



INCREASING CLIMATE DATA AND AMBITION IN INDONESIA THROUGH ENHANCED DATA TRANSPARENCY AND INCENTIVE SCHEMES

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EXECUTIVE SUMMARY

Highlights

- The Paris Agreement recognizes that government and private sector collaboration is needed; therefore, the private sector's engagement in the climate journey should be leveraged more effectively than is currently being done.
- As the momentum of corporate climate action and transparency continues to increase, there is a clear opportunity for countries to establish more systematic public-private collaborations to improve data sharing, analysis, reporting, and verification and to inform more ambitious actions.
- The government of Indonesia needs to enhance data transparency, and it can do so by developing an integrated and participatory climate reporting system to streamline and strengthen its current data management system.
- Various initiatives, incentives, and best practices have been shown to underpin a more effective and integrated data management system, which, in turn, can accelerate the pace of the needed transformation.
- Combined government and corporate efforts to create and sustain an effective “data and ambition loop” can unleash commercial demand for decarbonizing various sectors of the economy faster and more sustainably.

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Context

Climate change has the potential to hinder Indonesia's progress towards zero poverty and food security. Temperature increases of approximately 0.8°C by 2030 are predicted for Indonesia (Oktaviani et al. 2011), which is expected to negatively impact the country's economic growth and performance. These changes expose Indonesia to a higher risk of drought; reduced food productivity, human health, and nutrition; and a higher risk of malaria, dengue fever, and other infectious diseases, not to mention the sea level rise as an archipelago country. An International Food Policy Research Institute report found that by 2030, climate change will have a significant and negative effect on the Indonesian agricultural and agribusiness sector, which will subsequently affect both producers and consumers (Oktaviani et al. 2011). On the other hand, the New Climate Economy suggests that by 2030, smart policies designed to accelerate climate action could unlock more than US\$26 trillion in economic opportunities globally while generating more than 65 million jobs and eliminating more than 700,000 premature deaths per year attributed to air pollution (New Climate Economy 2018).

Governments and private companies are now expected to collaborate on targets and policies that will enable considerable, widespread progress to outpace the most damaging and disruptive effects of climate change (Metzger et al. 2018). The landmark Paris Agreement requires all Parties to communicate their climate plans through nationally determined contributions (NDCs). These NDCs help strengthen the global effort to keep temperature rise well below 2°C above preindustrial levels during the 21st century. They also strive to limit the temperature increase even further—to 1.5°C—and to increase countries' resilience in the face of a changing climate. The Intergovernmental Panel on Climate Change's special report entitled *Global Warming of 1.5°C*, mandated by countries as part of the Paris Agreement in December 2015, emphasizes the urgency of accelerating policy implementation and investment and makes it clear that reaching net-zero greenhouse gas (GHG) emissions by 2050 is both possible and necessary to achieve the 1.5°C goal (IPCC 2018). At the 2018 United Nations Climate Change Conference held in Katowice, Poland, countries adopted a rule book that outlines how their climate actions will be planned, implemented, and reviewed to fulfill the promise of the Paris Agreement in a more transparent and rigorous manner.

Robust transparency and accountability rules under the Paris Agreement have implications for both governments and nonstate actors, particularly the private sector. The challenges for developing countries are exacerbated by the lack or unavailability of high-quality climate data and difficulties in sustainably collecting, managing, and coordinating data (Dagnet et al. 2019b). This often precludes governments from attaining various objectives, improving the accuracy of national GHG inventories, and supporting and building trust in carbon markets. Because the private sector holds much precious sectoral data and its effort to reduce its carbon footprint can drive sectoral and climate trends, it is critical for governments and the private sector to strengthen their collaboration in a more transparent and inclusive manner.

About This Working Paper

This paper considers the concept of a “data loop”—a relationship between the government and the private sector that focuses on strengthening collaborative efforts to enhance climate ambition through data sharing—in the Indonesian context. In the data loop, the private sector shares climate and GHG emissions data with the government, and the government facilitates mandatory reporting systems to properly collect this data and incentivize voluntary reporting, further encouraging more robust data sharing. A data loop could generate the impetus for the private sector to provide the data required, and the government could, in turn, provide greater clarity through more robust assessments of efforts and projections, which would be supported by strengthened domestic and international measurement, tracking, reporting, regulation, and verification systems. The concept of the data loop builds upon previous research suggesting that a similar relationship could lead to enhanced climate action: an ambition loop. An ambition loop is a virtuous feedback loop in which bold policy action is supported by bold company leadership, resulting in the acceleration of further business action, faster progress to meet national targets, and the seizure of larger market opportunities. The government pushes companies by establishing bold targets and strong policies, and companies push the government by showing commercial demand and economic possibilities (Metzger et al. 2018).

The concept of the data loop is used to illustrate the relationship between governments and the private sector. In this case, this relationship is described in the context of climate-related data—GHG emissions, mitigation activities, and other data—but the primary purpose of the loop is to highlight the importance of government–private sector cooperation on climate action. As Metzger et al. (2018) illustrate, arguments for enhanced cooperation between governments and the private sector on climate change also relate to enhancing climate ambition and spurring greater climate action. However, this paper specifically looks at government–private sector collaboration in the Indonesian climate-relevant data context.

The practices and experiences showcased in this paper build upon a more regional analysis (in the Asian context), undertaken by the Partnership to Strengthen Transparency for co-Innovation (PaSTI) that dives deeper into this topic (see Dagnet et al. 2019b). This paper, however, focuses on the experiences of Japan, in view of the bilateral engagement between Indonesia and Japan through PaSTI. It is also based on a literature review of other relevant studies and platforms, which include peer-reviewed journals, legal documents, reports from nongovernmental organizations, and guides to relevant platforms. Focus group discussions and interviews with Indonesian government officials, representatives from the private sector, and experts from universities and organizations that have broad experience in Indonesia’s climate transparency were also conducted to gather relevant information.

This paper is structured into three main sections, one for each element of the figure. Section 2 explores the role of the private sector in the data loop and how it shares data with the Indonesian government. This section outlines Indonesia’s existing data reporting systems, including the data requirements, applicability, timing, and regulatory details based on focus group discussions with the PaSTI working group detailed in Appendix A. Next, Section 3 considers how the Indonesian government can support the data loop by facilitating mandatory reporting requirements and supporting voluntary data collection and reporting efforts. Drawing from lessons from the Japanese experience, based on trainings and peer exchanges between Indonesian and Japanese government officials, this section considers opportunities for the Indonesian government to support the private sector’s efforts. Finally, Section 4 discusses how data serves as an important foundation for

enhanced and more ambitious climate action. Whereas BAPPENAS’ Low Carbon Development Initiative (LCDI) builds upon existing data and modeling efforts, other climate actions—such as carbon pricing and the Science Based Targets Initiative—rely on credible data to effectively enhance climate action.

Key Findings

Based on the experience and practices highlighted in this paper, the Indonesian government has the opportunity to engage its private sector more effectively to enhance its data by developing a participatory and integrated reporting system. Currently, there are four ministries in Indonesia in charge of the MER system, with five reporting systems: Monitoring, Evaluation and Reporting Online (Pemantauan, Evaluasi dan Pelaporan Online; PEP Online) from BAPPENAS; Energy Management Online Reporting (Pelaporan Online Manajemen Energi; POME) and the Calculation and Reporting Application for Electricity Emissions (Aplikasi Penghitungan dan Pelaporan Emisi Ketenagalistrikan; APPLE-Gatrik), both from the Ministry of Energy and Mineral Resources; the Private Sectors Performance Rating Program (Program Penilaian Peringkat Kinerja Perusahaan; PROPER) from the Ministry of Environment and Forestry; and the National Industry Information System (Sistem Informasi Industri Nasional; SIINAS) from the Ministry of Industry (Kementerian Perindustrian). The multitude of reporting systems can make the reporting process ambiguous and confusing for the private sector. Different methodological and data requirements further complicate the reporting process. Therefore, Indonesia’s data management system can be streamlined and made more effective. Integrating the current reporting systems, for example, could potentially alleviate some of these challenges.

The Indonesian government can explore opportunities to facilitate mandatory reporting requirements and support voluntary and private data collection and reporting efforts. In terms of strengthening mandatory reporting requirements, peer exchanges between Indonesian and Japanese government officials suggest that there are several lessons from Japan’s long history of experience that could be applied in Indonesia. Some of these lessons include the need to establish clear institutional and legislative arrangements, including any cross- or interministerial committees to support coordination; to recognize the value in supporting voluntary private

sector efforts; and to collaborate with private sector and business association actors in designing data and reporting systems to ensure effective efforts. Based on these lessons, there are a number of different opportunities that the government could explore to incentivize and assist private sector data collection and reporting. Several reporting systems in Indonesia already provide incentives and disincentives to companies at a sectoral level for reporting in their respective reporting platforms.

A more robust, participatory, and integrated climate data management system can underpin enhanced climate action, including sustainable development planning, such as Indonesia's LCDI.

In October 2017, the government of Indonesia declared its goal of integrating climate action with the country's development agenda. The LCDI has a goal to explicitly incorporate carbon emissions reduction targets into policy planning efforts. The government's effort to design a more participatory, robust, and integrated reporting system can facilitate the buy-in from the line ministries and other key stakeholders. The LCDI may also provide a signal from governments that the private sector should take more responsibility for achieving climate targets. Although the LCDI has not touched upon the private sector yet, the Indonesian government needs to incentivize corporate participation in the climate actions and promote public-private collaboration. The LCDI's momentum can be increased and optimized with the engagement generated with the wide range of critical stakeholders, including the private sector, through the design of an integrated data management system.

