OR TCFD Report 2022

PTT OIL AND RETAIL BUSINESS PUBLIC COMPANY LIMITED

Aligned with Task Force on *Climate-Related Financial Disclosures (TCFD)*

(29 June 2023)

Sustainability, Quality, Safety, Health and Environment Department

PTT OIL AND RETAIL BUSINESS PUBLIC COMPANY LIMITED

Contents

Introduction

About OR

PTT Oil and Retail Business Public Company Limited (OR) is a flagship company in the oil business and retail business of PTT Group. OR operates its business under the vision of "Empowering All Toward Inclusive Growth" with four missions: Strengthening the integrated energy business for *Seamless Mobility*, creating comprehensive lifestyle choices to meet the needs of *All Lifestyles*, business base expansion to create success and acceptance in the *Global Market*, and solving social and environmental problems to upgrade to *OR Innovation*.

OR's Products and Services

Figure 1 OR Inclusive Growth Platform for "Outside - in Growth"

1. **Seamless Mobility**
   - PTT station: Petroleum station
   - EV Station PluZ: Electric vehicle charging station.
   - Energy Solution Provider: Fuel distribution for the commercial market in aviation, marine, and industry.
   - Cooking Gas (LPG)
   - Petroleum terminals and distribution
   - PTT lubricants for vehicles with gasoline, diesel, and NGV engines, as well as agricultural and industrial machinery.
   - FIT Auto for automobile repair and maintenance service.
2. **All Lifestyles**
   - Foods and beverages such as Café Amazon, Texas Chicken, Pearly Tea, etc.
   - Convenient stores such as Jiffy, and 7-Eleven, including leasing space to other businesses and investing in businesses related to health, wellness, and tourism.
3. **Global Market:** Expansion of energy and retail businesses overseas, such as PTT Station, Café Amazon, Jiffy and FIT Auto.
4. **OR Innovation:** OR applies current business strengths, capability of digital innovation development and cooperation between corporate, SME, and start-up partners to create business opportunities with the intention of solving social, community and environmental problems to achieve OR Innovation.

Sustainability at OR

OR operates in adherence to its sustainable management policy, which has incorporated the sufficiency economy philosophy and the Sustainable Development Goals (SDGs) to ensure suitability for the organization. The policy serves as guidelines for business operations and helps to reduce environmental, social, and governance and economic (ESG) risks across all business processes related to OR and its affiliates.

OR has also established OR 2030 Goals, which cover operations across three dimensions, namely *Performance, People, and Planet,* and define its SDG-specific concepts:

1) Small (s): Opportunities for communities through company operations and increasing the community's quality of life.

2) Diversified (D): More products and services, with an emphasis on collaboration with potential partners via the OR platform to diversify broad business options.

3) Green (G): Low-carbon business areas by encouraging all OR businesses to shift toward green with the aim to assist a low-carbon society.

Climate Initiative

- ### Climate Target

OR recognizes the intensifying impact of climate change and realizes that its business operations, including PTT stations, petroleum terminals, transportation of petroleum products, delivery of lubricants, FIT auto service stations, coffee shops, coffee roasters, etc., cause both direct and indirect emissions of greenhouse gases (GHG), especially energy from the consumption of oil products. Therefore, OR is committed to developing a climate change strategy and implementing it according to the plan set out to mitigate the impact that may occur in the future ***to become carbon neutrality by 2030 and achieve net zero emissions by 2050.***

In addition, OR has added climate change as another key consideration for drawing up corporate strategies. For instance, greenhouse gas emissions have been included as a key performance indicator (KPI) of the organization, and relevant performance is monitored and analyzed for improvement and regularly reported to PTT Group.

In 2023, OR has formulated a climate strategy and developed the net-zero goal to be in line with the standard set forth by Science Based Target initiative (SBTi).

- ### Climate Risk Assessment

OR recognizes the potential risks from climate change that may affect the organization as consumers become more aware of the importance of the environment, this causes changes related to consumer behavior and changes in regulations and laws related to climate change, such as the carbon tax. OR, therefore, integrates climate change risk into corporate risk management to assess impact levels and provide solutions to prevent or mitigate risks, as well as to seek opportunities for innovation or operational strategies that add business value. OR conducted the climate-related risk and opportunity assessment under various climate scenarios following the guideline of the Task Force on Climate-related Financial Disclosure (TCFD) to identify physical risks and

transition risks as well as opportunities that might impact OR's business operation.

OR intends to disclose the current processes and results that we have begun implementing under the four TCFD pillars, namely Governance, Strategy, Risk Management, Metrics, and Targets. Therefore, the report is organized into chapters to represent each element.

1. Our Governance

OR has a solid governance framework in place to guide its business activities and strategic decisions toward long-term growth.

We aim to reduce by more than one-third of GHG emissions from the business-as-usual scenario projected from 2022 base year by 2030 in parallel with committing to achieving Carbon Neutrality by 2030 and Net Zero by 2050. Therefore, we have begun to put this ambition into action by strengthening and improving our governance structure and framework for managing climate-related risks and opportunities. We have restructured our company to mainstream and include climate considerations in strategic decisions of both existing operations and business expansion.

We recognize the importance of good corporate governance. This is a critical foundation for all activities in all aspects of the organization in accordance with solid corporate governance principles that enable the business to grow sustainably. OR commits to conducting business in a transparent, ethical, and verifiable manner in accordance with the principles of good corporate governance and business ethics as well as against all sorts of corruption. In addition, OR advocates the adoption of ESG practices for effective operations and builds trust among all key stakeholders.

Our governance structure is designed to identify the extent of roles and responsibilities regarding climate action. OR climate-related governance is structured into three levels: Board, Management, and Operation as shown in Figure 2.

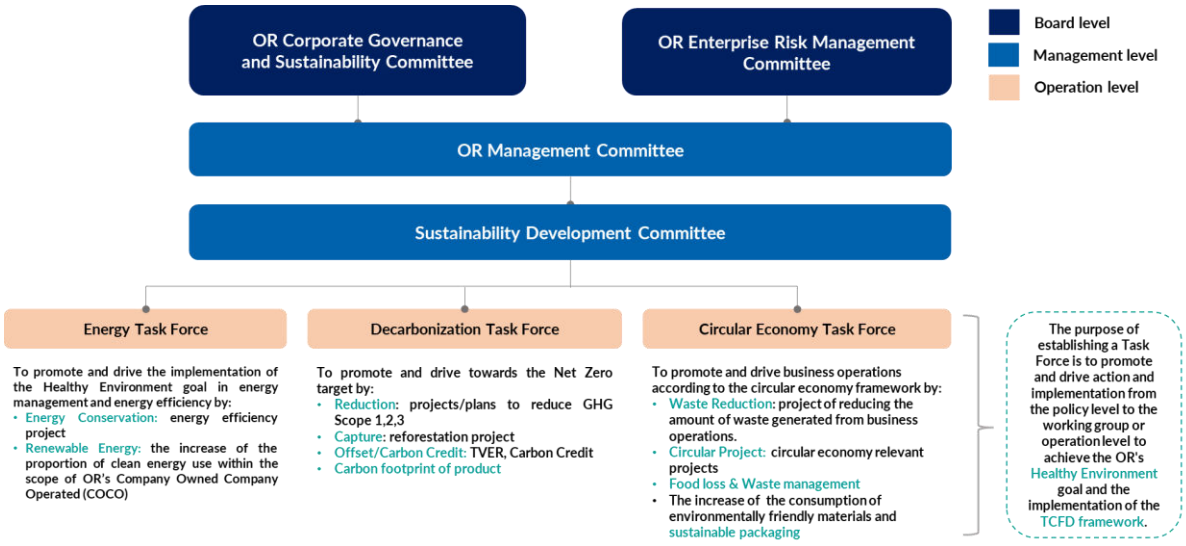


Figure 2 OR climate-related governance structure

- **OR Board** plays a key role in providing oversight of climate-related risks and opportunities which may impact OR's business activity. Their function in regard to climate issues is to evaluate the performance of established action plans, approve climate-related corporate KPIs, and ensure climate strategy aligns with the company's business policies.

