

2023

OR TCFD Report

Sustainability, Quality, Safety, Health and Environment Department
PTT OIL AND RETAIL BUSINESS PUBLIC COMPANY LIMITED

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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

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.



Figure 1 OR Inclusive Growth Platform for “Outside - in Growth”

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

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.

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.

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.

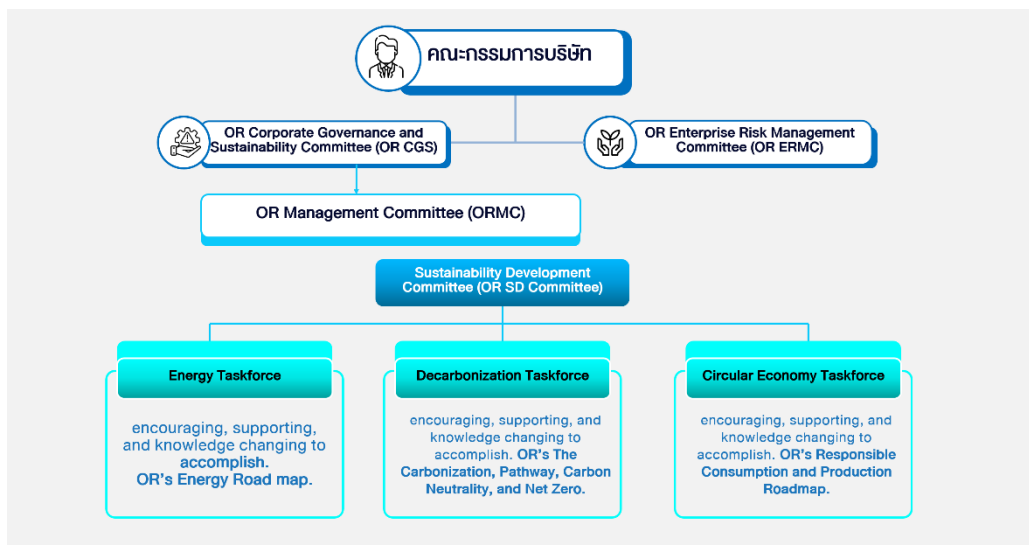


Figure 2 OR climate-related governance structure

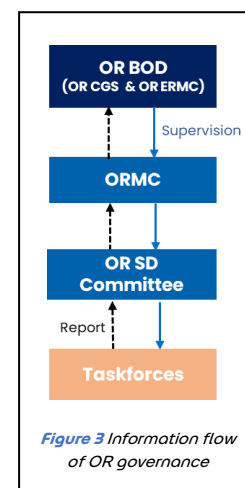
- **OR Board** plays a key role in providing oversight of climate-related risks and opportunities which may impact OR's business activity. Their function in regard to climate issues is to evaluate the performance of established action plans, approve climate-related corporate KPIs, and ensure climate 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 3.

Table 1 *Governing bodies and their responsibilities in climate actions*

Governing Body	Roles and Responsibilities	Meeting Frequency
Corporate Governance and Sustainability Committee (OR CGS)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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. • Provide recommendations for monitoring and evaluating risk management and stakeholder management to OR's Management Committee (ORMC) for further implementation. 	Quarterly

Management Committee (ORMC)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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 3.

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 3 OR Sustainability Strategy and 2030 Goals

2.1 Our Approach for Identifying Climate-Related Risks and Opportunities 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 risks 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 4.

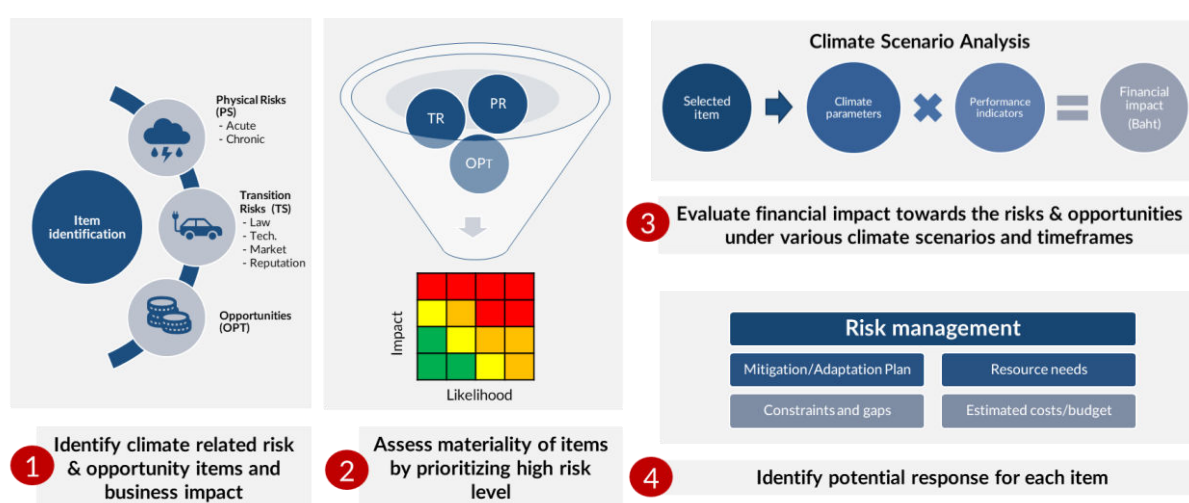


Figure 4 Climate-related risk assessment and management framework

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

Item Identification

1

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.

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. 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.

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 assessed qualitatively to understand impact levels. The impact levels are then translated into climate impact parameters and are assessed quantitatively to determine potential financial impacts to the business.
- Climate-related impacts are integrated into OR's risk matrix using company-specific parameters that reflect tangible damages to the company's overall performance.

