OSOTSPA

OSOTSPA TCFD Report 2025

OSOTSPA THE POWER TO ENHANCE LIFE

www.osotspa.com/new/en/home/

INTRODUCTION

Osotspa Public Company Limited ("Osotspa") is committed to addressing climate-related risks and opportunities in alignment with global sustainability goals. As a leading beverage company in Thailand, we recognize the urgency of climate action and the importance of transitioning to a low-carbon economy through
a clear decarbonization strategy.

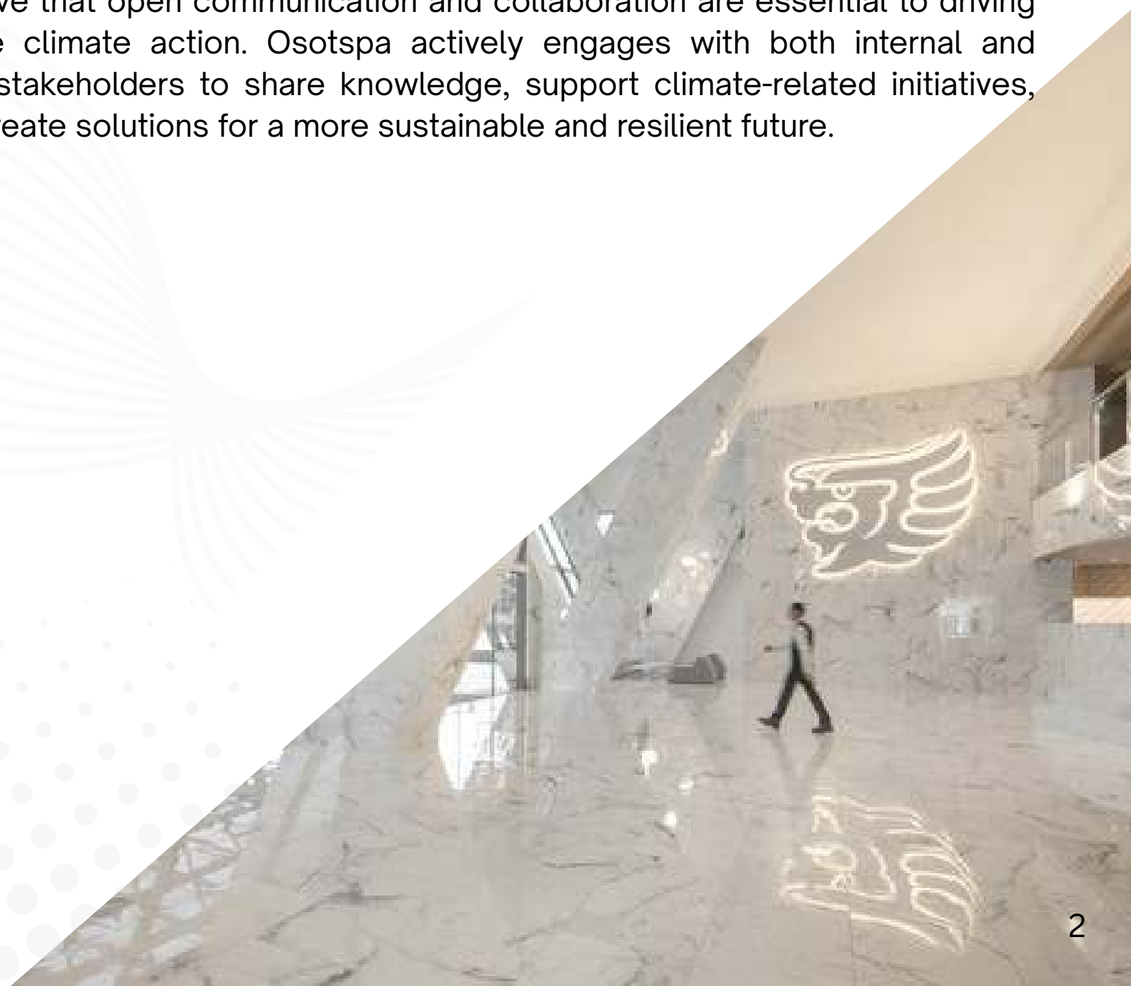
This TCFD aligned Climate-related Report 2025 aims to provide transparent disclosure of Osotspa's climate-related financial risks, opportunities, and mitigation strategies, with a long-term target of achieving **carbon neutrality by 2050.** In accordance with the **IFRS S2 Climate-related Disclosures**, we seek to enhance stakeholder understanding and enable informed decision-making across our value chain.

Climate change presents complex challenges to our operations and supply chain. These include physical risks, such as extreme weather events, and transition risks, arising from regulatory shifts, market changes, and technological disruptions. At the same time, the transition to a low-carbon economy presents opportunities to enhance resource efficiency, drive innovation, and develop sustainable products.

Since 2023, Osotspa has conducted both **qualitative and quantitative scenario analyses** to assess climate-related risks and opportunities. In this reporting cycle, we have expanded the scope to include key upstream and downstream activities, ensuring a more comprehensive understanding of impacts across our business ecosystem. This allows us to better engage stakeholders and business partners, and to identify levers for value creation through climate resilience and low-carbon transition.

This report is structured around the four core pillars of the **TCFD framework: Governance, Strategy, Risk Management, and Metrics & Targets.** Through transparent disclosure, we aim to demonstrate our commitment to managing climate risks, capturing transition opportunities, and contributing to Thailand's net-zero aspiration.

We believe that open communication and collaboration are essential to driving collective climate action. Osotspa actively engages with both internal and external stakeholders to share knowledge, support climate-related initiatives, and co-create solutions for a more sustainable and resilient future.



CLIMATE-RELATED CONTENT INDEX

Disclosure Area	Disclosure Alignment	Page
Governance Disclose the organization's governance around climate-related risks and opportunities.	The board's oversight of climate-related risks and opportunities.	Page 5
	Management's role in assessing and managing climate-related risks and opportunities.	Page 6-10
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.	The climate-related risks and opportunities the organization has identified over the short, medium, and long term.	Page 12-14
	The impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	Page 15-38
	The resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Page 32-38
Risk Management Disclosure of how the organization identifies, assesses, and manages climate-related risks.	The organization's processes for identifying and assessing climate-related risks	Page 40-45
	The organization's processes for managing climate-related risks.	Page 40-45
	Processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	Page 40
Metrics and Targets Disclosure of the metrics and targets used to assess and manage relevant climate-related risks and opportunities, where such information is material.	The metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	Page 47, 51
	Scope 1, Scope 2, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	Page 48-50
	The targets used by the organization to manage climate-related risks and opportunities and performance against targets.	Page 52-55

Governance

Effective climate governance is essential for Osotspa to address and integrate climate-related risks and opportunities into our business strategy. This section outlines the governance structures, controls, and procedures used to monitor and manage these issues.

At Osotspa, the Board of Directors (BOD) holds ultimate responsibility for incorporating climate strategy into the company's governance framework. The Nomination, Remuneration, Corporate Governance and Sustainable Development Committee (NRCSD), acting as the board-level sustainability committee, reviews key issues and recommends them for BOD deliberation.

Climate-related matters are regularly considered within risk management, strategic planning, and company performance—discussed weekly at the management level and at least twice annually at the board level. The board also participates in targeted training programs and consults external experts when needed. Climate-related competencies are embedded into ongoing board development and succession planning.

To strengthen climate governance, Osotspa has established dedicated Sustainability Committees at both board and management levels, ensuring a proactive transition to a climate-resilient business. The Sustainability Working Team, comprising relevant management representatives, integrates climate considerations into decision-making and allocates resources accordingly. Day-to-day actions are supported by a cross-functional Climate Task Force, which works closely with departments to embed climate priorities across the organization.

OSP Governance Structure

- BOD level
- Management level
- Working team level

Executive Committee

Nomination, Remuneration, Corporate Governance and Sustainable Development Committee (NRCSD)

Board of Directors

Risk Management Committee

Audit Committee

- **At board level**, climate related risks and opportunities as well as decarbonization strategies are overseen by the Board of Directors and NRCSD (Meeting Frequency: more than 5 times a year depending on the agenda)

Chief Executive Officer

Sustainability Working Team (OSP Management)

- **At the management level**, Sustainability Working team, steered by CEO, conducts climate change policy and strategy establishment, climate-related risks and opportunities assessment, and GHG emission reductions projects and planning in order to pursue the target of Carbon Neutrality by 2050. (Meeting Frequency: Quarterly)

Sustainability Department conducts Climate Change Strategy and manages climate-related risk and opportunities implement decarbonization tasks to achieve Carbon Neutral 2050.

Sustainability Department

Project Leaders

Supervised by the top management of the relevant functions

- Beverage Filling Plants
- Personal Care Plants
- Glass Factories
- Label Printing Factory

Corporate SHE/ Site Leaders /Manufacturing Improvement

BOARD OF DIRECTOR CLIMATE-RELATED EXPERIENCE

Board Member	Position	Summary of related experience	Company website or AR or SR page	URL
1. Mr. Somprasong Boonyachai	Independent Director, Chairman of the Board of Directors and Chairman of the Nomination Remuneration Corporate Governance and Sustainable Development Committee	>10 Years of experience in Environment & Sustainability- Members of Osotspa's NRCSD committee	247-248, 280-281,345-368	https://sustainability.osotspa.com/en/document/reports
2. General Surapong Suwana-adth	Independent Director, Vice Chairman of the Board of Directors and Member of the Nomination Remuneration Corporate Governance and Sustainable Development Committee	>10 Years of experience in Environment & Sustainability	247-248, 280-281,345-368	
3. Ms. Penchun Jarikasem	Independent Director and Chairman of the Audit Committee	>10 Years of Experience in Environment & Sustainability- Member of Committee, Working Group and Sub-committee in Energy sectors' company	247-248, 280-281,345-368	
4. Mrs. Sinee Thienprasiddhi	Independent Director and Member of the Audit Committee	>10 Years of experience in Environment & Sustainability	247-248, 280-281,345-368	
5. Ms. Camille Ma	Independent Director, Member of the Audit Committee and Member of the Risk Management Committee	>10 Years of experience in Environment & SustainabilityMember of the Sustainability and Risk Management Oversight Committee	247-248, 280-281,345-368	
6. Mr. Niti Osathanugrah	Director, Member of the Executive Committee, Member of the Nomination Remuneration Corporate Governance and Sustainable Development Committee and Member of the Risk Management Committee	>10 Years of experience in Environment & Sustainability	247-248, 280-281,345-368	
7. Mr. Salin Pinkayan	Director Member of the Executive Committee and Member of the Risk Management Committee	>10 Years of experience in Environment & Sustainability	247-248, 280-281,345-368	
8. Mrs. Wannipa Bhakdibutr	Director, Member of the Executive Committee, Member of the Risk Management Committee and Chief Executive Officer	- Training in ESG Business & Trends	247-248, 280-281,345-368	

