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GRP's Net Zero Roadmap

Our Decarbonization Approach

2023

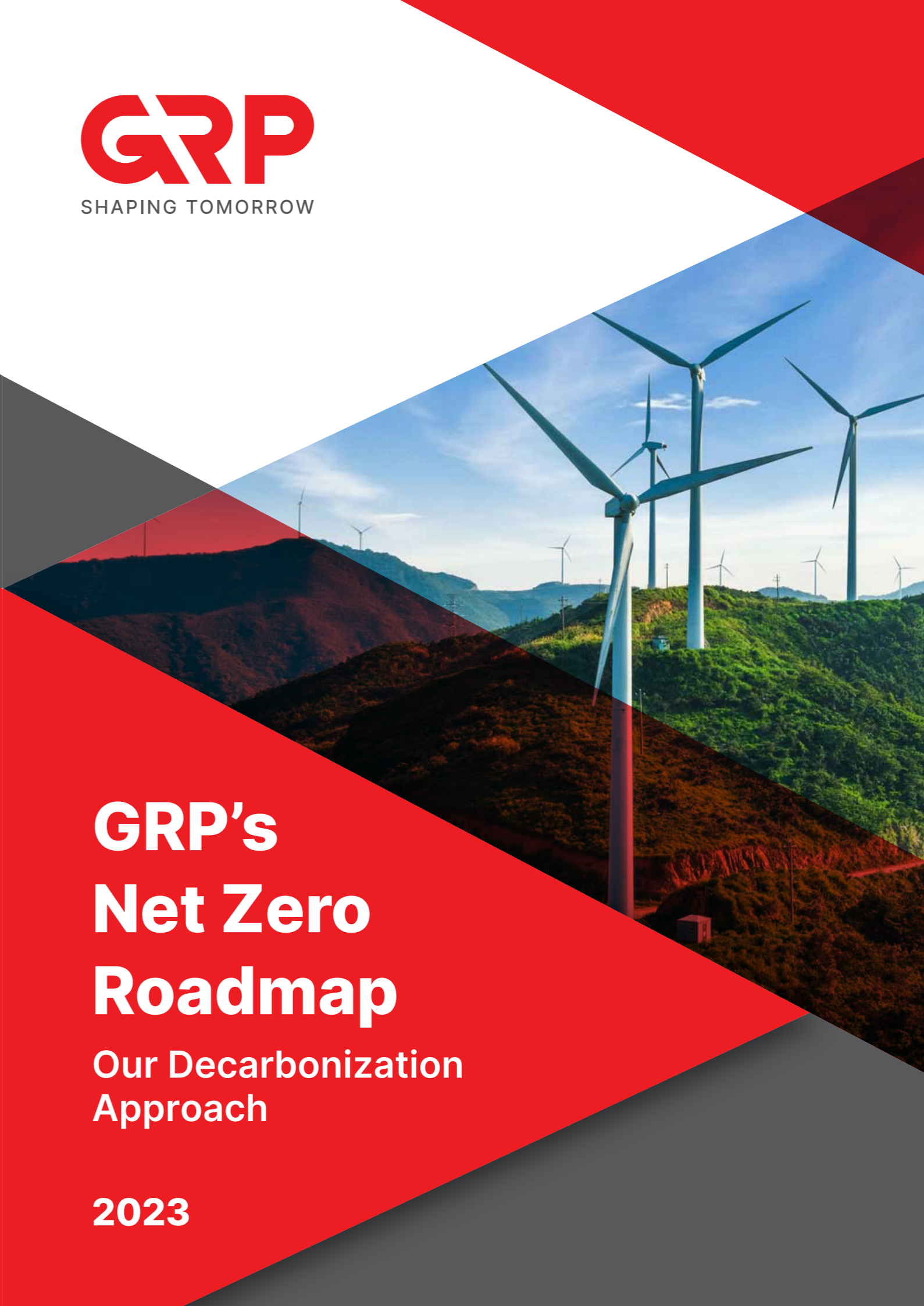




TABLE OF CONTENTS

1	Introduction	01
2	Climate Market Drivers	02
	2.1 - Indonesia Nationally Determined Contribution (NDC)	05
	2.2 - TCFD Framework	07
3	GRP's ESG Strategy	08
	3.1 - Priority Esg Topics	08
4	GRP GHG Inventory	09
	4.1 - Overview	09
	4.2 - GHG Scope And Reporting Boundary	11
	4.3 - Inventory Summary	12
5	Net Zero Strategy	13
	5.1 - Fuel Switching	15
	5.2 - Production Improvements and Resource Efficiency Improvements	15
	5.3 - Green Power Sourcing	16
	5.4 - Carbon Offsetting	16
	5.5 - Collaboration And Innovation	17
6	ResponsibleSteel™ Standard	17
7	GRP's Climate Target, Initiatives, and Actions	19



Acronyms and Abbreviations

Name	Description	Name	Description
GRP	Gunung Raja Paksi	Scope 1	Direct GHG emission from source/ origin that are under control by company such as emission from company facility or vehicles.
GHG	Greenhouse gas	Scope 2	Indirect GHG emission from purchase of electricity, steam, heat, or cooling.
IPCC	Intergovernmental Panel on Climate Change	Scope 3	GHG emission from activities that are not owned or controlled by company, but the company indirectly effects in its value chain.
WBCSD	World Business Council for Sustainable Development		
WRI	World Resources Institute		
WSA	World Steel Association		

1. Introduction

PT Gunung Raja Paksi Tbk (GRP) is a member of Gunung Steel Group, one of the largest private steel companies in Indonesia. GRP is in Cikarang Barat, West Java Province, Indonesia, covering more than 200 hectares.

In recent years, there is an increase of global recognition on the climate change impact from Paris agreement and COP26 by various stakeholders. In addition to GRP's commitment to integrating Environmental, Social, and Governance (ESG) aspects in their business, GRP recognized the importance of taking climate-related actions. The company has started their climate journey in 2021 and completed their first scope 1 & 2 greenhouse gas (GHG) emissions inventory in 2022. Moving forward, GRP has set its ambition on achieving carbon neutrality by 2050.

To ensure alignment with international best practices, GRP's GHG inventory referred to the World Steel Association's International Steel Sector Guidance, the *Greenhouse Gas Protocol*, the *Intergovernmental Panel on Climate Change (IPCC) 2019* guidelines, and the *ResponsibleSteel™* framework.

This playbook aims to inform GRP's stakeholders on GRP Climate inventory and its actions plan toward becoming a carbon neutral business.



2. Climate Market Drivers

The current production of steel causes approximately 7% of the global carbon emissions, with the expectations that the demand of steel will increase by approximately 15-20% between 2030 and 2050 (as indicated in the STEPS scenario in **Figure 1**).