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, 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 the risk assessment of other business units will be covered in future analysis.

The second priority for assessment is the Lifestyle business, with a focus on Café Amazon. Since coffee accounts for a significant portion of sales, the items considered for assessment were specified as coffee/coffee beans.

OR's climate-related risks and opportunities assessment covers OR's own operations and value chain (upstream and downstream). OR reviews climate-

related drivers for physical risk assessment covering both acute and chronic risks and reviews climate-related drivers for transition risks and opportunities assessment covering current regulations, emerging regulations, technology risks, legal risks, market risks, and reputational risks. Through a screening process, OR selects risks and opportunities based on perceived significance to OR's business.

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.

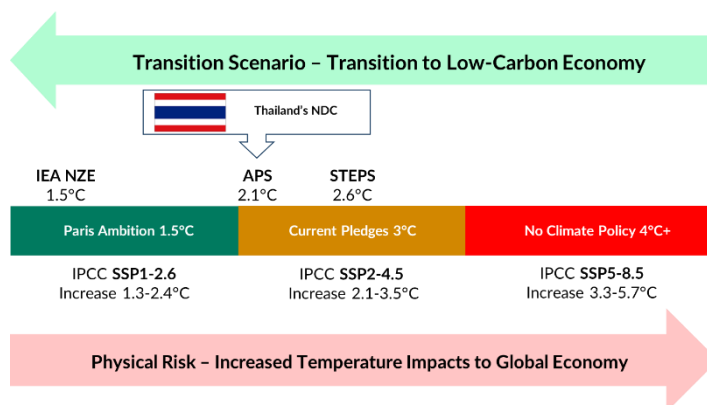


Figure 5 Scenarios for assessing climate risks and

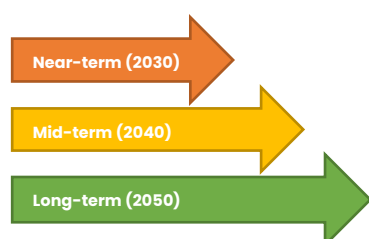
For **transition risks** and **opportunities**, three scenarios developed by the IEA were selected; Stated Policies Scenario (STEPS), Announced Policies Scenario (APS), and Net Zero Emission (NZE).

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 impact 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 the 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 for the Mobility business Table 4 for the Lifestyle business.

Table 3 Identified climate risks and opportunities for mobility business operations.

	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	Low	Low	Low
		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

	Oil BUs	Risk Item	Business Impact	Risk Level by Timeframe		
				2030	2040	2050
	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

Table 4. *Identified climate risks and opportunities for lifestyle business operations.*

	Risk Item	Business Impact	Risk Level by Timeframe		
			2030	2040	2050
Physical Risk	Flood caused logistic disruption to the distribution point	P1: Revenue loss from sale loss	High	High	Extreme
	Flood caused logistic disruption on raw materials shipped for production	P2: Revenue loss from production volume less than plan	Medium	High	High
	Flood caused raw materials shortage	P3: Additional cost for sorting raw materials due to raw materials shortage	Medium	High	Extreme
	Flood caused operation disruption	P4: Expenses for recovering damaged assets	Medium	High	Extreme
	Drought caused raw materials shortage/high cost	P5: Revenue loss from production volume less than plan	High	High	Extreme
		P6: Additional cost due to raw materials' price increased	High	High	Extreme
Transition Risk	GHG emission reporting enforcement by regulation	T1: Additional cost due to carbon/GHG emission reporting regulation	High	High	Extreme
	Recycle/plastic free for packaging regulation	T2: Additional cost due to limiting the use of certain products (plastic bags or non-recyclable packaging)	High	High	Extreme
	Technology disruption on self-service coffee machines	T3: Revenue loss from the self-service coffee machines	Medium	Medium	High
	Customer behavior changes due to a preference shift to low carbon product	T4: Revenue loss from sale loss or customer loss	High	High	Extreme
Opportunity	Low carbon/ carbon neutral product	O1: Revenue from new product e.g. carbon neutral coffee	Medium	High	Extreme
	Self-service coffee machines	O2: Revenue from new service	Medium	Medium	High

2.2.2 Risk Materiality

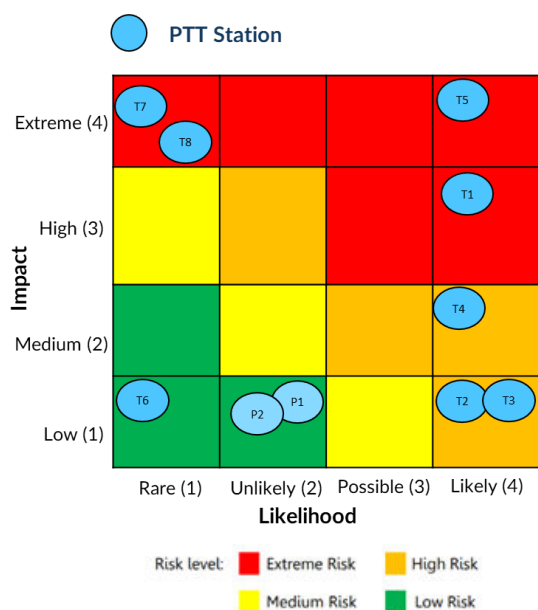
1. Own operation of OR

As mentioned in 2.1.1, we prioritized the financial impact of PTT stations in the mobility business and Café Amazon in lifestyle 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 6 and Figure 7 demonstrate the risk matrix of a PTT station and Café Amazon, respectively.

The following are selected items for assessing the financial impact in 2030.