INTRODUCTION

1.1 Context

The Intergovernmental Panel on Climate Change's special report *Global Warming of 1.5°C* emphasizes the urgency of accelerated policy implementation and investments and makes clear that achieving net-zero greenhouse gas (GHG) emissions by 2050 is both possible and necessary to meet the Paris Agreement's 1.5°C goal. Countries and companies must establish targets and policies that enable each other to go further and faster to outpace the most damaging and disruptive effects of climate change.

The landmark Paris Agreement requires all Parties to communicate their climate plans through nationally determined contributions (NDCs). The NDCs help strengthen the global effort to keep the global temperature rise this century well below 2°C above preindustrial levels. They also strive to limit the temperature increase even further—to 1.5°C—and to increase countries' resilience in the face of a climate crisis. To make these goals a reality, the agreement calls for the appropriate mobilization and provision of financial resources, technology transfers, and enhanced capacity building for developing countries and for aligning financial flows with the agreement's goals (low GHG emissions and a climate-resilient pathway). The Paris Agreement relies on a cycle of planning NDCs, implementing climate actions, and then reviewing both individual and collective efforts to enhance the next round of climate plans (Dagnet and Cogswell 2018). The agreement also provides an enhanced transparency framework for action and support by having all Parties regularly report their individual commitments and then sum up these commitments in a collective stocktaking exercise to spur more ambitious actions by Parties every five years.

The Paris Agreement's enhanced transparency framework has important implications for nonstate actors (NSAs), particularly the private sector. Countries will be looking to the private sector for data on GHG emissions to ensure their measurement, reporting, and verification (MRV) systems are accurate and complete. For developing countries, these transparency challenges can be exacerbated by the lack or unavailability of high-quality data and difficulties in developing institutional structures to sustainably collect, manage, and coordinate data (Dagnet et al. 2019b). Challenges like these may limit governments from improving their national GHG inventories or undermine support and trust in carbon markets. It is important to enhance governments' capacity for managing data, but it is just as important to be sure that governments are able to effectively leverage the information collected by NSAs, including the private sector, for decision-making.

In light of the global context and requirements set by the Paris Agreement, this paper explores how Indonesia can engage with the private sector to advance climate transparency, fulfill international requirements, and enhance climate action. This paper is a contribution to the Partnership to Strengthen Transparency for co-Innovation (PaSTI; see Box 1). It builds upon a previous regional PaSTI analysis, *“Data and Ambition Loops for Enhanced Climate Action: Potential Drivers and Opportunities in Asia,”* which considers how governments and the private sector can work together to develop more robust and accurate data that can support decision-making for greater climate action (Dagnet et al. 2019b). The previous PaSTI paper presents a new lens through which to view the relationship between governments and the private sector. Governments have often relied on various policy instruments for environmental change—from mandatory requirements to financial incentives. The work of Metzger et al. (2018) notes that the policy relationship is not solely a one-way relationship where the private sector only responds to the mandates or incentives of governments; rather, policy action is supported with corporate leadership to create accelerated action. Metzger et al. (2018) applied this lens to enhancing climate action and coined the term *ambition loop*.

Dagnet et al. (2019b) built upon the lens first introduced in Metzger et al. (2018) and applied the idea of mutually reinforcing actions from governments and the private sector to climate data and transparency efforts. Fulfilling the international requirements of the Paris Agreement requires that governments have a proper understanding of the GHG emissions and climate actions from the private sector. Governments can foster an environment that encourages the exchange of necessary information with the private sector. Dagnet et al. (2019b) first introduced the concept of a “data loop,” which is a positive “relationship between governments and the private sector focused on enhancing data sharing and climate action, whereby the private sector engages in data reporting, responds to data-reporting arrangements and strives to reduce its carbon footprint, while governments provide incentives and develop systems to collect and properly receive such data, and signal further climate actions.” This paper applies this concept to Indonesia and explores how the Indonesian government and private sector actors can work together to support enhanced data collection, data sharing, and inform greater climate action.

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

The Partnership to Strengthen Transparency for co-Innovation (PaSTI) is an initiative of Japan's Ministry of the Environment and 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-Pacific 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/National Development Planning Agency (Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional; Kementerian PPN/BAPPENAS). This work aims to enhance collaboration between the government and the private sector to strengthen transparency of GHG emissions reductions and to increase climate action ambition.

Two forthcoming publications will further explore opportunities to build an effective data loop in Indonesia:

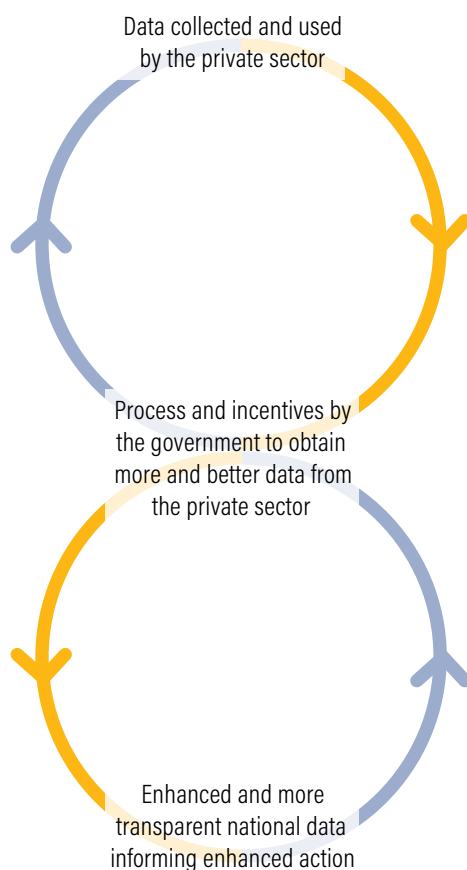
- **A policy and economic analysis.** Building upon the findings in the policy brief, this Working Paper will seek to further explore how to implement data and ambition loops in Indonesia. The paper will dive into policy options for the Indonesian national government to facilitate private sector reporting based on existing mandatory reporting requirements, such as developing a one-gate reporting system. It will explore opportunities for the government to support and incentivize voluntary reporting efforts and climate action from the private sector. Finally, it will also explore the economic benefits of climate transparency.
- **A guidebook.** Building upon the policy and economic analysis, the guidebook will provide specific guidance and methodologies for the private sector to navigate new policy options, including operationalizing a one-gate reporting system.

The primary idea of the data loop is to highlight the importance of collaboration between the private sector and governments. The data loop explores the government–private sector relationship through the lens of climate-relevant data. Successfully addressing climate change will require strong relationships between governments and the private sector on a number of different topics—from climate-relevant data to enhanced climate action. The aim of the data loop is to illustrate how governments and the private sector can advance their cooperation and collaboration for climate-relevant data. Both governments and the private sector use climate data to demonstrate their commitment to addressing climate change and to illustrate the ways in which they have implemented climate actions—and the success of those actions. Furthering collaboration on this topic could encourage both governments and the private sector to take additional action and inform public policy. Specifically, the data loop offers a framework for considering how both the government and the private sector play a key role in strengthening cooperation on the topic of climate data.

Figure 1 visualizes the data loop, illustrating three key moments in the government–private sector relationship:

- **The private sector collects data and reports to the government.** Data availability is the bedrock of the data loop, with the private sector needing to collect data on its GHG emissions, energy use, climate actions, and more. It is also important to understand how data are collected; governments set mandatory requirements for data collection and reporting, but a number of initiatives, such as the Greenhouse Gas Protocol, exist to support private sector data collection. To effectively support public policy, the private sector may be asked or required to share certain information with governments and follow governmental reporting standards.
- **The government develops the reporting system and explores opportunities to enhance private sector data collection and reporting.** As governments ask the private sector to report and share data, governments must also acknowledge the role they play in creating the structures and processes for such reporting. Governments may explore various institutional arrangements and consider other ways through which to encourage reporting and/or prevent noncompliance.

Figure 1. | **Illustrating the Data Loop**



Sources : Dagnet et al. 2019b.

- **Governments and the private sector can use data to strengthen collaborative efforts and support enhanced climate action.** Data collection and reporting are valuable in their own right, but they can also be used to support public policy and enhanced climate action. Leveraging the data loop with the concept of the ambition loop could support efforts to fulfill the goals of the Paris Agreement.

This paper is divided into three main sections, with each addressing a component of the data loop as depicted in Figure 1. Section 2 explores the role of the private sector in the data loop, including how the private sector reports to the Indonesian government. This section was developed based on a review of all current government mandates and regulations relevant to the operationalization of Indonesia's existing reporting systems; discussions of these systems are informed by focus group discussions with the responsible ministries that are in charge of maintaining these systems (for more on the focus group discussions, see Appendix B).

Section 3 focuses on efforts governments can take to support private sector reporting. This section draws on experiences from Japan, which is a PaSTI partner and has a history of developing its GHG inventory and climate transparency systems as well as engaging the private sector. Section 3 has been informed by a study tour to Japan. The paper's authors, along with Indonesian government officials, visited the country to learn about Japan's experience in developing its reporting system and engaging the private sector. This experience supplements the aforementioned focus group discussions in order to present potential opportunities for the Indonesian government to facilitate private sector reporting.

