PTT TCFD/IFRS S2 Report 2024

PTT Public Company Limited

Aligned with Task Force on Climate-Related Financial Disclosures (TCFD) and International Financial Reporting Standards (IFRS) S2 Climate-related Disclosures.

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Disclosure Aligned with TCFD Framework

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TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Recommendation Disclosure	Disclosure Source
a) Describe the board's oversight of climate-related risks and opportunities.	Page 9-10
b) Describe management's role in assessing and managing climate-related risks and opportunities.	Page 9, 11

Disclosure Aligned with TCFD Framework

Governance | **Strategy** | Risk Management | Metrics & Targets

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Recommendation Disclosure	Disclosure Source
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	Page 15-16, 21
b) Describe the impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning.	Page 17-25
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Page 27-28

Disclosure Aligned with TCFD Framework

Governance | Strategy | **Risk Management** | Metrics & Targets

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Recommendation Disclosure	Disclosure Source
a) Describe the organization's processes for identifying and assessing climate-related risks.	Page 31-33
b) Describe the organization's processes for managing climate-related risks.	Page 34-35
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	Page 26, 30-35

Disclosure Aligned with TCFD Framework

Governance | Strategy | Risk Management | Metrics & Targets

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

Recommendation Disclosure	Disclosure Source
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	Page 39
b) Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	Page 40-43
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	Page 37, 39

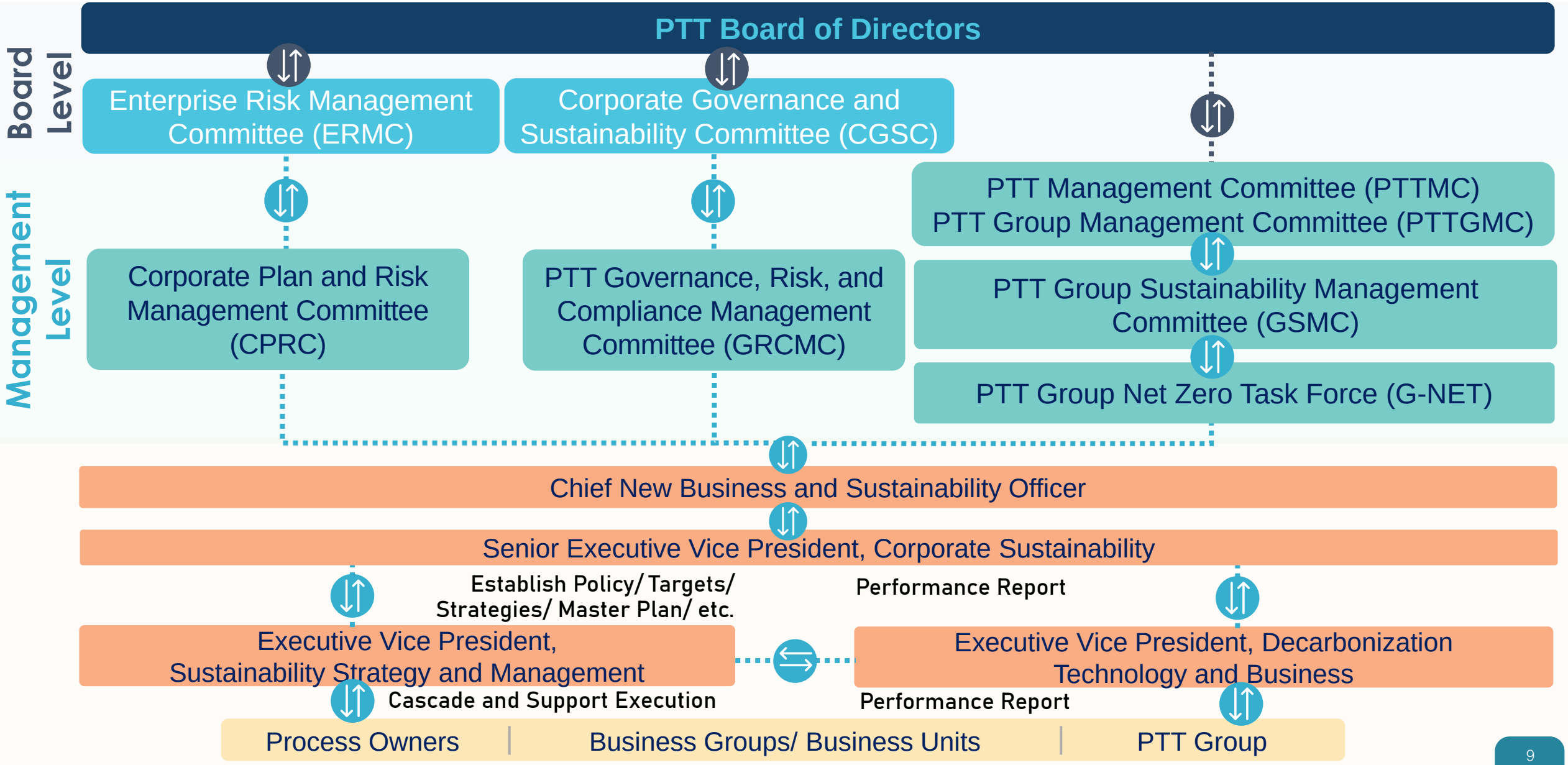
Disclosure Aligned with IFRS S2 Standard

Sections	Requirements
Governance	
	6.a, 6.a.i, 6.a.ii, 6.a.iii, 6.a.iv, 6.a.v, 6.b, 6.b.i, 6.b.ii
Strategy	
Climate-related risks and opportunities	9.a, 10, 10.a, 10.b, 10.c, 10.d, 11, 12
Business model and value chain	9.b, 13, 13.a, 13.b
Strategy and decision-making	9.c, 14, 14.a, 14.a.i, 14.a.ii, 14.a.ii, 14.a.iv, 14.a.v, 14.b, 14.c
Financial position, financial performance and cash flows	9.d, 15.a, 15.b, 16.a, 16.b, 16.c, 16.c.i, 16.c.ii, 16.d, 17, 18, 18.a, 18.b, 19, 19.a, 19.b, 20, 21, 21.a, 21.b, 21.c
Climate Resilience	9.e, 22, 22.a, 22.a.i, 22.a.ii, 22.a.iii, 22.a.iii, 22.b, 22.b.i.1-7, 22.b.ii.1-5, 22.b.iii
Risk Management	
Risk Management	25, 25.a, 25.a.i, 25.a.ii, 25.a.iii, 25.a.iv, 25.a.v, 25.a.vi, 25.b, 25.c
Metric and Targets	
Climate-related metrics	28, 28.a, 29.a, 29.a.i, 29.a.ii, B23, B24, B25, 29.a.iii, B26, B26.a, B26.b, B26.c, B27, B27.a, B27.b, B28, B28.a, B28.b, B29, 29.a.iv, 29.a.v, B30, B31, 29.a.vi, .B32, B33, B34, B53, B54, B55, B56, B57, 29.b, 29.c, 29.d, 29.e, 29.f, 29.f.i, 29.f.ii, 29.g, 29.g.i, 29.g.ii, 31, B64, 28.b, 32
Climate-related targets	28.c, 33, 33.a, B66, B67, 33.b, 33.c, 33.d, 33.e, 33.f, 33.g, 33.h, 34, 37, 35, 36, 36.a, 36.b, 36.c, 69, 36.d, 36.e.iii, 36.e.ii, 36.e, 36.e.i, 36.e.iv

Disclosure Source:
https://www.pttplc.com/uploads/Sustainability/2025/EN/09%20Sustainability%20Disclosure%20and%20Benchmarking/PTT%20(GRI)%20Content%20Index%20(11%20April%202025)_Final%20EN.pdf

GOVERNANCE

Climate Change Governance Structure



Climate Change Management Role (1/2)

The Executive Vice President of the Sustainability Management function directly reports to the Senior Executive Vice President, Corporate Strategy and Sustainability, responsible for PTT and PTT Group sustainability management consisting of establishing policies, strategies, standards, mechanisms, master plans, etc. for deployment to business units and PTT Group company levels with systematically integrated processes/ controls/ procedures. **Sustainability management roles and responsibilities (including climate-related risks and opportunities)** are as follows:

Governing Body	Roles and Responsibilities	Meeting Frequency
Board Level		
PTT Board of Directors (BoD)	BoD is responsible for endorsing the Decarbonization Pathway and assigns CGSC and ERMC to govern and manage sustainability including climate-related issues which establish risk management guidelines comprehensively and ensure executives' management and efficient system or process for risk management.	Monthly
Corporate Governance and Sustainability Committee (CGSC)	CGSC is responsible for establishing objectives, targets, policies, strategies, master plans, guidelines, and sustainability management plans covering environmental (including climate action management), social, and governance (ESG) corresponding to PTT's strategies and targets, national and international standards and practices, as well as monitor the implementation of sustainability management, provide advice and recommendations, and oversight to PTT Governance Risk and Compliance Management Committee (GRCMC), and report to the Board.	Quarterly
Enterprise Risk Management Committee (ERMC)	ERMC is responsible for supervising and reviewing risk policies, scopes, and management (including climate-related risks) with the business context and internal/external factor changes. ERMC oversees screening and reviewing the investment plan (major capital expenditures, acquisitions, and, mergers, etc.) with climate-related criteria (internal carbon price mechanism) to trade-offs associated with risks and opportunities. The Board also monitors the risk management measures and progress from the proposed corporate business strategy to mitigate the climate risks and supervises the Corporate Plan and Risk Management Committee (CPRC) for further actions.	Quarterly

Climate Change Management Role (2/2)