1.1 Mobility business: PTT station

- **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

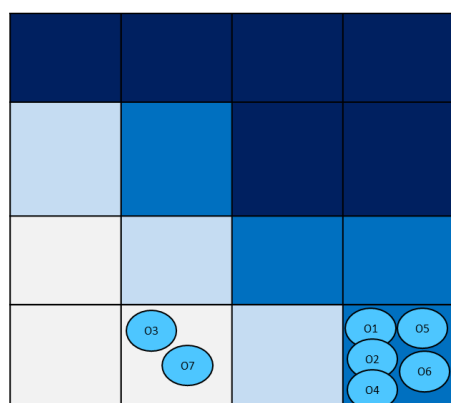
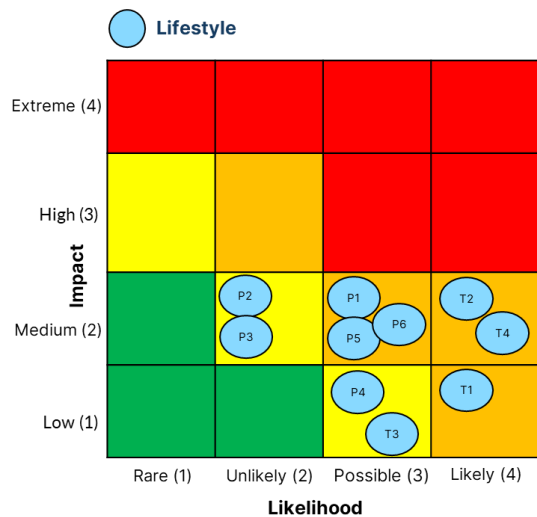


Figure 6 Risk matrix on climate related risks and opportunities of PTT station.

1.2 Lifestyle business: Café Amazon

- **Physical risk:** Drought caused additional cost due to raw materials' price increased.
- **Transition risk:** Revenue loss from low carbon product disruption due to customer preference shift to low carbon product (low carbon coffee).
- **Opportunity:** Revenue increase from selling carbon neutral coffee due to customer preference shift to low carbon product.



Physical risk items

P1: Flood caused sale loss due to logistic disruption to distribution points.
P2: Flood caused revenue loss from production volume less than plan due to logistic disruption on raw materials transportation for production.
P3: Flood caused additional cost for sorting raw materials due to raw materials shortage.
P4: Flood caused expenses of recovering damaged assets.
P5: Drought caused revenue loss from production volume less than plan due to raw materials shortage.

P6: Drought caused additional cost due to raw materials' price increased.

Transition risk items

T1: Additional cost due to GHG emission reporting.
T2: Additional cost due to low carbon packaging regulation.
T3: Revenue loss from self-service coffee machine.

T4: Revenue loss from low carbon product disruption due to customer preference shift

Opportunity items

O1: Revenue increase from selling low carbon products (Carbon neutral coffee)

O2: Revenue from new service (self-service coffee machine)

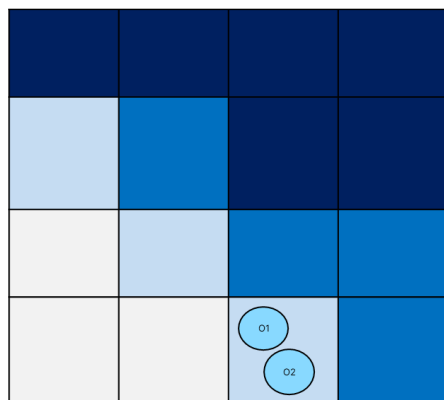


Figure 7 Risk matrix on climate related risks and opportunities of Café Amazon

2.2.3 Financial impact

2.2.3.1 Mobility Business: PTT Station

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 are selected for the financial impact assessment** and proposed this assessment with OR strategic response and adaptation plan for all existing and new operations (100%) in less than 5 years of the implementation timeline. 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 5 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 5 PTT Stations Physical Risk, Business Impact, and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)			Strategic Response/Adaptation Plan
						2030	2040	2050	
Floods	Expenses on repairing/recovering damaged facilities	SSP5-8.5	- Consider 220 PTT stations (COCO: Company owned	Area damaged (m ²)	Cost of repairing 20,000 THB/m ²	200-300	300-1000	1000-1600	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>
		SSP2-4.5	Company Operated)			200-300	200-300	200-300	
		SSP1-2.6	- Flood depth > 0.5 meter caused damage			<200	<200	<200	

2. Transition Risk: Fossil fuel demand change

Regarding transition risk, risk from oil demand change is selected. Thai governments 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 6, oil demand increases from 2030 to 2050 under the STEPS scenario and decreases after 2030 under the APS scenario.

Table 6 PTT Stations Transition Risk, Business Impacts and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)			Strategic Response/Adaptation Plan
						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	<p>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:</p> <ul style="list-style-type: none"> 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 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.
		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 retail, excluded commercial oil	oil sale change (%) 2030: -23% 2040: -70% 2050: -93%	Sale price = 30 Baht/liter	-92,000	-275,000	-366,000	

Remark: 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 7 PTT Stations Opportunity, Business Impacts and Financial Implication

Opportunity	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)			Strategic Response/Adaptation Plan
						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 3. 40% Market share of OR EV stations 4. Average Electricity consumption = 4,000 kWh/year/car	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.
		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	5) Promoting the EV Bike which will enhance Mobility as a Service (MaaS) in the electric two-wheeler segment as well

Opportunity	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)			Strategic Response/Adaptation Plan
						2030	2040	2050	
		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	<p>as develop a full electric vehicle business in order for OR to truly become a leader in the EV ecosystem as follows.</p> <ul style="list-style-type: none"> 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

