASEAN countries have approved SBTs. However, the growing number of Scope 3 emissions-reduction targets set by

multinational corporations with suppliers in the ASEAN region could change this. There is a growing urgency to reduce Scope 3 emissions—that is, the indirect emissions upstream and downstream in companies' value chains. For some, these emissions can make up most of a company's GHG emissions, yet they have so far been largely overlooked due to a lack of direct control, lack of adequate guidance, and difficulty in collecting high-quality data (Farsan et al. 2018).

The potential to reduce Scope 3 emissions is enormous, and companies are increasingly taking note. Hundreds of companies are setting Scope 3 reduction targets, and dozens of these are in line with best practice standards, according to SBTi (Farsan et al. 2018). This will have potentially transformative implications for ASEAN companies that supply products and raw materials in transnational value chains across multiple industries, including apparel, food and beverage, and manufacturing.

ASEAN countries are home to major suppliers, whose potential in reducing GHG emissions and water footprints, while benefiting their businesses, customers, and communities, may remain untapped. Savings of \$19.3 billion were reported by suppliers in 2018, proving that action on climate change and water consumption is not only the right thing to do but also the smart thing to do (Carbon Trust 2019a). This has implications for green procurement. Yet, few organizations engage with their suppliers on the risks and opportunities that climate and water issues pose to businesses and consumers: only 35 percent of organizations that responded to the 2016 CDP Supply Chain information request actively engage with their suppliers (Carbon Trust 2019a). While multilateral corporations' supply chain targets can increase the number of actors, uptake may remain limited and not be enough to achieve the transformation to a low-carbon society at the pace required. As highlighted in the sections above, government engagement (e.g., Japan), could be important in boosting the uptake of SBTs. Box 3 provides the case of Singapore and the real estate company City Developments Limited (CDL) to illustrate how CDL has incorporated and leveraged both the data and ambition loops into its regular operations.

In its Integrated Sustainability Report (ISR) for 2019, "Changing the Climate: Towards Future Value 2030 Goals," City Developments Limited (CDL) highlighted its efforts to accelerate its climate action and make progress toward its sustainability goals.

CDL was the first Singaporean real estate company to set a carbon emissions intensity-reduction target of 59 percent approved by SBTi and to complete a Climate Change Scenario Planning Study based on the Task Force on Climate-related Financial Disclosures' recommendations. CDL was also among the first to introduce the Renewable Energy Certificates procurement using blockchain technology and to commit to the construction of at least one Super Low Energy Building in the next five years. Its energy efficiency measures already resulted in more than \$24 million in savings between 2012 to 2018. Accuracy and transparency are secured through independent third-party verification of CDL's sustainability report and its greenhouse gas emissions disclosures. Through these efforts, CDL has demonstrated its commitment to using and aligning its efforts with existing voluntary climate reporting and target-setting initiatives, exploring opportunities to use new technologies to enhance data, and to ensuring data are robust and accurate to inform decision-making.

CDL set an internal carbon price and, as a member of the Singapore chapter of the Carbon Pricing Leadership Coalition, is continuing to look for ways to engage with industry and government to use internal carbon pricing to reduce emissions.

In its news release, CDL notes that its climate efforts were incentivized by the global commitment for a low-carbon economy and climate-resilient future under the Paris Agreement, as well as Singapore's recent launch of a carbon tax. Other drivers include investors and consumers' higher expectations for socially responsible brands and products and the benefits for sustained resilience and growth. CDL's climate change scenario analysis cited the international drivers for climate action and the carbon tax as clear signals of climate action policy that the company should act upon. The company also sees itself as a leader in this field, providing confidence to the government that it, along with partners in the Carbon Pricing Leadership Coalition, can work together to reduce carbon emissions. Recognizing that Singapore, as an island nation, is at risk from the impact of climate change, both the government and CDL see climate action policies as mutually beneficial.

Sources: CDL 2019a, 2019b; Metzger et al. 2018.

CONCLUSION

Countries agreed in the Paris Agreement that building trust and confidence in their ability to meet their national and international climate goals was paramount to fulfill the promise of the Paris Agreement. Countries went a step further in Katowice, Poland, in December 2018, by adopting the rules guiding their planning, implementation, and review efforts at national and international levels. Achieving the objectives of the Paris Agreement and the Sustainable Development Goals remains challenging, as governments and businesses must significantly step up their ambitions. Strategies and policies will need to be enhanced to close the gap between existing plans and the pace and scale of investment needed to limit global warming to 1.5°C.