- **OR Management** is represented by a Sustainability Development Committee to oversee and manage climate operations, which is the main entity that oversees the implementation of the defined sustainability policy and serves as a focal point between management and the board level.

- **OR Operation** consists of 3 Taskforces: Energy taskforce, Decarbonization taskforce, and Circular Economy taskforce. The Decarbonization and Circular Economy taskforces have recently been formed to support and promote the implementation of the OR healthy environment target, climate action, including the TCFD framework.

In summary, climate-related governance with its roles and responsibilities and the information flow can be described in Table 1 and Figure 4.

Table 1 Governing bodies and their responsibilities in climate actions

Governing Body	Roles and Responsibilities	Meeting Frequency
Corporate Governance and Sustainability Committee (OR CGS)	• Formulate climate policy, climate action plan, including integrating climate strategy into the core management policy and approve climate related corporate KPIs. • Oversight over the implementation of Climate Strategy and climate-related risks management and opportunities at the corporate level.	Quarterly
Enterprise Risk Management Committee (OR ERMC)	• Responsible for defining comprehensive key risk management policies and practices, which include climate-related risks. • Assess and review risks, considering both internal and external factors which may affect the achievement of corporate goals. This is to ensure that appropriate measures for tackling climate change, based on our business context, have been put in place.	Quarterly

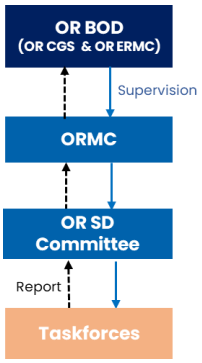


Figure 3 Information flow of OR governance

	• Provide recommendations for monitoring and evaluating risk management and stakeholder management to OR's Management Committee (ORMC) for further implementation.	
Management Committee (ORMC)	• Manage and ensure the direction of the operations to be sustainable. • Top leadership support and sponsorship are key pre-requisites contributing to the success of the whole process.	As needed
Sustainability Development Committee (OR SD Committee)	• Drive and monitor the operations of relevant departments to support implementation of the sustainability strategy and consider approving the annual OR sustainable development progress/report. • Responsible for approving OR's strategic plans, business plans, and action plans for sustainability which complies with the PTT Group policies in national and international sustainability standards.	Quarterly
Taskforces (Energy, Decarbonization, Circular Economy)	• Promote and drive actions and Implementations from the policy level to the working group or operational level in particular scope of consideration for achieving OR's 2030 Goal in Healthy Environment Strategy and implementation of TCFD framework.	Quarterly or as need

2. Strategy

OR identifies climate issues to drive the organization towards sustainability and integrate sustainability strategies into the operations of all business units, along with creating a new awareness of sustainability among employees, dealers, and suppliers.

OR defines its Strategic Framework under the vision "Empowering All Toward Inclusive Growth: OR Fulfilling Opportunities for Growth Together." This can be achieved by integrating Materiality Issues of the Organization into the Sustainability Strategy development process. The objective is to conduct business with a focus on seeking opportunities for growth and success, while also aiming to enhance the quality of life and foster a rich environment for everyone involved. OR's business operations therefore focus on the environmental, social, and economic responsibilities to create a balanced value for stakeholders.

Regarding climate strategy, OR strives for a low carbon society and strives for the remedy of risks and adaptation to climate changes, as was announced in the Quality Safety Health and Environment (QSHE) Policy. This has been communicated to the Strategic Department in every Business Units to take the risk assessment result as inputs in their annual strategy and business plans. Additionally, OR also adopts "PTT Group Clean & Green Strategy" a climate change strategy developed by PTT Group. The strategy has been implemented rigorously. As a result, the OR can continue to achieve the greenhouse gas emission reduction goal.

OR defined an organization's sustainability strategy to achieve the goals of business grow in a stable and sustainable way by considering the community, environmental resources, and society, as presented in Figure 4.

The climate is under the aspect of a Healthy Environment, with aims of carbon neutrality in 2030 and net-zero emissions in 2050. In order to reach the target, climate risks and opportunities assessment are undertaken as an initial step prior to developing a corporate climate strategy.

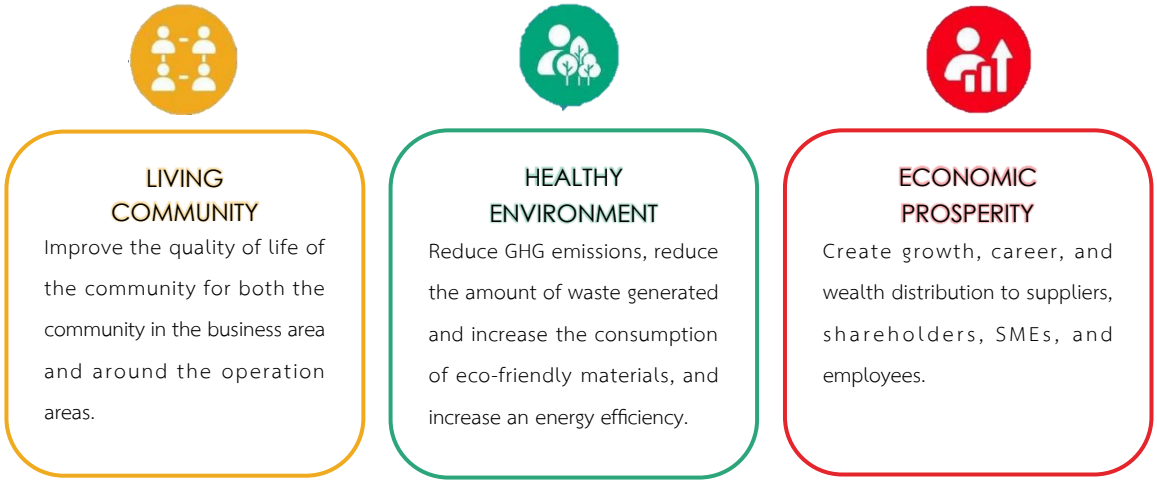


Figure 4 OR Sustainability Strategy and 2030 Goals

2.1 Our approach for identifying climate-related risks and opportunity and assessing financial impact

OR is operating business in the areas that are vulnerable to the impacts of the transition to a low-carbon world. We have begun our journey toward climate resilience by tackling climate-related risk strategically and systematically. Our environmental and strategic departments from various business units have joined forces to establish climate-related risk assessment routines which is the groundwork for continuous development in parallel with the growing experience of climate-related risk management. The framework for assessing and managing climate-related risk is shown in Figure 5.

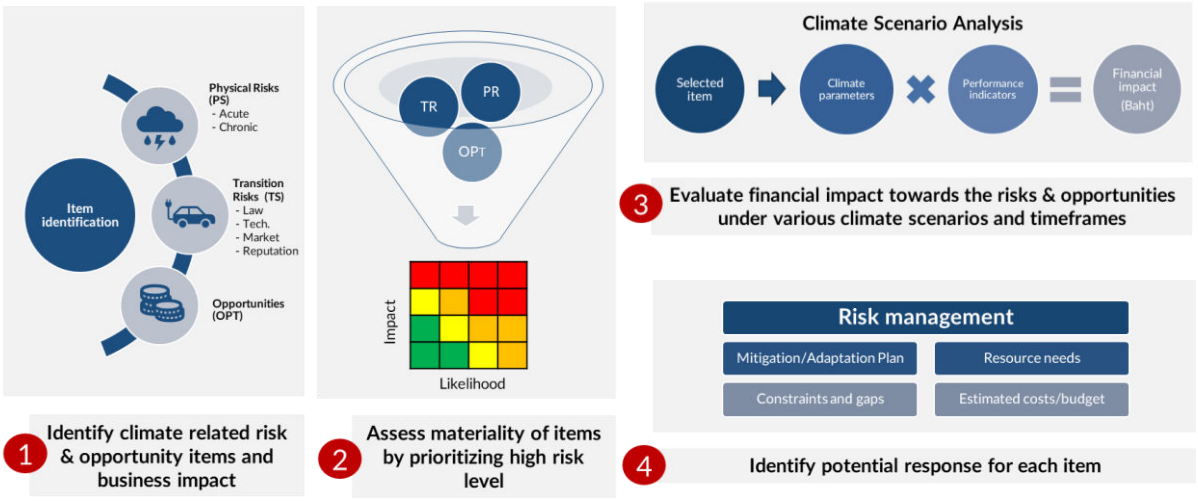


Figure 5 Climate-related risk assessment and management framework

The process of assessing the financial impact of climate-related risks and opportunities can be described by the 3 following steps.