2.2.3.2 Lifestyle Business: Café Amazon

1. Physical Risk: Drought

Drought can have significant and adverse effects on the availability and quality of agricultural raw materials used in beverages such as sugar, cacao bean, tea, and particular coffee beans, which is a critical raw material we chose to evaluate for Café Amazon. The following are how drought can affect coffee bean production:

- *Reduced Yield:* Drought conditions lead to water scarcity, which can reduce the overall yield of coffee crops. Coffee plants require a consistent and adequate supply of water to produce healthy beans. Drought stress can cause the plants to produce fewer cherries or beans, resulting in a lower coffee bean supply.
- *Lower Quality:* Drought stress can affect the quality of coffee beans. The beans may ripen prematurely or unevenly, leading to inconsistencies in flavor and aroma. Drought-stressed coffee beans may also have a more bitter taste and lack the desired acidity and sweetness.
- *Smaller Bean Size:* Drought can lead to smaller coffee beans. Smaller beans are often considered of lower quality and can result in lower coffee prices for growers. This can impact the cost and quality of the coffee used by Café Amazon.
- *Increased Pest and Disease Risk:* Drought-weakened coffee plants are more susceptible to pests and diseases. Insects and fungi can thrive in dry conditions, further compromising the health and yield of coffee crops. This can lead to the need for increased pesticide and fungicide use, which may have environmental and health implications.
- *Harvest Timing:* Drought can disrupt the typical harvest timing for coffee beans. In some cases, coffee cherries may ripen early due to water stress, requiring adjustments to the harvesting schedule. This can affect supply chain logistics and the availability of fresh beans.

All of the mentioned variables contribute to coffee bean price volatility. **Reduced coffee bean yields due to drought in coffee-growing regions can lead to increased prices in the coffee market. This may impact the cost of sourcing coffee beans for Café Amazon,** potentially leading to higher prices and reduced profitability.

The Factors used to evaluate financial impact is how much of coffee bean prices will increase in each scenario at different times and the forecast demand for the future. The assumptions are based on OR internal analysis and some of external sources and presented the financial assessment results with OR strategic response

and adaptation plan for all existing and new operations (100%) in less than 5 years of the implementation timeline.¹

¹ 1) [High extinction risk for wild coffee species and implications for coffee sector sustainability](#)
2) [Future coffee suitability](#) (page 7-8)

Table 8 Café Amazon Physical Risk, Business Impact, and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate impact parameters	Performance indicators	Financial Impact (THB)	Strategic Response/Adaptation Plan
						Additional cost = % cost increase x cost (THB/kg) x volume (kg)	
Drought	Additional cost due to raw materials' price increased	SSP5-8.5	- Severe drought results 30-50% reduction in coffee bean yields - Assume that % price increase is varied to % yield decrease (1:1)* - The average cost of coffee beans is 200 baht/kg.	Increased cost of coffee beans; 2030: +30% 2040: +40% 2050: +50%	Forecast coffee beans use; 2030: 7,000 ton 2040: 8,500 ton (20% growth) 2050: 9,000 ton (30% growth)	2030: 30% of coffee beans cost increased 2040: 40% of coffee beans cost increased 2050: 50% of coffee beans cost increased	<ol style="list-style-type: none"> 1) Business Contingency Plans (BCP): Develop BCP to prevent shortages in the procurement of raw materials due to extreme weather, including closely monitor coffee bean suppliers to maintain the potential to deliver coffee beans according to quotas. 2) Diversified Sourcing: Establish relationships with coffee suppliers in regions less susceptible to drought to ensure a stable supply of coffee beans. 3) R&D: <ul style="list-style-type: none"> • Internal: OR established "Amazon Park" to research and development of good coffee variety which hardiness and resistance to diseases and climate change-resilient. • External: Collaborate with the Royal Project Foundation to provide financial support on the research and development on enhancing coffee cultivation and production. 4) Climate-resilient Farming Practices: Work closely with coffee bean suppliers/farmers to apply climate-resilient farming practices and initiate the adoption of Café Amazon coffee standards as practices with farmers participating in the Community Coffee Sourcing project. (CCS). 5) Fair Trade: Provide a fair price guarantee for suppliers and farmers,
		SSP2-4.5	- Moderate drought results 10-30% reduction in coffee bean yields - Assume that % price increase is varied to % yield decrease (1:1)* - The average cost of coffee beans is 200 baht/kg.	Increased cost of coffee beans; 2030: +10% 2040: +20% 2050: +30%		2030: 10% of coffee beans cost increased 2040: 20% of coffee beans cost increased 2050: 30% of coffee beans cost increased	
		SSP1-2.6	- Mild drought results 5-15% reduction in coffee bean yields - Assume that % price increase is varied to % yield decrease (1:1)* - The average cost of coffee beans is 200 baht/kg.	Increased cost of coffee beans; 2030: +5% 2040: +10% 2050: +15%		2030: 5% of coffee beans cost increased 2040: 10% of coffee beans cost increased 2050: 15% of coffee beans cost increased	

Risk	Business Impacts	Climate Scenario	Assumption	Climate impact parameters	Performance indicators	Financial Impact (THB)	Strategic Response/Adaptation Plan
						Additional cost = % cost increase x cost (THB/kg) x volume (kg)	
							<p>mitigating the challenges associated with coffee bean management during periods of bean scarcity.</p> <p>6) Early Demand Analysis: Utilize climate data on global coffee price trends and meteorological updates to manage annual coffee bean planning.</p> <p>By taking these measures, OR can better navigate the challenges posed by climate-related droughts on coffee bean supply and maintain a consistent and high-quality coffee product for its customers.</p>

Remark: * Based on historical record of drought event impacted on the coffee yield and price

1. Transition Risk: Low-carbon coffee disruption

Customer preference shift to low-carbon products is one of the significant transition risks of Café Amazon. In recent years, consumers have been more environmentally conscious and often expect businesses to offer eco-friendly products. Café Amazon has prioritized sustainability by developing beverage packaging to be biodegradable and environmentally friendly. Furthermore, we have focused on providing our customers with more alternative products that have a lower carbon footprint, which is consistent with the sustainable consumer trend. In this assessment, OR has chosen to consider the risk associated with the low-carbon transition by focusing on coffee, as it is Café Amazon's major product.