BOARD-LEVEL CLIMATE GOVERNANCE

Board Committee/Individual	Climate-related Roles and Responsibilities	Meeting Frequency
Board of Directors	**Authorities, Duties and Responsibilities of the Board of Directors for Sustainability, Climate-related Risks and Opportunities:** • To determine the Company's vision, mission, targets, policies, strategies, directions, business plans, and annual • budgets on Sustainability Target and Climate –related issues. • To continuously monitor the business performance of the Company and its subsidiaries to be in line with their • respective operational plans and budgets on climate risks and opportunities management. • To consider establishing policies for risk management to cover all ranges of climate-related activities within the • Company and to set up systems or processes for risk management, through proper, sufficient, and efficient • contingency measures and control methods to lessen the potential impact on the Company's business operations. • To appoint sub-committees and determine their scope of duties on climate related issue, so that such sub- • committees can assist and support the Board of Directors in performing their responsibilities	• Quarterly
Executive Committee	**Authorities and Responsibilities of the Executive Committee for Sustainability, Climate-related Risks and Opportunities:** ◦ Manage business affairs in in its ordinary course of business, including to consider and set targets, policies, ◦ business plans, business strategies and directions as well as the annual budgets of the Company and those of companies within the Group as well as considering and scrutinizing any proposal made by the management before presenting it the Board of Directors for approval ◦ To supervise business operations those, concern with climate risks and opportunities, and follow up on business operational results and financial condition of the Company to be in line with those policies, strategies, plans, targets and budgets as approved by the Board of Directors ◦ Following up on business operational results with climate related issue concerned and financial condition of those companies within the Group, including considering the resource allocation and management in an efficient and effective manner, having regard to impact and development of resource through a value chain to sustainably achieve its objective and main targets and reporting he same on a regular basis to the Board of Directors	• Basis on quarterly, and per-request matters

BOARD-LEVEL CLIMATE GOVERNANCE

Board Committee/Individual	Climate-related Roles and Responsibilities	Meeting Frequency
Risk Management Committee	**Authorities and Responsibilities of the Risk Committee for Sustainability, Climate-related Risks and Opportunities:** • To supervise and support on climate risk management measures so that risks can be managed successfully by • way of evaluating all risk factors for appropriate decision making. The Risk Management Committee has the duty to follow and assess the Company's compliance with the risk management framework. In addition, it shall also review the sufficiency of the risk management policies and systems and improve operational procedures with a view to continually minimizing risks to suit the business conditions of the Company • To communicate with the Audit Committee on significant climate risks in order to evaluate the adequacy of the Company's internal control systems • To regularly report on the outcome of risk assessments and performance especially on climate risks, with acknowledgement by the Board of Directors. Any significant occurrence or issue on climate related matters that may have a material impact on the financial status and results of the Company's performance must promptly be reported to the Board of Directors for consideration	• Basis on Bi-quarter, and per-request matters
Nomination, Remuneration, Corporate Governance and Sustainable Development Committee (NRCSD)	**Authorities and Responsibilities of the NRCSD for Sustainability, Climate-related Risks and Opportunities:** • To determine appropriately policies, targets and key performance indicators of sustainable development works including being reviewed regularly • To monitor, review and evaluate the sustainable development performance including climate risk management and climate opportunities issue. • To drive the integration of sustainable development strategy into our business plans • To provide advice, encouragement, support, and the resources needed for material decision-making to the • management team overseeing sustainable development operations • To authorize to appoint a sub-committee or the sustainable development working team as needed and determine • their roles and responsibilities	• Basis on Bi-annual, and per-request matters
Audit Committee	**Authorities and Responsibilities of the Audit Committee for Sustainability, Climate-related Risks and Opportunities:** • To examine the internal controls and internal audit systems to the compliance with the Company's measure and this also included climate-related issue, strategy, and target. In this regard, the Audit Committee assigns Internal Audit team to review the process and operation of the business to ensure that they follow the measures, policies, codes of conduct, authority, regulations and requirements of the supervisory agencies, and relevant laws.	• At least twice a year

MANAGEMENT-LEVEL CLIMATE GOVERNANCE

Management Committee/Individual	Climate-related Roles and Responsibilities	Meeting Frequency
Chief Executive Officer (CEO)	Authorities and Responsibilities of Chief Executive Officer for Sustainability, Climate-related Risks and Opportunities: • Advise the Board of Directors on matters concerning corporate wide-ESG and climate related issues. • Review the corporate wide-ESG and climate-related issues, monitoring and propose recommendation for revision to the Corporate Governance committee to continuously ensure consistency and compatibility with the businesses of the Company	• Quarterly and per-request matters
Sustainability Working Team	Authorities and Responsibilities of Sustainability Working Team for Sustainability, Climate-related Risks and Opportunities: §Lead by the Chief Executive Officer (CEO), the Sustainability Working Team is working on the development of Sustainability Framework, Policy, Strategy, and Operational Plans especially on climate related risk management and potential opportunities. • Review the corporate wide-ESG and climate-related issues, monitoring and propose recommendation for revision to the Chief Executive Officer (CEO) to continuously ensure consistency and compatibility with the businesses of the Company. • Leverage the sustainability projects included the climate related projects to Nomination, Remuneration, Corporate Governance and Sustainable Development Committee (NRCSD) for review and endorse the Sustainability Framework, Policy, Strategy, and Operational Plans.	• Quarterly

CLIMATE-RELATED MANAGEMENT INTCENTIVES

Who is entitled to benefit from this incentive?	Type of incentive	Incentivized KPIs
Chief Executive Officer (CEO)	**Monetary Rewards:** •Climate-related targets are part of the company's corporate KPIs, which are tied to the variable compensation of the Chief Executive Officer (CEO). The CEO is responsible for the corporate KPIs, including Greenhouse Gas reduction, Energy reduction, and Renewable Energy increase. These metrics measure progress towards both the Sustainability Goals 2025 and the Carbon Neutrality Goal 2050.	•Progress towards a climate-related target •Achievement of a climate-related target •Company performance against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)
Chief Manufacturing Officer (CMO)	**Monetary Rewards:** •The Chief Manufacturing Officer (CMO) is responsible for manufacturing performance and KPIs related to Greenhouse Gas reduction, Energy reduction, Renewable Energy increase, and energy efficiency improvement. These efforts contribute to achieving the Sustainability Goals 2025 and the Carbon Neutrality Goal 2050.	•Reduction in absolute GHG emissions •Reduction in GHG emissions intensity •Reduction in total energy consumption •Energy efficiency improvement •Increased share of renewable energy in total energy consumption •Performance contribution against a climate-related sustainability index (e.g., DJSI, CDP, Climate Change score etc.)
Osotspa Employee	**Monetary Rewards:** •The compensation of all employees, both staff and executives, is aligned to corporate KPIs that include the Sustainability Goals 2025 and the Carbon Neutrality Goal 2050.	•Energy efficiency improvement •GHG offsetting activity •Performance contribution against a climate-related sustainability index (e.g., DJSI, CDP Climate Change score etc.)

Strategy

Osotspa recognizes that a strong climate strategy is vital for long-term success in a rapidly evolving world. We are committed to managing climate-related risks and seizing opportunities to build a sustainable, resilient business.

Our risk team, sustainability department, corporate SHE, site leaders, manufacturing improvement team, and other key functions work together to identify and assess climate-related risks and opportunities across our operations and value chain. Using comprehensive scenario analysis, we pinpoint vulnerabilities, quantify impacts, and develop both mitigation and adaptation plans.

To mitigate risks, we have set ambitious targets to reduce greenhouse gas emissions, enhance energy efficiency, adopt renewable energy, and promote sustainable practices throughout our value chain. Adaptation efforts focus on strengthening resilience to natural disasters.

We continuously monitor progress, review strategies, and invest in innovative, low-emission solutions to drive meaningful change. Transparency remains a priority—we are committed to disclosing our climate strategy and performance to foster accountability and build stakeholder trust.

OSOTSPA'S CLIMATE-RELATED STRATEGY

Osotspa recognizes the significant impact of climate change on our operations, value chain, and market environment. To build long-term resilience, we have embedded a climate-related risk and opportunity scenario analysis into our strategic planning under the "Strategy" pillar, aligning with the TCFD framework.
This analysis evaluates multiple climate scenarios based on internationally recognized frameworks, capturing both physical risks—such as extreme weather, rising temperatures, and water scarcity—and transition risks—including evolving regulations, technologies, and consumer behaviors. These insights guide our mitigation and adaptation strategies.

Key physical risks include supply chain disruptions and product quality issues, while transition risks may lead to higher compliance costs and investment needs. In response, we are accelerating initiatives such as GHG emissions reduction, energy efficiency, renewable energy adoption, and sustainable sourcing.
Climate change also offers opportunities to innovate. Our efforts in low-carbon product development, green technologies, and responsible sourcing aim to unlock new market segments, strengthen brand value, and enhance operational stability.

We have established strong governance involving the Board of Directors, Executive Committee, Risk Management Committee, and Risk Management & Internal Control team to oversee climate integration across strategic decisions. Ambitious targets, regular progress reviews, and alignment with global standards are central to our approach.

In support of the Paris Agreement, Osotspa joined the UN Global Compact in 2023, engaged with Thailand's Greenhouse Gas Management Organization (TGO), and became a member of the Thailand Carbon Neutral Network (TCNN) to drive our carbon neutrality goal by 2050.

Our scenario-based strategy enables us to manage climate risks proactively while seizing growth opportunities, reinforcing Osotspa's commitment to sustainability, resilience, and long-term value creation.

Overview of Osotspa's Climate-related Risks and Opportunities

Identification of Drivers

Osotspa has identified two main climate-related drivers: **physical risks** (e.g., extreme weather, water scarcity) and **transition risks and opportunities** linked to the shift toward a **low-carbon economy.**

Qualitative Scenario Analysis

Osotspa conducted a **qualitative scenario analysis** using **asset- and sector-specific climate data** over different time horizons. By **translating key drivers,** assessing impact severity, and visualizing risks with heatmaps, they explored high and low carbon scenarios to support **climate-resilient strategic decisions.**

Quantitative Scenario Analysis

Osotspa quantified the financial implications of key climate-related drivers by analyzing their potential impacts on financial position, performance, and cash flows across different timeframes. Using **financial modeling** and **scenario-based projections,** they developed adaptive strategies to maintain resilience and long-term profitability.

Development of Mitigation and Adaptation Plan

Osotspa has developed a strategic climate response plan, grounded in scenario analysis. It focuses on **mitigating key risks, enhancing resilience through targeted investments, and diversifying supply chains** to ensure long-term competitiveness while advancing sustainability.

Implementation and Monitoring

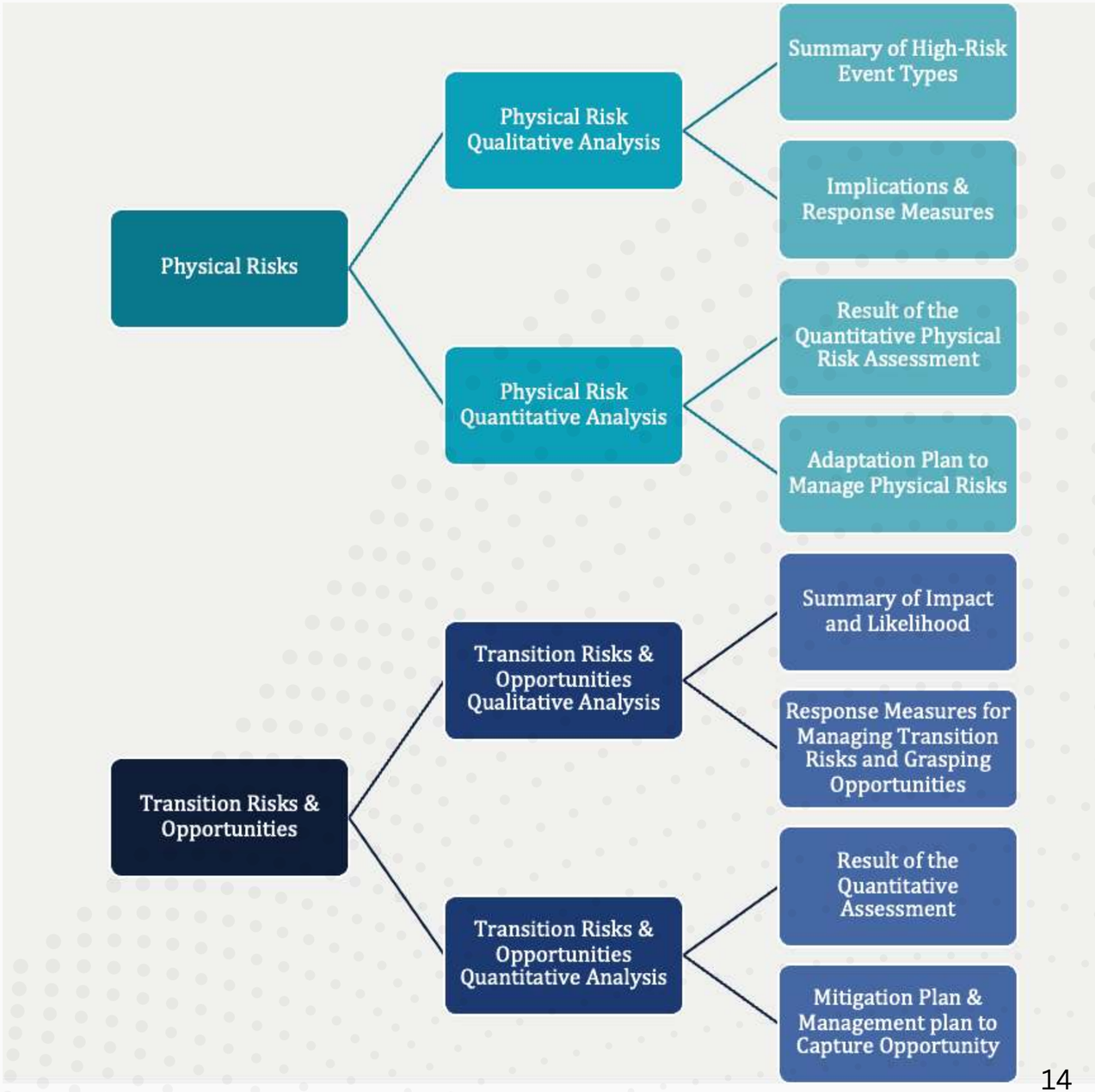
Osotspa is **implementing its climate strategy** through active mitigation and adaptation efforts, supported by robust monitoring, annual reviews, and **capacity building** to ensure alignment with both **site-level practices and the corporate climate framework.**