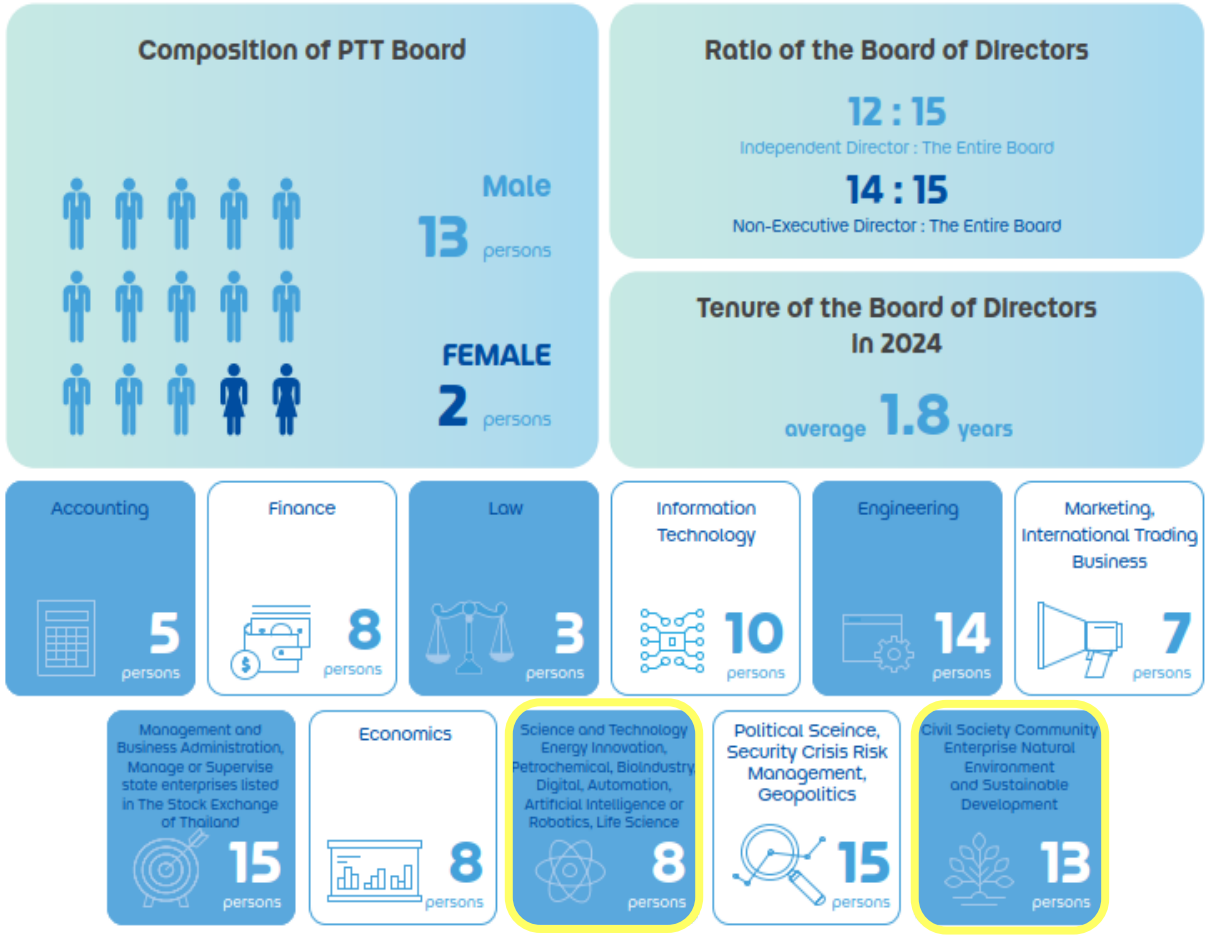
Governing Body	Roles and Responsibilities	Meeting Frequency
Management Level		
PTT Governance, Risk, and Compliance Management Committee (GRCMC)	• Determine sustainability management (including climate action) short-term and long-term business plans corresponding to the CGSC's policy framework. • Supervise and monitor the sustainability management performance progress according to the plan including suggestions and consulting to achieve operational efficiency.	Quarterly, report to CGSC
Corporate Plan and Risk Management Committee (CPRC)	• Consider and review the list of corporate risks covering climate-related risks, risk management plans, and progress including the assignment of the responsible team for risk management before presenting to ERMC and relevant governing management. • Drive and monitor the development of enterprise risk management processes in line with international standards and encourage corporate values in raising awareness of risk management. • Screen and recommend the risk management plan embedded with climate change and environmental management corresponding to the strategic direction investment portfolio and business goals to ERMC and the board approvals.	Monthly, report to ERMC
PTT Group Sustainability Management Committee (GSMC)	• Consider and approve PTT Group's policies, goals, scope, strategic plans, and directions for sustainable business operations (including climate action and environment management) in line with international standards and support the business operations. • Consider and approve PTT Group's sustainable business risk management. • Drive, support, monitor, report, and advice about business plans corresponding to the PTT Group's strategic directions and business targets.	Quarterly
PTT Group Net Zero Task Force (G-NET)	G-NET is responsible for establishing strategic directions and targets by initiating and executing supporting mechanisms to efficiently move towards net zero greenhouse gas emissions and be responsive to the stakeholder expectations.	Quarterly
Chief of New Business and Sustainability Group	The Chief of New Business and Sustainability leads the development of new growth areas and drives PTT Group’s sustainability transformation. Key responsibilities include overseeing the power business with emphasis on renewables, advancing non-hydrocarbon businesses such as EV charging, life sciences, and steering decarbonization initiatives to meet Net Zero targets. This includes exploring opportunities in hydrogen, CCS, and related technologies. The Chief also ensures effective implementation of sustainability policies across the group to create long-term value.	Monthly

PTT Board Skill and Competency on Climate-related Issues

The members of the PTT Boards will be nominated by the Nominating Committee. Presently, the PTT Board consists of 13 of 15 executive directors who have knowledge and experience in the energy industry according to the Global Industry Classification Standard (GICS) Level 1, Industry Experience. Moreover, PTT has always determined the diversification of the PTT Boards. They are different not only in qualifications and experiences with professional expertise necessary for the PTT's business operations such as the energy industry business, laws & legal, accounting & finance, sustainability (ESG), etc. but also have diverse social backgrounds, race, gender, religion, and cultures for providing advice or consult, the company's performance and approve the business directions relating to the sustainable growth of the company.

In 2024, PTT has 13 experienced board members on the Civil Society Community Enterprise Natural Environment and Sustainable Development and 8 members on Science and Technology Energy Innovation, Petrochemical, and Bio-industry to oversee strategies designed to respond to climate-related risks and opportunities.

In addition, the members of the PTT Board are also the Permanent Secretary of the Ministry of Natural Resources and Environment, and chair of the Thailand Carbon Neutral Network (TCNN), which is a private and local community "Thailand's Leading Network Achieving Carbon Neutrality and Net Zero Goals" driving the participation of various sectors in reducing greenhouse gas emissions, as well as speeding up the preparation of policy proposals for submission to the public sector, aiming to elevate the country's greenhouse gas reduction standards to be equivalent to international standards for sustainable growth in a climate-friendly society and push forward the Net Zero goal of the country from all sectors together.



Reference: PTT 56-1 One Report 2024, page 273

PTT Executive Compensation on Climate-related Issues

PTT Board of Director

As of December 31, 2024

Reference: PTT 56-1 One Report, page 362

PTT has established a corporate governance structure consisting of the PTT Board of Directors appointed by shareholders to oversee PTT's business conduct. PTT has divided the sub-board level committees into 5 specific committees to help scrutinize important works including the Audit Committee, Nomination Committee, Remuneration Committee, Corporate Governance and Sustainability Committee, and Enterprise Risk Management Committee. PTT President & CEO is the secretary of the Board and authorized director as the highest-level executive of the company as shown in the figure.

The CEO's performance is assessed and set by the remuneration committee followed by the PTT Board. The remuneration policy has aligned with the principal guidelines and practices of leading companies in the same industry under the clear, transparent, and fair, criteria. The CEO's salary and bonus increase has been determined by his key KPIs' scores and performance results in the reporting year (short-term) and the company's long-term strategies, including environmental, social, and governance (ESG). The CEO's compensation assessment has been considered by four key performance indicators (KPIs) consisting of 1) State Enterprise Assessment Model (SE-AM) (30%), 2) performance according to the company vision which the president & CEO presented to the PTT Board of Directors (30%), 3) management ability and leadership (30%), and 4) 360-degree assessment (10%).

PTT Executive Compensation Assessment by KPIs performance %

State Enterprise Assessment Model (SE-AM) KPI*

"Climate-related KPI: Eco-efficiency"

30	30	30	10

*Quarterly performance monitoring process by CPRC

In 2024, the absolute greenhouse gas (GHG) emissions reduction is considered a part of the "Eco-efficiency" KPI (emission intensity reduction = production per GHG emissions) as SE-AM KPI to reduce and control GHG emissions by achieving "15% absolute GHG reduction target by 2035 compared to the base year 2021" and toward "net zero emissions by 2050".

STRATEGY

Climate-related Risk and Opportunity Assessment

PTT has implemented a comprehensive approach to address climate-related risks and opportunities. The strategic planning involves regular reviews and analysis of climate-related risks across short- (annually), medium- (5-7 years), and long-term (more than 10 years) time horizons. PTT conducts scenario analysis to assess the financial implications and impact levels of these risks and aligns the planning with decarbonization goals. The approach corresponds with the Paris Agreement goal, aiming to limit global warming to below 2°C and achieve global Net Zero by 2050. PTT has set an interim target to reduce the GHG emissions by 15% in 2035 compared to the base year in 2021. Our long-term goals are to achieve Net Zero Emissions by 2050. These efforts contribute to Thailand's commitment to reducing GHG emissions by 20% by 2030, demonstrating PTT's commitment to climate action.