Corporate climate action and transparency efforts continue to grow, offering a clear opportunity to establish more systematic public-private collaborations for data sharing, analysis, and reporting and verification purposes.

The data loop can improve the information flow between governments and the private sector by facilitating mandatory reporting arrangements, supporting voluntary corporate reporting, and enhancing data sharing. These collaborative efforts between the government and the private sector through the data loop can support greater climate action, especially when leveraged with ambition loops. The paper highlights many processes, tools, and incentives that can facilitate an effective data loop. This includes voluntary reporting and target-setting from the private sector, encouraged and leveraged by the government; mandatory reporting requirements imposed by the government on data providers; verification processes; award schemes; and methodological standards.

Initiatives and policy instruments, such as carbon pricing and science-based targets, are growing around the world, including in the ASEAN region. Strong data foundations are critical to underpin initiatives and policies put in place to foster climate action and enhance the ambition of both countries and the private sector. The reason is simple: you cannot manage what you cannot measure. For example, carbon-pricing schemes rely on accurate data. Other voluntary target-setting programs, such as the Science Based Targets initiative, require companies to have data and an understanding of their GHG emissions to develop emissions-reduction targets and produce the maximum desired impact.

These initiatives and policy instruments work when combined with and underpinned by robust data and associated information management systems. Whether companies are mandated to account and report GHG information or they volunteer to do so on their own or through collaborative initiatives, they will need political ownership and significant institutional, technical, human, and financial resources to produce reliable and sustainable results. These include the need for adequate financial resources to be dedicated to GHG accounting and reporting, both by government policy-makers interested in promoting best practices and by businesses as they adopt these practices and build their emissions inventories.

Still, building the data loop requires commitments from both governments and the private sector. Private sector actors will also need skilled staff to support the technical and nontechnical functions necessary for GHG accounting and reporting, at the company level or through industry associations. Companies also need adequate institutional capacity to collect and process GHG data and to measure performance over time. Finally, companies need technical capacity to apply best accounting and reporting practices and to undertake cross-sector and sector-specific GHG emissions quantification. Of course, capacity needs vary across companies, industries, and countries, and policy-makers may prioritize different activities, such as building the capacity of medium- and small-scale companies, building capacity in particular sectors or subsectors, or building capacity to quantify emissions along the supply chain or along a product's life cycle.

Contributing to stronger MRV systems through more systematic data sharing would be mutually advantageous. Countries and companies can strengthen data and ambition loops now to unleash commercial demand for decarbonizing various sectors of the economy. They could capitalize on progress and momentum already evident in various sectors. They can provide clarity in terms of direction and pace, and confidence in long-term market development. Ministers and other government officials responsible for national climate action would likely find support among leading companies that share interests in building and accelerating ambition loops.

ENDNOTES

1. This is the case for the CDP Climate Change Questionnaire, which is fully aligned with TCFD recommendations. This is because CDP was one of the frameworks TCFD examined in the process of formulating its recommendations.
2. This was a collaboration between the National Information Society Agency (NIA), Korea Association for ICT Promotion (KAIT), the Ministry of Science and ICT (MSIT) of the Republic of Korea, United Nations Development in Asia and the Pacific, United Nations Volunteers, and Pulse Lab Jakarta, with support from the government of Australia.
3. For information on the United Kingdom, refer to the Climate Change Act of 2008; for information on Japan, refer to the Act on Promotion of Global Warming Countermeasures of 1998 and the Energy Conservation Act of 1979; for information on Australia, see Singh et al. (2015); and for information on Mexico, refer to the General Law on Climate Change of 2012.
4. For instance, the pilot project on Distributed Ledger Technology (DLT) applications within the MRV sector of the Pacific Alliance countries, with Canadian cooperation.
5. For more information on the Science Based Targets initiative, including what it means and how to set a science-based target, please see the SBTi website: <https://sciencebasedtargets.org/>.

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World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

Our Challenge

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

Our Vision

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

Our Approach

COUNT IT

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

CHANGE IT

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

SCALE IT

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