STRUCTURE OF STRATEGY PILLAR

The Structure of Strategy Pillar comprises two main components: Physical Risks and Transition Risks & Opportunities.

For Physical Risks, there are two types of analysis: Qualitative and Quantitative. The Physical Risk Qualitative Analysis includes a summary of high-risk event types and their implications, along with response measures. The Physical Risk Quantitative Analysis involves the result of the quantitative physical risk assessment and an adaptation plan to manage these physical risks.

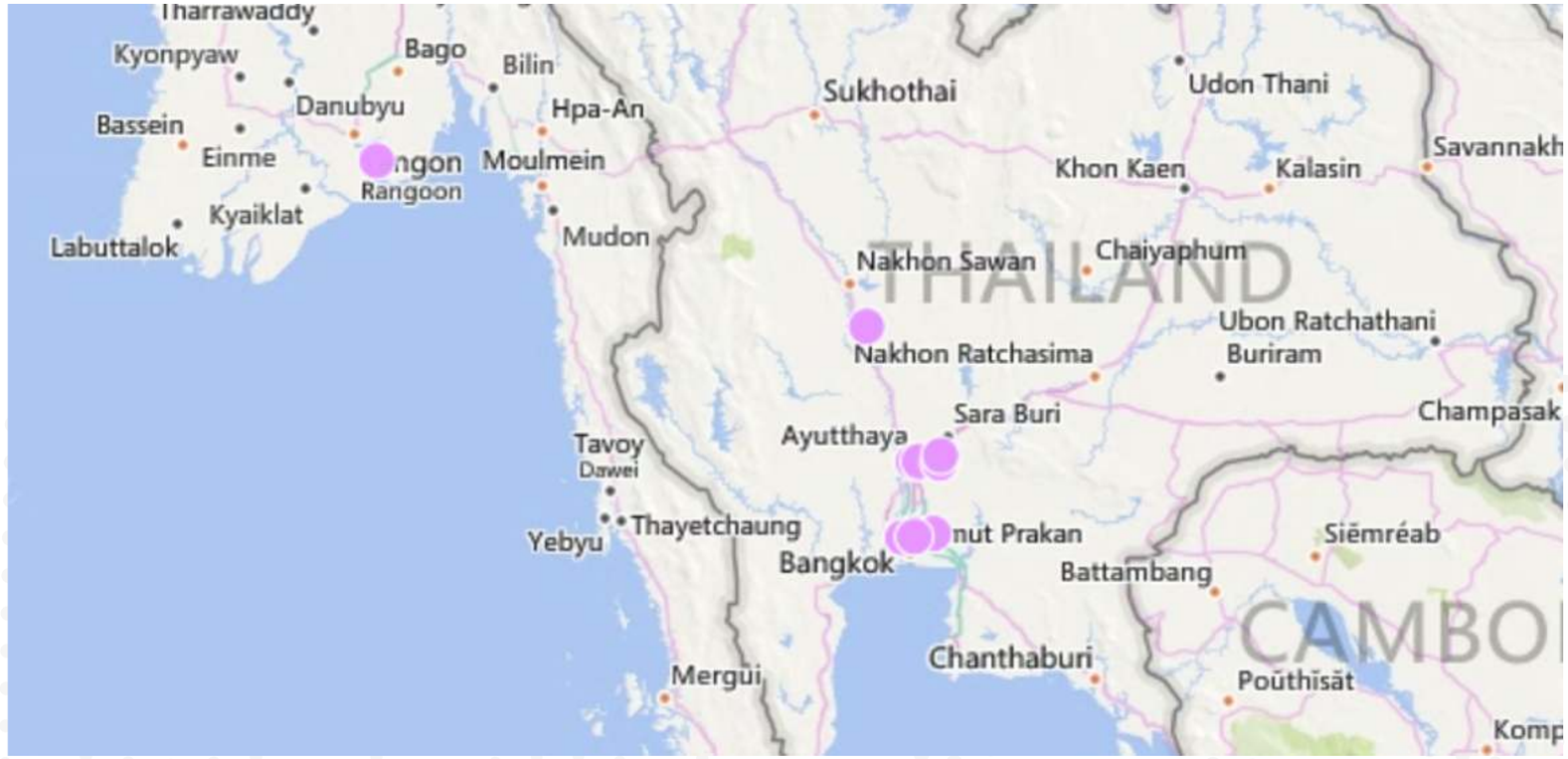
For Transition Risks & Opportunities, there are also two types of analysis: Qualitative and Quantitative. The Transition Risks & Opportunities Qualitative Analysis provides a summary of impact and likelihood, as well as response measures for managing transition risks and seizing opportunities. The Transition Risks and Opportunities Quantitative Analysis presents the result of the quantitative assessment and includes a mitigation plan and a management plan to capture opportunities.



Physical Risk Qualitative Analysis

Comprehensive Scope of Qualitative Physical Risk Assessment

A qualitative analysis of physical risks has been conducted on Osotspa's own assets, as well as selected upstream and downstream assets. The assessment incorporated two climate scenarios: SSP1-2.6, which represents a low-emissions scenario, and SSP5-8.5, which represents a high-emissions scenario. The results of this analysis are presented in three different timeframes (i.e.Short-term (baseline~2026), Medium-term (2030), Long-term (2050)), aligning with the requirements of IFRS S2.



Osotspa's Operational/upstream/downstream sites

10 Sites
- 6 Osotspa sites
- 2 upstream sites
- 2 downstream sites

2 Climate scenarios
- *SSP1-2.6 – Low emissions*
- *SSP5-8.5 – High emissions*

3 Timeframes
- Short-term (baseline~2026)
- Medium-term (2030)
- Long-term (2050)

8 Climate hazards

Extreme Heat, Coastal Flood, Extreme Rainfall Flood, River Flood, Extreme Winds & Storms, Water Stress & Drought, Rainfall-induced Landslides, and Wildfires.

Climate Scenarios Used in Qualitative Physical Risk

Shared Socioeconomic Pathways (SSPs) from IPCC Assessment Report 6 (AR6)

The Intergovernmental Panel on Climate Change (IPCC) released a key review of climate change science, referred to as 'Assessment Report 6 (AR6)', in 2021.
The report considers climate change trends provided by ~100 leading climate models. Projected trends are grouped into five Shared Socioeconomic Pathways (SSPs). These reflect potential changes in global greenhouse gas emissions, energy use, air pollution control, and land use by combining qualitative storylines of societal features and quantified measures of development alongside climate data to create plausible scenarios for how quickly humans can curb emissions. In this assessment, SSP1-2.6 and SSP5-8.5 are used.

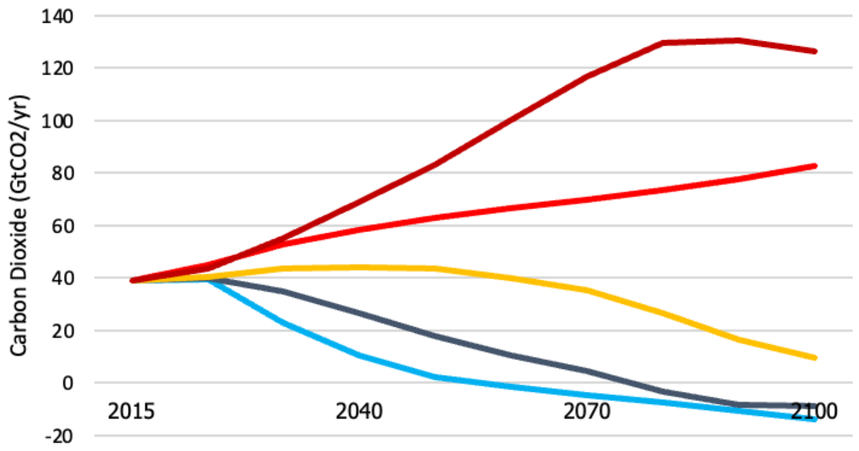
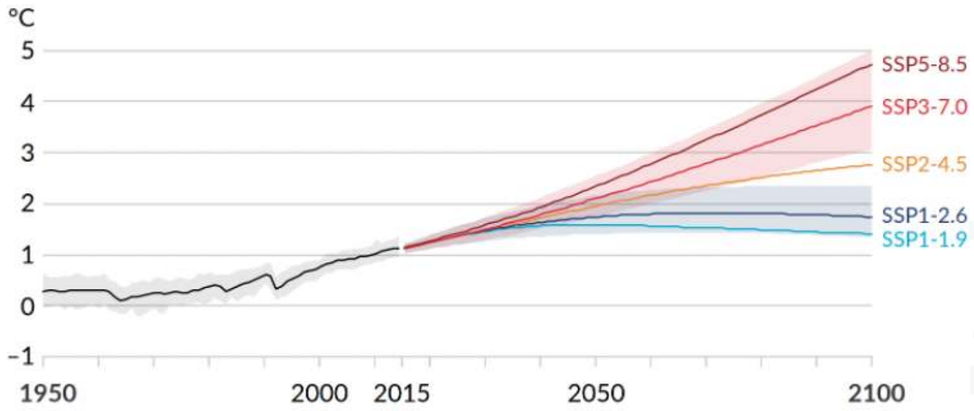


Figure: Projections of CO_2 emissions (top) and global surf temperature change (bottom) under the five SSPs.

- SSP1-2.6 is a low emissions scenario that stays below 2°C warming by 2100, aligned to current commitments under the Paris Agreement.
- SSP5-8.5 is a high emissions scenario, which follows a 'business as usual' trajectory, assuming no additional climate policy and seeing CO2 emissions triple by 2100. The selection of this scenario follows TCFD guidance to assess stressed exposure to physical climate change risks.