PTT has applied the physical and transition climate scenario analysis to assess and understand how climate change will affect the business operations over time. Both types of risk assessments cover four business segments across PTT Group’s value chain:
1) Upstream Exploration & Production, 2) Downstream, Retail, Refining, and Petrochemical, 3) Infrastructure (Power), and 4) Natural Gas.

Physical Risk Assessment

Scope of Assessment

4
Asset Types

- Oil & Gas: Onshore
- Refineries & Processing
- Manufacturing & Chemicals
- Power: Natural Gas

2
Timeframes

2030

2050

6
Climate Hazards

Acute
Event-driven

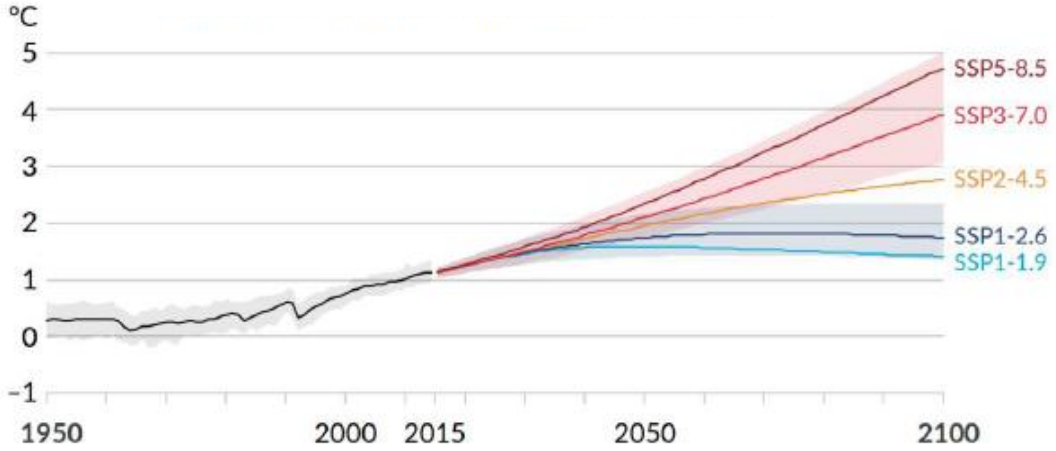
Chronic
Longer-term shifts

- Water Stress & Drought
- Extreme Heat
- Storms/ Extreme Wind
- River (Fluvial) Flood
- Coastal Flood
- Extreme Rainfall (Pluvial) Flood

3 Scenarios –
Shared Socioeconomic Pathways (SSPs) from IPCC Assessment Report 6

- **SSP1-2.6** a low emissions scenario that stays below 2°C warming by 2100, aligned to current commitments under the Paris Agreement.
- **SSP3-7.0** is a new scenario that didn't exist in AR 5. This scenario complements SSP5-8.5 as a more realistic worst-case outcome. Similar to SSP2-4.5, it is between the high and low extremes and offers an opportunity to explore a situation that previously could not be assessed.
- **SSP5-8.5** a high emissions scenario, which follows a 'business as usual' trajectory, assuming no additional climate policy and seeing CO_2 emissions triple by 2100. The selection of this scenario follows TCFD guidance to assess stressed exposure to physical climate change risks.

Global surface temperature change under the 5 SSPs



Source: IPCC ARG WGI Summary For Policymakers

Physical Climate Change Events

Evaluation of 6 climate-related natural hazards for PTT's value chain

Hazard Types: Acute, Chronic

Event Types	Physical Exposures
Extreme Heat 	In onshore oil and gas, it increases energy costs for liquefying natural gas and demands more cooling for heat-sensitive assets and indoor areas. Refineries and processing face reduced efficiency, lower output, and compromised product quality. Natural gas power has a low risk but requires increased liquefaction and cooling. Manufacturing and chemicals face moderate risks with additional cooling needs and compromised safety thresholds. Regulatory risks, unsafe working conditions, and decreased productivity are concerns.
Extreme Rainfall Flooding 	In onshore oil and gas, it damages infrastructure, including drilling rigs, pipelines, and storage facilities, leading to unsafe working conditions and contamination of waterways. Refineries and processing face operational damage, unforeseen shutdowns, and potential pipe ruptures, causing downtime, safety risks, and increased oil discharge. Chemical manufacturing suffers property damage, requiring evacuations, impacting the environment, and posing regulatory risks. Natural gas power sees infrastructure and operational damage, downtime, and reputational harm. Ground instability and gas leaks from flooded pipelines are additional concerns.
Storms/ Extreme Wind 	In onshore oil and gas, they damage infrastructure, disrupt operations and supply chains, and increase the risk of oil spills and gas leaks. Refineries and processing face structural damage, equipment breakdowns, and disruptions to utilities, leading to shutdowns and productivity loss. Chemical manufacturing suffers property damage, with potentially hazardous waste release and reputational impacts. Natural gas power sees physical damage to above-ground infrastructure, disruptions to operations and potential gas supply. Evacuations, blocked access, and revenue damage are common concerns across industries.
Water Stress & Drought 	In onshore oil and gas, reduced water availability leads to water competition, tougher environmental regulations, and reputational risks. Refineries and processing face decreased output, potential closures, and reduced productivity due to limited water for hydraulic fracturing and cooling systems. Chemical manufacturing suffers production delays and downtime, with lower water quality and availability impacting operations. Natural gas power experiences downtime and competition for water, requiring alternative sources and potential disruptions to construction and expansion. Increased water costs and reputational issues are common during water stress and drought.
Coastal Flooding 	In onshore oil and gas, infrastructure near the coast is vulnerable to damage and corrosion from saltwater. Refineries and processing facilities face physical damage to operational infrastructure, potential oil spills, and capacity challenges in water treatment. Chemical manufacturing is at risk of asset damage, hazardous waste release, and reputational impacts. Coastal flooding can disrupt transport networks and halt production. Natural gas power infrastructure is susceptible to damage and corrosion, leading to downtime and associated costs.

Climate Risk Score by Hazard (1/3)

Extreme Heat

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Extreme Rainfall Flooding

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Legend

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Minimal Risk

Climate Risk Score by Hazard (2/3)

River Flooding

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Storms/ Extreme wind

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Legend

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Minimal Risk

Climate Risk Score by Hazard (3/3)

Water Stress and Drought

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Coastal Flooding

Facilities	Baseline	2030			2050		
		SSP1-2.6	SSP3-7.0	SSP5-8.5	SSP5-8.5	SSP3-7.0	SSP5-8.5
Gas Processing							
Exploration and Production							
Gas Terminal							
Oil Terminal							
Petrochemical							
Refinery							
Utility							

Legend

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Minimal Risk

Transition Risk Assessment

Scope of Assessment

4

Business Groups from PTT's Value Chain

- Upstream Exploration & Production
- Downstream Oil Retail, Refining, and Petrochemical
- Infrastructure (Power)
- Natural Gas

Transition Drivers

- Policy & Legal
- Market
- Technology
- Reputation

Climate Scenarios (PTT & IEA)

Projects of future pathways mapped based on greenhouse gas emissions and considered under two time horizons by **2030 (mid term)** and **2050 (long term).**

PTT assesses climate change risk using two climate scenarios: PTT's Clean Scenario and Clear Scenario. With the update of the IEA World Energy Outlook 2022, we reviewed the Clean and Clear scenarios with the STEPS and APS data to extrapolate risks towards 2050. The methodology is based on the average ratio of Clean/STEPS and Clear/APS in the baseline, 2030 and 2040 to estimate the data points in 2050. The results suggest that Clean and Clear scenarios are largely in line with STEPS and APS in terms of oil demand in 2040 and 2050. However, Clean and Clear scenarios are more positive towards the change in oil demand in 2030 according to Thailand's Gas Plan where it is projected to increase while APS reports a slight decrease in 2030.

Base case – PTT Clean Scenario, supported by IEA Stated Policies Scenario (STEPS)

Temperature outcome of **2.7°C -3.3°C by 2100**

Accounts for existing policies | No future strengthening, or weakening, of policy | Sector-by-sector outlook

A scenario that explores where the energy system might go, considering current stated policies, without additional policy implementation. The global warming will reach 2.5ºC by 2100

Low Carbon scenario – PTT Clear scenario, supported by IEA Announced Pledges Scenario (APS)

Temperature outcome of **<2.0°C by 2100**

Surge in clean energy investment | Rapid shift away from fossil fuels | A clean energy world

A scenario which assumes that all climate commitments made by governments around the world will be met in full and on time. The global warming will reach 1.7ºC by 2100, in line with the below 2 ºC goal under the Paris Agreement.