The current production of steel causes
~ 7%
of the Global Carbon Emissions

The demand of steel will increase
~ 15-20%
between 2030 and 2050

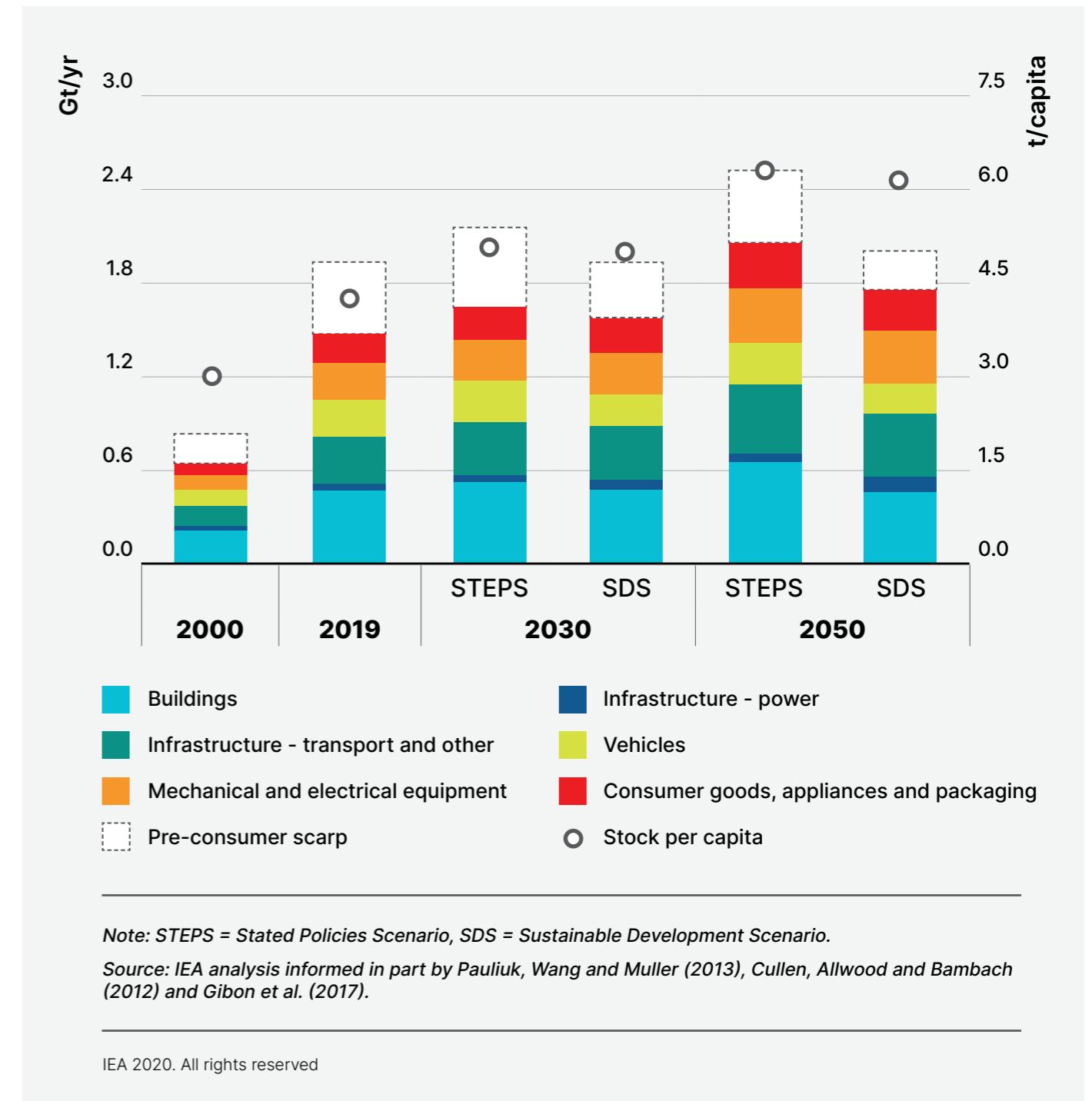


Figure 1: Global end-use steel demand and in-use steel stock by scenario

Consequently, it is a huge challenge for the steel industry to reach zero emission target by 2050 requiring approximately US\$1.4 trillion of investment ([Pedal to the metal: iron and steel's US\\$1.4 trillion shot at decarbonisation | Wood Mackenzie](#)). However, with the pressures from world global warming crisis, companies must start implementing initiatives to mitigate the impact from climate change as much as possible. There are also other stakeholders who are paying attention to this topic and voice their opinions in shifting the steel industry to become decarbonized (**Figure 2**).