1

Item Identification

The process starts with completing an exhaustive list of climate perils, transition risks, and opportunities. The items in the list were selected through the process of literature review. The strategic oversight personnel is assigned to every business unit to identify plausible risks associated with their operational boundaries that might emerge within the time horizons of interest. The identification is predicated on the understanding of business vulnerabilities and extrapolation from historical records. Business impacts that are the consequences of the risks are also elaborated in this process. The result is a database of risk items with associated business impacts and climate-related risks of every business unit.

2

Materiality Assessment

The risk assessment process employs the risk matrix for materiality assessment. The materiality of a risk item is characterized by the likelihood and the magnitude of the impact of the risk.

2 The numerical scales of the likelihood and the impact magnitude are derived from OR's Enterprise Risk Management guideline to preserve relevancy between climate-related risks and the current practice. The assessment results in risk levels associated with risk items and business impacts are reported in section 2.2.

3 **Climate Scenario Analysis**

To account for the uncertainty of future scenarios, a stress-testing analysis is conducted. The analysis starts with selecting climate scenarios that are applicable to OR's business. Climate scenarios that we used for physical risk assessment are referred from IPCC's database and from the International Energy Agency (IEA) for transition risks and opportunities.

- In each scenario, physical and socioeconomic parameters at different time horizons are taken into the materiality assessment process and produce relevant impact levels. The impact levels are translated into climate impact parameters, which are quantification of the impact levels under the business context.
- In the last step, the operational impacts are translated into financial impacts through the use of performance indicators. The performance indicators are company-specific parameters that reflect tangible damages to the company's financial performance from the operational impacts.

2.1.1 OR Boundary for Assessment and Disclosure

Due to the wide range of OR's businesses, the initial climate risk assessment and disclosure focuses on the Mobility business, a key sector with a substantial financial impact; particularly, PTT stations owned and operated by OR. When confronted with climate risks, the petroleum stations are likely to have a greater financial impact than other business units (BUs) due to the size of their market share and the nature of business vulnerability to fossil fuel demand change. As a result, the risks and opportunities chosen for the financial impact assessment in this report only include PTT stations. This decision was made due to their specific impact and connection with other oil businesses in the supply chain. The results of risk assessment of other business units including the Lifestyle businesses will be covered in future analysis.

2.1.2 Climate scenarios selection

According to the explanation of climate scenarios in topic 2.1, OR assessed the potential impacts of physical risks using the relevant Shared Socio-economic Pathways (SSPs) developed by the IPCC. Three SSPs scenarios were selected; SSP1-2.6, SSP2-4.5, and SSP5-8.5. The scenarios cover two extreme cases of future climate as a result of socioeconomic developments: a sustainable world (SSP1), and a climate-unsafe world (SSP5). The other scenario (SSP2) represents a middle road in which transitioning to a low-carbon world takes off but is not rapid enough for keeping the climate under a safe operating space.

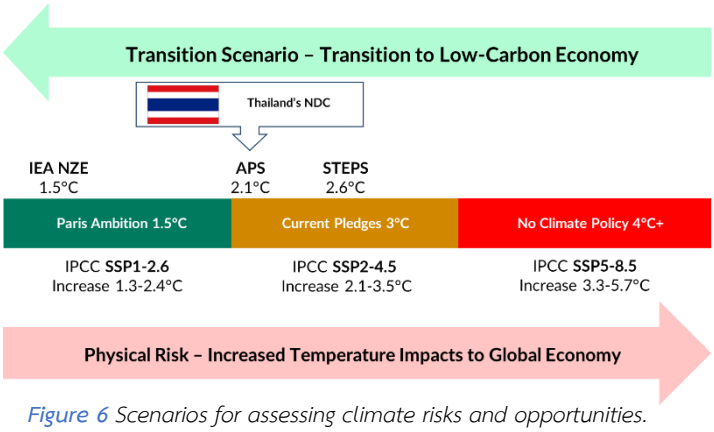


Figure 6 Scenarios for assessing climate risks and opportunities.

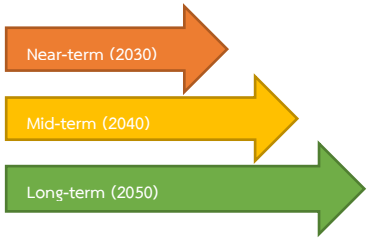
For transition risks and opportunities, three scenarios developed by the IEA were selected; Stated Policies Scenario (STEPS), Announced Policies Scenario (APS), and Net Zero Emission (NZE).

The scenarios selected for OR climate risks and opportunities assessment are presented in Table 2.

Table 2 Scenarios selected with explanation for OR climate risks and opportunities assessment.

Type	Climate Scenario	Scenario Explanation
Physical Risk	SSP1-2.6	Low GHG emissions: CO_2 emissions cut to net zero around 2075
	SSP2-4.5	Intermediate GHG emissions: CO_2 emissions around current levels until 2050, then falling but not reaching net zero by 2100
	SSP5-8.5	Very high GHG emissions: CO_2 emissions triple by 2075
Transition Risk and Opportunity	STEPS	A scenario which reflects current policy represented the business-as-usual pathway in which no further effort is implemented to mitigate climate change.
	APS	A scenario which assumes that all climate commitments made by governments around the world, including Nationally Determined Contributions (NDCs) and longer-term net zero targets, will be met in full and on time.
	NZE	A scenario represents a world where the transition takes off at a rapid rate to limit the warming to 1.5 °C with limited or no temperature overshoot (achieve net zero CO_2 emissions by 2050).

2.1.3 Timeframe selection for climate scenarios analysis (near-, mid-, long-term)



Diverse risk impacts could be apparent at different times, with substantial uncertainty of the timeline in certain circumstances. As a result, we considered three timeframes for climate impacts assessment. The first timeframe is characterized as occurring in 2030 in the near term. We expect to have high confidence in the probability of occurrence and the accuracy of our assumption in the immediate run. These are typically associated with transition risks, such as when laws are disclosed through public hearings or when there are market patterns and signals that we can track. The second timeframe under consideration is the medium-term, which is currently set to occur in 2040. According to business pledges and national promises, this is a timeframe for the near future in which we expect the economy will undergo a major transition. Lastly, we evaluate the long-term timeline in 2050 based on global trends to achieve a net zero target by 2050.

2.2 The result of financial impact of climate-related risks and opportunities on OR's businesses

2.2.1 Risk items selection

After delivering fundamental knowledge training on climate-related risks and opportunities assessment, the strategic team of each business unit identified and prioritized risk items. Table 3 shows the outcomes of the identification of climate risks and opportunities.