Upstream Exploration & Production

Transition risk largely driven by carbon pricing, low carbon transport and stakeholder pressure

Average RISK Clean to Clear		
Timeframe	**2030**	**2050**
Upstream	Limited	Higher Risk

Average OPPORTUNITY Clean to Clear		
Timeframe	**2030**	**2050**
Upstream	Limited	Lower

Average Risk & Opportunity Clean to Clear		
Timeframe	**2030**	**2050**
Upstream	Limited	Higher Risk

The risk/ opportunity scores (scenario deltas multiplied by normalised likelihood X impact ratings) for each indicator are netted off against each other to obtain average risk/ opportunity score. The average score is then compared to the ranges assigned to the different rating levels (limited, low, moderate, to high risk) to assign the overall rating

Climate Transition Drivers Screening						Upstream O&G Risk / Opportunity	
	Risk/Opportunity Description	**Impact Type**	**TCFD Category**	**Financial Impact**	**Scenario Indicator**	**2030**	**2050**
1	Mandatory Carbon Pricing	Risk	Policy & Legal	OPEX	CO_2 Price		
2	Decreasing oil demand	Risk	Market	Revenue	Oil demand		
3	Changing gas demand as a transition energy	Risk	Market	Revenue	Natural gas demand		
4	Low-carbon technologies for O&G exploration	Risk	Technology	CAPEX; OPEX	Share of electricity consumption in the industrial sector		
5	Low carbon transport for PTT operations	Risk	Technology	CAPEX; OPEX	Transport CO2 emissions		
6	Waste gas recovery for reducing venting and flaring	Opportunity	Technology	CAPEX; OPEX	Total CO2 emissions (including flaring)		
7	Stranded assets due to stakeholder pressure	Risk	Reputation	Valuation	Annual average investment spending in oil and gas		
	Average Risk & Opportunity at Business Segment Level (Upstream O&G)						

- Upstream business is expected to encounter the highest rise in transition risk from **mandatory carbon pricing, low-carbon transport** and **stranded assets**. Carbon pricing has become a key instrument for countries to disincentivize emissions. Carbon prices may be lower in the early stage, but they tend to increase much higher in a low-carbon scenario to effectively support countries to meet their climate goals. In addition, the pursuit of **low-carbon transport** would entail a higher CAPEX in clean energy carriers and associated fleets and infrastructure. Upstream business is also exposed to the **stranding risk** as investors start exiting high carbon investments.
- **Oil demand** and **gas demand** are expected to peak soon and would either stagnate (for gas) or start dropping (for oil) at a global level. PTT's exposure to these drivers remain **moderate** because of its presence in emerging nations in Asia. In the meantime, PTT would have to deploy low-carbon technologies such as electrification at a larger scale, leading to **much higher CAPEX and OPEX**, in a low-carbon world.
- A **limited opportunity** was identified for **waste gas recovery** which could reduce OPEX and recover CAPEX in a reasonable timeframe.

Opportunity Score Key

High Opp.	Mod. Opp.	Low Opp.	Limited Opp.

Risk Score Key

Limited Risk	Low Risk	Mod. Risk	High Risk

Downstream Oil Retail, Refining and Petrochemical

Electric mobility may present a high risk, while circular economy provides a low opportunity

Average RISK Clean to Clear		
Timeframe	**2030**	**2050**
Downstream	Limited	High Risk

Average OPPORTUNITY Clean to Clear		
Timeframe	**2030**	**2050**
Downstream	Limited	Lower Opp.

Average Risk & Opportunity Clean to Clear		
Timeframe	**2030**	**2050**
Downstream	Limited	Moderate Risk

The risk/ opportunity scores (scenario deltas multiplied by normalised likelihood X impact ratings) for each indicator are netted off against each other to obtain average risk/ opportunity score. The average score is then compared to the ranges assigned to the different rating levels (limited, low, moderate, to high risk) to assign the overall rating

Climate Transition Drivers Screening						Downstream Risk / Opportunity	
	Risk/Opportunity Description	Impact type	TCFD Category	Financial Impact	Scenario Indicator	2030	2050
1	Mandatory Carbon Pricing	Risk	Policy & Legal	OPEX	CO_2 Price		
2	Circular economy for petrochemical products	Opportunity	Market	Revenue	Plastic recycling rates		
3	Market shift towards electric mobility	Risk	Market	Revenue	Share of electricity in transport		
4	Decreasing demand for refinery products	Risk	Market	Revenue	Demand for refinery products		
5	Decarbonization Technologies For downstream O&G	Risk	Technology	CAPEX; OPEX	Transformation of hydrogen in oil refining		
6	Low Carbon Transport for PTT Operations	Risk	Technology	CAPEX; OPEX	Transport CO2 emissions		
7	Stranded assets due to stakeholder pressure	Risk	Reputation	Valuation	Refinery capacity at risk		
	Average Risk & Opportunity at Business Segment Level (Downstream O&G)						

- Downstream business is expected to encounter the highest rise in transition risk from **mandatory carbon pricing** and **market shift towards electric mobility** (See Page 36 for the description on carbon pricing impact). Electric mobility would dominate the transport sector in a low-carbon world. While it would stimulate a higher demand for petrochemical products, this positive impact could be outweighed by a greater threat on PTT's revenue from oil retail and refining business. Given the fast-growing EV market, the impact might be realized by 2030.
- **Decreasing demand for refinery products** would gradually show its impact as the economy shifts towards electrification. This could contribute to the **risk of stranding** where certain refining capacity would be idled due to a low market demand and stakeholder pressure.
- **Decarbonization technologies for downstream O&G** were assessed by the transformation of grey hydrogen to green hydrogen in oil refining, as refineries and petrochemical operations use huge volumes of hydrogen. However, this has been identified as a limited risk.
- As Thailand is promoting the Bio-Gircular-Green (BCG) economy model. **Circular economy** may present a **low opportunity** for PTT's petrochemical business as the company is proactive to develop circular products and production processes.

Opportunity Score Key

High Opp.	Mod. Opp.	Low Opp.	Limited Opp.

Risk Score Key

Limited Risk	Low Risk	Mod. Risk	High Risk

Infrastructure (Power)

Main risk from the deployment of decarbonization technologies with limited opportunities

Average RISK Clean to Clear		
Timeframe	**2030**	**2050**
Infrastructure (Power)	Limited	Moderate Risk

Average OPPORTUNITY Clean to Clear		
Timeframe	**2030**	**2050**
Infrastructure (Power)	Limited	Limited

Average Risk & Opportunity Clean to Clear		
Timeframe	**2030**	**2050**
Infrastructure (Power)	Limited	Moderate Risk

The risk/ opportunity scores (scenario deltas multiplied by normalised likelihood X impact ratings) for each indicator are netted off against each other to obtain average risk/ opportunity score. The average score is then compared to the ranges assigned to the different rating levels (limited, low, moderate, to high risk) to assign the overall rating

Climate Transition Drivers Screening						Infrastructure Risk / Opportunity	
	Risk/Opportunity Description	Impact type	TCFD Category	Financial Impact	Indicator	2030	2050
1	Mandatory carbon pricing	Risk	Policy & Legal	OPEX	CO_2 Price		
2	Policy on decarbonizing energy mix	Risk	Policy & Legal	Revenue	Share of electricity generated from unabated fossil fuels		
3	Rising trend in electrification	Opportunity	Market	Revenue	Share of electricity in total energy consumption		
4	Maturity of renewable electricity generation	Opportunity	Market	CAPEX; OPEX	Average LCOE - solar and wind		
5	Decarbonization Technologies for the power sector	Risk	Technology	CAPEX; OPEX	Share of fossil fuels with CCUS, hydrogen and ammonia in power generation		
6	Stranded assets due to stakeholder pressure	Risk	Reputation	Valuation	Annual average investment spending in unabated fossil fuels for power generation		
	Average Risk & Opportunity at Business Segment Level (Infrastructure/Power)						

- Infrastructure (power) business is expected to encounter the highest rise in transition risk from **decarbonization technologies.** The most important technologies for PTT's existing power plants (of which a majority are gas-fired) would be CCUS and the blend of hydrogen or ammonia with natural gas. These technologies would have to be more widely deployed in a low-carbon world, leading to much higher CAPEX and OPEX associated with the respective technologies. This also links to the **lower risk** from a reducing share of electricity generated from unabated fossil fuel as governments seek to **decarbonize the energy mix**.
- **Carbon pricing risk** shows a **moderate risk**, suggesting the importance to continuously seek decarbonisation of PTT's power operations. Meanwhile, **stranding risk** may exist, although **limited**, as investors shift their interest away from unabated fossil fuels.
- Two opportunities were identified from the **increase of electrification** and **maturity of renewable electricity generation**. The former would create a higher market demand for electricity in general, while the latter would help to reduce the CAPEX and OPEX associated with PTT's planned renewable capacity expansion. However, both opportunities were assessed as **limited** as the level of electrification has been higher and renewable energy has become much cheaper even at the baseline.

Opportunity Score Key

High Opp.	Mod. Opp.	Low Opp.	Limited Opp.