The risk regarding customer preference shift towards low-carbon coffee can have a negative impact on Café Amazon business in terms of market competition, cost implications, and brand reputation. Increased demand for low-carbon coffee may lead to heightened competition. As more brands enter the market, Café Amazon may find it challenging to maintain market share and profitability. Additionally, adapting to low-carbon practices, such as sustainable sourcing and production methods, may incur additional costs.

For the analysis, we considered revenue loss from low-carbon product disruption based on the sustainable consumer trend. We used the findings of a survey of Asia-Pacific sustainable customers, which revealed roughly 30 percent of Thai consumers have begun purchasing sustainable items in the last two years². The growth of customers interested in low-carbon coffee are expected to align with the growth rate of these sustainable consumers who are assumed to increase by up to 30 percent in the positive scenario; Net Zero emission.

² [Bain Asia-Pacific Environmental, Social, and Corporate Governance Survey, January 2022](#)

Table 9 Café Amazon Transition Risk, Business Impacts and Financial Implication

Risk	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)	Strategic Response/Adaptation Plan
						Revenue loss = % sale decreased x planned revenue	
Customer preference shift	Revenue loss from low-carbon coffee disruption	STEPS	- Growth of sustainable customers who are interested in low-carbon coffee 0% - Constant OR Market share	Sales according to the original business plan	Forecasted revenue from coffee sales (MTHB): 2030: 10,000 2040: 15,000 2050: 20,000	No revenue loss from selling coffee	<p>Café Amazon can proactively respond to the climate risk associated with changing customer preferences as follows:</p> <p>1) Menu Diversification: Develop a broader range of low-carbon and sustainable coffee options, including certified organic, Fair Trade, and carbon-neutral coffees, to cater to changing customer preferences.</p> <p>2) Sustainable Sourcing/Green Procurement: shift to sustainable and environmentally friendly coffee sources, such as buying coffee beans from farms that use eco-friendly cultivation methods, promote biodiversity, and reduce carbon footprint.</p> <p>3) Low carbon and energy reduction production process:</p> <ul style="list-style-type: none"> Implement low carbon, low energy, and renewable energy initiatives throughout the OR coffee production process and across the supply chain, including the logistics. <p>4) Carbon footprint: start to measure carbon footprint of coffee or carbon footprint of products (CFP) to use as a baseline and for the future low carbon improvement.</p>
		APS	- Growth of sustainable customers who are interested in low-carbon coffee is up to 20% - Constant OR Market share	Sales decreased (%) 2030: -10% 2040: -15% 2050: -20%		2030: revenue loss 10% 2040: revenue loss 15% 2050: revenue loss 20%	
		NZE	- Growth of sustainable customers who are interested in low-carbon coffee is up to 30% - Constant OR Market share	Sales decreased (%) 2030: -15% 2040: -20% 2050: -30%		2030: revenue loss 15% 2040: revenue loss 20% 2050: revenue loss 30%	

3. Opportunity: Carbon neutral coffee

The shift in customer preferences towards low-carbon coffee not only poses challenges as mentioned in transition risk, but also potentially translate into the opportunity for business growth as more environmentally conscious consumers seek low-carbon coffee options. It also can indirectly enhance OR brand image, attracting eco-conscious investors who want to support sustainable businesses.

The assumption utilized is the sustainable customer growth rate, which is similar to the assumptions used for the transition risk, but it was expected that carbon neutral coffee has less interest from customers than typical low-carbon coffee. The financial impact is analyzed independently by the expected revenue increase from selling carbon neutral coffee without taking into account the negative impact of revenue loss from low carbon coffee interruption. The potential responses are similar to the transition risk, with an addition of a focus on carbon neutrality by attempting to eliminate all GHG emissions from own operations and across the entire supply chain.

Table 10 Café Amazon Opportunity, Business Impacts and Financial Implication

Opportunity	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)	Strategic Response/Adaptation Plan
						Revenue gain= % sale increased x planned revenue	
Customer preference shift	Increase revenue from selling carbon neutral coffee	STEPS	- Growth of sustainable customers who are interested in carbon neutral coffee 0% - No carbon neutral coffee menu	Sales according to original business plan	Forecasted revenue from coffee sales: 2030: 10,000 2040: 15,000 2050: 20,000	No revenue gain from selling carbon neutral coffee	Cafe Amazon can seize the climate opportunity and position itself as a leader in the low-carbon coffee market by implementing a range of mitigation and adaptation strategies as follows: 1) Carbon-Neutral Certification : Obtain carbon-neutral certification for coffee to demonstrate the commitment to reducing carbon emissions associated with coffee production, distribution, and consumption. 2) Renewable Energy : 100% Transition to renewable energy sources for the production and cafe operations. Currently, OR's coffee roasting factory has partially installed solar rooftop to replace some of the electricity utilized. 3) Supply Chain Optimization : Work with coffee suppliers, farmers and partners to optimize the supply chain for lower carbon emissions e.g., source coffee beans from certified sustainable/ local suppliers to reduce emissions from transportation and logistics.
		APS	- Growth of sustainable customers who are interested in carbon neutral coffee is up to 10% - Partial carbon neutral coffee available	Sales increased (%) 2030: +5% 2040: +7% 2050: +10%		2030: revenue gain 5% 2040: revenue gain 7% 2050: revenue gain 10%	