Scenario	Best estimate temperature by 2100
SSP1-1.9	1.4°C
SSP1-2.6	**1.8°C**
SSP2-4.5	2.7°C
SSP3-7.0	3.6°C
SSP5-8.5	**4.4°C**

Selected



Source: IPCC AR6 WGI Summary For Policymakers

Physical Risk – Climate Indicators Used for the Assessment

The assessment uses scenario indicators to assess present-day conditions and future projected trends for eight climate hazards. The physical climate indicators used for the assessment of various climate hazards are as follows:
For coastal flooding, the scenario indicator is coastal flooding inundation depth. For extreme heat, it is the Warm Spell Duration Index (WSDI). For extreme cold, the indicator is the Cold Spell Duration Index (CSDI). In the case of extreme rainfall flooding, the scenario indicator is pluvial flooding inundation depth. For extreme winds and storms, the indicator is the maximum tropical cyclone wind speed. For rainfall-induced landslides, the scenario indicator is the Rainfall-Induced Landslides Index. For river flooding, the indicator is riverine flooding inundation depth. In the case of wildfires, the scenario indicators are the Forest Fire Danger Index (for future assessments) and the maximum burned area (for historical data).

Climate Hazard	Scenario Indicator(s)
Coastal Flooding	Coastal flooding inundation depth
Extreme Heat	Warm Spell Duration Index (WSDI)
Extreme Cold	Cold Spell Duration Index (CSDI)
Extreme Rainfall Flooding	Pluvial Flooding Inundation Depth
Extreme Winds & Storms	Maximum tropical cyclone wind speed
Rainfall-induced Landslides	Rainfall-Induced Landslides Index
River Flooding	Riverine Flooding Inundation Depth
Wildfires	Forest Fire Danger Index (future)
	Maximum burned area (historical)

Source:
- WRI Aqueduct: https://www.wri.org
- ISIMIP: https://www.isimip.org/
- Fathom-Global 2.0: https://www.fathom.global
- IBTrACs: https://www.ncei.noaa.gov/products/international-best-track-archive
- AMS: https://doi.org/10.1175/BAMS-D-18-0194.1
- NASA: https://earthobservatory.nasa.gov/images/89937/a-global-view-of-landslide-susceptibility
- ESA: https://climate.esa.int/en/projects/fire

5 Steps to Assessing Physical Risks

The physical risk assessment can be decomposed into 5 steps, supported by various datasets developed based on IPCC AR6 scenarios

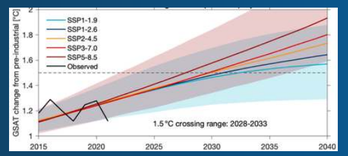
Identify 9 Physical Drivers

Determine the climate change risk factors putting pressure on company

Exposure Rating Key					
ery High	High	Moderate	Low	Minimal	N/A
10	8	6	4	2	0

Develop Exposure Weightings

Based on expert judgement on the inherent exposure of each asset type to a given hazard



Incorporate External Factors (scenario analysis)

Analyze impacts under different transition scenarios in different time horizons

	Coastal Flooding	Extreme Cold	Extreme Heat
Facility A			
Facility B			

Physical Risk heatmap

Based on internal and external factors

Physical Damage to Buildings/Infrastructure/Fleet

Business, Supply chain interruption

Physical Risk heatmap

Impact Interpretation & Risk Adaptation Plan

Asset Baseline Risk Score by Hazard

According to historical data, all assets in Thailand have been exposed to water stress & droughts. For example, a key facility in Myanmar is most exposed to extreme winds & storms and wildfires.

	Legend	
	4 ~10	Very high
	3 ~ 3.99	High
	2 ~ 2.99	Moderate
	1 ~ 1.99	Low
	0 ~ 0.99	Minimal

	Baseline							
	Extreme Heat	Extreme Rainfall Flooding	River Flooding	Extreme Winds & Storms	Water Stress & Drought	Coastal & Offshore	Rainfall-Induced Landslides	Wildfires*
Key Asset/Facility #1								
Key Asset/Facility #2								
Key Asset/Facility #3								
Key Asset/Facility #4								
Key Asset/Facility #5								
Key Asset/Facility #6								
Key Supplier #1								
Key Supplier #2								
Key Customer #1								
Key Customer #2								

Note: Assets in blue are upstream suppliers' sites, while assets in green are downstream customers' sites.

*Fire-weather indicator, representing an annual number of days where weather conditions are suitable to create a fire if other variables (such as burnable material) are provided, and thus the risk of fire weather is high

Asset Risk Score by Hazard in 2030 (SSP1-2.6)

	Legend	
	4 ~10	Very high
	3 ~ 3.99	High
	2 ~ 2.99	Moderate
	1 ~ 1.99	Low
	0 ~ 0.99	Minimal

Risk of extreme heat increases, at a moderate to high level. Except Key Asset/Facility #1 & #5, risk of wildfire for most assets also increases at a high to very high level.

	2030 (SSP1-2.6)							
	Extreme Heat	Extreme Rainfall Flooding	River Flooding	Extreme Winds & Storms	Water Stress & Drought	Coastal & Offshore	Rainfall-Induced Landslides	Wildfires*
Key Asset/Facility #1								
Key Asset/Facility #2								
Key Asset/Facility #3								
Key Asset/Facility #4								
Key Asset/Facility #5								
Key Asset/Facility #6								
Key Supplier #1								
Key Supplier #2								
Key Customer #1								
Key Customer #2								

Note: Assets in blue are upstream suppliers' sites, while assets in green are downstream customers' sites.

*Fire-weather indicator, representing an annual number of days where weather conditions are suitable to create a fire if other variables (such as burnable material) are provided, and thus the risk of fire weather is high

Asset Risk Score by Hazard in 2050 (SSP1-2.6)

The overall trend towards 2050 continues – risk of extreme heat for most of assets (except Key Asset/Facility #6) are reached at a high level.

	Legend	
	4 ~10	Very high
	3 ~ 3.99	High
	2 ~ 2.99	Moderate
	1 ~ 1.99	Low
	0 ~ 0.99	Minimal

	2050 (SSP1-2.6)							
	Extreme Heat	Extreme Rainfall Flooding	River Flooding	Extreme Winds & Storms	Water Stress & Drought	Coastal & Offshore	Rainfall-Induced Landslides	Wildfires*
Key Asset/Facility #1								
Key Asset/Facility #2								
Key Asset/Facility #3								
Key Asset/Facility #4								
Key Asset/Facility #5								
Key Asset/Facility #6								
Key Supplier #1								
Key Supplier #2								
Key Customer #1								
Key Customer #2								

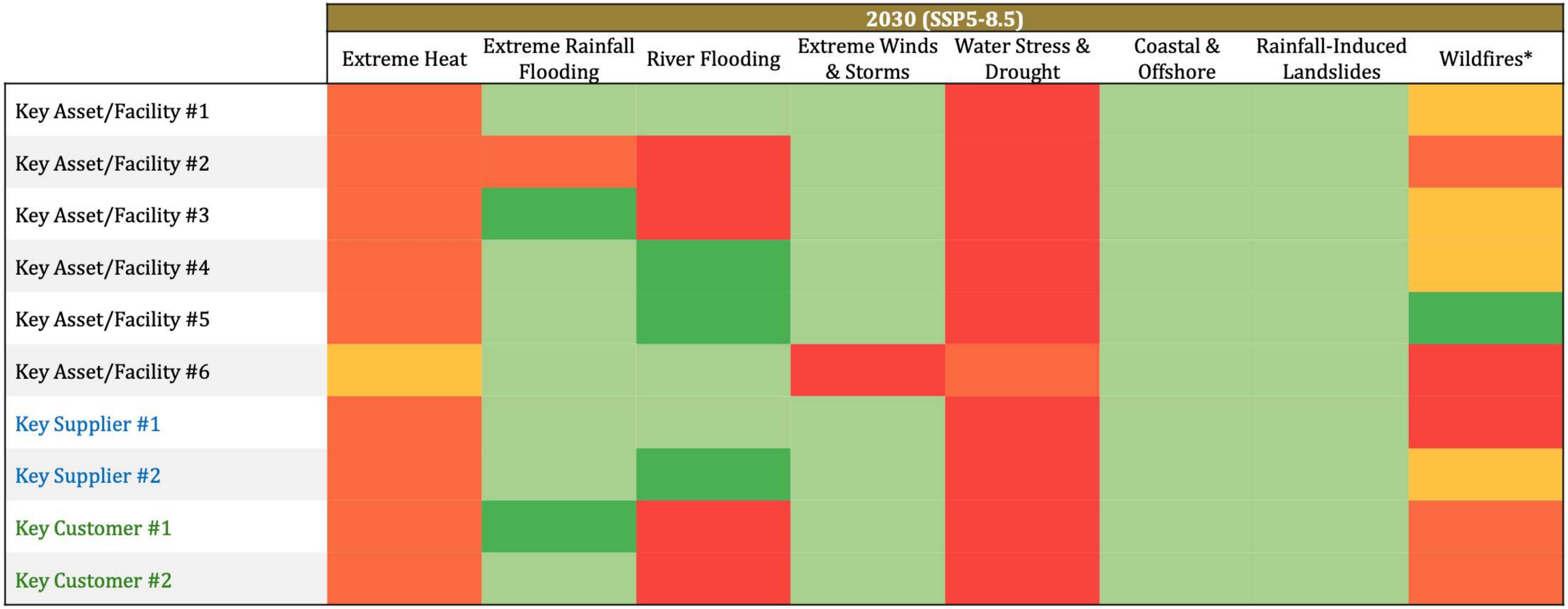
Note: Assets in blue are upstream suppliers' sites, while assets in green are downstream customers' sites.

*Fire-weather indicator, representing an annual number of days where weather conditions are suitable to create a fire if other variables (such as burnable material) are provided, and thus the risk of fire weather is high

Asset Risk Score by Hazard in 2030 (SSP5-8.5)

In a high-emission scenario, the risk of extreme heat will increase more significantly.

	Legend	
	4 ~10	Very high
	3 ~ 3.99	High
	2 ~ 2.99	Moderate
	1 ~ 1.99	Low
	0 ~ 0.99	Minimal



Note: Assets in blue are upstream suppliers' sites, while assets in green are downstream customers' sites.

*Fire-weather indicator, representing an annual number of days where weather conditions are suitable to create a fire if other variables (such as burnable material) are provided, and thus the risk of fire weather is high

Asset Risk Score by Hazard in 2050 (SSP5-8.5)

Compared to SSP1-2.6 at the same year, the risks of extreme heat and wildfire for every asset increases more rapidly.

	Legend	
	4 ~10	Very high
	3 ~ 3.99	High
	2 ~ 2.99	Moderate
	1 ~ 1.99	Low
	0 ~ 0.99	Minimal

	2050 (SSP5-8.5)							
	Extreme Heat	Extreme Rainfall Flooding	River Flooding	Extreme Winds & Storms	Water Stress & Drought	Coastal & Offshore	Rainfall-Induced Landslides	Wildfires*
Key Asset/Facility #1								
Key Asset/Facility #2								
Key Asset/Facility #3								
Key Asset/Facility #4								
Key Asset/Facility #5								
Key Asset/Facility #6								
Key Supplier #1								
Key Supplier #2								
Key Customer #1								
Key Customer #2								

Note: Assets in blue are upstream suppliers' sites, while assets in green are downstream customers' sites.

*Fire-weather indicator, representing an annual number of days where weather conditions are suitable to create a fire if other variables (such as burnable material) are provided, and thus the risk of fire weather is high

Summary of High-Risk Event Types

The table below summarizes all event types categorized as ‘High’ or ‘Very High’ risk (i.e.event type risk score >= 3) for each asset.