Table 3 The identified climate risk and opportunity items by business units

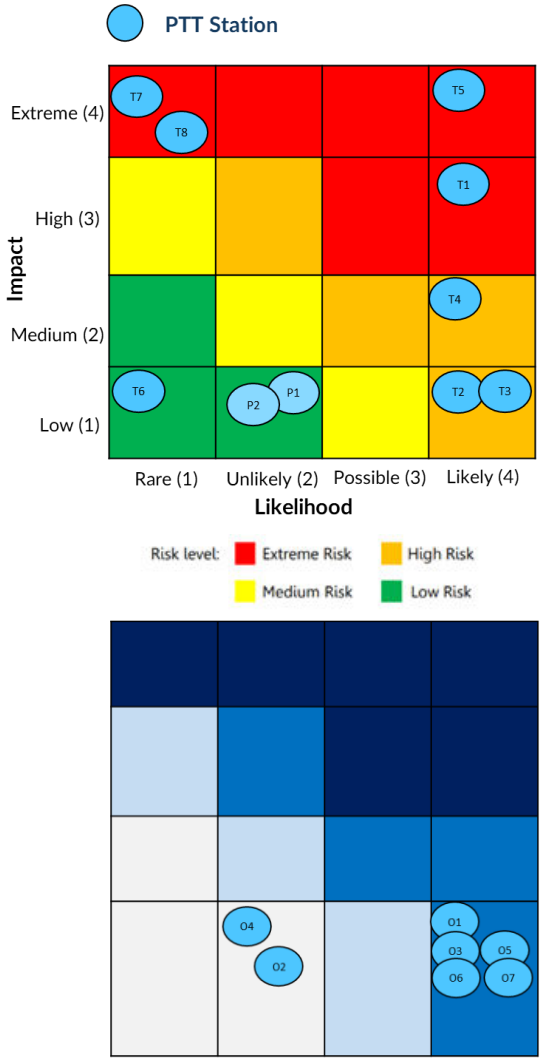
	Oil BUs	Risk item	Business impact	Risk level by timeframe		
				2030	2040	2050
Physical Risk	PTT Station	Flood caused PTT station operation disruption	P1: Revenue loss from business shut down	Low	Medium	High
			P2: Expenses for restoring damaged areas or assets	Low	Medium	High
	Petroleum Terminal	Flood caused transportation disruption to distribution point	P1: Revenue loss from business shut down	Low	Medium	High
			P2: Expenses of recovering damaged areas/assets	Medium	Medium	High
			P3: Expenses from executing business continuity plan	Low	Medium	High
	FIT Auto, Lubricants	Flood caused operation disruption	P1: Revenue loss from sale loss	Low	Medium	Medium
	Energy Solution (commercial fuel, LPG)	Flood caused operation/ transportation disruption	P1: Revenue loss from business shut down sale loss	Low	Medium	Medium
			P2: Revenue loss from business shut down (LPG Manufacture)	Low	Medium	Medium
Transition Risk	PTT Station	GHG emission reporting enforcement by regulation	T1: Additional cost due to carbon/GHG emission reporting regulation	Extreme	Extreme	Extreme
		Carbon tax enforcement	T2: Additional cost due to carbon tax from Climate Change Act. (Coherent of the risk on customer behavior change)	High	High	High
		CBAM	T3: Additional cost due to CBAM	High	High	High
		Low-emission fuel standard for vehicles	T4: Additional cost for developing low carbon fuel for car	High	High	High
		EV disruption	T5: Fossil fuel demand decrease caused sale volume loss	Extreme	Extreme	Extreme
			T6: Increase operation cost due to less volume production	Low	Medium	Medium
			T7: Revenue loss from dealer loss	Extreme	Extreme	Extreme
			T8: Dealer loss so that OR has to invest more to maintain network and sales	Extreme	Extreme	Extreme
	Petroleum Terminal	Depot facility improvement to serve the policy or alternative clean fuel regulation	T1: Investment cost for depot facility improvement to serve the policy/ alternative clean fuel	High	High	High
		GHG emission reporting enforcement by regulation	T2: Additional cost due to carbon/GHG emission reporting regulation	High	High	High
	FIT Auto	GHG emission reporting enforcement by regulation	T1: Additional cost due to carbon/GHG emission reporting regulation	Extreme	Extreme	Extreme
	Lubricants	GHG emission reporting enforcement by regulation	T1: Additional cost due to carbon/GHG emission reporting regulation	Extreme	Extreme	Extreme
		Low-emission fuel standard for vehicles	T2: Additional cost for developing low-carbon lubricant	Extreme	Extreme	Extreme
		EV disruption	T3: Revenue loss from lubricants sale due to conventional engine decrease	Extreme	Extreme	Extreme
	Energy Solution	GHG emission reporting enforcement by regulation	T1: Additional cost due to carbon/GHG emission reporting regulation	Extreme	Extreme	Extreme

		Aviation regulation (CORSIA)	T2: Additional cost for developing low-carbon aviation fuel due to CORSIA	High	High	High
		Marine regulation (IMO)	T3: Additional cost for developing low carbon bunker fuel due to IMO	High	High	High
Opportunity	PTT Station	EV charging stations and services	O1: Revenue from EV charging stations	High	High	Extreme
			O2: Revenue from the battery swapping	High	High	High
		Hydrogen station	O3: Revenue from hydrogen sale	Low	Medium	Medium
		Solar rooftop	O4: Revenue and cost savings	High	High	High
		Low carbon/ carbon neutral product	O5: Revenue from Bioenergy	High	High	High
		Carbon credit	O6: Revenue from carbon credit	High	High	High
		I-REC	O7: Revenue from I-REC	Low	Medium	Medium
	Petroleum Terminal	Solar rooftop	O1: Revenue and cost savings	High	High	High
		Carbon credit	O2: Revenue from carbon credit	Medium	Medium	High
	FIT Auto	EV charging stations and services	O1: Revenue from EV light maintenance	High	High	High
	Lubricants	Low carbon/ carbon neutral product	O1: Revenue from new products to support the EV market	High	High	High
	Energy Solution	Solar rooftop	O1: Revenue and cost savings	High	High	High
		Low carbon/ carbon neutral product	O2: Revenue from alternative fuels	High	High	High
		Carbon credit	O3: Revenue from carbon credit	High	High	High

2.2.2 Risk Materiality

As mentioned in 2.1.1, we prioritized the financial impact of PTT stations in the mobility business due to the magnitude of the impact, the size of the business unit, and the availability of data for assessment. We used the OR risk matrix, which is commonly used in corporate risk assessment, to prioritize the risk and opportunity levels. Figure 7 demonstrates the risk matrix of a PTT station. The following are selected items for assessing the financial impact.

- **Physical risk:** Flood causes expenses of recovering damaged areas or assets.
- **Transition risk:** Fossil fuel demand changes and sale volume change/loss due to EV disruption.
- **Opportunity:** EV charging stations



Physical risk items

P1: Flood caused PTT station operation disruption and revenue loss from business shut down

P2: Flood causes expenses of recovering damaged areas/assets

Transition risk items

T1: Additional cost due to GHG emission reporting

T2: Additional cost due to on carbon tax from Climate Change Act.

T3: Additional cost due to CBAM

T4: Additional cost for developing low carbon fuel for car

T5: EV promotion caused fossil fuel demand change/decrease & sale volume loss

T6: EV caused increase operation cost due to less volume production

T7: EV caused dealer loss

T8: EV caused dealer loss so that OR has to invest more to maintain network

Opportunity items

O1: Revenue from EV charging stations

O2: Revenue from battery swapping service

O3: Revenue from hydrogen sale

O4: Revenue and cost savings of solar rooftop

O5: Revenue from Bioenergy

O6: Revenue from carbon credit

O7: Revenue from I-REC

Figure 7 OR Risk matrix on climate related risks and opportunities of PTT station

2.2.3 Financial impact

1. Physical Risk: Floods

Floods can significantly impact the PTT stations and their supply chain, including petroleum terminals, Fit Auto Service Center and lubricants, LPG services and retail shops located within the station. Here's how flood-related climate risks can affect various aspects of a PTT station and its supply chain:

- *Infrastructure Damage:* Floods can cause damage to the physical infrastructure of PTT Stations, including fuel storage tanks, pumps, pipelines, and other equipment. This damage can lead to disruptions in fuel supply and distribution, as well as costly repairs or replacements.
- *Fuel Supply Disruptions:* Floods can impact the transportation and delivery of fuel to PTT Stations. Road closures, damaged infrastructure, or inaccessible routes can hinder the supply chain, resulting in delayed or reduced fuel deliveries.
- *Operational Interruptions:* Floods can force the temporary closure of PTT stations due to safety concerns or damaged infrastructure. This interruption in operations can result in financial losses for the station and inconvenience for customers who rely on the services provided.
- *Inventory Losses:* Floods can damage or destroy fuel inventory stored at the station. This can result in significant financial losses for the station as well as impact on the ability to meet customer demand for fuel and related products.
- *Customer Accessibility:* Floods can make PTT stations inaccessible for customers due to road closures or unsafe conditions. This can lead to a decline in customer visits, affecting the station's revenue and profitability.
- *Environmental Impact:* Floods can increase the risk of fuel spills and environmental contamination. If fuel storage tanks or pipelines are compromised during a flood event, it can result in leaks or spills, leading to soil and water pollution. The cleanup and remediation efforts required can be costly and time-consuming.