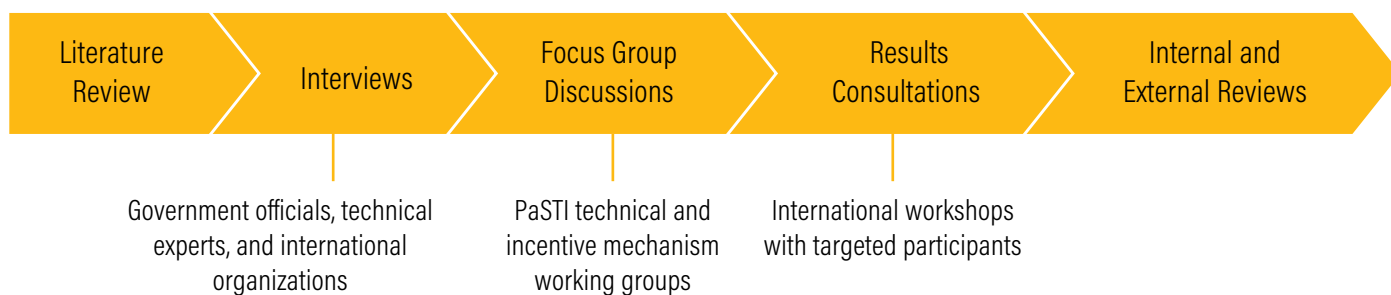
Section 4 presents a discussion of ways in which the data loop could lead to enhanced climate action and support the ambition loop concept. This section, in particular, explores Indonesia's Low Carbon Development Initiative (LCDI), carbon pricing, and the Science Based Targets initiative (SBTi). The discussion of the LCDI is informed by the authors' work on the project, and the discussions of SBTi and carbon pricing draw on the research in Dagnet et al. (2019b) and discusses their key elements.

1.2 Study Approach

This Working Paper was developed through a comprehensive data-gathering process that included a literature review, interviews and focus group discussions, and a series of public convenings and consultations. The process is explained in further detail below (see Figure 2).

- **Literature review.** Desk study and analysis of relevant studies and platforms were conducted. These include peer-reviewed journals and gray literature, such as reports from nongovernmental organizations, legal documents related to climate change in Indonesia, and technical guidelines from various climate-reporting platforms.
- **Interviews.** After completing the literature review, the paper's annotated outline was then discussed through one-on-one interviews with the national government and various experts to scope out relevant data and information. The respondents included BAPPENAS, the Ministry of Industry (Kementerian Perindustrian; Kemenperin), the Special Envoy to the President of Indonesia on Climate Change, and the World Energy Council. An interview with the Japanese government was also conducted during a technical training held in Japan in July 2019. These interviews targeted respondents who had knowledge and capacity in the subject matter. (See Appendix A for the list of interviewees and questions.)
- **Focus group discussions.** A series of focus group discussions was conducted between January and February 2019 with Indonesian government officials, representatives from the private sector, and experts from universities and organizations that have broad experience in Indonesia's climate transparency systems. The main objectives of these discussions were to review the specifics of each reporting platform and identify the main climate data transparency challenges in Indonesia. (See Appendix B for the complete list of stakeholders and the key findings summary for the process.)

Figure 2. | **Development Process of the Working Paper**



Note: PaSTI = Partnership to Strengthen Transparency for co-Innovation.

Source: Authors.

- **Stakeholder consultations.** The findings of this paper were presented at an international workshop held in Jakarta, Indonesia, in February 2020. Stakeholders from key ministries, the private sector, nonprofit organizations, and members of the media participated in a robust dialogue that resulted in a positive response. In addition, the findings were also disseminated to Association of Southeast Asian Nations (ASEAN) audiences during the Asia-Pacific Climate Week 2019 and other regional events, such as PaSTI's Japan-ASEAN Integration Fund Workshop 2019 in Manila and the Center of International Law Workshop 2019 at the National University of Singapore. Feedback was also gathered from present stakeholders during those events.

- **Internal and external reviews.** The final draft of this Working Paper underwent an extensive internal and external review process that included 11 reviewers from the Indonesian government, the private sector, experts, and international organizations. Their feedback was carefully considered and integrated into the final version of the paper. The internal and external reviewers are shown in the Acknowledgments section.

THE ROLE OF THE PRIVATE SECTOR

Accurate and credible data is necessary to inform Indonesia's policymaking on climate change and fulfill the Paris Agreement's international requirement that governments have a proper understanding of the GHG emissions and climate actions from the private sector.

The private sector can participate in voluntary programs and initiatives that collect and track climate data as well as set internal standards that align sectoral, subnational, or national climate targets. Although these voluntary efforts may limit the accuracy and consistency of the data and may not be suitable for inclusion in national transparency efforts, they build overall transparency and trust in private sector action and pledges (UNCTAD 2013).

Mandatory reporting is the primary way in which the private sector engages with the government on data collection and usage. These systems help ensure that the data being reported are consistent and accurate and, in turn, help boost stakeholder confidence in the information provided (Singh et al. 2015). Furthermore, aligning other domestic requirements and policies, as well as other international GHG reporting systems, benefits national priorities.

This section reviews and discusses the key elements of the five existing climate reporting systems in Indonesia: (i) Monitoring, Evaluation and Reporting Online (Pemantauan, Evaluasi dan Pelaporan Online; PEP Online); (ii) Energy Management Online Reporting (Pelaporan Online Manajemen Energi; POME); (iii) the Private Sectors Performance Rating Program (Program Penilaian Peringkat Kinerja Perusahaan; PROPER); (iv) the Calculation and Reporting Application for Electricity Emissions (Aplikasi Penghitungan dan Pelaporan Emisi Ketenagalistrikan; APPLE-Gatrik); and (v) the National Industry Information System (Sistem Informasi Industri Nasional; SIINAS). These systems support data exchange between the private sector and the government and are maintained by four separate government ministries. They vary in terms of the type of data collected and their reporting deadlines, and each is based on different regulations.

2.1. PEP Online

PEP Online is the monitoring, evaluation, and reporting (MER) system owned and developed by BAPPENAS. To measure implementation progress on climate action, a good monitoring system is needed to evaluate the performance of climate mitigation action through GHG emissions reductions. The MER system for climate mitigation actions, or the so-called PEP Online, was initiated to meet this need. PEP Online is a web-based application with the following objectives (Kementerian PPN/BAPPENAS 2019):

- Outlining the achievements and activities of the National Climate Actions for Greenhouse Gas (Rencana Aksi Iklim Nasional Gas Rumah Kaca; RAN-GRK) and the Sub-National Climate Actions for Greenhouse Gas (Rencana Aksi Iklim Daerah Gas Rumah Kaca; RAD-GRK)
- Enhancing the efficiency of data collection and information on the implementation of mitigation activities to achieve GHG emissions reduction targets
- Preparing the evaluation materials for policymaking/actions needed to improve the implementation of RAN-GRK and RAD-GRK over time
- Providing annual reports on the national GHG emissions reduction achievements
- Enhancing user accessibility in reporting mitigation actions and others related to provincial or national climate mitigation commitments

Data reported to the PEP Online system include emissions reduction calculation data, national and regional mitigation data, and emissions intensity calculation data. The reporting period for PEP Online is from January to April each year. PEP Online reporting activities only cover MER activities, not verification. The detailed concept of the MER cycle in PEP Online is shown in Appendix C.

It should be noted that in early 2020, PEP Online was being superseded by the Indonesian Low Carbon Development Planning and Monitoring Application (Aplikasi Perencanaan dan Pemantauan Pembangunan Rendah Karbon Indonesia; to be AKSARA) to capture the implementation of the LCDI (Partnership on Transparency in the Paris Agreement, 2020).

2.2. POME

According to Government Regulation (PP) No. 70 of 2009 on Energy Conservation, every company that consumes more than 6,000 tons of oil equivalent (TOE) must report its energy use every year. This is aligned with the Ministry of Energy and Mineral Resources (Kementerian Energi dan Sumber Daya Mineral; ESDM) target of reducing energy consumption by 17 percent from business as usual. These outcomes are expected to enhance energy security, economic growth, and competitiveness as well as save energy in the industrial, commercial, household, and transportation sectors.

Owned and managed by the Director General of New and Renewable Energy and Energy Conservation of the ESDM, POME was created as a platform for companies to report their energy use and energy management every year. It includes variable data, power plant data, energy usage data, energy efficiency activities and investment, and energy efficiency activity plans (ESDM 2019). The GHG inventory is reported by companies that have operational control over the electricity generation units. Activity data reported include direct emissions from fuel combustion in boilers, diesel engines, generators, gas engines, and gas turbines; direct GHG emissions from moving sources of company operational vehicles such as motor vehicles (cars, excavators, ships, etc.); treatment of steam waste produced; and fugitive emissions.

2.3. APPLE-Gatrik

APPLE-Gatrik was developed as a platform for companies to do inventory and report GHG emissions to the ESDM. Managed by the Director General of Electricity, power plant holding companies are required to report their GHG emissions inventory for the electricity sector to the ESDM resources every April (ESDM 2019). The GHG inventory is reported by companies that have operational control over the electricity generation units. Activity data reported include direct emissions from fuel combustion in boilers, diesel engines, generators, gas engines, and gas turbines; direct GHG emissions from moving sources of company operational vehicles, such as motor vehicles (cars, excavators, ships, etc.); treatment of steam waste produced; and fugitive emissions.

2.4. PROPER

Based on Act (UU) No. 32 of 2009 on Environmental Protection and Management, the Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan; KLHK) is required to conduct an environmental audit covering planning, implementation, and reporting steps to improve the quality of environmental management. The PROPER system was created to help manage this audit and is divided into two categories: assessment of compliance and assessment of performance beyond compliance. Assessment of compliance begins with the preparation stage and is carried out from January to March each year. After preparation, the program continues with the controlling phase through verification in the field and evaluating assessment documents to obtain the company's temporary compliance rating. (See Appendix D for descriptions of the compliance ratings.)

PROPER's criteria are designed to encourage businesses to systematically mitigate impacts and to use measurable performance indicators. Hence, businesses are expected to not only make mitigation efforts but also measure and report on environmental management performance. Data that must be reported in PROPER consists of energy efficiency, emissions reductions, water savings, waste utilization and management, and biodiversity protection. As a result, annual efforts to improve environmental management and quality have been reported quantitatively.