- Extreme heat
- River flooding
- Extreme rainfall flooding
- Coastal flooding
- Extreme winds & storms
- Rainfall-induced landslides
- Water stress & drought
- Wildfires

	Site Name	Baseline	2030		2050	
			SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
1	Key Asset/Facility #1	Water stress & drought	Water stress & drought	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought, Wildfires
2	Key Asset/Facility #2	River flooding, Water stress & drought	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Extreme rainfall flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires
3	Key Asset/Facility #3	River flooding, Water stress & drought	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires
4	Key Asset/Facility #4	Water stress & drought	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought, Wildfires
5	Key Asset/Facility #5	Water stress & drought	Water stress & drought	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought
6	Key Asset/Facility #6	Extreme winds & storms, Water stress & drought, Wildfires	Extreme winds & storms, Water stress & drought, Wildfires	Extreme winds & storms, Water stress & drought, Wildfires	Extreme winds & storms, Water stress & drought, Wildfires	Extreme heat, Extreme winds & storms, Water stress & drought, Wildfires
7	Key Supplier #1	Water stress & drought, Wildfires	Water stress & drought, Wildfires	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought, Wildfires
8	Key Supplier #2	Water stress & drought	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought	Extreme heat, Water stress & drought, Wildfires	Extreme heat, Water stress & drought, Wildfires
9	Key Customer #1	River flooding, Water stress & drought	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires
10	Key Customer #2	River flooding, Water stress & drought	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires	Extreme heat, River flooding, Water stress & drought, Wildfires

Note: Assets in blue are upstream suppliers’ sites, while assets in green are downstream customers’ sites.

Implications & Response Measures for Osotspa

Hazard	Key Implications: Physical Damage	Financial Impact	Key Implications: Business/ Supply Chain Interruption	Financial Impact	Key Implications: Health, Safety and Environment	Financial Impact	Recommended Response Measures
Extreme Heat	• **Fires, explosions** – extreme heat conditions could lead to a higher chance of plant/HAVC system failure, leading to potential fires and explosions.	• ↗ CapEx • ↗ Cost for repair • ↘ Revenue due to repair, resulting in decreased productivity	**1. Business Interruption** • **Increased energy demand** • **Reduced efficiency of cooling systems, turbines and compressors** - decrease output and quality of refined products • **Increased water demand and reduced staff productivity** • **Reduced product output** **2. Supply Chain Interruption** • **Increased cooling demand during transport**	• ↗ OpEx • ↗ Cost for cooling • ↗ Cost for water usage • ↘ Revenue due to decreased productivity or product quality • ↗ Monetary compensation for not meeting production demands	• **Health and safety risk to site personnel** – Heat stroke and dehydration may occur more frequently. Decreased working hours or time off due to unsuitable working conditions. • **Power outage** – electricity transmission systems are put under higher pressure in extreme heat, hence more likely to fail, which is dangerous for site personnel.	• ↗ Medical and first aid cost • ↗ Monetary compensation for affected staff • ↘ Revenue due to decreased productivity (lack of manpower) or operation halts to ensure safety	• **Employee training** to identify heat stress symptoms and provide first aid. • Evaluate and improve existing **operational temperature ranges** of cooling systems for projected extreme temperature ranges. • Establish and enhance the **Heat Safety Policies and guidelines** on the provision of adequate water supplies, rest breaks, and access to cooler areas for breaks. • Install **energy-efficient cooling** systems.

Implications & Response Measures for Osotspa

Hazard	Key Implications: Physical Damage	Financial Impact	Key Implications: Business/ Supply Chain Interruption	Financial Impact	Key Implications: Health, Safety and Environment	Financial Impact	Recommended Response Measures
Flooding of all types	• **Physical damage to structural integrity** of buildings, road access, electrical equipment and utilities.	• ↗ CapEx • ↗ Cost for repair • ↘ Revenue due to repair, resulting in decreased productivity	1. **Business Interruptions** • **Forced shutdowns and downtime** if there is physical damage to the asset or road access is cut off • **Water treatment facilities** may reach capacity and not able to process wastewater further on site. 2. **Supply chain interruption** – if access to affected assets is cut off by floods, or if materials are damaged by floods and could not be delivered to customers	• ↗ OpEx • ↗ Cost for repair • ↗ Insurance claims • ↗ Insurance premium for sites at flood prone locations • ↘ Revenue due to decreased productivity • ↗ Monetary compensation for not meeting customer demands	• **Health and safety risk posed by encountering floodwaters contaminated with hazardous chemicals**. This could lead to chemical leakage and environmental contamination that warrants evacuations.	• ↗ Medical and first aid cost • ↗ Cost for environmental decontamination • ↗ Monetary compensation for affected staff • ↗ Monetary compensation/fines due to environmental contamination • ↘ Revenue due to decreased productivity (lack of manpower) or operation halts to ensure safety • ↘ Revenue due to reputational damage	• **In-depth flood risk assessment** to identify flood prone areas for all key locations. • Design and **implement suitable mitigation measures** such as increasing capacity of water drainage or pumping systems, construction of flood barrier where needed, etc. • Implement **early warning systems** at sites exposed to flooding risks and conduct **capacity building/training** on safety measures during floods for employees. • **Collaborate with other stakeholders** to plan for flood risk management.

Implications & Response Measures for Osotspa

Hazard	Key Implications: Physical Damage	Financial Impact	Key Implications: Business/ Supply Chain Interruption	Financial Impact	Key Implications: Health, Safety and Environment	Financial Impact	Recommended Response Measures
Extreme Winds & Storms	• **Physical damage** to high-rise structure due to extreme wind conditions. High rainfall caused by storms may further lead to flooding that affects infrastructure, electromechanical equipment and utilities.	• ↗ CapEx • ↗ Cost for repair • ↘ Revenue due to repair, resulting in decreased productivity	1. **Business disruption** • **Temporary forced closure** due to heavy storm, as infrastructure may be damaged, or staff are unable to travel to office site. 2. **Supply Chain Disruption** – Debris and flooding due to Extreme Winds & Storms may **block key access routes** for site personnel and logistics.	• ↗ OpEx • ↗ Insurance claims • ↗ Insurance premium for sites at storm prone locations. • ↘ Revenue due to decreased productivity • ↗ Monetary compensation for not meeting customer demands • ↘ Real estate market value	• **Health and safety risk** and evacuations may be necessary during a typhoon/storm event.	• ↗ Medical and first aid cost • ↗ Monetary compensation for affected staff • ↘ Revenue due to decreased productivity (lack of manpower) or operation halts to ensure safety • ↘ Revenue due to reputational damage	• Develop response mechanisms to plan operations and take **preventive steps** (e.g., planned shut down before a typhoon/storm comes) to reduce impacts. • Evaluate and improve, existing **operational windspeed ranges** of high-rise structures for projected extreme wind ranges. • **Capacity building/training** on safety measures for site personnel. • **Emergency response plan** for business continuity or evacuation.

Implications & Response Measures for Osotspa

Hazard	Key Implications: Physical Damage	Financial Impact	Key Implications: Business/ Supply Chain Interruption	Financial Impact	Key Implications: Health, Safety and Environment	Financial Impact	Recommended Response Measures
Water Stress & Drought	No direct damage expected	**N/A**	1. **Business Interruption** • **Production delays and downtime –** low water flows can reduce the quality of water as well as the volume available for use. • **Increased cost of water** and **competition for water resources** • **Reduced productivity** due to less water available for cooling systems	• ↗ OpEx • ↗ Cost for cooling due to water scarcity • ↗ Cost for water usage due to competition for water resource • ↘ Revenue due to decreased productivity • ↗ Monetary compensation for not meeting production demands	• **Deteriorating sanitation and hygienic conditions** to staff due to water shortage	• ↗ Medical and first aid cost • ↗ Monetary compensation for affected staff • ↘ Revenue due to decreased productivity (lack of manpower)	• Adopt **water efficient/ saving technologies** • **Identify alternate water source/supply** externally or internally through **water storage infrastructure** (e.g., rainwater harvesting) • Explore opportunities for **wastewater recycling and reuse.** • Study about **Deep well license** and opportunity to get more licenses for prevent the water shortage

Implications & Response Measures for Osotspa

Hazard	Key Implications: Physical Damage	Financial Impact	Key Implications: Business/ Supply Chain Interruption	Financial Impact	Key Implications: Health, Safety and Environment	Financial Impact	Recommended Response Measures
Wildfires	• **Physical damage and destruction** through direct heat and flame to buildings, equipment and utilities. • Flammable chemicals may **ignite** or **explode** if exposed to direct flame or heat from wildfires, which can cause further damage to the site and surrounding area. • **Damage to electricity transmission systems**, leading to power outages in manufacturing facilities	• ↗ CapEx • ↗ Cost for repair • ↘ revenue due to repair, resulting in decreased productivity	1. **Business Interruption** • **Operational disruption** if wildfires cause physical damage and thus require repairs and maintenance, leading to redundancies. • **Outdoor operations** may be affected by dust and smoke. 2. **Supply Chain Interruption - Key access routes for site personnel and logistics** may be blocked by wildfires or debris.	• ↗ OpEx • ↗ Cost for repair • ↗ Insurance claims • ↘ revenue due to decreased productivity • ↗ monetary compensation for not meeting customer demands	• **Health and safety risk** through heat, explosions and flame as well as smoke and dust particulates. • **Evacuations and operation halts** may be necessary to ensure safety	• ↗ Medical and first aid cost • ↗ monetary compensation for affected staff • ↘ revenue due to operation halts to ensure safety • ↘ revenue due to reputational damage	• **Awareness and preparation are key** in minimizing risk during wildfires. • **Emergency response plan for** workers and employee evacuation. • **Capacity building/training** on safety measures for site personnel. • Check **local emergency broadcast** radio for updated information regarding the path of wildfires. • Build **Buffer Zone** between community and the operational site

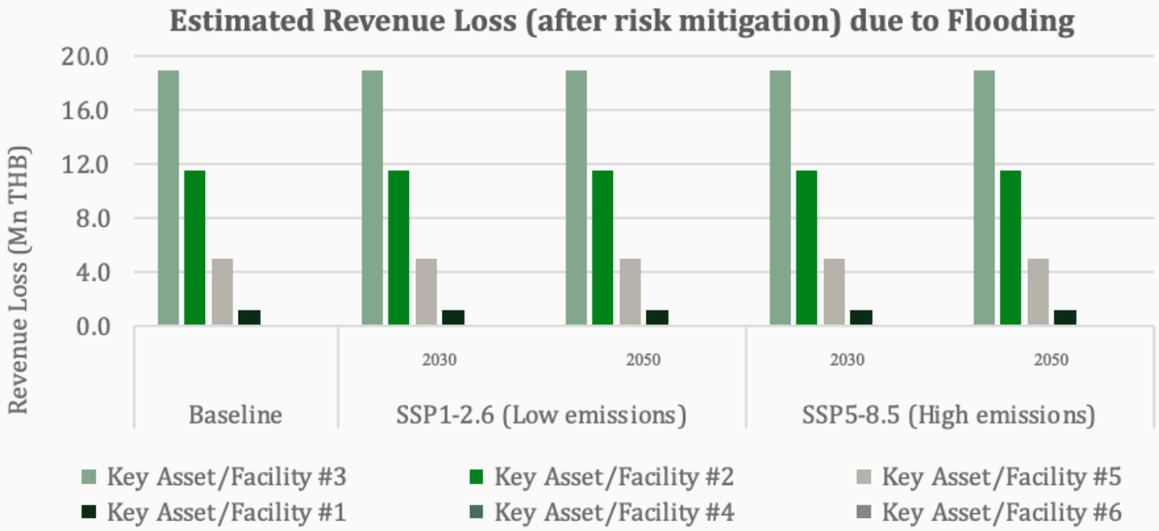
Estimated Financial Implications of Physical Risk - Flooding

Following the qualitative analysis, Osotspa further conducted a quantitative impact assessment of flooding to revenue generation.