Risk Score Key

Limited Risk	Low Risk	Mod. Risk	High Risk

Natural Gas

Similar risk profile to the upstream business, with a limited opportunity from energy efficiency

Average RISK Clean to Clear		
Timeframe	**2030**	**2050**
Natural gas	Limited	High Risk

Average OPPORTUNITY Clean to Clear		
Timeframe	**2030**	**2050**
Natural gas	Limited	Limited

Average Risk & Opportunity Clean to Clear		
Timeframe	**2030**	**2050**
Natural gas	Limited	High Risk

The risk/ opportunity scores (scenario deltas multiplied by normalised likelihood X impact ratings) for each indicator are netted off against each other to obtain average risk/ opportunity score. The average score is then compared to the ranges assigned to the different rating levels (limited, low, moderate, to high risk) to assign the overall rating

Climate Change Drivers Screening						Natural gas Risk / Opportunity	
	Risk/Opportunity Description	**Impact type**	**TCFD Category**	**Financial Impact**	**Indicator**	**2030**	**2050**
1	Mandatory carbon pricing	Risk	Policy & Legal	OPEX	CO_2 Price		
2	Changing gas demand as a transition energy	Risk	Market	Revenue	Natural gas demand		
3	Gas mobility in the low-carbon transition	Risk	Market	Revenue	Natural gas use in the transport sector		
4	Low-carbon technologies for gas processing	Risk	Technology	CAPEX; OPEX	Share of electricity consumption in the industrial sector		
5	Low-carbon transport for PTT Operations	Risk	Technology	CAPEX; OPEX	Transport CO2 emissions		
6	Energy efficiency improvement	Opportunity	Technology	OPEX	Energy consumption in the industrial sector		
7	Stranded assets due to stakeholder pressure	Risk	Reputation	Valuation	Annual average investment spending in oil and gas		
	Average Risk & Opportunity at Business Segment Level (Natural Gas Value Chain)						

- The risk profile of PTT's gas value chain appears like that of the upstream business. **Carbon pricing** was found presenting the highest risk. Carbon prices may be lower in the early stage, but they tend to increase much higher in a low-carbon scenario to effectively support countries to meet their climate goals. The pursuit of **low-carbon transport** would entail a higher CAPEX in clean energy carriers and associated fleets and infrastructure. Gas business could also face a **stranding risk** as investors shift further towards clean energy options. These risks were assessed as **moderate** to **high** by 2050
- **The changing gas demand** would not be a risk until after 2030. However, PTT should be careful about any new deployment of gas assets to reduce the effect of carbon lock-in in a longer term. Specific to the transport sector, natural **gas mobility** could be replaced by electricity and low-carbon gaseous fuels (such as biomethane, hydrogen, synthetic methane) more extensively, becoming a limited risk to PTT's NGV sales.
- To reduce its own emissions, PTT would have to deploy low-carbon technologies such as electrification (i.e., fuel switch from fossil fuels to electricity) more extensively in a low-carbon world, leading to higher CAPEX and potentially OPEX too. On the other hand, a **low opportunity** may be seized from cost-saving **energy efficiency improvement** such as process optimization, although the magnitude is assessed limited.

Opportunity Score Key

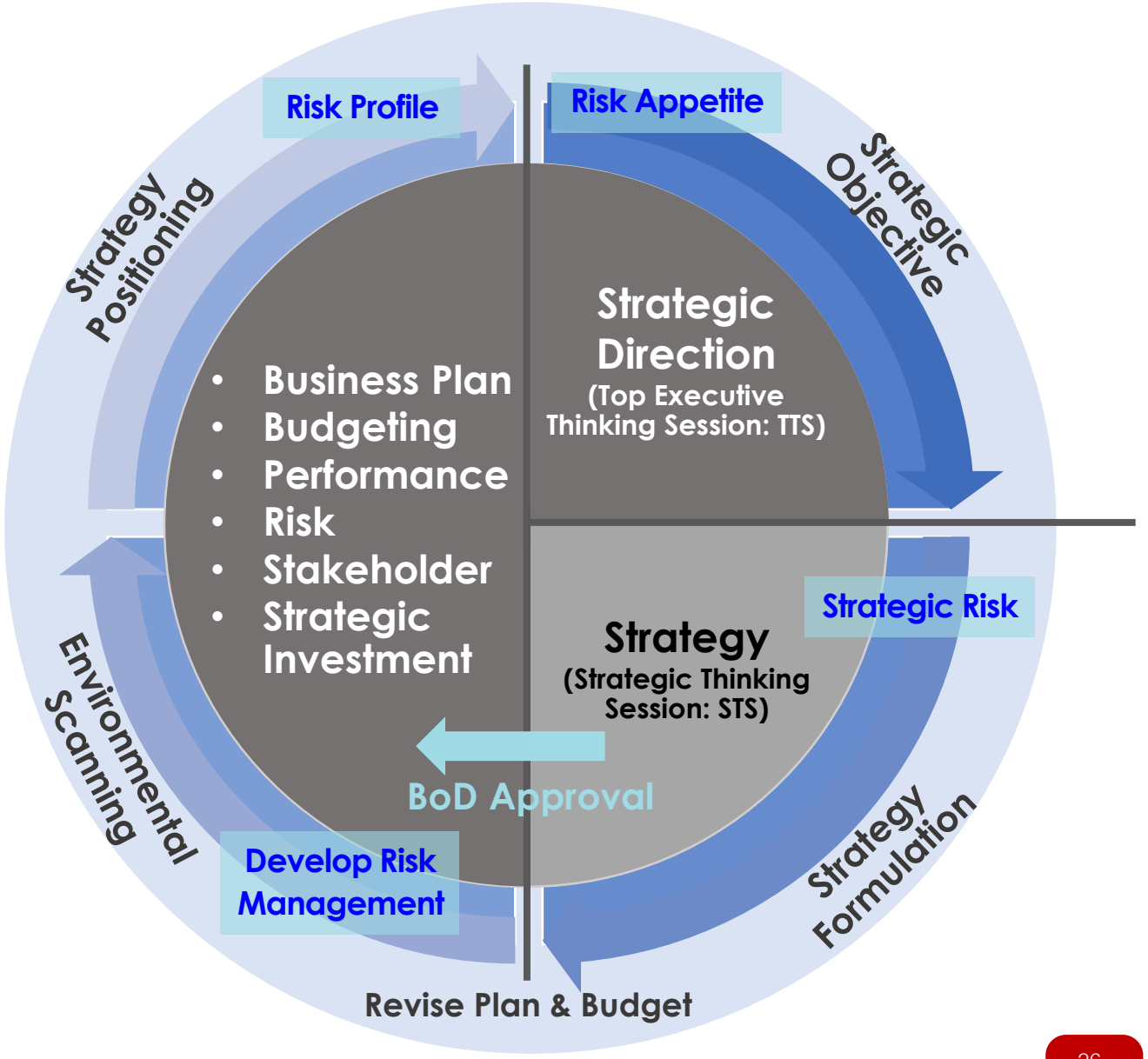
High Opp.	Mod. Opp.	Low Opp.	Limited Opp.

Risk Score Key

Limited Risk	Low Risk	Mod. Risk	High Risk

Strategy and Business Planning Process

The climate-related scenario analysis enables the identification of potential risks and opportunities on the business model. PTT incorporates these results as a part of developing the outlook for the energy transition during the environmental scanning process of the strategy and business planning. The annual planning involves the executives from the Group level and business groups throughout the Top Executive Thinking Session and the Strategic Thinking Session. The strategy is then presented and approved by the Board. To drive the plan for decarbonization strategy to meet the goal of the Paris Agreement, PTT will regularly review the impacts based on the changing situations and adjust the plans, as well as the budget planning and performance metrics accordingly.



C^3 Decarbonization Pathways

C^3 Decarbonization Pathways are linked to the organization's Carbon Neutrality target by 2040 and Net Zero Emissions target by 2050, which serves as a framework for collaborative action within PTT Group. Key action plans/projects include the following:

Climate-Resilience Business

Investing in clean energy and low-carbon businesses, while restructuring the portfolio to align with global and Thailand's energy transition goals.

Key Highlights

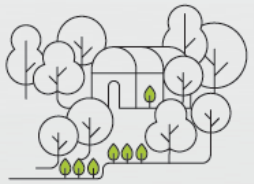
- Advancing natural gas exploration and production, alongside investments in Clean Hydrogen and renewable energy projects
- Executing a complete exit from the coal business
- Expanding renewable energy investments domestically and globally

Carbon-Conscious Asset

Reducing greenhouse gas emissions from production and operations through targeted mitigation strategies.

Key Highlights

- Enhancing energy conservation and energy efficiency
- Utilizing clean and renewable energy
- Adopting advanced technologies such as Small Modular Reactors (SMR), etc.



Coalition, Co-Creation and Collective Efforts for All

Collaborating with stakeholders to lead national efforts in GHG emissions reduction through CCS, hydrogen use, and nature-based solutions like reforestation

Key Highlights

- Carbon Capture and Storage (CCS) at the Arthit/Eastern Thailand CCS hub
  - Offshore and Onshore
- Carbon Capture and Utilization (CCU)
- Expanding forest areas by an additional 2 million rai (3.2 billion m^2)
  - Collaborating with the government and through independent initiatives

For further details of the progress, see PTT 56-1 One Report 2024 page 162-168.

Climate Risk Quantification

Climate Risk Quantified

Physical Risk
Water Stress and Draught

Transition Risk
Carbon Tax

Scenarios

SSP1-2.6 | SSP3-7.0 | SSP5-8.5

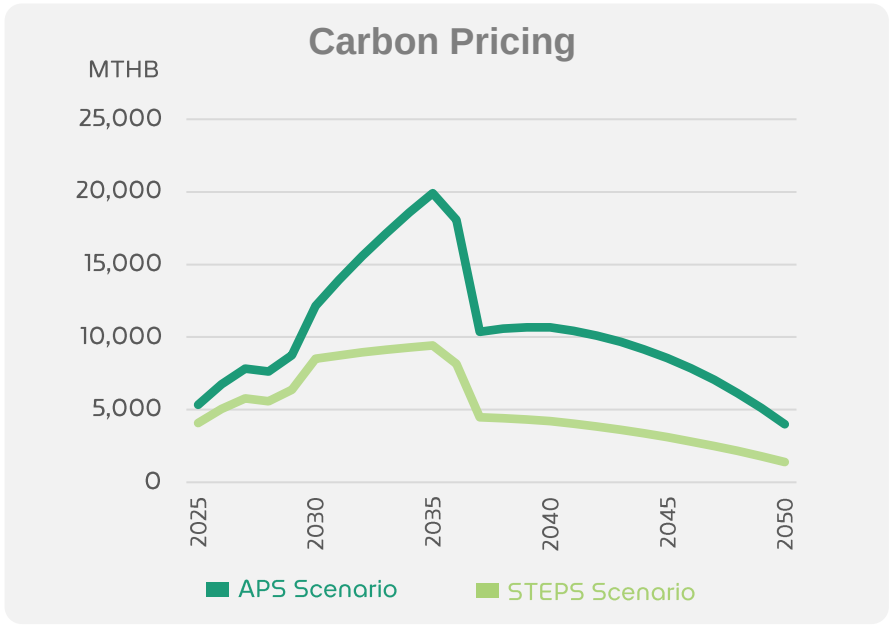
STEPS | APS

Time frames

2030 | 2050

2030 | 2040 | 2050

Financial & Production Data	Unit
Annual revenue	THB
Annual water cost	THB
Operational Data	
Water withdrawal volume	m^3
Adjustment based on adaptation measures	%
Water Stress Data	
Number of days with increased water costs	Day
Number of days of business interruption	Day
Change in water costs due to water stress & draught	%



Financial Implications

- **Revenue loss 3,071,000 THB in 2050**
- **Additional OpEx 39,000 THB in 2050**

- **Additional OpEx 12,157 MTHB**

Cost of Measures

3Rs (Reduce, Reuse, and Recycle) projects = 370,000 THB

The cost of adaptation measures is estimated for long-term implementation plans (>10 years) and cover PTT's existing and future operations.