Opportunity	Business Impacts	Climate Scenario	Assumption	Climate Impact Parameters	Performance Indicators	Financial Impact (MTHB)	Strategic Response/Adaptation Plan
						Revenue gain= % sale increased x planned revenue	
			- Costs can be fully passed on to customers				<p>4) Eco-Friendly Packaging: enhance sustainable and eco-friendly coffee packaging options to be 100% biodegradable or recyclable materials.</p> <p>5) Carbon Offsetting: Invest in carbon offset projects, such as reforestation, to compensate for any remaining emissions associated with the coffee business.</p> <p>6) Carbon-Neutral Menu: Create a dedicated menu section that emphasize carbon-neutral coffee options, including issue promotion campaign and further launch a broader range of other low-carbon beverages.</p> <p>7) Partnerships: Collaborate with organizations and initiatives focused on carbon neutrality and sustainability to access expertise, resources, and customer networks.</p>
		NZE	<p>- Growth of sustainable customers who are interested in carbon neutral coffee is up to 20%</p> <p>- 100% carbon neutral coffee available</p> <p>- Costs can be fully passed on to customers</p>	<p>Sales increased (%)</p> <p>2030: +10%</p> <p>2040: +15%</p> <p>2050: +20%</p>		<p>2030: revenue gain 10%</p> <p>2040: revenue gain 15%</p> <p>2050: revenue gain 20%</p>	

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

2.3.1 Mobility business

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.

2.3.2 Lifestyle business

Café Amazon is the main business in the Lifestyle business. It plays a crucial role in enhancing OR's business resilience by providing revenue diversification, building a strong brand, and positioning the company to adapt to changing market dynamics, regulatory environments, and consumer preferences. It serves as a strategic asset that contributes to the overall resilience and sustainability of OR's business.

Café Amazon, in addition to being a business that helps diversify OR's business, has the potential to improve self-climate resilience by implementing a strategy that combines both mitigation and adaptation measures, as addressed in the potential response under topic 2.2.3.2 (financial impact assessment by various climate scenarios).

The significant climate strategy to boost Café Amazon's resilience is OR established "Amazon Park" to research and development (R&D) of good coffee variety which hardiness and resistance to diseases and climate change-resilient and involves partnering with the Royal Project Foundation to engage in research and development (R&D) focused on cultivation techniques and adoption of various sustainable farming practices. These factors are critical for enhancing the organization's ability to adapt and thrive in a changing climate.

Furthermore, in case of coffee beans scarcity, having a contingency plan in place to be able to modify the proportion of coffee to support the market as well as having supply chain resilience is essential. OR maintain the priority on sustainable coffee sourcing, focusing on low-carbon coffee beans options, including diversifying coffee sourcing from regions that mitigate risks from coffee beans shortages.

To meet OR climate goals and align with global efforts, OR have taken more of the following actions.

- R&D of good coffee variety which hardiness and resistance to diseases and climate change-resilient.
- Implement circular economy practices to minimize waste and extend the life of resources.
- Develop a waste reduction strategy that includes recycling, composting, and reducing single-use items.
- Innovate to create more sustainable retail stores, operations, production, and delivery.
- Invest in carbon offset projects and transparently communicate its carbon neutrality efforts to customers.
- Further assess the climate risks in our supply chain, especially for sourcing ingredients.

Beyond from that, OR strives to update decarbonization strategy to account for evolving climate scenarios and emerging risks, as well as conduct a thorough climate risk assessment to identify vulnerabilities in our operations and supply chain under various climate scenarios in order to regularly monitor risks and impacts. By

adopting these actions, Cafe Amazon can enhance its sustainability, reduce climate-related risks, and align with global efforts to limit global warming to 2°C while continuing to provide quality coffee products to its customers.

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.

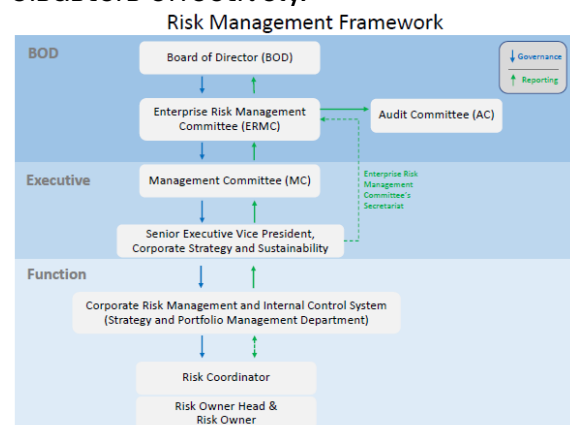


Figure 8 OR's Risk Management Framework

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.