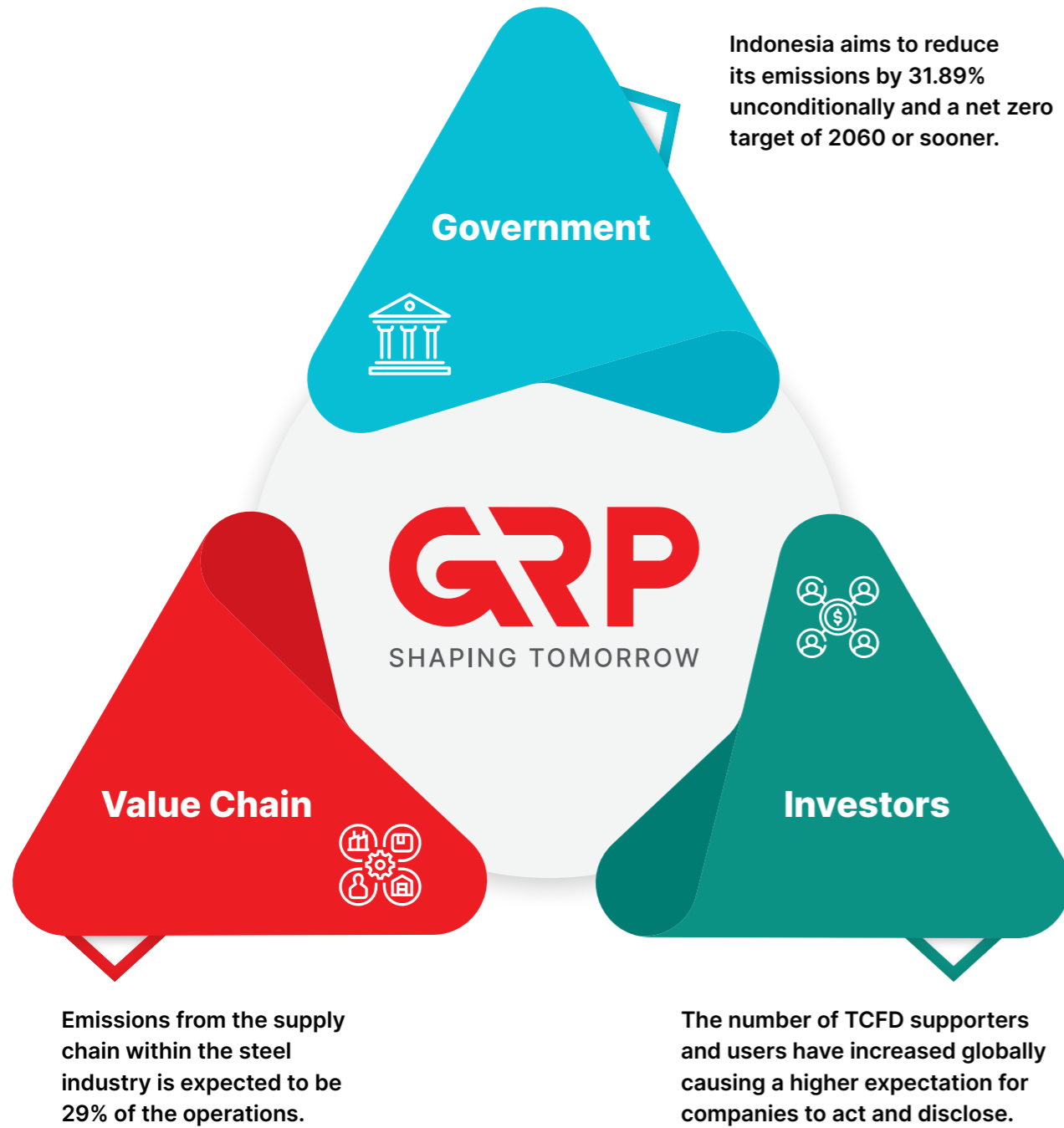


Figure 2: Climate Market Driver for GRP Business



Government

Along with the global concerns and trends, the Government of Indonesia continues to raise awareness around the impact of climate change and has recently updated its Nationally Determined Contribution (NDC) to be more closely aligned with the Paris Agreement temperature goal. With the update goals, Indonesia aims to reduce its emissions by 31.89% unconditionally (an increase from 29%) by 2030, and a net zero target of 2060 or sooner ([23.09.2022_Enhanced NDC Indonesia.pdf \(unfccc.int\)](#)). GRP will keep a close eye on the 2022 United Nations Climate Change Conference (commonly known as COP 27) for any further updates to Indonesia's NDC.



Investors

The number of TCFD supporters and users have increased globally causing a higher expectation for companies to act and disclose the financial impact from climate risk ([TCFD Report Finds Steady Increase in Climate-Related Financial Disclosures Since 2017 | Task Force on Climate-Related Financial Disclosures \(fsb-tcdf.org\)](#)). Investors and companies, including GRP, are increasingly using these data points to assess their business decisions and amend their strategies to adapt to the potential impact from climate risk.



Value Chain

As customers preferences are shifting towards low-carbon products ([Creating a Cleaner and Sustainable Steel Industry as Demand Rises | Suez \(watertechnologies.com\)](#)), many companies are also teaming up with their suppliers and their peers to produce steel more sustainably ([Net-zero steel in building and construction: The way forward | McKinsey](#)). Further upstream, emissions from the supply chain within the steel industry is expected to be 29% (**Figure 2**) of the operations, indicating the importance of decarbonization along the value chain.

Moreover, ESG raters such as CDP are requesting companies to disclose their supplier's environmental risks and opportunities through their annual questionnaires. To improve their rankings and performance, companies benefit from interacting with their supply chain to symbiotically work towards their respective net-zero goals. This working relationship also allows for potential cost savings of \$12.4 billion (<https://sciencebasedtargets.org/blog/supply-chain-the-missing-link-for-corporate-climate-action>) globally.

2.1 Indonesia Nationally Determined Contribution (NDC)

A NDC is a climate action plan to cut emissions and adapt to climate impacts. Each party to the Paris Agreement is required to establish an NDC and update it every five years ([All About the NDCs](#) | [United Nations](#)).



As a steel manufacturer, GRP recognizes that our operations will fall under the Industrial Processes and Product Use (IPPU) category, under which the NDC stipulates an expected emission reduction of 0.6MtCO_{2e} or 0.9MtCO_{2e} with international financing for the Iron and Steel Industry by 2030. GRP understands that the Indonesia's NDC is dependent on various factors which may delay the country's timeline to reach net zero towards 2060. However, we believe that reaching net zero by 2050 is imperative for the future of this country and planet and will be using this as our timeline in setting our climate-related goals and targets.