2.5. SIINAS

Based on the Act (UU) No. 3 of 2014 on Industrial Affairs, SIINAS was developed as an integrated information system. It contains data and information about national industry and is managed by Kemenperin. Its scope includes collecting and processing data and presenting information. To collect data, industrial companies and estate managers prepare and submit online production reports to SIINAS. In a reciprocal arrangement, industrial companies can freely access industry information provided by Kemenperin, such as information on market opportunities, regulations, and developments in exports and imports. SIINAS collects data on energy use, the production process, waste management, mitigation activities, industrial supporting facilities and infrastructure, and industrial technology.

2.6. Understanding the Reporting Landscape

Table 1 provides a summary of the five different reporting systems detailed in this chapter. In particular, the table notes the relevant regulation, the operating ministry, the types of data collected, whether reporting is mandatory or voluntary, and reporting timelines.

Because these systems gather and calculate a variety of data types using different methodologies, participating companies must prepare and submit a number of different reports. Several private sector officials whom we interviewed (from three sectors: cement, fertilizers, and power generation) stated that this whole process can be time-consuming and requires extra resources, which could hinder overall private sector participation in MRV activities, especially for small and medium-size companies that are unlikely to have staff that specifically handle sustainability affairs. Furthermore, different regulations apply for each reporting system, with some requiring mandatory reporting and others allowing voluntary reporting, with varied reporting deadlines. Based on the focus group discussions both with ministries and private sectors (Appendix B), these different requirements could pose a burden to the companies and might decrease the quality of the data that are being reported.

Company representatives have already experienced problems with data overlap, resulting in double reporting within line ministries (Table 2), as discussed during the first focus group discussion (Appendix B). For example, an entity might report energy efficiency data to three different reporting systems with the same datasets, which is time-consuming and inefficient.

Table 1. | **Summary of the Reporting Systems Used by the Government of Indonesia**

Data Type	PEP Online	POME	APPLE-Gatrik	PROPER	SIINAS
Regulation	Presidential Regulation (PERPRES) No. 61 of 2011	Government Regulation (PP) No. 70 of 2009 on Energy Conservation	Act (UU) No. 30 of 2009 on Electricity	Act (UU) No. 32 of 2009 on Environmental Protection and Management	Act (UU) No. 3 of 2014 on Industrial Affairs
Operating ministry	Ministry of National Development Planning	Ministry of Energy and Mineral Resources	Ministry of Energy and Mineral Resources	Ministry of Environment and Forestry	Ministry of Industry
Web address	http://pep.pprk.bappenas.go.id	http://pome.ebtke.esdm.go.id/	https://apple-gatrik.esdm.go.id/	http://proper.menlh.go.id/	https://siinas.kemenperin.go.id/
Data reported	<ul style="list-style-type: none"> • Number of emissions reduction calculations • Number of national and regional mitigation actions • Number of emissions intensity calculations 	<ul style="list-style-type: none"> • GHG emissions variable data • Power plant data • Energy use • Energy efficiency activities and Investment 	<ul style="list-style-type: none"> • GHG emissions variable data • Direct emissions from fuel combustion in boilers, diesel engines, generators, gas engines, and gas turbines • GHG emissions directly from moving sources of company operational vehicles such as motor vehicles (cars, excavators, ships, etc.) • Treatment of steam waste produced • Fugitive emissions 	<ul style="list-style-type: none"> • GHG emissions variable data • Energy efficiency • Emissions reductions • Water saving • Waste utilization and management • Biodiversity protection 	<ul style="list-style-type: none"> • Energy use • Production process data • Waste management data • Mitigation activities • Industrial supporting facilities and infrastructure data • Industrial technology data
Data reported	Mandatory	Mandatory for companies that regularly consume energy above 6,000 tons of oil equivalent	Mandatory for companies that have power plants	Mandatory for companies that want to get an environmental permit	Voluntary
Reporting period	January–April	January–March	April–June	January–March	May–June

Note: APPLE-Gatrik = Aplikasi Penghitungan dan Pelaporan Emisi Ketenagalistrikan (Calculation and Reporting Application for Electricity Emissions); GHG = greenhouse gas; PEP Online = Pemantauan, Evaluasi dan Pelaporan Online (Monitoring, Evaluation and Reporting Online); POME = Pelaporan Online Manajemen Energi (Energy Management Online Reporting); PROPER = Program Penilaian Peringkat Kinerja Perusahaan (Private Sectors Performance Rating Program); SIINAS = Sistem Informasi Industri Nasional (National Industry Information System).

Source: Authors' analysis.

Table 2. | **Comparison of Datasets Submitted to the MRV**

Data Type	PEP Online	POME	APPLE-Gatrik	PROPER	SIINAS
Number of emissions reduction calculations data	●	●			●
Number of national and regional mitigation actions data	●				
Mitigation activities	●	●			●
Number of emissions intensity calculations data	●				
GHG emissions variable data		●	●	●	●
Power plant data		●	●		
Energy use data		●	●	●	●
Energy efficiency activities and investment	●	●	●		
Emissions reduction	●	●		●	●
Water saving				●	
Utilization of hazardous and toxic materials and nonhazardous and toxic materials waste that has been produced by the company				●	●
Biodiversity protection				●	
Production process data				●	
Waste management data			●	●	●
Industrial supporting facilities and infrastructure data					●
Industrial technology data			●		●
Direct emissions from burning fuel in boilers, diesel engines, generator sets, gas engines, gas turbines			●		
GHG emissions directly from moving sources (operational vehicles)			●		●
Fugitive emissions			●		

Note: APPLE-Gatrik = Aplikasi Penghitungan dan Pelaporan Emisi Ketenagalistrikan (Calculation and Reporting Application for Electricity Emissions); GHG = greenhouse gas; PEP Online = Pemantauan, Evaluasi dan Pelaporan Online (Monitoring, Evaluation and Reporting Online); POME = Pelaporan Online Manajemen Energi (Energy Management Online Reporting); PROPER = Program Penilaian Peringkat Kinerja Perusahaan (Private Sectors Performance Rating Program); SIINAS = Sistem Informasi Industri Nasional (National Industry Information System).

Source: Authors' analysis.

THE ROLE OF GOVERNMENTS: LESSONS FROM JAPAN AND OPPORTUNITIES FOR INDONESIA

For the data loop to work, it is vital to build trust between governments and the private sector. Creating appropriate legislative arrangements that enhance mandatory reporting systems and supporting voluntary reporting schemes can improve the relationship between governments and companies, thereby supporting a more robust data loop (Dagnet et al. 2019b).

Governments play a critical role in supporting corporate climate reporting. When governments ask or require data to be reported directly to their agencies, they should develop an approach and system that works for both the government and the private sector. Governments must be sure to organize their legal, institutional, and legislative arrangements in an effective manner.

It is important for governments to clearly establish the legal architecture for mandatory reporting schemes. This helps to prevent duplication and facilitates better private sector engagement. Different countries have taken different approaches in doing so. In the United Kingdom, GHG reporting provisions were folded into existing law; in Australia and Mexico, new legislation was adopted (Singh et al. 2015). Regardless of how countries build either architecture, it is necessary to take advantage of and align with established systems, procedures, compliance, and enforcement measures to build on existing capacities and minimize the additional burden on reporting entities (Singh et al. 2015).

Governments may also look to the private sector to help develop a system that enhances trust between policymakers and stakeholders and works for all parties. By involving stakeholders and developing “buy in,” governments can promote compliance and improved data quality and resolve conflicts. These efforts can

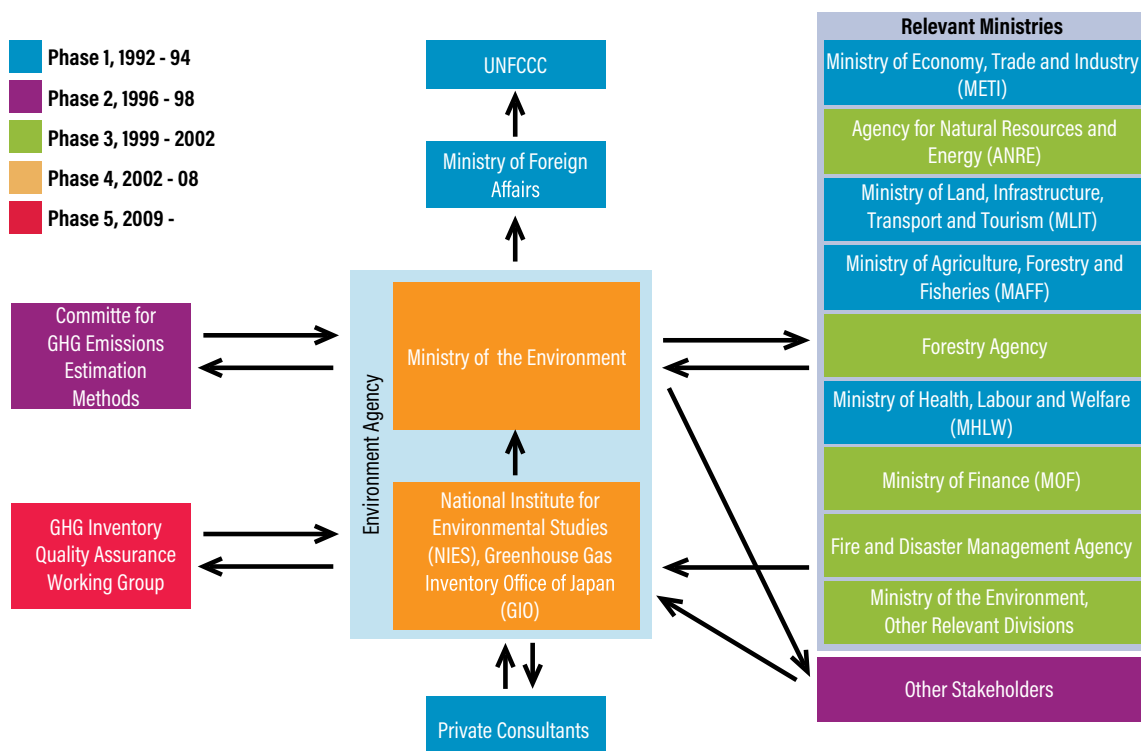
improve reporting. The Republic of Korea’s GHG and Energy Target Management System, for instance, was developed through in-depth consultations and negotiations between the government and private sector actors (Shrivastava 2015). This promotes cooperation and ensures ownership of the program by key stakeholders (Shrivastava 2015).