Flooding is one of the most common hazards in Thailand, our country of operation. Some of our sites are located in the areas prone to flooding. Compared to other hazards identified from the qualitative assessment which have not caused any issues to our operation in the past, such as extreme heat and water stress, we are more concerned about flooding because of the historical experience in Bangkok and its vicinity.
To assess the financial impact of flooding in the future, we leveraged the regional flood damage curve developed by Huizinga, J., De Moel, H. and Szewczyk, W. (2017). It suggests at any given inundation depth, how much damage it could cause to an industrial building in Asia. In addition, we did an extensive literature review to further link the percentage of flood damage to the estimated length of business interruption.

With these background studies, we managed to assess the inherent impact of flooding to our revenue generation based on the formula below:
Estimated financial impact (i.e., revenue loss due to flooding)
= number of days of business interruption x revenue generated per day (x resilience factor*)

**A resilience factor (%) was determined by considering our risk management measures against the potential flood depth at each site. It was applied to the equation to assess the estimated impact after risk mitigation.*



if a 1-in-500-year flood event affects all of our facilities in any given year** (baseline/present day, 2030, 2050), under SSP1-2.6 or SSP5-8.5:
•***Estimated revenue loss before risk mitigation: 36.5 million THB***
•***Major risk management actions:*** flood barriers, pumping systems and a business continuity plan for flooding – ***a total of 10 million THB have been or planned to be invested by Osotspa***

***The estimated inundation depth across time (from baseline/present day to 2050) does not vary much, so does the estimated financial impact across time. Among Osotspa's facilities, the maximum length of business interruption due to a 1-in-500-year flood is estimated to be almost 6 months.*

Adaptation Plan to Manage Physical Risks

Upon completing the physical risk quantification, Osotspa identified the potential impacts that need to be managed appropriately. To address these, Osotspa developed a flooding manual specifically tailored to each facility. Given the complexity of these details, the Osotspa team has summarized the common response measures applicable to all existing plants as well as new operations. This comprehensive approach ensures that all facilities, including new operations, are prepared and can respond effectively to flooding risks, enhancing overall resilience and operational continuity.

Response Measures

Current Response Measures:

- Each site has an emergency response plan specifically for flooding. These plans include the locations of detention ponds (where established) and instructions on constructing flood defense sandbags to minimize flood impact.

Near-Term Response Plan (within 5 Years):

- Flood Risk Assessments: Conduct thorough inland flood risk assessments to identify key assets that are vulnerable to flooding.
- Review and Enhance Mitigation Measures: After identifying vulnerable key assets, review existing mitigation measures and consider increasing efforts, such as enhancing stormwater drainage systems or installing pumping stations to prevent floodwater accumulation.
- Regular Training: Implement regular training sessions on emergency response plans across all production sites to ensure readiness and effective response during flood events.

New Operations:

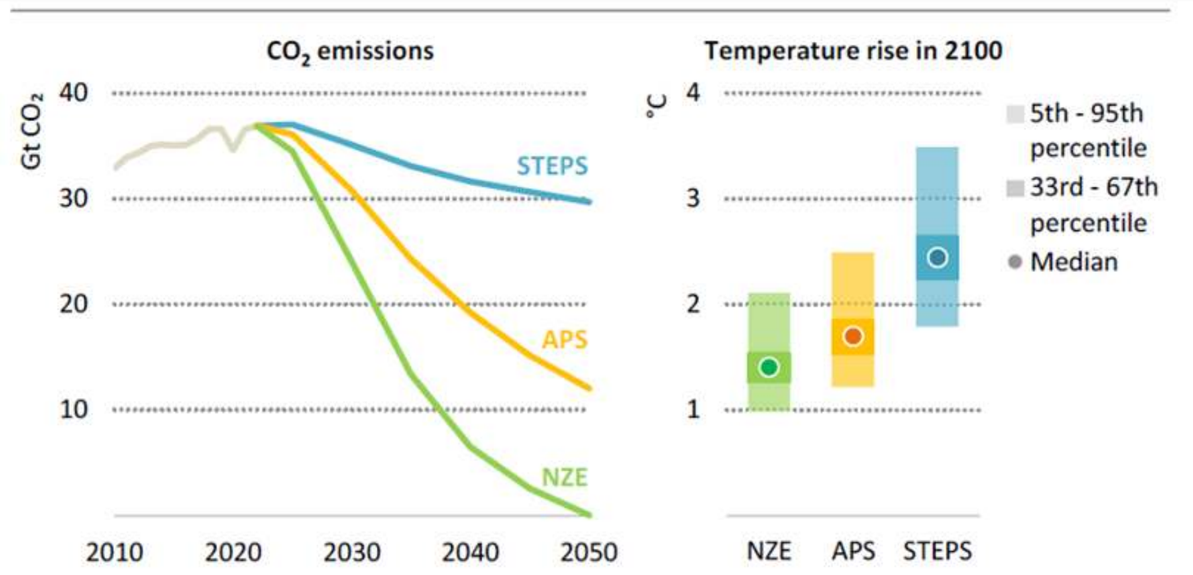
- Physical Risk Screening: Conduct comprehensive physical risk screenings of new operational areas to understand and forecast potential physical risks, particularly related to flooding.
- Financial Impact Assessment: Assess the potential financial impact of identified physical risks at the site level to understand the economic implications.
- Mitigation During Construction: Implement relevant mitigation measures during the construction process of new sites to proactively address identified risks and reduce vulnerability.

Transition Risks & Opportunities Qualitative Analysis

Comprehensive Scope of Qualitative Transition Risks & Opportunities Assessment

A qualitative analysis of transition risks & opportunities has been conducted on Osotspa'scompany-wide perspective which has the focus on the transitioning to a lower-carbon economy may entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. The assessment incorporated two climate scenarios: Net Zero Emissions by 2050 (NZE) Scenario, and Stated Policies Scenarios (STEPS). The results of this analysis are presented in three different timeframes (i.e. Short-term (2026), Medium-term (2030) and Long-term (2050)), aligning with the requirements of IFRS S2.

International Energy Agency (IEA) World Energy Outlook Scenarios



Source: IEA (2023), World Energy Outlook 2023, IEA, Paris
https://www.iea.org/reports/world-energy-outlook-2023

Time horizons defined in the assessment:
Short-term (2026), Medium-term (2030) and Long-term (2050)

Scenarios	Description
Net Zero Emissions by 2050 (NZE) Scenario	Sets out a pathway to the stabilization of global average temperatures at 1.5°C above pre-industrial levels.
Announced Pledges Scenario (APS)	Assumes that governments will meet, in full and on time, all the climate-related commitments they have announced, including NDCs and commitments in related areas.
Stated Policies Scenarios (STEPS)	This scenario looks at what governments are doing to reach the targets and objectives set forth, but it does not take it for granted that all announced goals will be achieved.

Selected

Transition Risks & Opportunities Drivers

The following drivers have been selected from the **IEA World Energy** outlook and insights from climate experts. These drivers are used to assess impact and likelihood, which are then translated into a heatmap. This process helps identify and plan mitigation actions.

Policy & Legal

- R1: Climate-related policies/ regulations
- R2: Carbon pricing

Market

- R3: Low-carbon products
- R4: Changing input costs due to reduced fossil fuel supply

Technology

- R5: Decarbonization technologies
- R6: Low-carbon transportation
- O1: Adoption of renewable energy
- O2: Energy efficiency in business operations

Reputation

- O3: Higher access to capital and finance due to climate responsible practices
- R7: Increasing stakeholder concern and pressure

Risk

Opportunity

Transition Risks & Opportunities: Heatmap

Heat map at Corporate Level in 2026, 2030 and 2050, incorporated both Osotspa's inputs and external scenario data.

Risk score colour key						
Higher Opp.	Mod. Opp.	Lower Opp.	Limited	Lower Risk	Mod. Risk	Higher Risk

TCFD Category	Identified Transition Driver	Financial Implication	Risk/Opportunity		
			2026	2030	2050
Policy and Legal	R1: Climate-related policies/ regulations	OpEx ↗, Valuation ↘	*No IEA proxy indicator available*		
	R2: Carbon pricing	OpEx ↗	Limited	Higher Risk	Higher Risk
Market	R3: Low-carbon products	Revenue ↘	Limited	Lower Risk	Limited
	R4: Changing input costs due to reduced fossil fuel supply	OpEx ↗	Limited	Lower Risk	Lower Risk
Technology	R5: Decarbonization technologies	CapEx ↗, OpEx ↑↓	Mod. Risk	Higher Risk	Higher Risk
	O1: Adoption of renewable energy	CapEx ↗, OpEx ↘↘	Limited	Mod. Opp.	Higher Opp.
	O2: Energy efficiency in business operations	CapEx ↗, OpEx ↘↘	Higher Opp.	Mod. Opp.	Mod. Opp.
	R6: Low-carbon transportation	CapEx ↗, OpEx ↑↓	Limited	Lower Risk	Limited
Reputation	O3: Higher access to capital and finance due to climate responsible practices	Cost of capital ↘	Limited	Mod. Opp.	Mod. Opp.
	R7: Increasing stakeholder concern and pressure	OpEx ↗, Valuation ↘	*No IEA proxy indicator available*		
Consolidated Average Scores					
Average Risk & Opportunity			Limited	Limited	Lower Risk
Average Risk			Mod. Risk	Mod. Risk	Higher Risk
Average Opportunity			Higher Opp.	Mod. Opp.	Mod. Opp.

Osotspa's Response Measures for Managing Transition Risks and Grasping Opportunities

Upstream (procurement from suppliers)

- Continuously study and prepare responses to emerging climate-related policy and regulatory trends in Osotspa's countries of operation and key markets. — R1, R2
- Work with upstream businesses to develop/secure new sources of alternative fuels/chemicals. — R3 – R5
- Form industrial or cross-industry alliance for Research & Development (R&D) of low-carbon products and process technologies. — R1, R3, R5
- Incorporate supplier emissions into Osotspa's procurement criteria. Engage suppliers in Osotspa's scope 3 emissions management. — R1-R3, R5

Osotspa's Operations (production)

- Explore decarbonization/ low-carbon opportunities at facility, equipment and product levels. — R1, R3 – R5, O1 – O3
- Prioritize low-hanging fruits for emissions reduction in the short run, while preparing for deep decarbonization which may not be commercially viable until a later stage. — R1, R5, O2, O3
- Incorporate transition impacts into financial planning and portfolio management to inform strategic decisions in a low-carbon economy. — R1 – R7, O1 – O3
- Apply economic analysis tools such as internal carbon pricing to incentivize low-carbon investments. — R1 – R7, O1 – O3

Downstream (distribution/sales)

- Explore the markets / develop go-to-market strategy for the products and clients contributing to a low-carbon transition economy. — R3, O1
- Engage downstream clients in Osotspa's scope 3 emissions management through enhanced collaboration to demonstrate Osotspa's extended producer responsibility such as product lifetime expansion and recycling. — R1, R3, R5

Transition

R1 — ***Policy and Legal:*** *Climate related policies/ regulations*

R2 — ***Policy and Legal:*** *Carbon pricing*

R3 — ***Market:*** *Low-carbon products*

R4 — ***Market:*** *Changing input costs (e.g. raw material, energy) due to reduced fossil fuel supply*

R5 — ***Technology***: *Decarbonization technologies*

O1 — ***Technology***: *Adoption of renewable energy*

O2 — ***Technology:*** *Energy efficiency in business operations*

R6 — ***Technology:*** *Low-carbon transportation*

O3 — ***Reputation***: *Higher access to capital and finance due to climate responsible practices*