Investment in decarbonized technology such as the carbon capture and storage (CCS) 7,820 MTHB for the capacity of 10 MTPA

RISK MANAGEMENT

PTT Risk Management

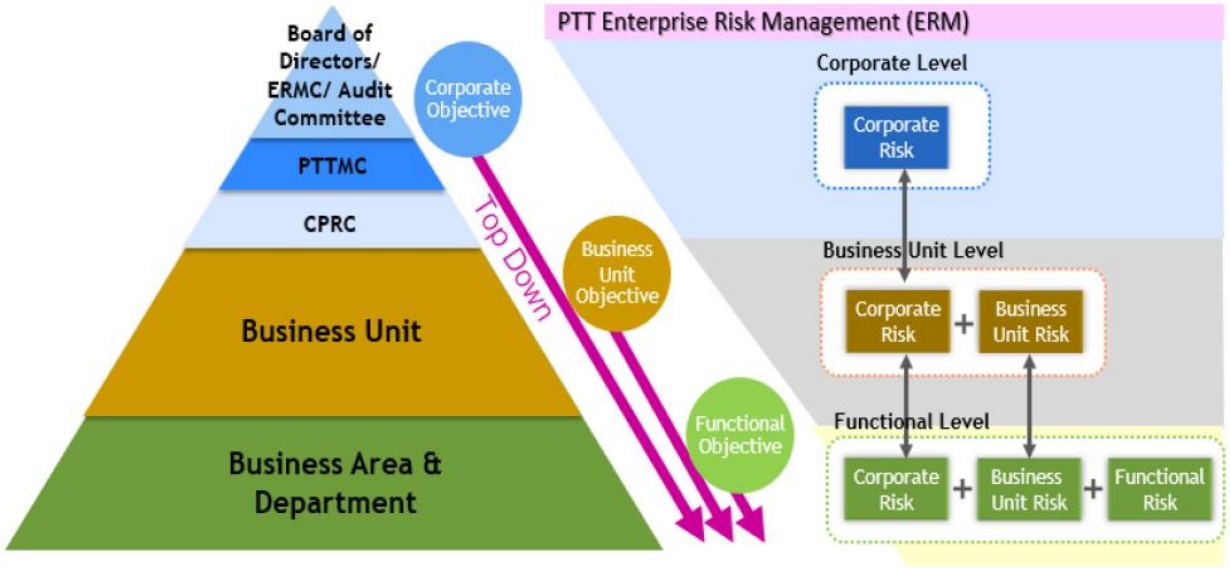
Integrated Enterprise Risk Management

PTT's Enterprise Risk Management is a process by which the Board of Directors, executives and employees throughout the organization jointly define the organization strategy, identify risk events that may affect the organization and manage the risks to ensure the achievement of the organizational objectives.

PTT has applied the COSO ERM 2017 and ISO31000:2018 Risk Management to develop PTT ERM Framework and determine acceptable organization's risk level in each type of risk corresponding to the company's **Vision/ Mission** and align with the **strategic objective** and core business.

For the **Strategic Planning**, all potential risk factors from the Risk Universe are reviewed. Key risks that affect both short-term and long-term strategies are identified thoroughly. The result of the risk analysis becomes the input to determine the direction of the organization's strategy and related **master plans**.

PTT Risk Management (cont.)

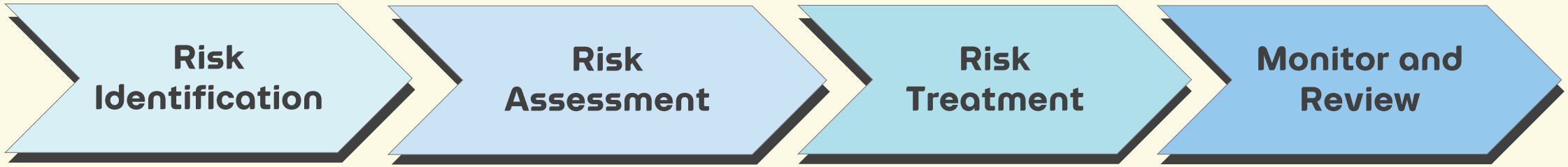


PTT Enterprise Risk Management Structure Framework

PTT Enterprise Risk Management is divided into 3 levels as follow:

1. **Corporate Level**: manage risks that affect the achievement of Corporate Objectives.
2. **Business Unit Level:** Manage risks that affect business level objectives. Risks that have extreme impacts will be upgraded to Corporate Level Risk.
3. **Functional Level:** Manage risks that affect operational level objectives.

Risk Management Process

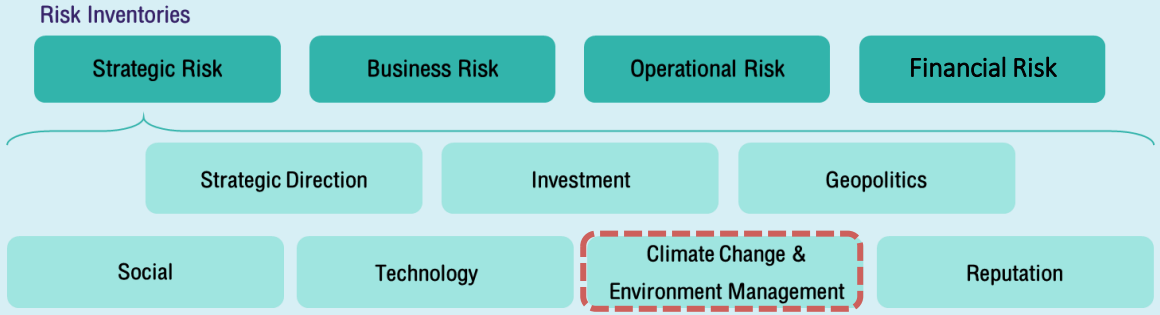


PTT Risk Management Process (1/4)

Risk Identification | Risk Assessment | Risk Treatment | Monitor and Review

Analyze potential risks based on the source of risk.

Categorize risk items into risk inventories



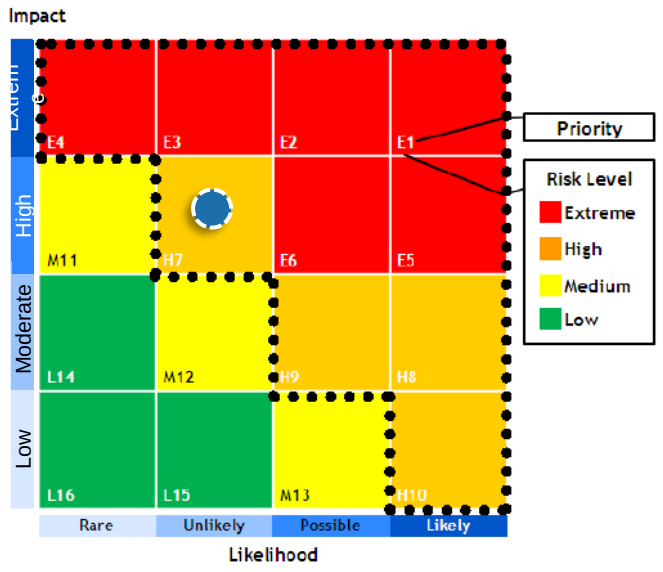
Risk items from the risk universe are categorized into 4 categories of risk inventories as follows:

1. Strategic Risk
2. Business/ Support Function Risk
3. Operational Risk
4. Financial Risk

Climate-related risks are identified under the Strategic Risk.

PTT Risk Management Process (2/4)

Risk Identification | **Risk Assessment** | Risk Treatment | Monitor and Review



Risk Analysis and Evaluation

Assess the impact and likelihood of each risk item and evaluate risk level into the risk matrix

Risk Prioritization

Prioritize risk item:

- Extreme and High risk levels are assessed to be corporate risk which must be implemented in accordance with the risk management process at corporate level
- Medium and Low risk levels are assessed to be Business unit level and functional level risk
- Climate-related Risk, Clean Growth Target Achievement, is assessed as High Risk and selected to be Corporate Risk.