Governments can also work to allay concerns from the private sector regarding the safety and confidentiality of their data. There are a number of different ways to ensure the confidentiality of commercially sensitive data without sacrificing the transparency and usability of reported information. For example, governments could allow the private sector to declare specific activity and process-related data confidential; this information would still be reported but would not be disclosed publicly (Singh et al. 2015). Other practices allow the private sector to indicate that certain data must be treated as confidential with appropriate justifications (Singh et al. 2015). For datasets with key climate information, governments can work to organize data supply agreements, which could outline how information is to be treated, with specific private sector actors.

3.1. Lessons from Japan

Japan’s experience in building an MRV system and engaging with NSAs can provide the region with some lessons learned. In 1992, Japan began with a small GHG inventory team (MOE 2018). However, over the years since, Japan has engaged more ministries and different stakeholders and has reorganized its institutional arrangements to more effectively improve the quality of its GHG inventories (Dagnet et al. 2019a). Japan built its MRV system over time, recognizing that rushing to impose a new structure would likely cause additional challenges and burdens. By evolving the MRV system gradually, Japan was able to work through barriers between ministries and develop its existing complex structure in a way that operates effectively (Dagnet et al. 2019a). Figure 3 below shows the history of the MRV system in Japan, which evolved over 17 years to reach its current structure.

Figure 3. | The History of Japan's MRV System



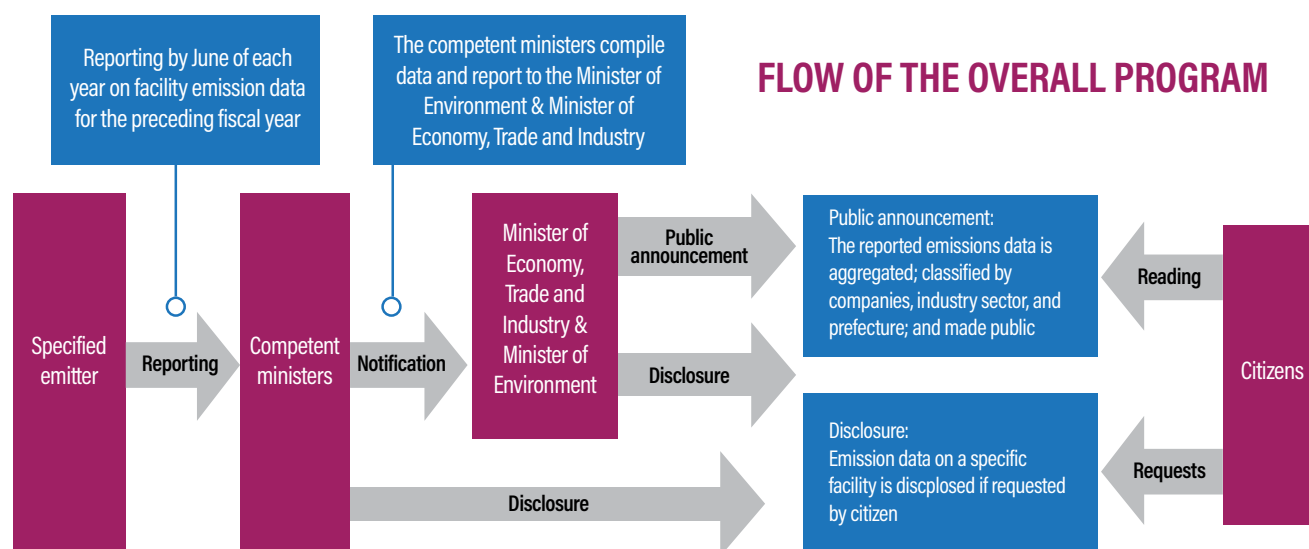
Note: GHG = greenhouse gas; MRV = measurement, reporting, and verification; UNFCCC = United Nations Framework Convention on Climate Change.
 Source: Adapted from Dagnet et al. 2019a.

3.1.1. Mandatory GHG Reporting System

In 1998, Japan's Act on Promotion of Global Warming Countermeasures was established as the first step of measures to combat climate change by formulating a plan to attain targets under the Kyoto Protocol. The act has been revised several times, including to address issues related to the Kyoto Protocol, to formulate guidelines for business operators, and for plans to replace the Kyoto Protocol targets.

One of the key revisions most important for the private sector is the establishment of the Mandatory Greenhouse Gas Accounting and Reporting System in 2005. The mandatory reporting system requires entities that emit large amounts of GHGs—regardless of business type—to calculate their emissions and report the result to the government, which compiles the reported data and announces the result. The GHGs, namely carbon dioxide (CO₂), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride are subject to reporting. A penalty is imposed for violating the reporting obligations or making false reports, with fines rising to a maximum of 200,000 yen. Figure 4 shows the flow of the overall program.

Figure 4. | **Mandatory GHG Accounting and Reporting System Program Flow**



Sources: Ministry of Environment Japan

3.1.2. The Government Supports Climate Change Action Driven by the Private Sector

The Japanese government has supported corporate climate change initiatives, providing guidance and supports, including the Green Value Chain Platform, the Task Force on Climate-related Financial Disclosures (TCFD) guidelines, and the SBTi.

3.1.2.1. GREEN VALUE CHAIN PLATFORM

To support countries in calculating GHG emissions throughout their supply chains, Japan's Ministry of Economy, Trade and Industry (METI) and Ministry of the Environment (MOE) developed national guidelines for calculating supply chain emissions. This guidance, "Basic Guidelines on Accounting for Greenhouse Gas Emissions throughout the Supply Chain", was first released in March 2012. The guidance notes its efforts for consistency with the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard but states the guidance was "formulated in accordance with conditions in Japan" (MOE and METI 2012). The Green Value Chain Platform serves as a supply chain emissions information platform.

3.1.2.2. TCFD GUIDANCE

The TCFD's role in supporting greater voluntary reporting is described in Section 1.1 on the data loop. In Japan, METI launched a study group to consider ideal approaches for implementing the guidelines through discussions with stakeholders in Japan. At the end of 2018, METI declared support for the TCFD recommendations and published guidance to support the private sector in implementing them (METI 2018). In addition, MOE released a practical guide for scenario analysis in line with the TCFD recommendations in March 2019. This is the first practical guide to show how companies should implement scenario analysis to integrate climate-related risk and opportunities into their own management strategies by utilizing the TCFD recommendations.

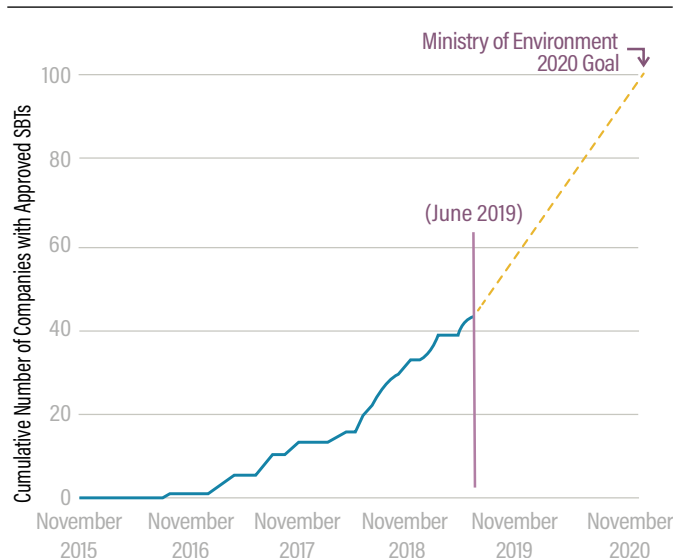
In May 2019, Japanese companies came together to form a consortium, with 164 members, in support of the TCFD. The consortium aimed to draft further guidelines for financial institutions by late 2019 (Nagata 2019).

3.1.2.3. THE SCIENCE BASED TARGETS INITIATIVE

Japan's MOE operates the Programme on Promotion for Enhancement of Corporate Value with Decarbonized Management to encourage private companies to set ambitious targets consistent with the Paris Agreement, including through the SBTi. This program promotes effectively reducing GHG emissions throughout the supply chain and engages in decarbonized management by incorporating risks and opportunities of climate change to their management strategies in line with TCFD.

As the result of this initiative, the number of companies that participate in the SBTi has grown in recent years (Figure 5). Aden (2019) mentioned that as of October 15, 2019, the number has increased to 82 in total, including 52 companies with set and approved targets and another 30 companies committed to setting a target. MOE set a target of having 100 Japanese companies with approved science-based targets by 2020 and is supporting businesses in setting targets, including with a dedicated budget. Companies can apply to MOE for assistance and may receive dedicated advice from consultants. After first being limited to large companies, the program has expanded in recent years to small and medium-sized businesses (Aden 2019).

Figure 5 | **Growth in the number of Japanese companies setting science-based targets**



Source: Adapted from Aden 2019.