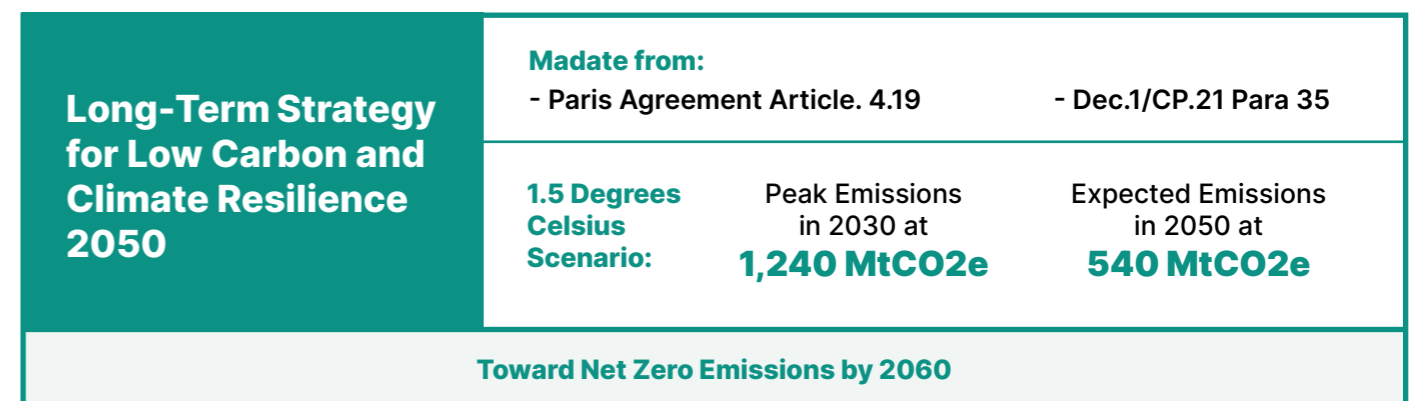
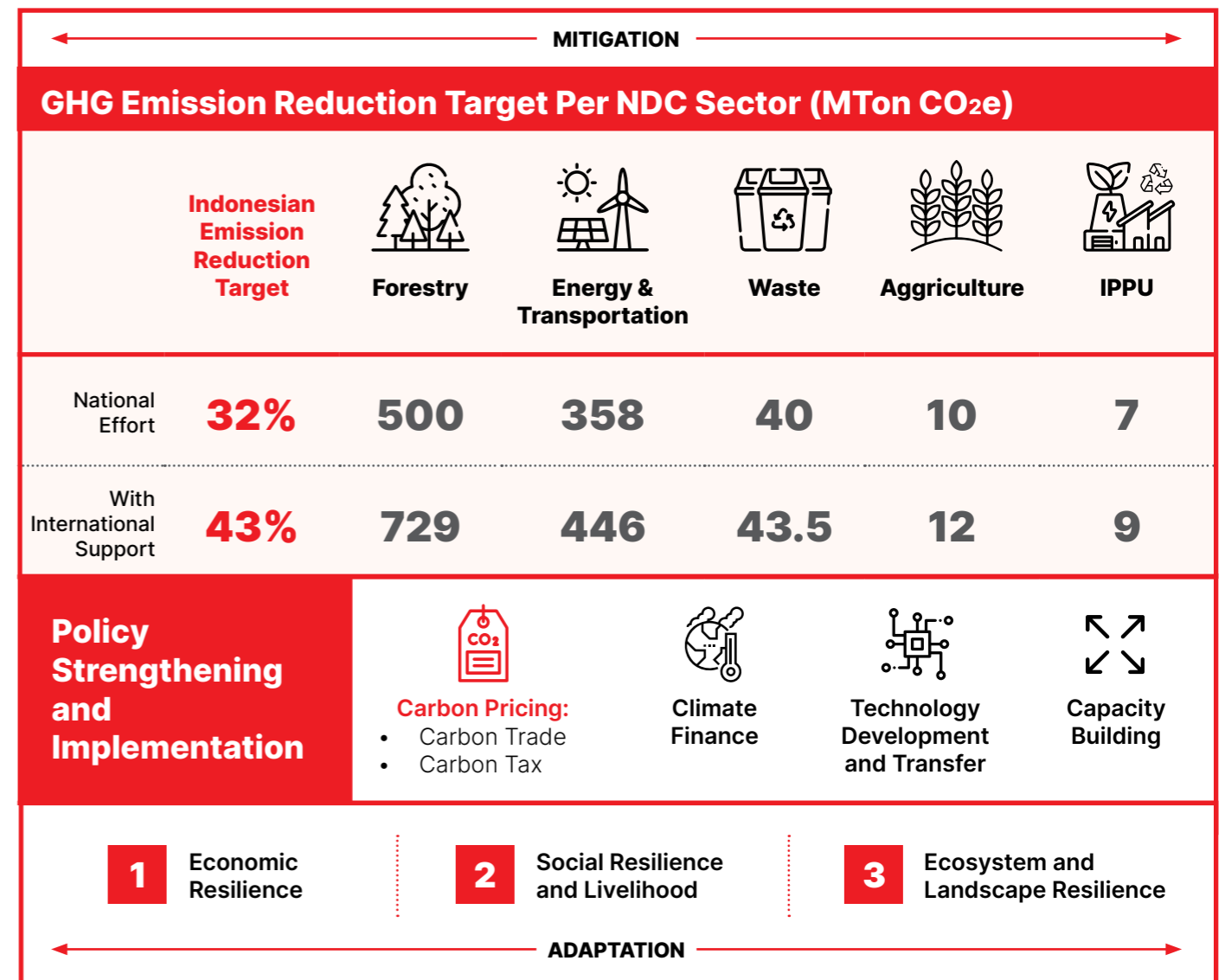
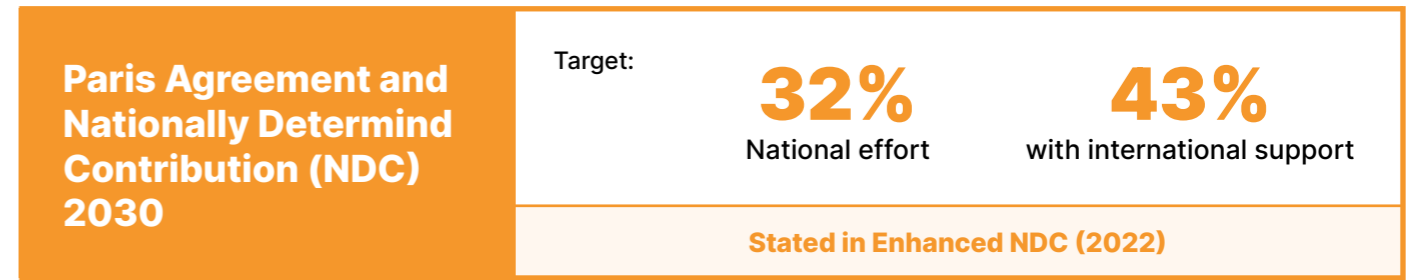


Figure 3: Indonesia's Climate Change Agenda

2.2 TCFD Framework

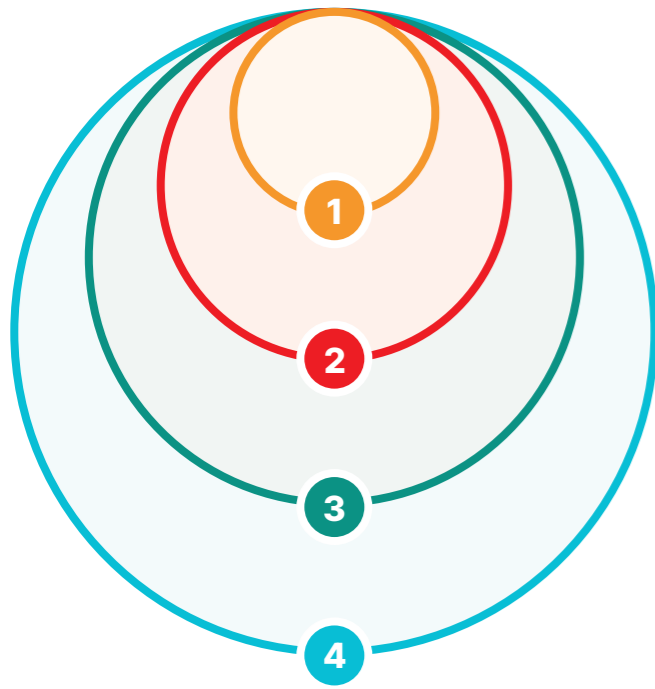


Figure 4: TCFD 4 Pillars of Recommended Disclosures
Source: [TCFD Final Recommendations Report](#)

GRP understands the importance of climate risk in assessing current and future business opportunities. We are currently reviewing the TCFD recommendations, identifying any gaps within our current operating procedures to enhance our ability mitigate the impacts from climate risk and adapt our business for future scenarios. We are looking forward to disclosing our first TCFD narrative in the upcoming year. GRP believes that this narrative will help interested stakeholders, such as investors, lenders, and governmental entities, analyze our business operations for climate risk and appreciate the steps we have or will take in order limit the exposure of this risk on the business and its people.

- 
1. Metrics and Targets
 The metrics and targets used to assess and manage relevant climate-related risks and opportunities.
- 
2. Risk Management
 The processes used by the organization to identify, assess, and manage climate-related risks.
- 
3. Strategy
 The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.
- 
4. Governance
 The organization's governance around climate-related risks and opportunities.