According to our selection, **floods that cause infrastructure/facilities damage is selected for the financial impact assessment.** This analysis includes a direct impact on the cost of damage repairs on building structures, cost of damaged oil facilities (underground oil storage tank and piping, oil dispenser) and cost of damaged EV facilities. The cost of damaged buildings is estimated by using the Aqueduct Flood model and depth-damage function method. While cost of damaged oil facilities and EV facilities estimated from OR historical data.

The estimated financial impact from Table 4 demonstrates that the expected financial impact of both scenarios in 2030 of SSP5-8.5 and SSP2-4.5 are similar in the range of 200-300 MTHB as well as the other timeframes in SSP2-4.5. The SSP1-2.6's impact tends to be less than 250 MTBH across all timeframes.

Table 4 OR Physical Risk, Business Impact, and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate impact parameters	Performance indicators	Financial Impact (MTHB) 2030	2040	2050	Potential Response
Floods	Expenses on repairing/ recovering damaged facilities	SSP5-8.5	- Consider 220 PTT stations (COCO: Company owned Company Operated) - Flood depth > 0.5 meter caused damage	Area damaged (m^2)	Cost of repairing 20,000 THB/m^2 This measure and adaptation cost of response is implemented presently (less than 5 years).	200-300	300-1000	1000-1600	1) Infrastructure Resilience: Implement flood mitigation measures such as raised platforms, flood barriers, and improved drainage systems to protect petroleum station infrastructure from flood damage. 2) Emergency Response Plans: Develop and implement robust emergency response plans that outline procedures for managing flood events, ensuring employee safety, and minimizing operational disruptions. 3) Diversification of Supply Routes: Establish alternative supply routes and transportation options to reduce reliance on a single route. This can help ensure a continuous fuel supply to the station, even if one route is affected by floods. 4) Inventory Management: Maintain adequate fuel inventories and establish contingency plans to handle disruptions in supply. This can include working with suppliers to secure additional fuel sources or having backup storage facilities in unaffected areas.
		SSP2-4.5				200-300	200-300	200-300	
		SSP1-2.6				<200	<200	<200	

5) Business Continuity Planning: Develop and regularly review business continuity plans that address potential flood-related disruptions. This includes backup power systems, alternative communication channels, and arrangements for repairs and maintenance.
6) Environmental Protection Measures: Implement measures to prevent or minimize environmental contamination in the event of a fuel spill or leak during a flood. This can include secondary containment systems, regular inspections, and proper maintenance of fuel storage facilities.

By implementing these measures, petroleum stations can enhance their resilience to climate risks from floods, minimize disruptions to their operations and supply chains, and ensure the continued availability of fuel and services to customers.

2. Transition Risk: Fossil fuel demand change

Regarding transition risk, risk from oil demand change is selected. Thai government are putting in efforts to promote Thailand as an electric vehicle (EV) production base for the Asean region through policy and related regulation development. Moreover, to support these policies, tax reduction and others related issue have been advocated for EV production investment in the country. Thus, the use of more EVs caused an expansion in EV's market and decrease oil demand.

Scenario data are retrieved from the IEA World Energy Outlook 2022 report and the Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS). As shown in the findings in Table 5, oil demand increases from 2030 to 2050 under the STEPS scenario and decreases after 2030 under the APS scenario.

Table 5 OR Transition Risk, Business Impacts and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate impact parameters	Performance indicators	Financial Impact (MTHB)			Potential Response
						2030	2040	2050	
Fossil fuel demand change in the transportation sector	**Revenue change/loss from oil demand volume**	**STEPS**	- Constant OR market share - Oil retail, excluded commercial oil	oil sale change (%) 2030: +9% 2040: +10% 2050: +12%	Sale price = 30 Baht/liter	+3,700	+41,000	+48,000	To support the change in energy technology direction and changing consumer behavior, OR, therefore, has adjusted its business strategy and the investment proportion, continuously seeking new business development opportunities, including: ● Diversification and Adaptation: Explore opportunities to diversify business operations by investing in alternative energy solutions, such as electric vehicle charging infrastructure (EV Station Pluz), renewable energy projects (Solar Rooftop), or offering other services that align with changing consumer
		APS (Thailand's LT-LEDS)	- Constant OR market share - Oil retail, excluded commercial oil	oil sale change (%) 2030: +6% 2040: -45% 2050: -55%	Sale price = 30 Baht/liter	+22,000	-178,000	-216,000	
		NZE	- Constant OR market share	oil sale change (%) 2030: -23% 2040: -70%	Sale price = 30 Baht/liter	-92,000	-275,000	-366,000	

	- Oil retail, excluded commercial oil	2050: -93%	preferences e.g., E-Fit Auto (Light Maintenance, EV Station Pluz Application. ● Long-term Planning on Portfolio management and Adaptability: Develop long-term business plans that consider potential scenarios and the changing landscape of oil demand. Adaptability, flexibility, and continuous monitoring of market trends are crucial for successfully navigating the transition.

<u>Remark:</u> In the short term, oil demand will increase in STEPS scenario for all timeframes and APS scenario in 2030. However, it will decline sharply in the NZE scenario. The oil products need close attention to manage during the transition.

3. Opportunity: EV charging station

OR is one of PTT Group's flagships, committed to driving manufacturing innovation by providing end-to-end EV services to support the country's target industries transition to a low-carbon society across the EV value chain. OR services range from the development of battery standards to the supply of EV downstream services such as EV charger stations and EV light maintenance, as well as the provision of full EV services on digital platforms. These existing operations highlight the advantages of operating an EV business and the potential of OR to be a key player in developing and promoting the full spectrum of Thailand's EV economy.

According to Thailand's EV promoting policy and OR business direction, a large potential is presented in electricity sales driven by the surge in EV demand. OR has rolled out the plan to increase the market share of EV charging stations around the country to capture this opportunity. Regarding that, the opportunity of electricity sale from EV share increase is prioritized to be assessed.

Table 6 OR Opportunity, Business Impacts and Financial Implication

Opportunity	Business Impacts	Climate Scenario	Assumption	Climate impact parameters	Performance indicators	Financial Impact (MTHB)			Potential Response
						2030	2040	2050	
Expansion of EV charging station due to EV demand increase	**Increased revenue from electricity sales**	**STEPS**	***Consider only BEV passenger cars/trucks.*** 1. No. of EV is 440,000 in 2030 based on 30@30 policy* with 15-20% growth annually from 2030 2. 15% of EV users charge at EV station	Electricity sales (MWh/year) 2030: 100 2040: 500 2050: 2100	Average sale price = 6.5 THB/kWh	700	3,400	14,000	1) Partnership to expanding EV charging station in residential and commercial building. 2) Developing swapping battery station 'Swap & Go' for car and motorbike 3) Distribution of Ultra EV Home Charger 4) The establishment of a "FIT Auto Academy" workshop for the purpose of increasing the abilities of staff working at all FIT Auto service centers including the capacity to maintain EV cars. 5) Promoting the EV Bike which will enhance Mobility as a Service (MaaS) in the electric two-wheeler segment as well as develop a full electric vehicle

	3. 40% Market share of OR EV stations 4. Average Electricity consumption = 4,000 kWh/year/car					
APS	1. No. of EV is 660,000 in 2030 with 15-20% growth annually from 2030 (No. 2-4 same assumptions as STEPS)	Electricity sales (MWh/year) 2030: 160 2040: 800 2050: 3,200	Average sale price = 6.5 THB/kWh	1,000	5,100	21,000
NZE	1. No. of EV is 880,000 in 2030 with 15-20% growth annually from 2030 (No. 2-4 same assumptions as STEPS)	Electricity sales (MWh/year) 2030: 200 2040: 1,000 2050: 4,300	Average sale price = 6.5 THB/kWh	1,400	7,000	28,000

business in order for OR to truly become a leader in the EV ecosystem as follows.