R7 — ***Reputation***: *Increasing stakeholder concern and pressure*

Estimated Financial Implications of Transition Risk – Carbon Pricing

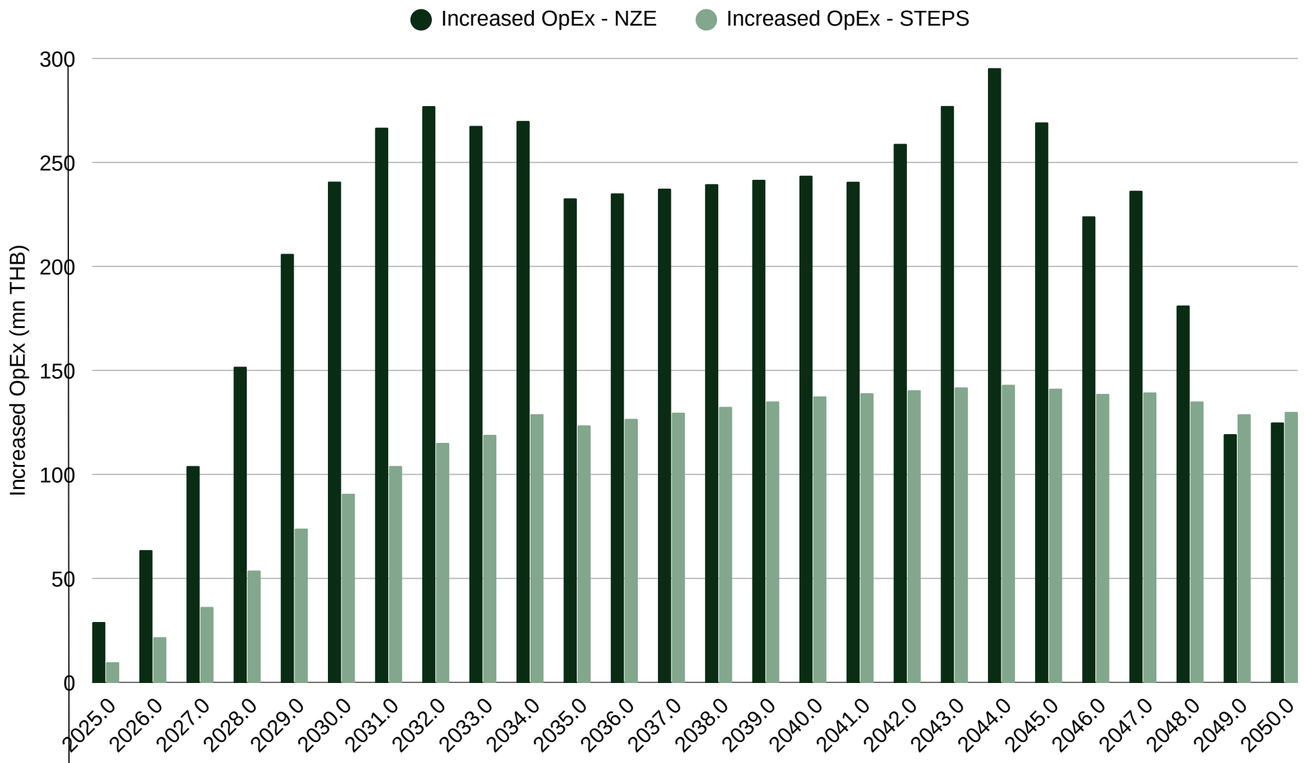
Following the qualitative analysis, Osotspa further conducted a quantitative impact assessment of carbon pricing

Thailand aims to reduce 30% of GHG emissions by 2030 (compared to 2005 level). It also pledges to reach carbon neutrality by 2050 and net-zero emissions by 2065. To achieve these goals, carbon pricing will be an important policy tool that disincentivized companies from emitting CO2.
Therefore, carbon pricing stands out to be the most material risk to Osotspa in a low-carbon economy transition if the world accelerates its efforts towards a future of Net Zero Emissions by 2050.

According to IEA WEO2023 data, emerging market and developing economies with net zero pledges will have to set a carbon price of 200 USD/tCO2e by 2050 under a Net Zero Emissions by 2050 (NZE) scenario. This implies a significant increase of operating expenditure to Osotspa if we fail to achieve our carbon neutral by 2050 commitment. The following formula was applied to assess the financial implication of carbon pricing in such a case:

Estimated financial impact (i.e., increased OpEx due to
a mandatory carbon pricing scheme)
= (Osotspa's Scope 1 emissions + Osotspa's electricity demand x IEA emission factor*) x IEA CO2price

**Osotspa's scope 2 emissions were projected by multiplying the estimated electricity demand in the future with the emission factors estimated by IEA.*

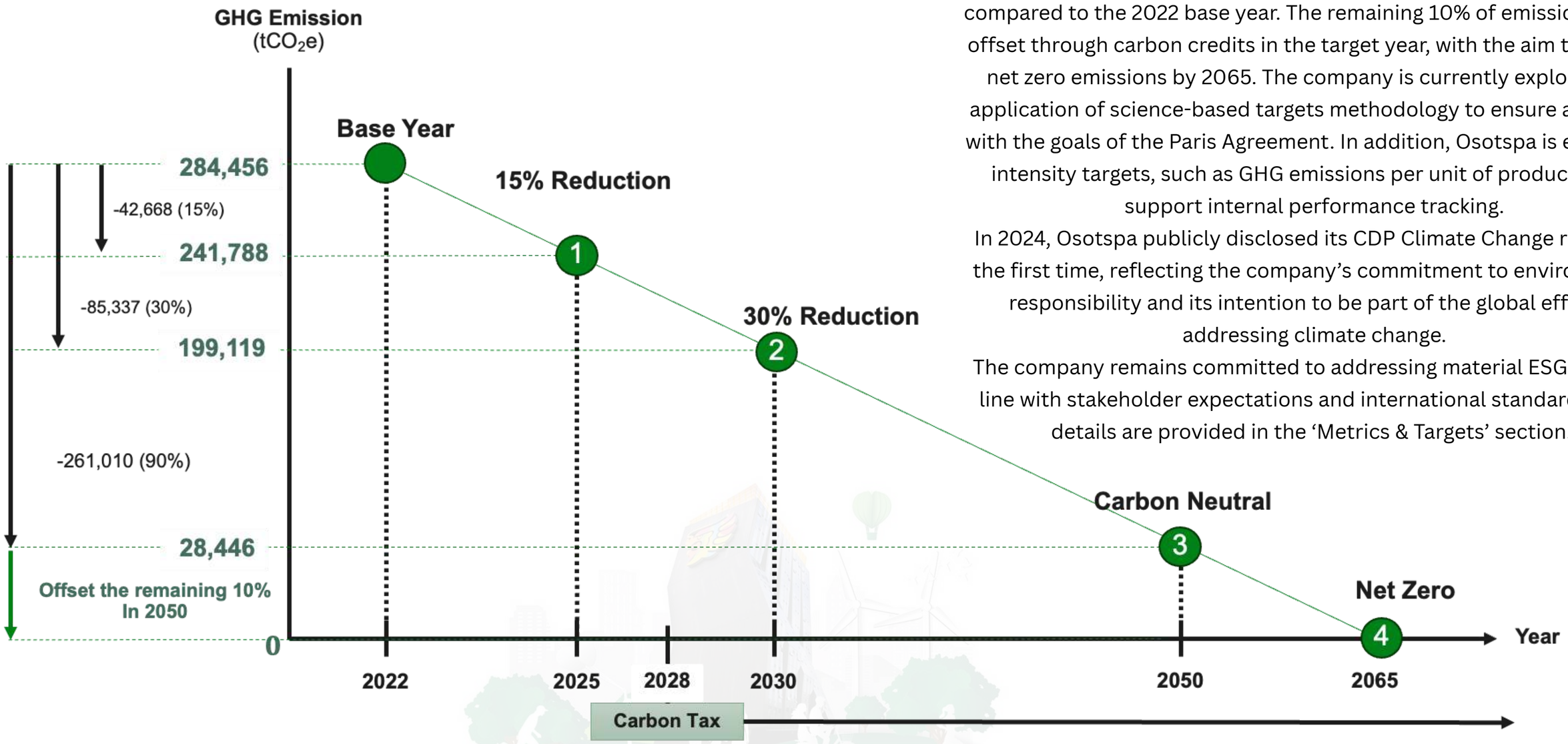


If a mandatory carbon price is introduced, under NZE or STEPS:

- Estimated increase in OpEx: 295 million THB in 2044 (maximum) under NZE.
- Major risk management actions : furnace upgrade & maintenance – a total of 65 million THB per annum have been invested or planned to be invested by Osotspa.

***financial implications of carbon pricing will not be fully removed by 2050 as Osotspa's emissions reduction goals align with Thailand's carbon neutrality by 2050 and net zero emissions by 2065.*

Mitigation Plan to Manage Transition Risks



"To mitigate the risks related to climate regulations, such as a potential carbon tax, Osotspa has set an absolute emissions reduction target to reduce 90% of Scope 1 and 2 Greenhouse Gas (GHG) emissions by 2050, compared to the 2022 base year. The remaining 10% of emissions will be offset through carbon credits in the target year, with the aim to achieve net zero emissions by 2065. The company is currently exploring the application of science-based targets methodology to ensure alignment with the goals of the Paris Agreement. In addition, Osotspa is evaluating intensity targets, such as GHG emissions per unit of production, to support internal performance tracking.

In 2024, Osotspa publicly disclosed its CDP Climate Change report for the first time, reflecting the company's commitment to environmental responsibility and its intention to be part of the global effort in addressing climate change.

The company remains committed to addressing material ESG topics in line with stakeholder expectations and international standards. More details are provided in the 'Metrics & Targets' section."

Estimated Financial Implications of Transition Opportunity – Adoption of Renewable Electricity

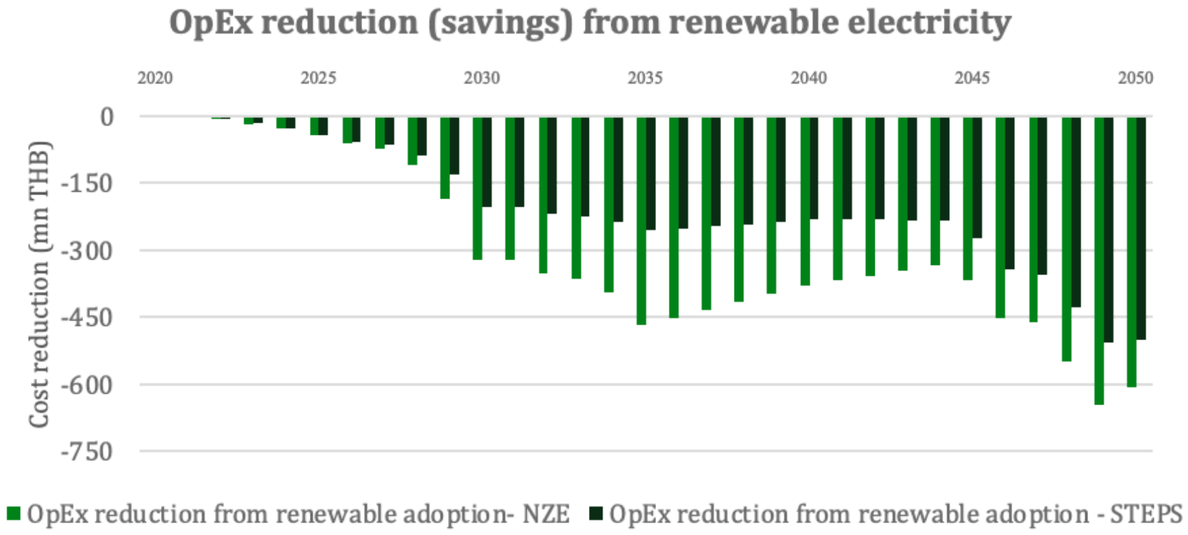
Following the qualitative analysis, Osotspa further conducted a quantitative impact assessment of the benefits from wider adoption of renewable electricity

The use of renewable-based electricity is key to decarbonising the industrial sector. Countries are striving to increase renewable-based electricity generation. This will allow the cost of green power procurement to become lower as well, leading to a decrease in OpEx.
Therefore, adoption of renewable electricity stands out to be one of the most promising opportunities to Osotspa in a low-carbon economy transition if the world accelerates its efforts towards a future of Net Zero Emissions by 2050.