3. GRP'S ESG Strategy

3.1 Priority ESG Topics

GRP recently conducted a materiality assessment to highlight the critical ESG topics and help develop the company's ESG strategy. The result of this assessment is shown in the matrix below (Figure 5):

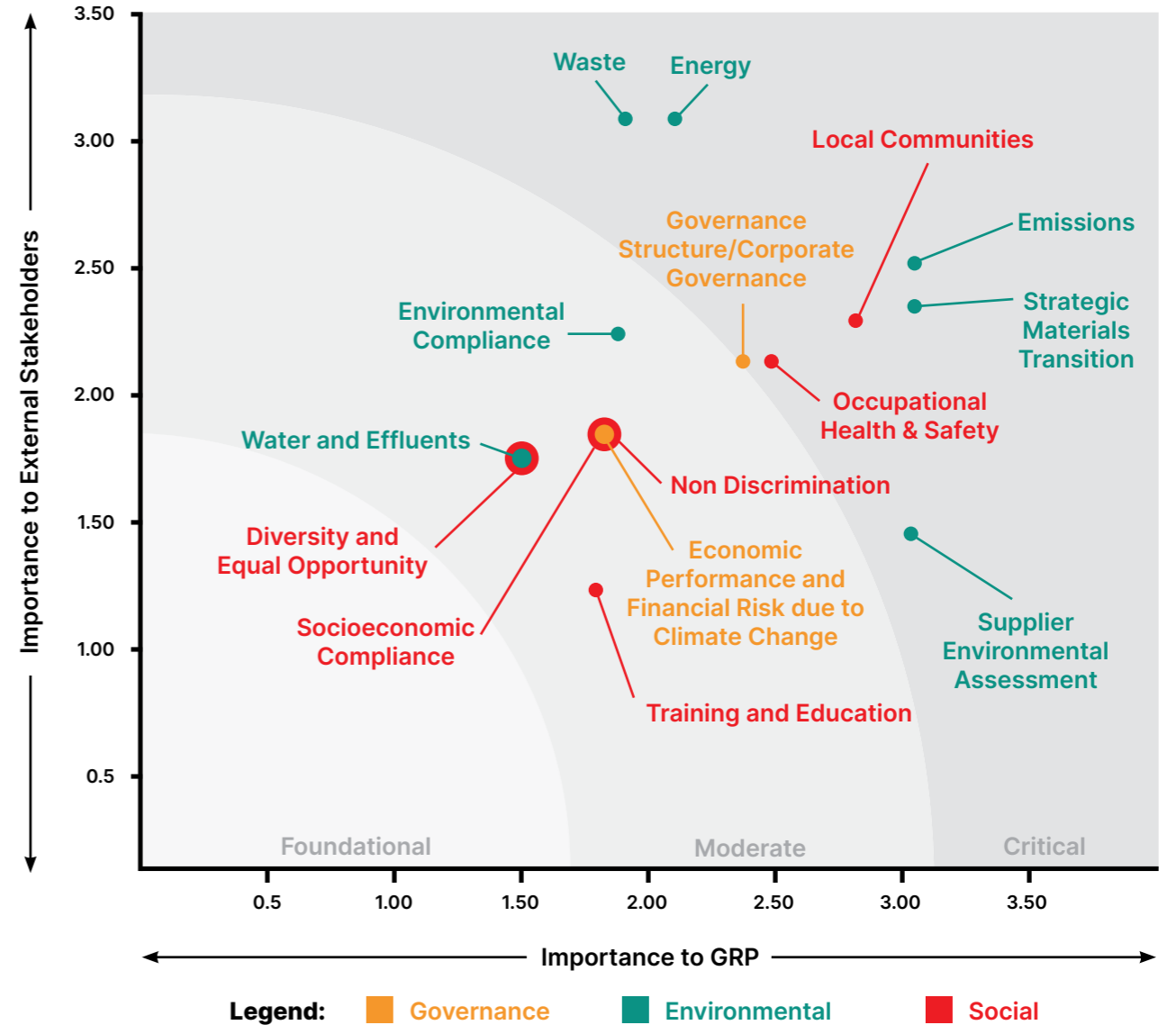


Figure 5: GRP's Materiality Matrix

As this matrix highlights, two of the most material topics to our stakeholders are Energy and Emissions. GRP heard its stakeholders and have conducted a GHG inventory study to understand the energy usage and emissions from our operations to help our decarbonization journey.

GRP is publishing this handbook to communicate our current understanding of our emissions and our current plan in adjusting our operations to reach out net zero goal.

4. GRP GHG Inventory

4.1 Overview

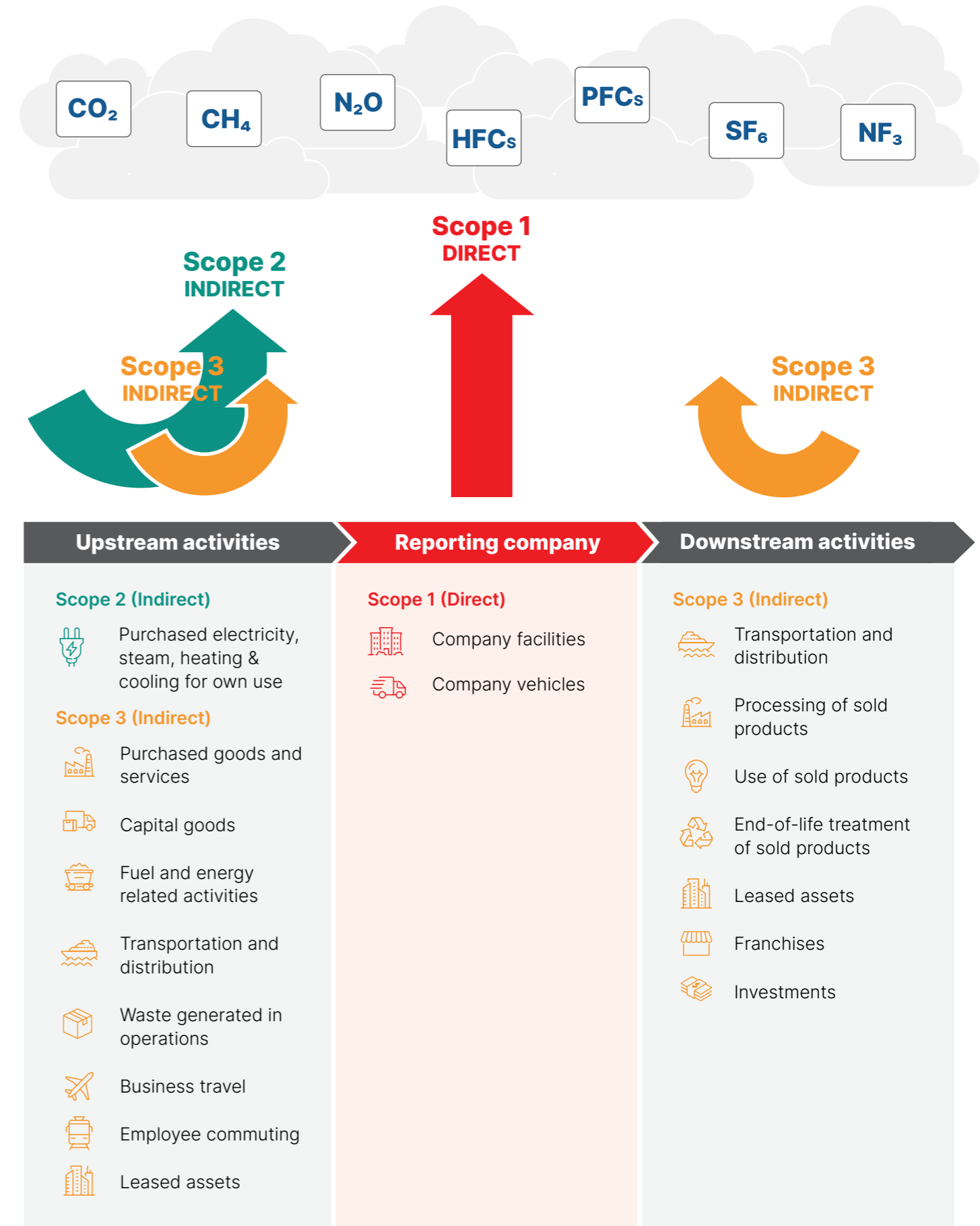
GRP's GHG inventory follows the methodological approach adopted as per GHG Protocol's *Corporate GHG Accounting and Reporting* guidance and World Steel Association methodology on *CO₂ emissions data collection programme*. The GHG protocol was developed under a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) and is a commonly used methodology for GHG accounting. World Steel Association provides the guidance for Iron and Steel Sector GHG emission inventory accounting and its methodology for data collection was used as the basis for the published international standard ISO 14404:2013 – calculation method of carbon dioxide emission intensity from iron and steel production.