OR Enterprise Risk Management

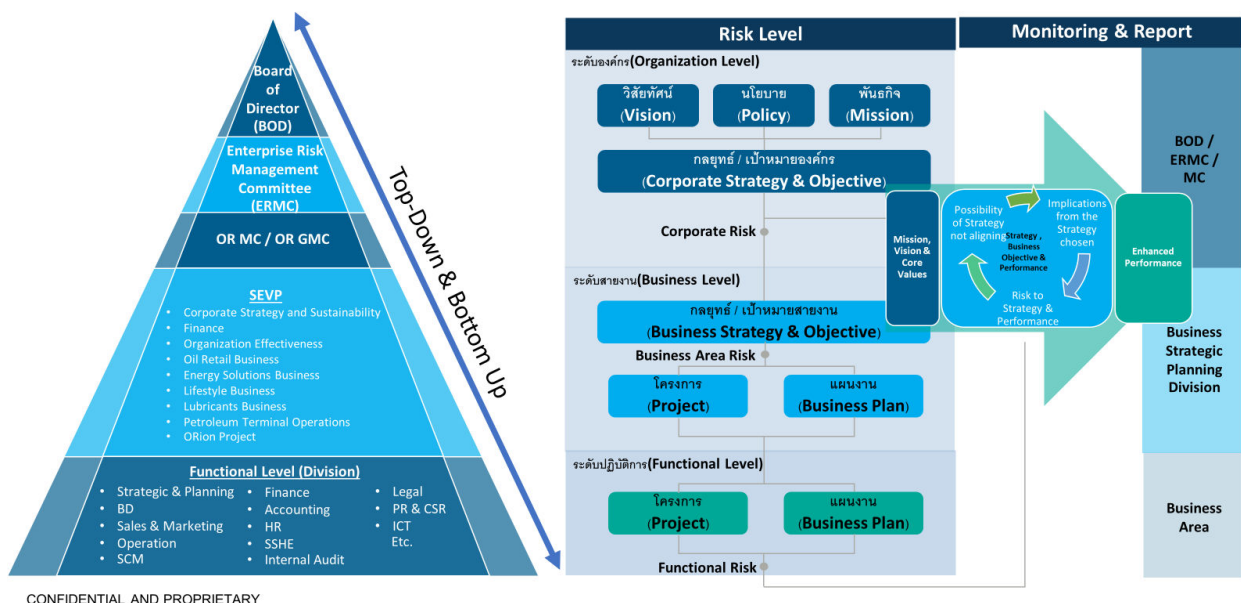


Figure 9 OR's Enterprise Risk Management

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.

The 3R climate strategy has been developed to facilitate the journey towards achieving net-zero emissions, serving as a robust framework that directs and guides our climate actions toward our long-term goals. The figure below outlines the three pillars of 3R climate strategy; Reduce, Remove and Reinforce.

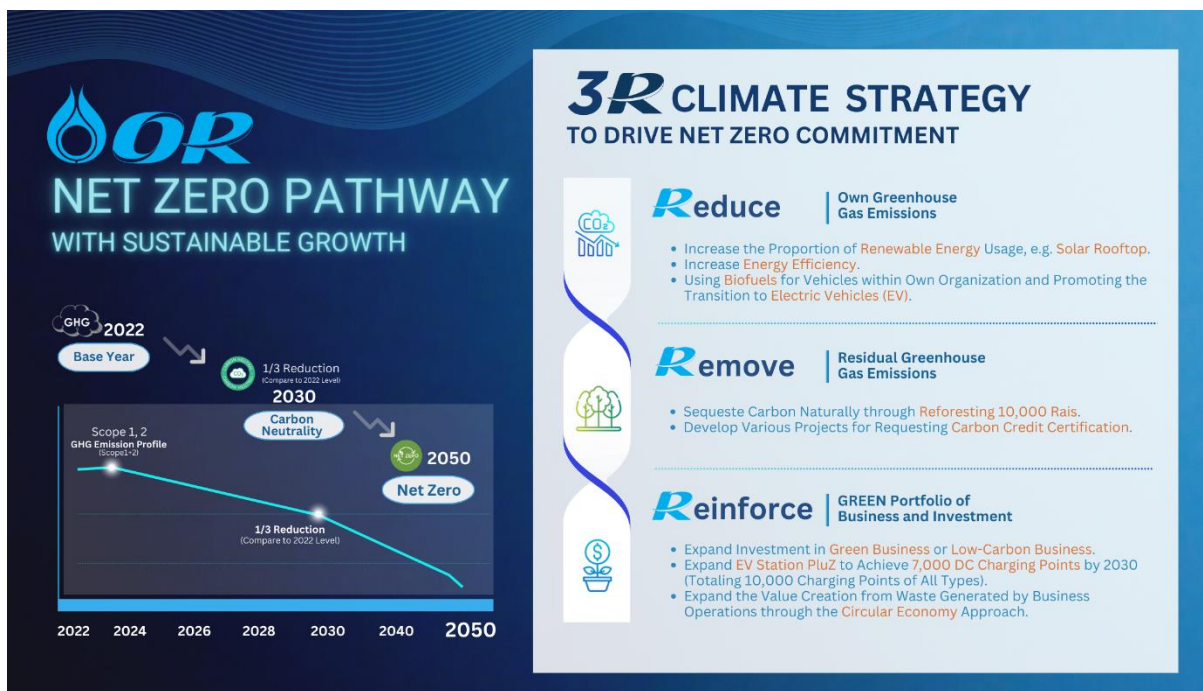


Figure 10 OR Net Zero Pathway and 3R Climate Strategy

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 (90% reduction target from base year 2022). 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.