- Jointly development of a prototype electric motorcycle with the I Motor Group to be used to transport LPG gas tanks for LPG retailers in the OR group, including outside OR boundary.
- Collaboration with electric motorcycle firms to build an electric automobile rental service concept for transportation fleets. A pilot project is being carried out in collaboration with Thailand Post, and it is being expanded to include other businesses.

Remark: Number of EV projection is based on Thailand's 30@30 policy and the market share of OR EV stations is based on an estimation from climate risks workshop

2.3 The action to increase the resilience of OR's mobility businesses strategy

OR's primary business is oil, which creates the majority of the company's revenue. While the oil business is the riskiest sector that may lose revenue due to climate-related risks, particularly the aspect of the economic shift to a low-carbon economy, which could impact oil sales as well as other associated products and services. As a result, by diversifying OR business operations, we have been able to decrease such risks as well as corresponding climate concerns.

We believe the diversity of OR's business can play a crucial role in reducing climate risks and increasing its resilience. A diversified business portfolio can help reduce the reliance on a single sector or product, such as fossil fuels. By expanding into renewable energy, electric vehicle charging infrastructure, or other clean technologies, OR can capture new revenue streams that align with the low-carbon economy. This reduces the risk associated with declining demand for fossil fuels and provides alternative sources of income. In addition, diversification helps mitigate climate-related risks by reducing dependence on activities that are more vulnerable to climate change impacts. For example, if the oil retail sector faces challenges due to climate policies or changing consumer preferences, OR's diversified businesses can act as a buffer, spreading the risk across different sectors.

Here are several more key actions that contribute to the resilience of the OR oil business in the face of climate-related scenarios.

- Supply Chain Resilience: Assess the resilience of the supply chain and identify vulnerabilities related to climate-related scenarios. Diversify suppliers and establish contingency plans to mitigate potential disruptions. Consider working with suppliers who prioritize sustainability and resilience in their operations.
- Climate Scenario Analysis: Conduct a thorough climate scenario analysis to understand the potential impacts of different climate-related scenarios, including the 2°C or lower scenario. The analysis should assess regularly to keep up with the changes in terms of up-to-date climate conditions, regulations, and consumer preferences that may affect the business and operations.
- Collaboration and Partnerships: Collaborate with stakeholders across the value chain, including energy providers, suppliers, and technology partners, to foster innovation and create shared solutions. Partnerships can help drive the adoption of sustainable practices and leverage collective expertise and resources.
- Customer Engagement and Communication: Engage with customers to understand their evolving needs and preferences related to climate change and sustainability. Communicate the business's efforts and progress in implementing sustainable practices and offering low-carbon alternatives. This can help build customer loyalty and attract environmentally conscious consumers.
- Risk Management and Resilience Planning: Develop a robust risk management framework that includes climate-related risks and opportunities.

By integrating these actions into the business's strategy, OR has increased its resilience and navigated the challenges and opportunities presented by climate-related scenarios. OR enables the business to align with sustainability goals, meet changing consumer demands, and contribute to a more resilient and sustainable future.

3. Risk Management

OR has integrated climate-related risks management into the organization's overall risk management and has provided measures to prepare and deal with risks that occur comprehensively and prudently.

At present, OR business operations are more challenging in terms of market competition, crises, and transitions. Risk management is, therefore, considered an important tool for OR's business management to ensure that business operations can achieve goals and respond to the needs of all stakeholder groups in a balanced manner, as well as prevent losses that may arise from uncertainty. Risk management also includes seeking opportunities to enhance business value to maintain the competitiveness of the organization in the future.

OR adjusted the risk management policy to be in line with the Company's business directions and strategies. The policy aims to operate based on a Triple Bottom Line emphasizing People, Planet, and Performance to grow with all groups of stakeholders sustainably. OR has taken into account significant risk factors, both external and internal to the organization. The risk trends for 2023 have been communicated, which include global risks, national risks specific to Thailand, and business area risks. Particularly, climate risk has been recently considered in the assessment of enterprise risks. Risk management plans have been prepared in alignment with strategic plans and business plans, ensuring consistency with the strategic direction, corporate goals, and the Corporate Risk Framework.

Extreme weather events and energy transition are considered as emerging risks and are handled by taking into account their impacts on business operations. OR has implemented risk control and instituted additional risk reduction measures to the point that the risk can be mitigated to an acceptable level. OR has implemented a stress test and prepared mitigation plans, prevention and emergency response plans, recovery plan and impact management, and a business continuity management plan of critical business processes that covers all work locations. In addition, the plans for storms and floods were reviewed and drilled for business continuity management throughout the organization along the value chain in October 2022, in order to be able to respond to emergencies from natural disasters effectively.

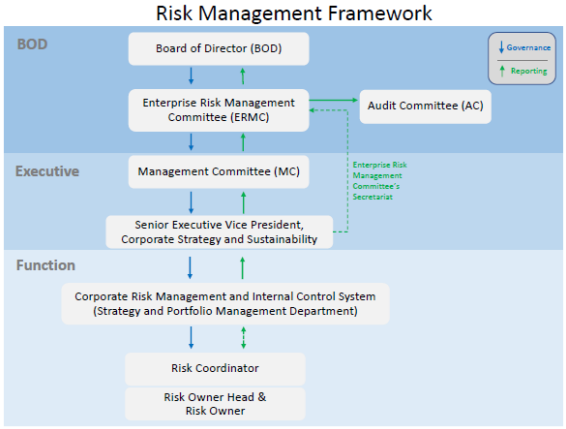


Figure 8 OR's Risk Management Framework

The risk management process for Climate-related risks and opportunities, which is integrated into OR's Enterprise Risk Management, begins with

gathering important risk issues from business operations and support lines of business in order to prepare an annual Corporate Risk Profile. Then an annual corporate risk management plan approved by the Board of Directors is communicated to all departments so that they can manage risks, as well as to ensure that risk management is consistent at the corporate, functional, and operational levels. The results of risk management are monitored and reported quarterly to the Enterprise Risk Management Committee and the Board of Directors.

Risk Appetite and Risk Tolerance have been used to determine the threshold of the Key Risk Indicator to be used to measure and improve the efficiency of risk management.

The risk management process relevant to Climate-related risks and opportunities is illustrated in Figure 9.