The objective of GHG accounting and reporting is to:

1. Identify and consolidate baseline GHG emissions (Scope 1 and Scope 2) from GRP's business activities specific to operations, sites, and geographic location
2. Communicate GHG emission data tailored to various users' expectations
3. Provide the basis which allows GHG emission reduction targets to be set, enablement of measurements of progress toward set targets, and reporting of outcomes to stakeholders

To better understand how we classified the emissions from our operations, **Figure 6** highlights the general emissions from operations across all industries, which the GHG Protocol classifies as Scope 1, 2, and 3.



Source: GHG protocol

Figure 6: Scope 1, 2, and 3 emissions

4.2 GHG Scope and reporting boundary

To calculate the GHG inventory, GRP selected the operational control approach and the consolidated boundary of the operational facilities located in Cibitung, West Java, Indonesia covers the units listed in **Table 1** and emission sources listed in **Figure 7**.

Table 1: Facilities covered in the GRP's GHG Inventory

Manufacturing plants	<ul style="list-style-type: none"> ■ Steel Melt Shop 1 ■ Steel Melt Shop 2 ■ Beam Plant 1 ■ Light Section Mill ■ Plate Steckel Mill ■ Forming Service Centre 	<ul style="list-style-type: none"> ■ Plate Service Centre ■ Spiral Pipe Mill ■ Cold Rolling Mill ■ Steel Service Centre ■ Divisi Wire Industry
Non-Manufacturing Facilities	<ul style="list-style-type: none"> ■ Head Office ■ Cafeteria ■ Sporthall/ Vertical Garden ■ Mess ■ Central Assembly ■ Laboratories ■ Main warehouse ■ Workshop (Fabrication) ■ Machine Shop 	<ul style="list-style-type: none"> ■ Heavy Equipment Workshop ■ Hazardous Waste Warehouse ■ Weighing Area ■ Batching Plant ■ Slag Grinding Mill ■ Slag Crusher (OM Slag)



Scope 1 - Emissions:

- Stationary Combustion - EAF Coal, Natural gas, Natural gas, Pig Iron, Gas based DRI, Ferro-Silicon, Ferro-Chromium, Ferro-Manganese, Silico-Manganese, EAF electrodes, LF Graphite Electrode, LPG, CO₂ gas, Heavy Oil, Light Oil, LNG, and Acetylene Gas.
- Mobile Combustion – gasoline and diesel fuels for company vehicles.
- Fugitive Emissions – Refilling of CO₂ base fire extinguishers.



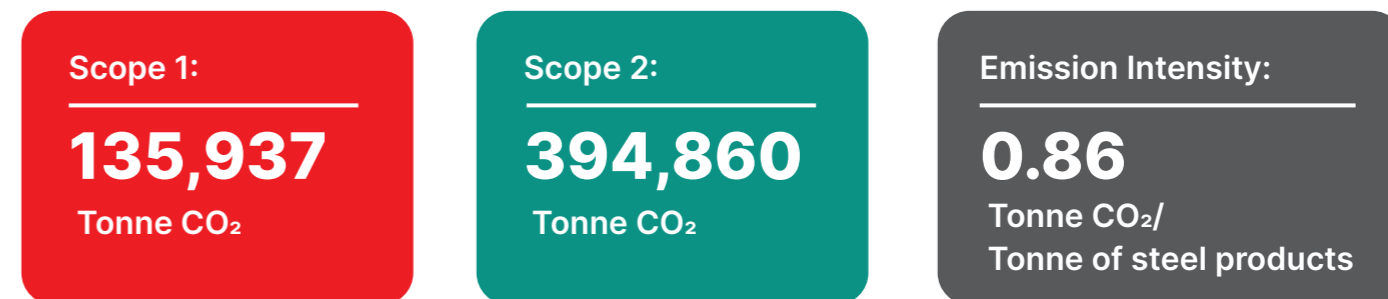
Scope 2 - Emissions:

- Emissions from purchased grid electricity for GRP Manufacturing plant
- Emissions from purchased grid electricity for GRP Non-Manufacturing facilities.

Figure 7: Emission Sources Considered for GHG Inventory

4.3 Inventory summary

GHG emissions inventory for the period 1st January 2021 to 31st December 2021.



Approximately 74% of GRP's total emissions are Scope 2 emissions from the use of grid electricity. The remaining 26% are Scope 1 direct emissions. Most of Scope 1 emissions are from natural gas (79%) and coal (15%) consumption. The current GHG inventory does not cover indirect emissions (Scope 3) yet, however GRP is working on expanding the scope of its GHG inventory in future years.

GHG emissions are calculated and reported in carbon dioxide equivalent (CO₂e) to allow for consistency across all GHG scopes and activities. GRP's GHG emissions are calculated from activity data provided by GRP and emission factors from the IPCC, WorldSteel Association guideline and Climate Transparency Report 2021 for Indonesia. Non-CO₂ emissions corresponding to each GHG-emitting activity is multiplied by the global warming potential to convert into CO₂e.