In the latest long-term climate and growth strategy that was submitted, Japan also acknowledged the SBTi as one of the international initiatives that is becoming more influential. The inclusion of science-based targets in official Japanese documents indicates that the government may start the public-private collaboration by leveraging the internationally established initiatives. Opportunities for Indonesia to apply science-based targets or other initiatives and have them endorsed by the government are still wide open. As of November 30, 2020, only 14 companies from ASEAN countries were participating in the SBTi, with 7 companies having approved targets from Singapore, Thailand, Malaysia, and Cambodia but none from Indonesia. Therefore, leveraging the SBTi would be a great way for the Indonesian government to start collaborating with the private sector.

Overall, Japan shows that collaboration plays a critical role in increasing participation in climate action. Several lessons can be learned from Japan's decades-long effort to establish its current MRV system:

- **Establish a clear institutional arrangement.** It is clear from Figure 3 that Japan had already built a clear GHG management framework. In this case, Indonesia may also adopt a similar arrangement by establishing a separate climate change agency that collaborates with each respective sector.
- **Start with voluntary actions.** Japan took years to establish the mandatory GHG reporting. The process was taken with a long dialogue and collaboration across all relevant stakeholders. Indonesia could also start by establishing voluntary platform to attract participation. By the time those voluntary systems are settled, mandatory reporting could be further established. Indonesia also has a big opportunity to leverage the international initiatives, such as the SBTi and the CDP. Lessons from Asia also show that governments can support better GHG reporting and data management by encouraging voluntary reporting while also developing a mandatory reporting system (Dagnet et al. 2019b).
- **Collaborate with the private sector and business associations.** Japan also found that the corporate sectors of other countries were hesitant to join climate actions. By engaging corporations in the high-level dialogue, the government could clearly understand the expectation of each member. As mentioned in Japan's recently submitted long-term strategy, a "virtuous cycle of environment and growth" will lead to business-led disruptive innovation, rapid implementation of actions, and efforts from other countries (Government of Japan 2019). Learning from this, the government of Indonesia could start engaging the private sector through associations such as the Indonesian Chamber of Commerce and Industry (Kamar Dagang dan Industri Indonesia), which has a big influence in the overall market in Indonesia. Specific sector associations, such as the Indonesia Cement Association (Asosiasi Semen Indonesia) and Indonesia's Fertilizer Producers Association (Asosiasi Produsen Pupuk Indonesia), could be another alternative. At the end of the day, engaging with the associations will likely make it easier for the government to approach individual members.

3.2. Opportunities and Challenges in Indonesia

The authors recommend that the Indonesian government follow the example set by the Japanese government and encourage companies to set and communicate ambitious carbon-reduction goals consistent with the Paris Agreement. Furthermore, the government can support this position by linking such efforts with its NDC. Indonesia is home to many supply chain companies whose resourcefulness in reducing GHG emissions and water use while benefiting businesses, customers, and communities may remain untapped. This is mainly due to the lack of awareness of the risks and opportunities (e.g., savings of US\$12.4 billion in 2016 based on LCDI modeling) that climate and water issues pose to their businesses and customers (Kementerian PPN/BAPPENAS 2019). No company headquartered in Indonesia has yet to participate in the SBTi. Based on the discussion above, the SBTi would be a great gateway for Indonesian companies to participate more strongly in climate actions. Leveraging the potential of industry associations and business organizations will be beneficial to start the process.

Governments can also encourage the private sector to share data by fostering an environment that incentivizes voluntary reporting. Awards, rankings, or certification schemes can be one such way to do so because they can improve business performance and positively affect reputations (Corporate Citizenship 2013). By building on existing reporting requirements or guidance, private sector participation in such initiatives can be beneficial to governments because it can strengthen companies' engagement in climate action. Furthermore, recurring awards and rankings can be an effective method of improving systems over time.

Although award schemes dedicated specifically to climate change have not yet been developed in the ASEAN region, there is a growing effort to acknowledge efforts in strengthening corporate sustainability and social responsibility. In Indonesia, for example, the Minister of BAPPENAS, the Indonesia Business Council for Sustainable Development, PricewaterhouseCoopers, and others host the annual Sustainable Business Awards in which companies are recognized in a number of different categories, including energy management and the United Nations Sustainable Development Goals (SDGs) (IBCSO 2019).

One opportunity to apply incentive schemes in Indonesia is to link with the SDGs. Incentive schemes provide a sense of recognition to participants—currently, the efforts of private actors are acknowledged in the annual SDGs report. SDG 13.2 on “climate action” discusses integrating climate change measures into national policies, strategies, and planning. The indicator for SDG 13.2 is the establishment of a policy/strategy/plan that increases the country's ability to adapt to the adverse impacts of climate change. In addition, SDG 17.17 is to “strengthen the means of implementation and revitalize the global partnership for sustainable development.” It encourages the promotion of effective public, public-private, and civil society partnerships, building on the experience and resourcing strategies of partnerships.

Considering the wide impact of SDGs on global development, acknowledgment of corporate action in the annual SDGs report in Indonesia may become a way to engage the country's private sector. SDGs already refer to companies, especially their role in corporate social responsibility. Lessons learned from Japan show that acknowledging climate action in the annual SDGs report has proved not only to enhance a company's reputation but also to attract more investment. A study by the National Bureau of Economic Research stated that “lack of transparency is associated with lower exposure of emerging market funds” (Gelos and Wei 2002). It also emphasized that lack of data from countries and companies will make investors hesitant and more likely to follow what other fund managers are doing instead of conducting their own analysis.

Based on the focus group discussion (Appendix B), and aside from the annual SDGs report, the Indonesian government could explore opportunities for a number of different incentives:

- **Rankings/ratings for companies that meet specific criteria.** This award has been adapted by PROPER. It recognizes the NSAs that have contributed to environmental and energy management based on what has been reported.
- **Awarding green certificates.** Certificates could acknowledge companies that have submitted their reports.
- **Reduced costs.** When a company only reports its data using a new uniform dataset, it can certainly reduce costs for resources from the reporting stage to the verification stage of data compliance.

- **Assurance, insurance, or other technical assistance to companies.** The government could offer technical assistance to companies willing to report their energy management activities.
- **Data security.** The government should guarantee the confidentiality of company data to avoid issues that could harm the company. This can be achieved by developing strong data confidentiality procedures and putting in place strict preventive measures.

By developing an integrated reporting system, Indonesia will be able to apply the data and ambition loop concept. The system will help increase private sector participation in transparency efforts, which will provide more robust data. Beyond the technical discussion with the PaSTI working group about the system's development, the Indonesian government could also provide the private sector with both financial and nonfinancial incentives. In Indonesia, the idea of incentivization is still targeted at developing financial schemes that could provide companies with immediate profit, and they have not been clearly established in the country. Environmental, social, and governance (ESG) financing in the country has been planned since 2015 as a part of the Financial Service Authority (Otoritas Jasa Keuangan) road map for sustainable finance, but explicit regulation with regard to sustainable financing and the inclusion of ESG financing was only implemented in 2017. In this regard, there is a clear opportunity to build robust financial incentives by leveraging data and ambition loops.

LEVERAGING DATA FOR ENHANCED CLIMATE ACTION

Improving the quality and quantity of climate and emissions data is incredibly important, but that data must also inform policymaking and efforts to enhance climate action. Given the urgency of addressing climate change, it is important to consider how enhanced data can lead to enhanced climate action. Companies and the private sector are looking for and pursuing climate change actions and solutions. At the same time, countries are looking to develop more ambitious climate plans. Leveraging the interest and actions from both governments and the private sector can drive even greater climate action. Metzger et al. (2018) introduced and defined the concept of an ambition loop as “a positive feedback loop in which bold business leadership supports bold policy action that in turn accelerates further business action.” Governments can provide confidence and clarity in order to provide the incentives and atmosphere to drive investments and action. Businesses, in turn, can set their own plans

for emissions reductions and provide inspiration to governments.