PTT Risk Management Process (3/4)

Risk Identification | Risk Assessment | **Risk Treatment** | Monitor and Review

Risk Owner
set up a risk management plan consisting of:

- **Control**: manage to reduce the likelihood of risk item
- **Mitigation Plan:** manage to reduce the impact that may affect the goals if such risk event occur
- **Cost & Benefit Analysis:** Evaluate the worthiness of the benefits and operating costs
- **Leading KRI:** Indicators established to track the likelihood of a risk occurring
- **Lagging KRI:** Performance indicators of risk management

Corporate Plan and Risk Management Committee (CPRC)
endorses Corporate Risk Profile and risk management plan

Enterprise Risk Management Committee (ERMC)
approves Corporate Risk Profile and risk management plan

PTT Risk Management Process (4/4)

Risk Identification | Risk Assessment | Risk Treatment | **Monitor and Review**

Monitor the progress and effectiveness of risk management plan, obstacles, event risks, and changes in risk levels when performing various activities to control the risk within the acceptable risk level and ensures the organization objectives achievement.

Situation/ Risk	PTT Group Performance	Leading/ Lagging KRIs	Risk Item Management Progress by Risk Owners
Monitor changes in situations, trends and risks that have a significant impact.	Monitor PTT Group's performance to ensure that there are no significantly risk items affect the performance compared to the target.	• Monitor the KRIs result. • Risk owner analyzes why KRIs do not meet targets, assess the trend of the situation and improve / add supportive measures.	• Monitor the risk management plan progress. • Monitor and adjust the risk management plan align with the changing situation.

The risk owners must report the progress of risk management plans to the CPRC monthly and to the ERMC on a quarterly basis.

METRICS AND TARGET

PTT Net Zero Emissions Target

PTT has set an interim target to reduce the GHG emissions by 15% in 2035 compared to the base year in 2021, and a long-term goals to achieve Net Zero Emissions by 2050, which is in line with the latest scientific scenario that would limit global temperature rise to 2°C above pre-industrial levels, such targets have been considered and approved by PTT Group Net Zero Task Force (G-NET). To achieve these targets, PTT has a process for monitoring and controlling the amount of GHG emissions to be in line with the plan, including review the targets when the policies change and reporting to PTT Group Net Zero Task Force (G-NET) quarterly.

Metrics and Targets

Greenhouse Gas Emissions Measurement

PTT measures greenhouse gases emissions in accordance with the international standards consisting of ISO 14064 - 1:2018 and the Greenhouse Gas Protocol (developed by WBCSD/WRI, 2004). For organizational boundary, PTT has applied the operational control approach where fully counts the GHG emissions from operations that PTT has the authority to control and implement operating policies. There are two assumptions for calculating the amount of greenhouse gases from the carbon dioxide separation process which are the mass balance method, calculated from the difference between the amount of CO_2 gas that enters the system and the CO_2 gas that leaves the system, and the method using Vent flow rate and CO_2 concentration of the permeate gas. In addition, the permeate gas must be classified into two cases, those with incineration and without incineration.

Climate Mechanism Implementation

PTT conducted an internal carbon pricing mechanism to trade-off associated with risks and opportunities of the investment plans by setting at USD 20 per ton of carbon dioxide equivalent. PTT's internal carbon pricing mechanism has covered the investment projects that are GHG reduction and emission projects approved by the Strategic Investment Management Committee (SIMC).

Metrics and Targets

2024 Key Performance Indicator (KPI):

Short-term Target	Long-term Target	Progress against Short-term Target	Indicators
PTT and PTT Group's greenhouse gas emissions (scope 1 and scope 2 including domestic and international operations) are less than 11.5 million tons of CO_2e and 51.0 million tons of CO_2e, respectively.	Reducing PTT's greenhouse gas emissions by 15% in 2035 compared to the base year 2021 to achieve net zero emissions by 2050.	PTT and PTT Group's greenhouse gas emissions are 11.06 million tons of CO_2e and 41.45 million tons of CO_2e, respectively.	• State Enterprise Assessment Model Key Performance Indicator (SE-AM KPI) and Corporate KPI* • Functional KPI • KPI for PTT Sustainability Management Masterplan for Social and Environmental Responsibilities 2022 – 2025 • QSHE indicator in 2024 for PTT and PTT Group's performance *SE-AM KPI and Corporate KPI for 'Climate Action' measures Eco-efficiency performance, calculates from greenhouse gas emission and PTT-specific product

2024 Key Risk Indicator (KRI):

Leading KRI	Trigger	Lagging KRI	Target
Lower Emissions: PTT GHG Emissions Performance	> 11.5 million tons of CO_2e	Financial institution and investor withdrawal of investment as a result of climate-related issues	None

PTT Direct and Indirect GHG Emissions

PTT's direct and indirect greenhouse gas emissions

Unit: Million tons of CO_2 equivalent

Remarks:

- *PTT's direct and indirect greenhouse gas emissions cover only the activities conducted solely by PTT.*
- *From 2020 to 2022, the indirect greenhouse gas emissions (Scope 3) only accounted for emissions from the combustion of fuel products sold by PTT. In 2023, the Scope 3 emissions of PTT expanded to include not only the combustion of fuel products sold by PTT (Use of Sold Product) but also waste generated from production processes (Waste Generated in Operations) and business travel (Business Travel).*
- *The indirect greenhouse gas emissions (Scope 2) of PTT are derived from electricity purchased and electricity generated from solar panels installed and used at the Innovation Institute, the Kanom Natural Gas Separation Plant, the Wangchan Valley project area, the natural gas pipeline system operations, and the operations of the natural gas for vehicles division.*
- *The market-based indirect greenhouse gas emissions data is sourced from activities including electricity usage from the transmission system and electricity purchased from private power plants, GPSC and GC.*
- *The emission factors and global warming potential (GWP) values used are referenced from IPCC AR6 for GWP calculations.*
- *The standards, methodologies, assumptions, and/or calculation tools applied are based on the GHG Protocol and the API Compendium.*
- *PTT's greenhouse gas emissions targets are focused on managing direct emissions (Scope 1) and market-based indirect emissions (Scope 2).*

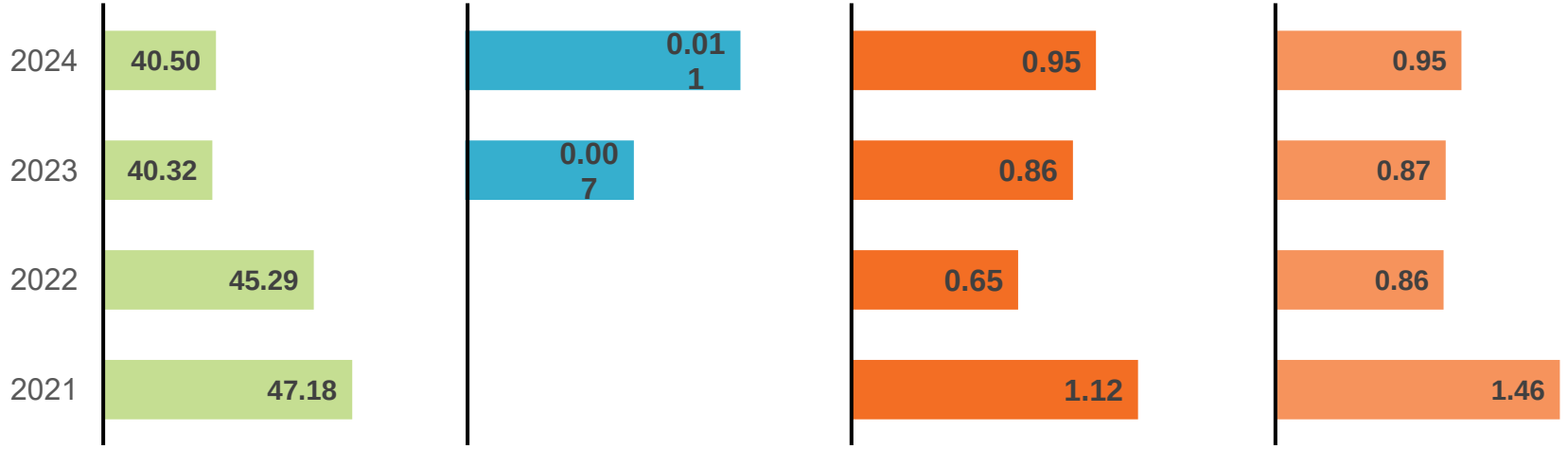
Source: 56-1 One Report 2024, page 169

PTT Group Direct and Indirect GHG Emissions (1/2)

PTT Group's direct and indirect greenhouse gas emissions[1,8]

Unit: Million tons of CO_2 equivalent

GHG Scope 1



Remarks:

1 The data scope under operational control includes companies in which PTT directly owns more than 20% and is the majority shareholder or holds 100% indirect ownership. This also covers joint ventures with an equivalent proportion of major shareholders. The greenhouse gas emissions for these companies are calculated based on those entities where PTT directly owns more than 20% or is the majority shareholder, or holds 100% indirect ownership, including joint ventures with an equivalent shareholding structure.

2 Reporting on direct and indirect greenhouse gas emissions includes GC's operations abroad, with estimated emissions of approximately 0.31 million tons of CO2 equivalent for direct emissions and 0.01 million tons of CO2 equivalent for indirect emissions (estimated based on 2020 operational data).