GHG emissions=Activity data x Emission Factor (x Global Warming Potential)

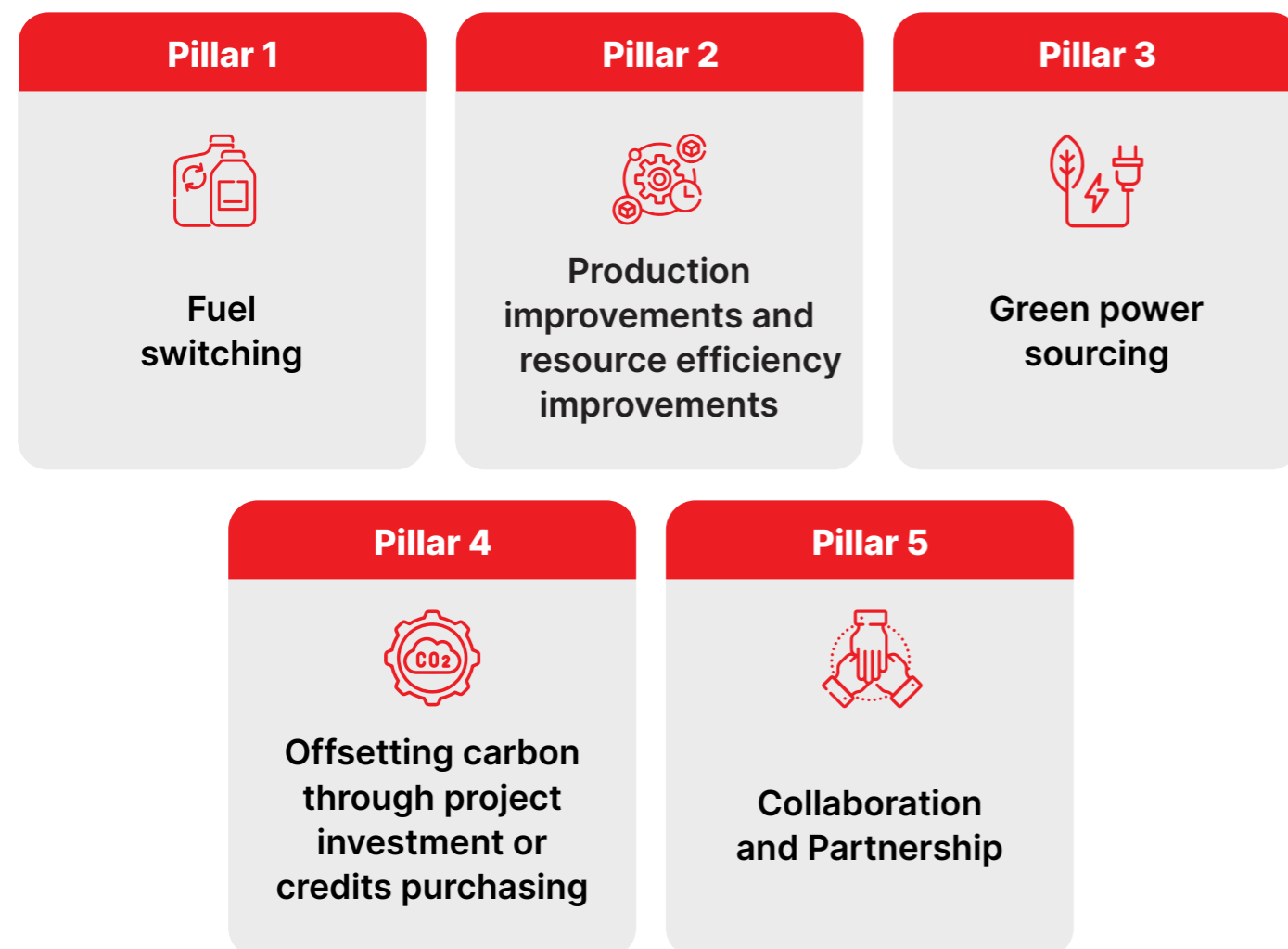
Table 2: Total Scope 1 and 2 GHG Emission by GHG sources

Scope	GHG Activity	Emissions (tonnes CO ₂)	Total emission (%)
Scope 1 Emissions (tonnes CO ₂ -e)	Stationary Combustion (Steel Manufacturing Operations)	135,140	25.46%
	Stationary Combustion (Non-Manufacturing Operations)	272	0.05%
	Mobile Combustion (Non-Manufacturing Operations)	518	0.10%
	Fugitive Emissions (Non-Manufacturing Operations)	6	0.00%
TOTAL Scope 1 Emissions		135,937	25.61%
Scope 2 Emissions (tonnes CO ₂ -e)	Purchased Grid Electricity (Steel Manufacturing Operations)	389,219	73.33%
	Purchased Grid Electricity (Non-Manufacturing Operations)	5,641	1.06%
	TOTAL Scope 2 Emissions	394,860	74.39%
TOTAL Scope 1 + Scope 2 Emissions		530,797	100%

5. Net Zero Strategy

As identified by the results of GHG inventory calculation, GRP's primary sources of emissions are from the use of grid electricity and fuel (natural gas and coal) combustion. GRP is actively looking at clean energy alternatives to reduce its dependence on fossil-based fuels and transition towards becoming carbon neutral in its operations.

Below are the emissions reduction measures and initiatives that GRP is foreseeing to adopt to achieve carbon neutrality:



Pillar 1

5.1 Fuel switching

After reviewing the inventory, GRP found that it can reduce up to 64% of the current emissions from the utilization of coal by transitioning to natural gas due to the lower carbon content found in natural gas, which translates to approximately 2% reduction in total emissions. GRP realizes that this is an interim solution while the renewable options become more feasible and available in the market.



Pillar 2

5.2 Production improvements and resource efficiency improvements

Utilisation of electric arc furnace (EAF) in the GRP's operation has provided a lower emission compared to blast furnace operation yet providing another challenge of availability of high quality scrap in the production. Further we have replaced our Beam Plant 2 and are taking efforts to modernize Beam Plant 1 by Q2 2024, within our Light Section Mill and Medium Section Mill respectively, to help improve our operational efficiency and expand our product portfolio. Similarly, GRP is already using Hot Briquetted Iron (HBI) as a raw material source within our operations, which is an industry best practice to reduce our emission intensity due to the reduced processing requirements.

We are in the process of assessing the best balance between meeting our current demand, electrifying our equipment, and decarbonizing our operations. Some exciting new technologies that are organized in terms of GRP's implementation preference are ([Five actions to improve the sustainability of steel \(ey.com\)](#), [FINAL_IFC_Steel_7-26-2021.pdf](#)):

- A. Direct Reduced Iron (DRI) using natural gas (commercially feasible) or using green / blue hydrogen (10 – 20 years before becoming commercially viable)**
- Benefits - High energy savings due to reduced emissions from DRI operations from processing recycled / scrap materials. Additionally, utilizing DRI with our current EAF equipment is an industry best practice to make the most impact in our decarbonization efforts.
 - Challenges – The cost and supply of natural gas and hydrogen. Similarly, the raw materials required for this type of operating process come in two forms which are i) DRI or ii) Hot Briquetted Iron (HBI) a more refined and transportable form of DRI, both of which are currently in low supply around Asia.
- B. Iron electrolysis (research phase)**
- Benefits – Largest potential in carbon dioxide reduction
 - Challenges – Still at early stages of research

C. Blast Furnace / Basic Oxygen Furnace with biofuel (Commercially active)

- a. Benefits - Easy to implement by altering the input mix in the furnace
- b. Challenges - High amount of biofuel required which increases transportation and storage costs

D. Blast Furnace / Basic Oxygen Furnace with carbon capture (5 – 10 years before commercially active)

- a. Benefits - Easy to integrate into current operations
- b. Challenges - Large infrastructure investment required for storage and transportation

E. Blast Furnace / Basic Oxygen Furnace with hydrogen (10 years before commercial feasibility)

- a. Benefits – Potential emissions reduction in coke plant (due to reduce coal input) and furnaces
- b. Challenges – Difficult to scale past a certain point due to difficulty replacing reducing agent in hydrogen”



Pillar 3

5.3 Green Power Sourcing

An important part of our decarbonization journey is sourcing green energy either from the grid or producing this ourselves. As the technology initiatives above mention, hydrogen is one of the biggest players in transition to more sustainable energy source.