4.1. Enhancing Development Planning in Indonesia through Data

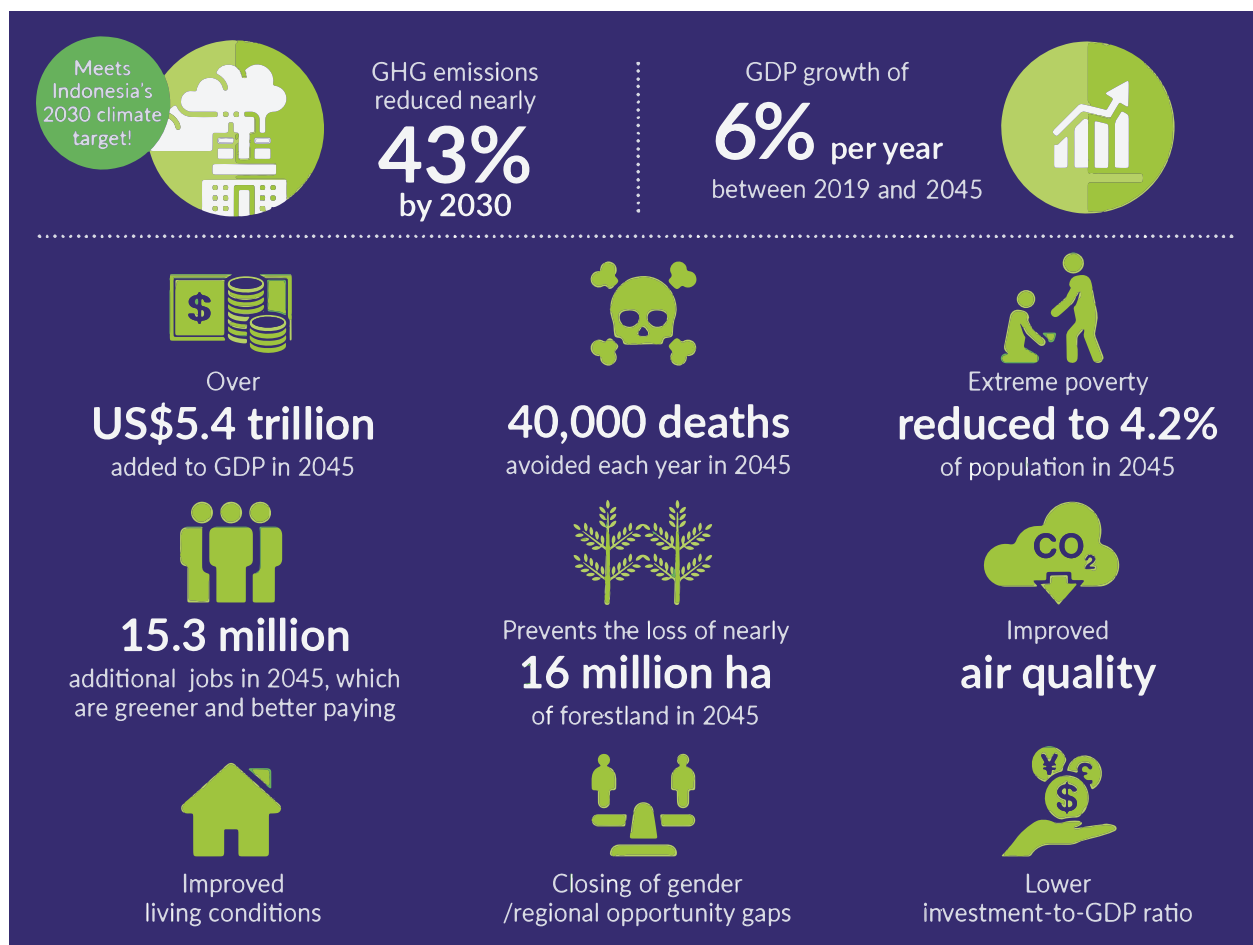
Having data can also be a key component of development planning. In October 2017, the government of Indonesia declared its goal of integrating climate action into the country's development agenda. The LCDI was launched on October 25, 2017, at BAPPENAS with a goal of explicitly incorporating carbon emissions reduction targets into the policy planning exercise. Over the long haul, Indonesia's development vision is guided by its National Long-Term Development Plan (Rencana Pembangunan Jangka Panjang Nasional) 2005–2025, which broadly seeks to establish a country that is “developed and self-reliant, just and democratic, and peaceful and united” (Kementerian PPN/BAPPENAS 2019). The long-term plan is being implemented through four medium-term plans of five years each, the current one covering the period 2015–19. Through the LCDI, it is expected that BAPPENAS will streamline low-carbon development policies into the upcoming National Medium-Term Development Plan (Rencana Pembangunan Jangka Menengah Nasional) 2020–2024.

A report by the LCDI estimated that a sustainable, inclusive, long-term growth path would deliver an average global gross domestic product growth rate of 6 percent per year until 2045. The report also found that a low-carbon development pathway could unlock an array of economic, social, and environmental benefits (Figure 6). The results of this study will now be integrated into Indonesia's next five-year development plan.

Ultimately, by taking a low-carbon development pathway, Indonesia's GHG emissions are estimated to drop by almost 43 percent by 2030, exceeding Indonesia's current national climate target of 41 percent below baseline (Kementerian PPN/BAPPENAS 2019). Further planning efforts can only be strengthened by building the proper data loop and ensuring an active and healthy relationship with the private sector.

While the LCDI will add momentum to the Indonesian government's efforts, the certainty it signals can also incentivize the private sector to take more responsibility for achieving the climate targets and contribute to the government's effort to meet SDGs. In Indonesia, no companies have yet to set or even commit to setting a science-based target. Building on the lessons from Japan, Indonesia may examine how best to encourage and support companies to participate in the SBTi. As

Figure 6. | **The Estimated Benefits of Indonesia's New Low-Carbon Growth Path (LCDI High Scenario Compared with Base Case)**



Note: GDP = gross domestic product; GHG = greenhouse gas; ha = hectare.
Source: Kementerian PPN/BAPPENAS 2019.

the private sector enhances its data in support of the LCDI, it may also be in a better position to participate in the initiative. Ultimately, having the right data, of strong quality and quantity, is the bedrock that informs enhanced climate action. Indonesia can significantly improve its ability to explore opportunities to advance and enhance climate action by strengthening, aligning, and ensuring the fitness of its data and MRV systems.

4.2. Data as a Bedrock for Science-Based Targets and Carbon Pricing

Opportunities arise around the world to promote more ambitious business actions to combat climate change. Such international initiatives as the SBTi serve as tools for companies to align with climate science across their supply chains. Furthermore, putting a price on carbon may be an opportunity for both public and private sector collaboration. This section will highlight the importance of data management to implement science-based targets and carbon pricing.

4.2.1. The Science Based Targets Initiative

Some companies have responded to the call from citizens and governments to decarbonize by 2050 by increasing their own climate actions and aligning their strategic growth plans with the goals of the Paris Agreement. About 500 companies have committed to set science-based emissions reduction targets to do their part to limit warming to below 2°C, and an additional 800 companies have indicated they plan to do so by 2019 (Science Based Targets n.d.). In the Asia-Pacific region, Japan is leading the way, followed by South Korea and then Singapore. ASEAN countries are behind, with Indonesia counting only five companies having committed to science-based targets in the construction/material sector (Dagnet et al. 2019b).

The 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 the CDP, the United Nations Global Compact, WRI, and the World Wide Fund for Nature, and is one of the We Mean Business coalition commitments.

The SBTi has developed best practices for setting science-based targets; independently assesses companies' targets; provides technical assistance through workshops, targeted guidance, and other resources; and builds awareness of companies' efforts. The supply chain sector is on the front line when it comes to ensuring long-term environmental sustainability (in view of its impact on energy consumption, deforestation, and the dispatching of trucks that emit many of the GHGs causing global warming). This may be particularly relevant for Asian countries, including Indonesia, because many supply chain suppliers are located in the region. For example, as part of the company's indirect emissions reduction target, Levi Strauss will expand its work with the Partnership for Cleaner Textiles to reduce emissions from suppliers in ASEAN countries, supporting the ambition loop in those countries. This could be a good "business benefit" selling point for ASEAN suppliers and foster green procurement. Other drivers for this uptake are customers, investors, and employees who expect companies to capture new market opportunities, realize the many economic and social benefits of keeping the world under a 1.5°C temperature increase, and develop greater resilience to climate change risks.

However, data is a key element of the success of the SBTi: to set targets, companies must have an understanding of their emissions data. All participating companies must publicly report their GHG emissions each year, though not necessarily to the government. Only with an understanding of their emissions are companies actually able to set targets that align with the goals of the Paris Agreement and the SBTi.

4.2.2. Carbon Pricing

Putting a price on carbon emissions can drive efficient emission reductions, spur innovation, and allow businesses and households to make clearer decisions about how they reduce emissions. If designed and implemented effectively, carbon pricing can also achieve broader sustainable development benefits and reduce economic inequalities. Carbon taxes or emissions trading systems are either in place or planned in 74 jurisdictions worldwide, covering 20 percent of global emissions (World Bank 2020). The 2017 High-Level Commission on Carbon Prices suggested that carbon prices should reach \$40–\$80 per tonne of CO₂ by 2020 and \$50–\$100 per tonne by 2030 (World Bank 2017). But half of carbon emissions covered by carbon pricing initiatives were priced at less than \$10 per tonne of CO₂ equivalent (World Bank and Ecofys 2018). However, in 2017 and 2018, several jurisdictions—including China and various states and provinces in the United States and Canada—expanded their pricing systems, and others, such as British Columbia, the European Union, and France, increased their prices (World Bank and Ecofys 2018). Other countries, including Chile, Colombia, Kazakhstan, Mexico, Singapore, and South Africa, are also designing economy-wide carbon pricing systems. This is a remarkable increase from the less than 1 percent coverage in 2004. The programs generated around \$33 billion in government revenues in 2017.

But there is an important condition to make it work: carbon pricing schemes rely on accurate data. If carbon emissions are not counted, they cannot be taxed or traded. Without an understanding of the emissions under the pricing scheme, the scheme cannot function effectively. Therefore, carbon pricing schemes require the government, the private sector, and all other participating stakeholders to have an accurate assessment of their data (Dagnet et al 2019b).

CONCLUSION

Achieving the objectives of the Paris Agreement and SDGs will require governments to step up their ambition—and do so in an inclusive and participatory manner with NSAs, especially the private sector. Indeed, countries will need strategies and policies to close the gap between existing plans and the pace and scale of investment needed to limit global warming to 1.5°C. But the Paris Agreement recognizes that governments alone will not succeed at the pace and scale required; thus, it encourages enhanced collaboration with NSAs. As part of PaSTI, the authors of this paper have explored how combined and mutually reinforcing government and corporate efforts can propel Indonesia on a sustainable path for decarbonizing its economy and making its society more climate resilient.

Enhanced transparency builds trust among countries. This is why countries committed under the Paris Agreement to track, report, and verify their progress in implementing their climate plans. As the momentum behind corporate climate action and transparency continues to build, there is a clear opportunity for countries to establish more systematic public-private collaborations through data sharing, analysis, reporting, and verification purposes. Enabling stronger MRV systems through more systematic data sharing would be mutually advantageous. Stronger MRV would not only help governments, including Indonesia, gather better information and data, but it would also allow them to better integrate the contributions of NSAs, including the private sector, when making climate projections and designing better incentive mechanisms for NSAs, ranging from award schemes to green procurement and carbon pricing. Similarly, enhanced reporting and disclosure can facilitate a better understanding and alignment of business decisions with emerging market trends and sustainability considerations, thus driving corporate and government actions more effectively towards a low-carbon economy.