3 Data for PTT Group from 2019 - 2024 has been revised due to:

- *The expansion of the organizational boundary due to PTTEP's operation in the G2 area in 2022, as well as the expansion of reporting boundaries to include companies within the TOP group (TLB, TOPSPP, TPX, LABIX) and GC (BPE, EOEG, GCL, GCME, GCMP, GCO, GCP, BPA, Phenol, GCS, ME I&II, NPS S&E, TPRC, TTT). This also includes the merger between TOP and TP (Thai Oil Power) in 2021, and the acquisition of the GLOW Group's power and steam plants by GPSC in 2019.*
- *The expansion of the operational boundary due to increased reporting from ORP, HGP, office spaces of EnCo and Rayong, laboratories, Innovation 2, workshops by GC, as well as IRPC's warehouse and tank yards, LPG cylinder storage in Songkhla, and OR's lubricants distribution center in Bangpakong.*
- *The addition of new activities, such as the operation of power generators at PTTLNG in 2020.*
- *In 2024, the operational boundary was expanded due to increased reporting for the GC Campus of PTT Global Chemical Public Company Limited, The EnCony and Enco Terminal buildings of Energy Complex Co., Ltd., and LNG Map Ta Phut Terminal 2 (LMPT2) by PTT LNG Co., Ltd. Additionally, the greenhouse gas accounting method for PTT's natural gas pipeline system was adjusted, specifically in the "Fugitive" category, to calculate emissions per piece of equipment.*

4 Data on other indirect greenhouse gas emissions (Scope 3) covers the combustion of fuel products sold by PTT and OR (including natural gas, gasoline, diesel, jet fuel, fuel oil, liquefied petroleum gas, and kerosene). PTT manages other indirect greenhouse gas emissions (Scope 3) by setting reduction targets for both direct and indirect emissions (Scope 1 and 2) in alignment with the sales of PTT's products, as part of State Enterprise Assessment Model (SE-AM).

5 The scope of other indirect greenhouse gas emissions (Scope 3) for 2019 - 2021 includes PTT and OR.

6 Data on other indirect greenhouse gas emissions (Scope 3) from 2022 - 2023 includes emissions from the combustion of fuel sold by PTT, GC, TOP, IRPC, and OR. These emissions are calculated based on fuel sales data provided by the Department of Energy Business, with fuel used for customer manufacturing processes accounting for approximately 42% of the total Scope 3 emissions. This is considered direct greenhouse gas emissions (Scope 1) within the greenhouse gas accounting boundary of the entity or organization. Most of these emissions are controlled through the establishment of carbon neutrality and zero-emission targets for those legal entities and organizations.

7 Reporting on biogenic CO2 emissions has now been initiated.

8 The organization's greenhouse gas emissions reporting is expanding to cover all operations. Once this process is complete, data will be updated for future disclosures in subsequent reports.

9 Data on other indirect greenhouse gas emissions (Scope 3) also includes energy loss from purchasing electricity from external producers and using it within PTT Group.

10 Data on other indirect greenhouse gas emissions (Scope 3) covers waste disposal from PTT, PTTEP, GC, IRPC, GPSC, OR, and TTM production processes.

11 Data on other indirect greenhouse gas emissions (Scope 3) from 2023 - 2024 covers business travel by airplane for PTT, PTTEP, IRPC, GPSC, PTT LNG, PTT TANK, and TTM.

12 Data on other indirect greenhouse gas emissions (Scope 3) from 2023 - 2024 covers the disposal of petrochemical products sold by PTT Group, particularly by GC and IRPC.

Source: 56-1 One Report 2024, page 170

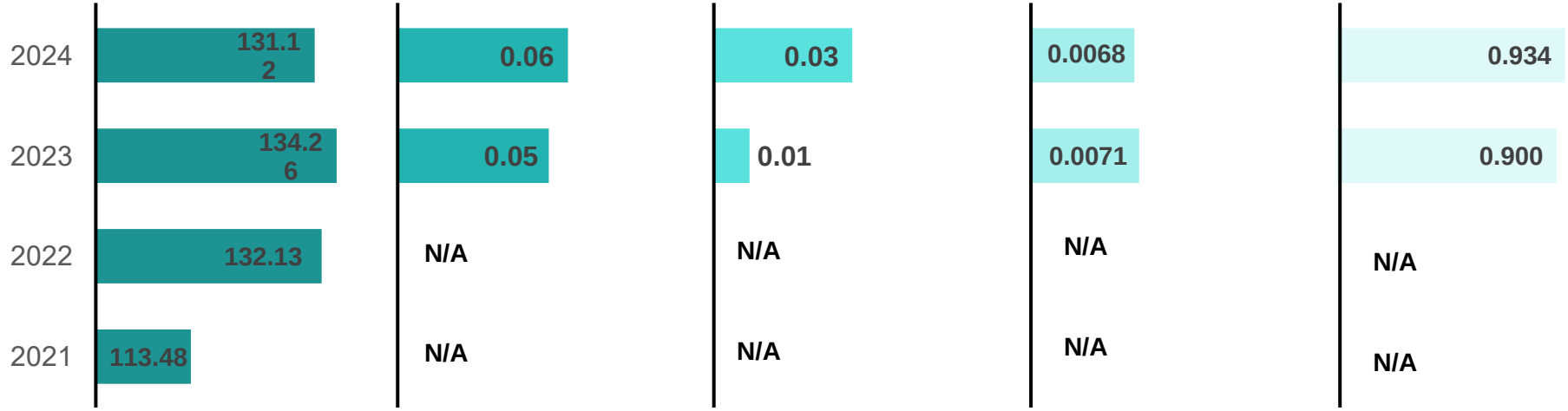
PTT Group Direct and Indirect GHG Emissions (2/2)

PTT Group's direct and indirect greenhouse gas emissions[1,8]

Unit: Million tons of CO_2 equivalent

GHG Scope 3 [2,3]

- Use of sold products[4,5,6]
- Fuel- and energy-related activities[9]
- Waste generated in operations
- Business travel[11]
- End-of-life treatment of sold products[13]



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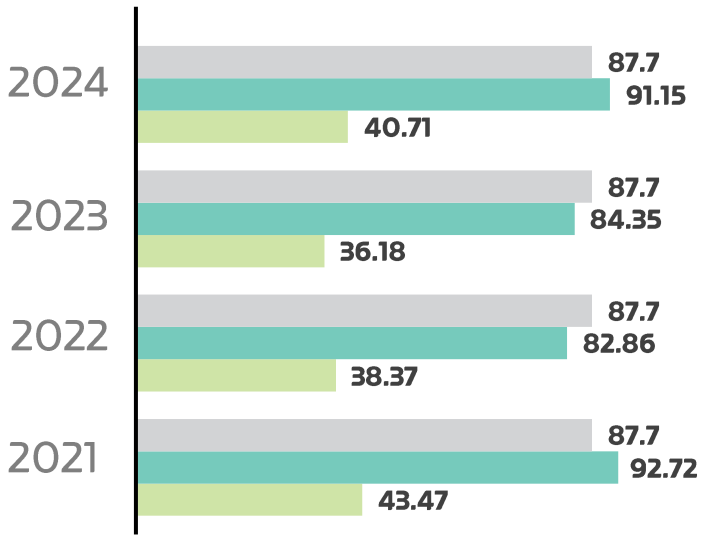
Source: 56-1 One Report 2023, page 167

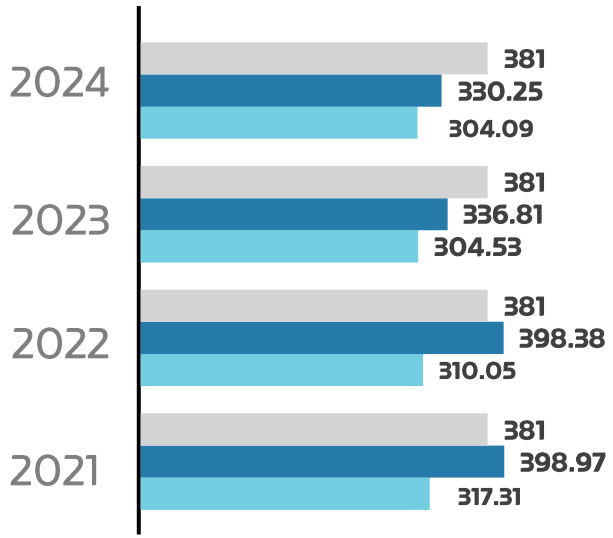
PTT Group GHG Emission Intensity

Greenhouse Gas Intensity [1, 5]

- Direct and indirect greenhouse gas emissions from PTT's activities (Scope 1 and 2)[2]
- Direct and indirect greenhouse gas emissions from PTT Group's activities (Scope 1 and 2)[2]
- PTT Group's Target



- Direct and indirect greenhouse gas emissions from PTT's activities, and the combustion of fuel products supplied by PTT. (Scope 1, 2 and 3)[4]
- Direct and indirect greenhouse gas emissions from PTT Group's activities, and the combustion of fuel products supplied by PTT. (Scope 1, 2 and 3)[4]
- PTT Group's Target



Unit: *kilograms of carbon dioxide equivalent per barrel of crude oil equivalent*

1 *The data scope under operational control includes companies in which PTT directly owns more than 20% and is the majority shareholder or holds 100% indirect ownership. This also covers joint ventures with an equivalent proportion of major shareholders. The greenhouse gas emissions for these companies are calculated based on those entities where PTT directly owns more than 20% or is the majority shareholder, or holds 100% indirect ownership, including joint ventures with an equivalent shareholding structure.*
2 *Calculations are based on greenhouse gas emissions from PTT Group and fuel sales by PTT and OR.*
3 *The data is calculated from greenhouse gas emissions according to the organizational boundary disclosed in PTT's 2021 annual report.*
4 *The calculation includes direct and indirect greenhouse gas emissions from PTT Group, as well as other indirect emissions and fuel sales from PTT and OR, based on the organizational boundary for 2020 to 2023.*
5 *The determination of targets and reporting of greenhouse gas intensity is under review for potential adjustments. This is due to ongoing efforts to expand greenhouse gas data collection across the organization to encompass additional operations. Once completed, the data will be revised and updated for future disclosures.*

Source: 56-1 One Report 2024, page 171