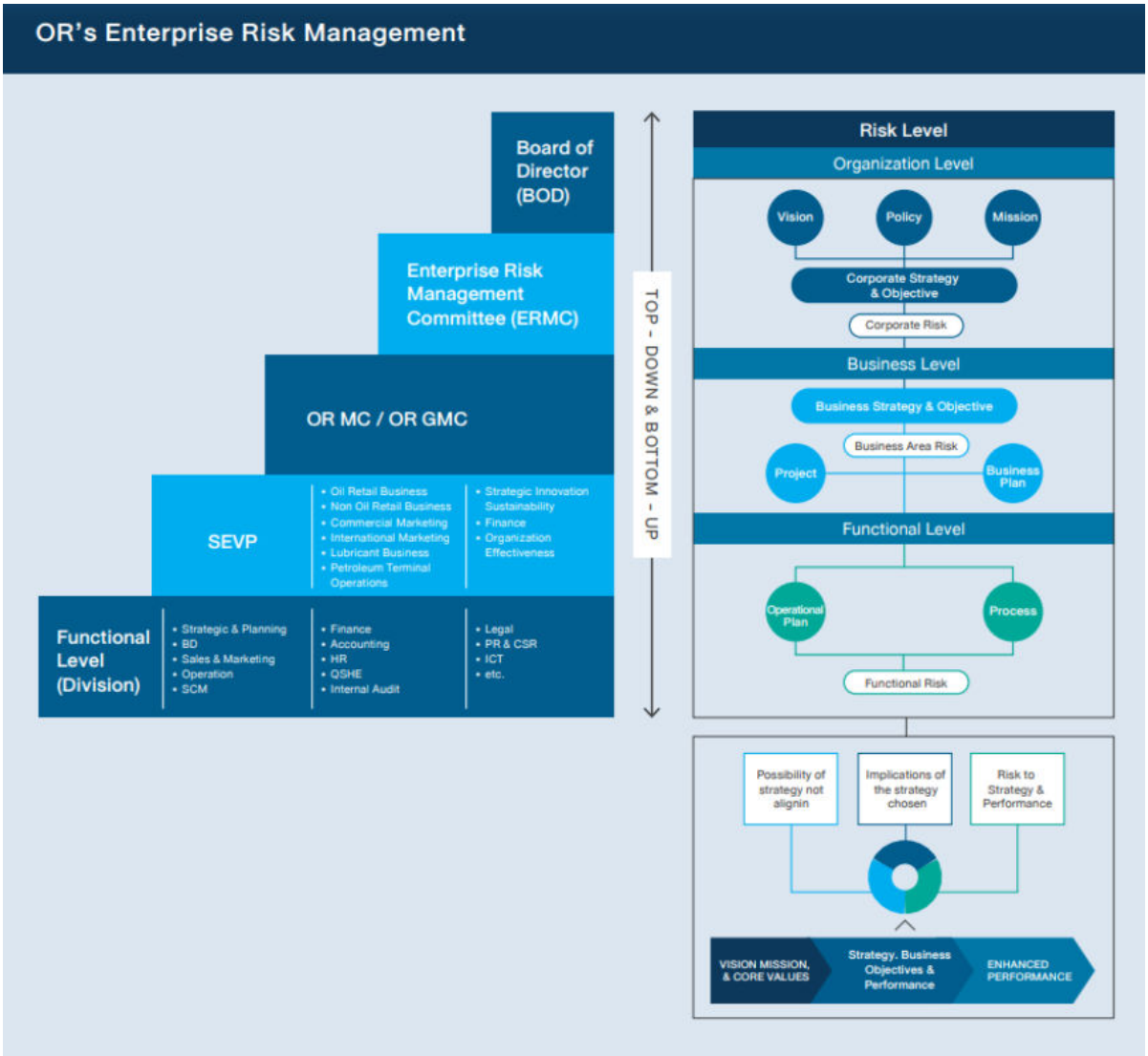


Figure 9 OR's Enterprise Risk Management

4. Metric and Targets

OR has committed its intention to achieve carbon neutrality by 2030 and net-zero emissions by 2050, with an emphasis on impact mitigation and adaptation in order to create a low-carbon economy.

4.1 Towards our climate ambition

At OR, our unwavering commitment lies in transforming our climate ambitions into tangible action to achieve carbon neutrality by 2030 and net-zero emissions by 2050. This ambitious target sets us on a challenging path, aiming to reach net-zero 15 years ahead of Thailand's national target of 2065. However, we remain determined to execute this through utilizing technological advancements and engaging in new market opportunities. Each year, we proactively implement a range of green and sustainable practices to systematically decarbonize our operations. We firmly believe in the importance of tracking and assessing our progress, which is why we have established clear metrics to evaluate the effectiveness of our measures. Through our climate disclosure, we aim to showcase our ongoing efforts in driving meaningful change and contributing to a sustainable future.

① Our first target is to reduce our absolute emissions by 33% by 2030 when compared to the 2022 level. Additionally, we are going beyond this short-term goal by becoming carbon neutral. This will be done with high environmental integrity by our forestry projects which aim to help local communities as well as sourcing high quality credits aligned with best practices.

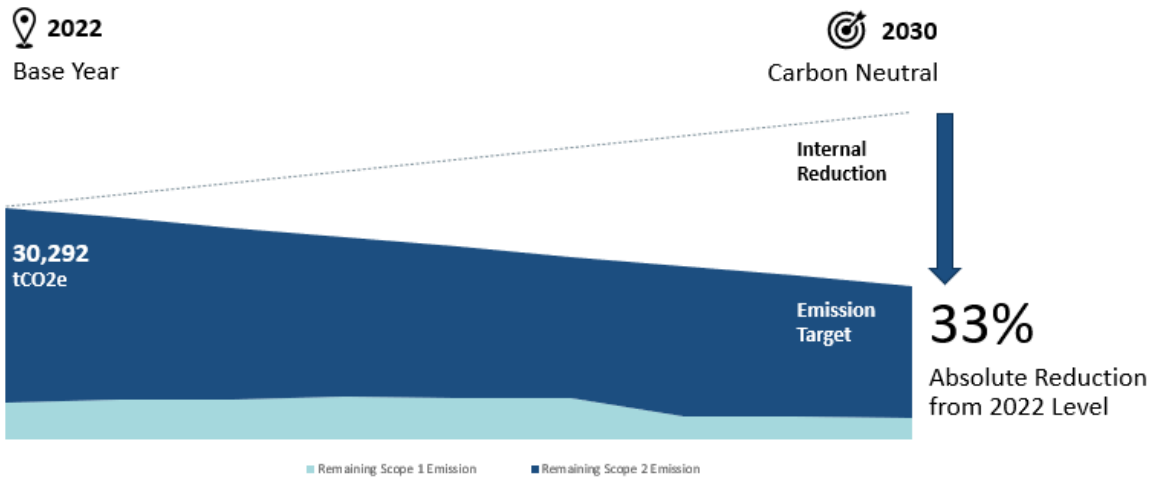


Figure 10 OR Forecasted Emissions Targets to reduce and achieve carbon neutral in 2030

② Our second target is focused on driving our GHG performance by reducing our conventional fuel intensity per EBITDA. This will help ensure that we conserve energy consumption and increase energy efficiency as we continue to expand our business. Recognizing that emissions from electric

consumption contribute significantly to our overall footprint, this target encompasses a substantial portion of our emissions. To achieve this, we are actively expanding our installed renewable capacity and exploring various market-based mechanisms for procuring renewable energy.

3 Our third target addresses waste reduction by one third. We aim to do this through many approaches. Firstly, we aim to dive deeper into our products' waste profile to understand how to further enhance our waste management practices. In addition, we are reducing our operational waste, packaging waste, and food waste through different circular projects. Examples of these practices include promoting recycling and upcycling products.

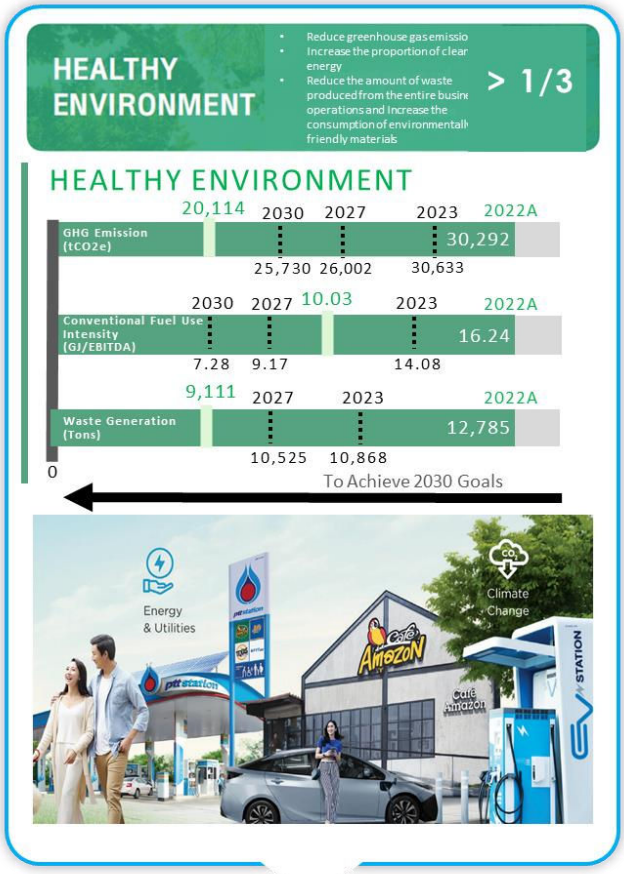


Figure 11 OR 2030 Healthy environment targets

4.2 Decarbonization Measure

To support these three overarching goals and targets, we have established a detailed breakdown of sub-targets and measures that serve as important milestones on our journey. These are listed in the table below.