A number of incentives and practices from around the world can enable a country like Indonesia to both enhance its data and inform the design of more ambitious climate action. The engagement between the government and the private sector is at the heart of the lens suggesting that greater engagement can support enhanced climate action. The incentives and practices fostering the implementation of such a transformative loop include voluntary and mandatory reporting and disclosure schemes underpinned by a robust data management system; this is supported by a strong legal and institutional framework, standards, and harmonized methodologies to measure and track corporate and government efforts. These schemes are expected to incentivize the private sector to share critical sectoral data of better quality to the government and to use such data to set up processes and mechanisms to reduce their own carbon footprints. In return, the government is empowered to report on its efforts and on plans to accelerate or scale up its climate efforts based on more accurate, evidence-based decisions. Such empowerment can be illustrated through government policies such as carbon pricing and trading or initiatives that lead private companies to set up science-based targets.

Indonesia has the opportunity to strengthen its data loop by integrating its climate reporting system and by enhancing private sector engagement and participation. Currently, similar datasets are being submitted by private sectors to five reporting systems—PEP Online, POME, APPLE-Gatrik, PROPER, and SIINAS—each with different methodologies. This paper suggests setting up a one-gate reporting system that will standardize datasets and strengthen the roles and responsibilities of the various ministries. The design and implementation of this integrated system is already under way through the PaSTI project.

Once initiatives such as Indonesia's LCDI are underpinned by more accurate data and supported by a more robust, integrated, and participatory reporting system, they can unleash commercial demand for decarbonizing various sectors of the economy. Through the LCDI, the

government can provide clarity in terms of direction and pace and offer confidence in long-term market development, based on stronger evidence and more accurate data generated through the more sustainable integrated MRV system described above. Ministers and other government officials responsible for national climate action would likely find support among leading companies interested in building and accelerating their climate action plans. With bolder policies and private sector leadership reinforcing each other, ambition loops will emerge, and Indonesia can move faster towards its climate and development goals. Furthermore, to increase more participation from NSAs, clear incentive mechanisms could be established similar to those undertaken by Japan and other countries.

Moving forward, further cost-benefit analysis is needed to identify which reporting schemes (e.g., mandatory versus voluntary), incentives, and initiatives (e.g., science-based targets, carbon pricing) should be put in place and how to implement them effectively and sustainably.

But this should not stop governments from embracing the data and ambition loop journey. That journey will not be perfect straight away—to pursue this loop, what matters is to start the journey, building on lessons and experiences from other countries.

APPENDIX A: INTERVIEWS

To complement the literature review, this study also draws insights from interviews with climate change experts and government officials.

The people interviewed were affiliated with the following organizations:

- Technical experts from the five reporting systems
 - PEP Online (BAPPENAS)
 - POME (ESDM)
 - APPLE-Gatrik (ESDM)
 - PROPER (KLHK)
 - SIINAS (Kemenperin)
- Climate change and transparency experts
 - World Energy Council
 - Special Envoy to the President of Indonesia on Climate Change
- International organizations
 - Overseas Environmental Cooperation Center, Japan
 - Deutsche Gesellschaft für Internationale Zusammenarbeit (German development agency)

The following questions were asked during the interview:

- How familiar are you with transparency and climate data issues?
- Do you think it is important to have climate data transparency in Indonesia? Why do you think it would be helpful or not helpful for Indonesia (capacity issue, political, or otherwise)?
- What are the challenges in achieving climate data transparency?
- What kind of additional capacity would be needed to improve climate data transparency?
- What are the roles different stakeholders can play to increase data transparency in Indonesia?

APPENDIX B: PASTI WORKING GROUPS

PaSTI Technical Working Group

Each ministry that handles the various reporting systems in Indonesia, along with each development partner, is represented in the technical working groups. Several focus group discussions on the integrated reporting platform were conducted with these representatives.

- BAPPENAS
 - Directorate of Environmental Affairs
- ESDM
 - Directorate of Energy Conservation
 - Directorate of Electricity Engineering and Environment
- Kemenperin
 - Center of Green Industry
 - Center of Data and Information
- KLHK
 - Secretary of Directorate General of Pollution and Environmental Damage Control
 - PROPER Secretariat
- RAN-GRK Secretariat
- Development partners
 - Technical Team from MER Online
 - WRI Indonesia
 - Indonesia Business Council for Sustainable Development

The main topic for discussion in the technical working group was the development of the One Gate Reporting System (OGReS). The discussion and activities of the working group are described below.

- **Establishing a technical working group with key relevant ministries** (BAPPENAS, KLHK, Kemenperin, ESDM). To formally start the working group activities, a study tour was conducted in Tokyo, Japan. During the technical tour, the working group discussed several things:

- MRV system development in Japan
- Incentives and disincentives for climate actions
- Incorporating SDGs and ESG into the reporting framework
- The site visit to Itoki in Chiba, Japan, to learn about the climate mitigation activities in the whole supply chain

Key takeaway:

- Several case studies to be included in the “Lessons from Japan” section of the paper (Section 3.1)
- **Capacity building for the technical working group.** Throughout several activities, the working group focused on developing capacity for each member of the technical working group. Through this process, we saw the willingness of each line ministry to synchronize its platform and provide the private sector with more nonfinancial incentives through the single reporting scenario that PaSTI interventions hope to develop.

Key takeaways:

- The capacities of the technical teams need to be improved with hands-on experience and peer-to-peer exchange
- The urgent need to establish a one-gate reporting system in Indonesia

- **Open platforms.** The working group conducted open platform discussions and meetings to see how to technically synchronize OGReS with the following platforms:

- PEP Online (BAPPENAS)
- PROPER (KLHK)
- POME and APPLE-Gatrik (ESDM)
- SIINAS (Kemenperin)

From these discussions, we identified opportunities for integration between each platform system.

PaSTI Incentive Mechanism Working Group

Aside from the technical working group, PaSTI also established an incentive mechanism working group to discuss potential incentives to be implemented to OGReS. The working group consisted of the following stakeholders:

- Coordinating Ministry of Economic Affairs (Kementerian Koordinator Bidang Perekonomian)
- Financial Service Authority
- Bank of Indonesia
- Ministry of Finance
- Central Bureau of Statistics (Badan Pusat Statistik)
- Global Reporting Initiative Indonesia

Key takeaways:

- Incentive mechanisms could be leveraged from international initiatives that are already being established, such as the SBTi and carbon pricing
- The incentive mechanism will be the key for more participation from the private sector
- The establishment of the incentive mechanism should go hand in hand with the development of OGReS

APPENDIX C: PEP ONLINE SYSTEM

The concept of the PEP Online system is divided into four stages.

Figure A-1. | The MER Cycle of PEP Online



- **Planning** involves data and information on mitigation action plans (RAN-GRK/RAD-GRK) that have been prepared by the local government and related technical ministries. The key information includes mitigation action plans, baselines, and emissions reduction targets.
- **Monitoring** contains information on the monitoring of mitigation actions that have been carried out by the local government and related technical ministries. The monitoring process is carried out every year and is supported by quality control processes that are already integrated into the system. Key information includes a list of mitigation actions that have been implemented and the emissions reductions per mitigation action.

- **Evaluation** involves a comparison of the mitigation action plan with the achievement of emissions reductions and measures the fulfillment of the ministerial and regional mitigation targets. The evaluation process is carried out by BAPPENAS as an input for the next planning cycle of the mitigation action. The key information here is a comparison of actual emissions with emissions under a business-as-usual scenario and a comparison of actual performance with the emissions target.
- **Reporting** contains a summary of overall information from all existing modules and can be downloaded by all actors of mitigation action activities.

APPENDIX D: CRITERIA FOR COMPLIANCE RATINGS IN PROPER

PROPER acknowledges companies according to their level of reporting quality. Annually, the secretariat will assess the performance according to the criteria below and publicly announce the results. It was proved that PROPER's ratings were being used as an incentive that encouraged more participation from the private sector to not only increase the reporting quantities but also quality.

ABBREVIATIONS

APPLE-Gatrik	Aplikasi Penghitungan dan Pelaporan Emisi Ketenagalistrikan (Calculation and Reporting Application for Electricity Emissions)	NSA	nonstate actor
ASEAN	Association of Southeast Asian Nations	OGReS	One Gate Reporting System
BAPPENAS	Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional (Indonesian Ministry of National Development Planning/National Development Planning Agency)	PaSTI	Partnership to Strengthen Transparency for co-Innovation
CO ₂	carbon dioxide	PEP Online	Pemantauan, Evaluasi dan Pelaporan Online (Monitoring, Evaluation and Reporting Online)
ESDM	Kementerian Energi dan Sumber Daya Mineral (Ministry of Energy and Mineral Resources)	POME	Pelaporan Online Manajemen Energi (Energy Management Online Reporting)
ESG	Environmental and Governance	PROPER	Program Penilaian Peringkat Kinerja Perusahaan (Private Sectors Performance Rating Program)
GHG	greenhouse gas	RAD-GRK	Rencana Aksi Iklim Nasional Gas Rumah Kaca (National Climate Actions for Greenhouse Gas)
Kemenperin	Kementerian Perindustrian (Ministry of Industry)	RAN-GRK	Rencana Aksi Iklim Daerah Gas Rumah Kaca (Sub-national Climate Action for Greenhouse Gas)
KLHK	Kementerian Lingkungan Hidup dan Kehutanan (Ministry of Environment and Forestry)	SBTi	Science Based Targets Initiative
LCDI	Low Carbon Development Initiative	SDG	Sustainable Development Goal
MER	monitoring, evaluation, and reporting	SIINAS	Sistem Informasi Industri Nasional (National Industry Information System)
METI	Ministry of Economy, Trade and Industry	TCFD	Task Force on Climate-related Financial Disclosures
MOE	Ministry of the Environment	TOE	tons of oil equivalent
MRV	measurement, reporting, and verification		
NDC	nationally determined contribution		

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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.

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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

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