GRP will explore on how to invest in blue or green hydrogen plants with our national energy provider to discuss how best to create such an energy plant. To kick-start this process the company signed a memorandum of understanding (MoU) with Fortescue Future Industries (FFI) and the Indonesian Chamber of Commerce and Industry (Kadin) at the B20 Summit. The goal of the MOU is to explore green hydrogen and ammonia use cases to enable GRP to produce low-emission steel ([Support Carbon Neutrality 2060, GRP Signs MoU with FFI and KADIN - PT Gunung Raja Paksi Tbk](#)). In the interim, GRP is leasing solar panels to provide a clean source of energy for our operations to start developing internal capabilities of transitioning to renewable energy.



Pillar 4

5.4 Carbon Offsetting

In many manufacturing and upstream industries, including steel manufacturing, there are some hard to abate emissions due to the nature of the operations which is where carbon offsets help reach our Net Zero goal, and will be the final step in our decarbonization journey. “Carbon offset” refers to a reduction in GHG emissions – or an increase in carbon storage (e.g., through land restoration or the planting of trees) to compensate for emissions that occurs elsewhere.

Offsetting carbon can be done through projects or exchanging certified carbon credits between governments or independent certification bodies. The price of an offset credit can range from under US\$1 to over US\$35 depending on the project type and location.

Carbon offset projects can range from small to large scale and can contribute to social and environmental benefits beyond GHG reductions. To ensure that offset credits are genuine and is of high quality, GRP is focusing on offset credits that demonstrates “additionality”. An offset credit from a project fulfils the additionality requirement when the GHG reductions that arise from the project would not have occurred in the absence of a market for offset credits (i.e. the project only exists because of funding from carbon credits).

GHG reductions from investments in a project that is already viable through funds from sources other than the carbon credit market (e.g. through the sale of electricity, government funding, and/or regulations and other policies) do not fit the additionality requirement as the project can still exist under a business-as-usual scenario regardless of any further investments made to the project. Examples of carbon offset project types are listed below:

- **Renewable energy development (displacing fossil-fuel emissions from conventional power plants through investing in a new solar farm or wind turbine development);**
- **The capture and destruction of high-potency GHGs like methane, N2O, or HFCs; or**
- **Avoided deforestation and reforestation (through both the avoidance of emission from carbon stored in trees and additional carbon absorbed over time).**

To qualify as high-quality offsets GRP believes they must meet the requirements of internationally recognized GHG crediting programs and their respective standards such as the *Verified Carbon Standard, Climate Action Reserve, Gold Standard, American Carbon Registry, and the United Nations Clean Development Mechanism*.

GRP acknowledges that all climate-related actions matter. As of 2021, GRP has implemented reforestation programs and planted 4,205 trees with 31 varieties, which has contributed to the absorption of an estimated 9,348.48 tCO₂/year.



Pillar 5

5.5 Collaboration and Partnership

To enable the implementation of the solutions identified previously, GRP is working with the Indonesia Iron & Steel Industry Association (IISIA) and participating in KADIN Net ZERO hub within the ESG Taskforce to collaborate on reaching our goals.

6. ResponsibleSteel™ Standard

GRP is currently a full member of the ResponsibleSteel™ ([Members and Associates | ResponsibleSteel](#)) and would like to carry this relationship further by certified our products and operation site which requires GRP to meet the 13 principles, and the 370 associate requirements, highlighted in the ResponsibleSteel™ International Standard V2.0 ([ResponsibleSteel-Standard-2.0.pdf](#)).

Table 3: ResponsibleSteel™ Standard Principles



Governance Principles

1. Corporate leadership
2. Social, environmental, governance management systems
3. Responsible sourcing
4. Decommissioning and closure



Social Principles

5. Occupational health and safety
6. Labour rights
7. Human rights
8. Local communities
9. Stakeholder engagement and communication



Environmental Principles

10. Climate change and greenhouse gas emissions
11. Noise, emissions, effluents, and waste
12. Water stewardship
13. Biodiversity

Source:

<https://www.responsiblesteel.org/wp-content/uploads/2022/09/ResponsibleSteel-Standard-2.0.pdf>

The Site Certification applies to operational steel sites and to related sites that process raw materials for steelmaking, or that produce steel products. It does not apply to service providers, mine sites, or to sites producing final products made with steel components.

Similarly, the Steel Certification follows the aforementioned requirements, plus requirements for responsible sourcing of input materials and crude steel GHG emissions intensity performance. There are 4 performance levels based on the GHG emissions intensity of the crude steel and the ESG performance of steel companies' suppliers, with Level 1 represents the "entry level" certification. To pursue this certification further, GRP will conduct a life-cycle assessment (LCA) to better understand the various emissions across the value chain.



7. GRP's Climate Target, Initiatives, and Actions

In line with our ESG Strategy Handbook, our Energy Transition and Low-Carbon Solutions pillar looks at strategies to respond to and manage climate-related risks and opportunities throughout GRP's value chain.

2030 Targets

Achieve a GHG emissions reduction pathway that limits the global average temperature to well below 2°C above pre-industrial levels and increase efforts to limit the temperature increase to 1.5°C above pre-industrial levels, in line with ResponsibleSteel™ criteria

Strategic Initiatives

Our ambition is to strategize our management of climate-related risks and opportunities throughout GRP's value chain via the following levers:

- Put in place a robust GHG data management system, as well as transparent and accountable reporting process at both corporate and site levels
- Reduce GHG emission intensity (Scope 1 and 2)
- Build partnerships and enhance stakeholder communications in our pursuit of a Low-Carbon transition
- Improve management over climate related risks and opportunities.
- Offer certified green products to support low carbon transition using ResponsibleSteel™ criteria

Priority Action

- Exploring and set up a corporate-wide GHG data management system and site-specific collection/reporting tools and procedures
- Reduce GHG emission intensity (Scope 1 and 2)
- Utilization of renewable energy
- Understanding climate risks and opportunities, and reporting in line with TCFD
- Obtaining ResponsibleSteel™ certification at a site and product level

Figure 8: Emission Sources Considered for GHG Inventory

The strategy and action items identified will be our guideline in our next steps to reach GRP's goal of becoming Net Zero by 2050.