Table 7 Measures list and the progress of action taken

Measures	Target	Progress status
Increase proportion of EV in vehicle fleet	65% of fleet as EV	4% of cars in fleet are EV and exploring solutions with potential partners
Energy Efficiency	In Progress	Completed Energy Audit of OR facilities
Increase renewable installation capacity	22.18 MWp installed solar by 2030	Installed 7.45 MWp with additional plans in the next few years
Remunerations and KPI for executives	All relevant board members and executive have remuneration based on climate performance	KPI has already been set regarding climate performance
E-Learning: Basic environment training for employee (about climate change, waste management, and other environmental management)	online training programs with the goal of encouraging all employee participate in the training at least 85%	Complete target of employee participate in the training more than 85%

4.3 Our GHG Performance

Table 8 OR GHG accounting (scope 1, 2, 3) from 2020 to 2022

GRI	Required Data	Unit	Year		
			2020	2021	2022
	Total GHG emissions (Scope 1+2)	**Metric tonnes CO_2 equivalents (tCO_2e)**	**25,335**	**22,249**	**30,293**
GRI 305-1 (2016)	**Direct Greenhouse Gas Emissions (Scope 1)**				
	Total direct GHG emissions (Scope 1)[1]	tCO_2e	4,075	3,483	4,427
	Oil Business (Company Own Company Corporate)	tCO_2e	794	839	834
	Retail Business (Company Own Company Corporate)	tCO_2e	607	640	837
	Others (Company Own Company Corporate)	tCO_2e	2,674	2,004	2,756
	Biogenic CO2 emissions (Scope 1)	tCO_2e	No Data	No Data	No Data
GRI 305-2 (2016)	**Indirect Greenhouse Gas Emissions (Scope 2)**				
	Total Indirect Greenhouse Gas Emissions (Scope 2)[1]	tCO_2e	21,260	18,766	25,866
	Location-based	tCO_2e	21,260	18,766	25,866
	Market-based	tCO_2e	N/A	N/A	N/A
	Oil Business (Company Own Company Corporate)	tCO_2e	17,096	13,719	20,102
	Location-based	tCO_2e	17,096	13,719	20,102
	Market-based	tCO_2e	N/A	N/A	N/A
	Retail Business (Company Own Company Corporate)	tCO_2e	2,835	4,113	4,427
	Location-based	tCO_2e	2,835	4,113	4,427
	Market-based	tCO_2e	N/A	N/A	N/A
	Others (Company Own Company Corporate)	tCO_2e	1,329	934	1,337
	Location-based	tCO_2e	1,329	934	1,337
	Market-based	tCO_2e	N/A	N/A	N/A
GRI 305-3 (2016)	**Scope 3 GHG Emissions**				
	Total Scope 3 GHG Emissions[1]	tCO_2e	0	0	66,855,074
	Use of sold products	tCO_2e	No Data	No Data	66,855,074

N/A (Not Applicable): There is no relevant to the operations of OR. No Data: There is no data in the reporting year.

[1] OR using the PTT Group's statistical reporting standards according to the principles of WBCSD Greenhouse Gas Protocol.

At OR, we firmly believe that understanding and accounting for our greenhouse gas (GHG) emissions is crucial in our journey towards achieving carbon neutrality and net-zero goals. Our focus lies in creating an accurate, transparent, and consistent GHG inventory, enabling us to make well-informed decisions on impactful decarbonization measures. Since 2018, we have continuously improved data collection and flow within our organization to establish an inventory that maintains high traceability of each emission source.

In our GHG calculations, we adhere to the highest standard by following the GHG calculation methodology outlined in the GHG Protocol. We systematically assess each activity data to ensure there are no significant omissions in our reports. Furthermore, we rely on the most localized emission factors available, sourced from reputable entities such as Thailand Greenhouse Gas Organization (TGO) and the International Panel for Climate Change (IPCC). To enhance the completeness of our reporting, we sought assurance for the first year from third-party verification.

This year, we have expanded our coverage of GHG emissions particularly in our scope 3 calculations. Recognizing our significant impact on the transition to a low-carbon economy, we consider our scope 3 inventory essential for understanding emissions associated with our sold products. Aligned with our commitment to long-term sustainability, we actively pursue the expansion and diversification of our green products portfolio. This strategic growth reflects our environmental responsibility while meeting the evolving needs of customers with a balanced approach that considers the demand for traditional products.

4.4 Capturing New Market Opportunities

Table 9 Measures to capture new market opportunities

Measures	Target	Progress status
Expand network of EV Station PluZ charging Station	450 locations with 500 chargers by 2022 and 7,000 locations by 2030	131 locations installed during 2022 (302 locations are the accumulated number)
Increase Biodiesel supply	N/A*	436 million liters

Remark: There is limitation in setting target as biofuel demand is according to the government's required biofuel share.

The transition towards a low-carbon economy presents immense opportunities, particularly in the area of sustainable energy products. At OR, we wholeheartedly embrace this transition and strategically expand our energy product portfolio to include innovative solutions such as electric vehicle (EV) chargers and biofuels. Presently, we have successfully installed over 100 EV charging stations and supplied over 1,000 million liters of biofuel. Our vision is to become a leader in this field by further facilitating EV uptake and expanding our network of chargers to 7,000 locations by 2030.

Furthermore, as a provider of retail energy products, we cater to a diverse range of customers, including maritime, aviation, and industrial clients, each facing unique challenges in decarbonizing their operations. To address these challenges, we actively study and explore new emerging products and solutions such as

alternative fuels. By doing so, we aim to offer comprehensive energy solutions that support our clients' transition towards sustainability.

In addition to our energy retail business, OR is also involved in sectors such as restaurants, health, and convenience stores. These areas provide us with opportunities not only to make environmental impacts but also to engage with suppliers and local communities. We firmly believe that fostering partnerships with local communities enables us to embark on an inclusive journey towards more sustainable practices. By continuously expanding our energy product portfolio, engaging in research and development, and collaborating with various stakeholders, OR remains committed to driving the transition towards a low-carbon future while seizing the market opportunities it present

TCFD CONTENT INDEX

TCFD Recommendation	Page in this report/ OR reference source
Governance - Disclose the organization's governance of climate-related risks and opportunities.	
a) Describe the board's oversight of climate-related risks and opportunities.	6-8
b) Describe management's role in assessing and managing climate-related risks and opportunities.	6-8
Strategy - Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.	13-16 (topic 2.2)
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	13-16 (topic 2.2)
c) Describe the resilience of the organization's strategy, taking into consideration different climate related scenarios, including a 2°C or Lower scenario.	24 (topic 2.3)
Risk Management - Disclose how the organization identifies, assesses, and manages climate-related risks.	
a) Describe the organization's processes for identifying and assessing climate-related risks.	10 (topic 2.1)
b) Describe the organization's processes for managing climate-related risks.	26-27 Governance, Risk, and Compliance (OR Website)
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	26-27 Governance, Risk, and Compliance (OR Website)
Metrics & Targets -Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	29 (Figure 11)
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG)	31 (topic 4.3)

TCFD Recommendation	Page in this report/ OR reference source
emissions, and the related risks.	
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	28 (topic 4.1)