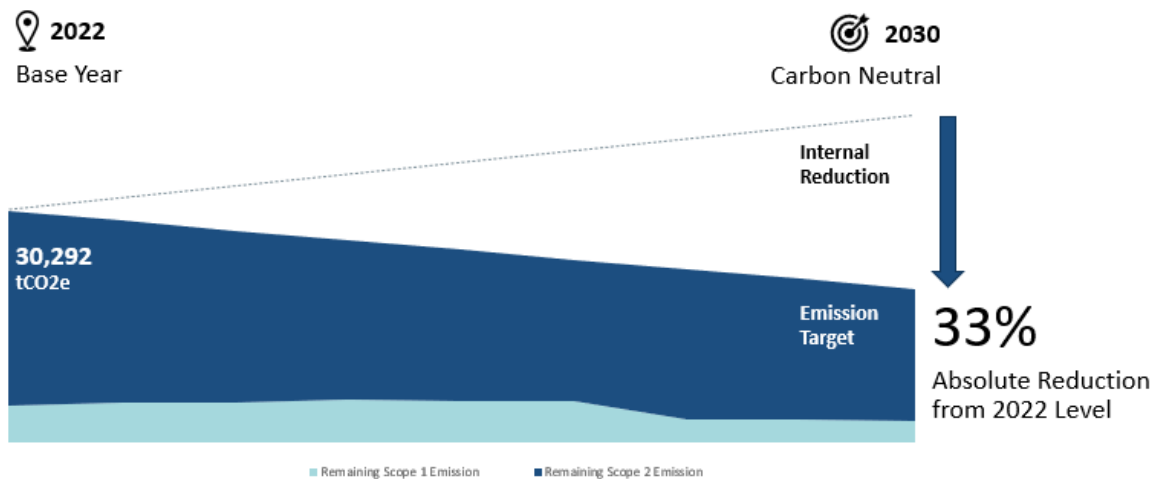


Figure 11 OR Forecasted Emissions Targets to reduce and achieve carbon neutral in 2030

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.

Key Performance Indicators (KPI)

- 1 Direct and Indirect greenhouse gas emissions (Scope 1 and Scope 2) In 2023
- 2 Renewable energy using from Solar Rooftop in 2023
- 3 Expand the EV Station PluZ Network in 2023

2023 Targets

Not exceed 28,900 tons
CO2 equivalent

Accumulative installed
capacity 14.165 MWp

1,702 DC Connector

2023 Performances

27,371 tons CO2
equivalent

Accumulative installed
capacity 12.783 MWp

1,618 DC Connector

Figure 12 2023 Target and Performance

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 11 Measures list and the progress of action taken

Measures	Target	Progress status
Increase proportion of EV in OR's vehicle fleet	65% of fleet as EV by 2030	Start to implement this plan in 2024, by 10% of eligible vehicles will be considered for conversion to EV according to the cycle of procurement.
Energy Efficiency	In Progress	Study the possibility to enhance energy efficiency (EE) in 2 focused area which are OASYS and Phrakanong Office Building
Increase renewable installation capacity	19.90 MWp installed solar by 2030	Installed 12.784 MWp
Remunerations and KPI for executives	CEO and all relevant executives have remuneration based on climate performance	KPI has already been set regarding climate performance See more detail (Climate-Related Management Incentives): https://orapiweb.pttor.com/upload/s/documents/20240627_095142_3245.pdf
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 12 OR GHG accounting (scope 1, 2, 3) from 2020 to 2023

GRI	Required Data	Unit	Year			
			2020	2021	2022	2023
	Total GHG emissions (Scope 1+2)	Metric tonnes CO₂ equivalents (tCO₂e)	25,335	22,249	30,293	33,407
GRI 305-1 (2016)	Direct Greenhouse Gas Emissions (Scope 1)					
	Total direct GHG emissions (Scope 1) ^[1]	tCO ₂ e	4,075	3,483	4,427	4,998
	Oil Business (Company Own Company Corporate)	tCO ₂ e	794	839	834	1,152
	Retail Business (Company Own Company Corporate)	tCO ₂ e	607	640	837	785
	Others (Company Own Company Corporate)	tCO ₂ e	2,674	2,004	2,756	3,060
	Biogenic CO ₂ emissions (Scope 1)	tCO ₂ e	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 ₂ e	21,260	18,766	25,866	28,410
	Location-based	tCO ₂ e	21,260	18,766	25,866	29,188
	Market-based	tCO ₂ e	N/A	N/A	N/A	28,410
	Oil Business (Company Own Company Corporate)	tCO ₂ e	17,096	13,719	20,102	18,799
	Location-based	tCO ₂ e	17,096	13,719	20,102	19,293
	Market-based	tCO ₂ e	N/A	N/A	N/A	18,799
	Retail Business (Company Own Company Corporate)	tCO ₂ e	2,835	4,113	4,427	8,069
	Location-based	tCO ₂ e	2,835	4,113	4,427	8,290
	Market-based	tCO ₂ e	N/A	N/A	N/A	8,069
	Others (Company Own Company Corporate)	tCO ₂ e	1,329	934	1,337	1,562
	Location-based	tCO ₂ e	1,329	934	1,337	1,605
	Market-based	tCO ₂ e	N/A	N/A	N/A	1,562
	Scope 3 GHG Emissions					
GRI 305-3 (2016)	Use of sold products	tCO ₂ e	No Data	No Data	66,855,074	66,356,737

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 13 Measures to capture new market opportunities

Measures	Target	Progress status
Expand network of EV Charger	1,702 DC Connector by 2023 and 7,000 DC Connector by 2030	1,618 DC Connector
Increase Biodiesel supply	N/A*	464.84 million liters
Amazon Park	1 Area	1 Area

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 DC Connector 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.	4-6
b) Describe management's role in assessing and managing climate-related risks and opportunities.	4-6
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.	9 (topic 2.1)
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	13 (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.	32 (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.	9 (topic 2.1)
b) Describe the organization's processes for managing climate-related risks.	36-37 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.	36-37 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.	16-17 (Figure 6-7)
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	41 (topic 4.3)
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	38 (topic 4.1)