Osotspa has planned to execute the solar rooftop sustainability project in five phases, with each phase from 2021 through 2025. Our objective is to incrementally improve our renewable energy capacity, aiming to reduce our carbon dioxide equivalent emissions by around 10,000 metric tons annually by 2025.

According to IEA WEO2023 data, the renewable energy mix in the grid will reach 89% by 2050 under a Net Zero Emissions by 2050 (NZE) scenario and the levelized costs of electricity for solar and wind will be much lower than grid electricity prices. These imply an important cost saving to Osotspa if we use more renewable electricity. The following formula was applied to assess the financial implication in such a case:
Estimated financial impact (i.e., reduced OpEx from using renewable electricity)
= Osotspa's renewable electricity consumption* x (renewable LCOE - grid electricity price)

**We assumed that Osotspa will use as much renewable electricity as the renewable energy mix in the grid projected by IEA.*



If Osotspa uses more renewable-based electricity, under NZE or STEPS:
•Estimated reduction in OpEx**: 645 million THB in 2049 under NZE (maximum).
•Major actions to grasp the opportunity: onsite solar installations & green electricity procurement – a total of 32.5 million THB per annum have been invested or planned to be invested by Osotspa

***Positive financial implications of the adoption of renewable electricity will last by and beyond 2050 as long as Osotspa continues to use renewable-based electricity. Such cost savings will only be faded until the renewable energy mix in the grid reaches 100%.*

Risk Management

In this section, Osotspa aims to enable stakeholders to understand our process to identify, assess, prioritise and monitor climate-related risks and opportunities, including whether and how those processes are integrated into and inform our overall risk management process. Also, we outline our strategies and initiatives for addressing the identified risks associated with climate change and integrating climate issues into our COSO: Enterprise Risk Management Framework.
In order to efficiently manage risks and possibilities, we recognize that climate change issues need to be included in our framework. In 2024, we further integrated and delegated tasks to all level of climate governance in terms of identify, assess, prioritise and monitor climate-related risks and opportunities. This integration allows stakeholders to see a holistic view of risk assessment, scenario analysis, and decision-making, in another word, overall risk management framework.

Osotspa is committed to regularly reviewing and improving our risk management strategies and integrating climate issues into our ERM processes. We engage with stakeholders to foster collaboration, share best practices, and drive collective action in addressing climate-related risks.
By effectively managing climate-related risks and integrating climate issues into our ERM framework, Osotspa strives to protect shareholder value, ensure business continuity, and contribute to a more sustainable and resilient future.

Risk Management

Integrating climate issues into COSO: Enterprise Risk Management Framework

Risk Identification

The Risk Management and Internal Control (RMIC) team, in collaboration with the Osotspa Leadership Team (OLT), undertakes a comprehensive identification and assessment of climate-related risks and opportunities across the entire value chain. This process ensures a thorough understanding of the potential impacts and vulnerabilities that climate change may pose to the organization.

Risk Prioritization

Following the identification phase, the RMIC team prioritizes the climate-related risks based on their materiality and plots these risk factors within a risk matrix. This visual representation aids in understanding the severity and likelihood of each risk. The RMIC team then presents these prioritized risks to the OLT, the Executive Committee (Excom), the Risk Management Committee (RMC), and the Board of Directors (BOD) for their endorsement, ensuring alignment and consensus on the most critical risks to address.

Risk Management

On a quarterly basis, the RMIC team updates and finalizes the progress of risk mitigation efforts in management meetings. These updates ensure that mitigation strategies are on track and effective. The RMIC team then reports the results of these efforts to the RMC quarterly, and to the RMC and Audit Committee (RMC&AC) and BOD biannually. This regular reporting ensures that senior management and the board remain informed and engaged in the risk management process.

Monitoring

Throughout the year, the RMIC team remains vigilant for any new emerging climate-related risks. If such risks are discovered, the RMIC team promptly proposes discussions with the OLT and RMC to evaluate and address the new risks and their potential mitigation strategies. If the emerging risk is deemed severe enough, it will be integrated into the enterprise risk management framework, ensuring it is managed with the appropriate level of attention and resources.

Process of Physical Risk Qualitative Assessment

Identify Physical Drivers

Determine climate change risk factors affecting companies, including extreme heat/cold, river flooding, coastal flooding, tropical cyclones, rainfall-induced landslides, water stress & drought, extreme rainfall flooding, and wildfire weather.

Develop Exposure Weightings

Based on expert judgment, assess the inherent exposure of each asset type to various hazards, using a rating key from "Very High (10 rating)" to "N/A. (0 rating)"

Incorporate External Factors (scenario analysis)

Analyze impacts under different climate scenarios and time horizons based on IPCC AR6 scenarios.

Physical Risk Heatmap

Use internal and external factors to create a heatmap that visualizes risk levels for different hazards across sites. Interpret physical damage and business/supply chain interruption to recommend risk adaptation strategies.

Process of Physical Risk Quantitative Assessment
Revenue Loss due to business interruption cause by Flooding

As part of our comprehensive physical risk assessment, we have identified the most significant type of physical risk through a qualitative analysis. To quantify its potential impact on our financial performance, we have selected "Revenue Loss due to business interruption cause by Flooding" as the key risk factor for further evaluation.

Data Collection:

- **Internal Insights:** We begin by analyzing our daily revenue generation and operational costs to establish a baseline understanding of our financial health across different sites.

- **External Factors:** Leveraging expert insights and regional data, we evaluate projected flood depths and frequencies for key return periods, looking ahead to 2030 and 2050.

Calculating Potential Impacts:

- Site-Specific Analysis: Each location's daily revenue contribution is carefully considered alongside the projected number of days that business operations could be disrupted by flooding.
- Adaptation Measures: We factor in the effectiveness of our existing adaptation strategies, such as infrastructure improvements and emergency response protocols, which mitigate potential financial losses.

Estimating Financial Consequences:

- As shown under “Strategy” pillar, by applying a formula that integrates daily revenue, projected business interruption periods, and the effectiveness of our adaptation measures, we compute the potential financial impact of floods on our operations.

Process of Transition Risk & Opportunity Qualitative Assessment

Identify Transition Drivers

Policy & Legal: Examine regulatory changes, government policies, and legal requirements related to climate change and decarbonization.

- **Reputation:** Consider the impact of public perception and stakeholder expectations on Osotspa's reputation.
- **Market:** Analyze market trends, customer preferences, and shifts in demand towards more sustainable products and services.
- **Technology:** Assess advancements in technology that can either pose risks or offer opportunities for the transition to a low-carbon economy.

Assess Internal Factors

- **Likelihood Scale:** Evaluate the probability of each transition driver impacting the company.
  - Remote (1)
  - Slightly likely (2)
  - Possible (3)
  - Likely (4)
  - Almost Certain (5)
- **Impact Ratings:** Determine the potential impact of each driver on the company, ranging from low to high.

Develop Scoring Weightings

- **Scenario Indicators:** Use different scenarios to assign weightings to the drivers, considering factors such as CO2 pricing and regulatory changes.
- **Case Studies:** Compare different cases (e.g., APS-STEPS, NZE-STEPS) to understand the potential impacts under various future conditions.
- **Rationales:** Provide explanations for the assigned weightings based on the specific context of each scenario.

Incorporate External Factors (scenario analysis)

- **IEA World Energy Outlook :** Utilize data and projections from the International Energy Agency's World Energy Outlook to inform the analysis.
- **Scenario Analysis:** Consider different future scenarios (e.g., Total Final Consumption in STEPS, NZE) to assess external factors impacting the transition.

Transition Risk & Opportunity Heatmap

- **Time Horizon:** Assess risks and opportunities over different time periods (2026, 2030, 2050).
- **Average Risk and Opportunity:** Evaluate the overall level of risk and opportunity for each time period.
- **Net Risk / Opportunity:** Calculate the net impact, taking into account both risks and opportunities.

Process of Transition Risk Quantitative Assessment

Increase in Direct Operating Cost due to Carbon Pricing

As part of our comprehensive transition risk assessment, we have identified the most significant type of transition risk through a qualitative analysis. To quantify its potential impact on our financial performance, we have selected "Increase in Direct Operating Costs due to Carbon Pricing" as the key risk factor for further evaluation.

Data Collection and Input Variables

- Revenue / Cost of Sales: We start by gathering our financial data, specifically our revenue and the cost of sales. This provides the financial baseline needed for our calculations.
- Scope 1 Greenhouse Gas Emissions: We measure our direct greenhouse gas emissions, known as Scope 1 emissions. These emissions are generated from sources that we own or control, such as manufacturing facilities or company vehicles.
- Purchased Electricity: We track the amount of electricity we purchase from external providers. This electricity consumption is critical as it contributes to our indirect emissions, known as Scope 2 emissions.
- Carbon Pricing Exposure: We identify the regions where we operate and gather data on existing or proposed carbon pricing mechanisms in those regions. This helps us understand the potential costs associated with our carbon emissions.
- Transition Scenario Data
- Grid Emission Factors: For each region where we operate, we collect data on the emission factors of the electricity grids. These factors represent the amount of greenhouse gases emitted per unit of electricity consumed and vary by location.
- Carbon Prices: We also collect information on the carbon prices in these regions. Carbon prices are set either by governments or through market mechanisms and reflect the cost of emitting one tonne of CO_2.
- Calculation Process

Using the collected data, we calculate the potential increase in our operating expenses due to carbon pricing.

The calculation involves the following steps:

- Determine Carbon Costs: We calculate the carbon cost from our direct (Scope 1) emissions and the carbon cost passed through our electricity consumption (Scope 2 emissions). This is done by multiplying our emissions by the respective carbon prices and grid emission factors.
- Adjust for Carbon Pricing Exposure: We adjust the calculated carbon costs based on the carbon pricing exposure in the regions where we operate. This gives us a more accurate estimate of the potential financial impact.
- Calculate Incremental Operational Expenditure (OpEx): The total carbon cost is then multiplied by the carbon pricing exposure to determine the incremental operational expenditure due to carbon pricing.
- Financial Impact Analysis: Finally, we compare the additional OpEx to our revenue or profit. This helps us understand the relative impact of carbon pricing on our financial performance.

Financial Impact:

As shown under “Strategy” pillar, the result of this detailed calculation is the additional operational expenditure we may incur due to carbon pricing. This is expressed in Thai Baht (THB) and provides a clear picture of how carbon pricing could influence our operating costs.

Process of Transition Opportunity Quantitative Assessment
Increase in Operating Cost Saving due to Adoption of Renewable Energy

As part of our comprehensive transition opportunity assessment, we have identified the most significant type of transition opportunity through a qualitative analysis. To quantify its potential impact on our financial performance, we have selected "Increase in Operating Cost Saving due to Adoption of Renewable Energy" as the key opportunity factor for further evaluation.

Our approach begins with gathering essential data from both internal and external sources:

Internal Data:

- Revenue and Cost of Sales: These figures help us understand our current financial baseline.
- Electricity from Onsite Renewables: We measure the amount of electricity we generate using our renewable energy systems.
- Total Electricity Demand: This is the total amount of electricity our operations require.

External Data from Secondary Sources:

- Operating Costs of Onsite Renewables: Information sourced from international energy agencies provides insights into the costs associated with running our renewable energy systems.
- Procurement Costs of Offsite Renewables: This data helps us understand the expenses involved in buying renewable energy from external providers.
- Procurement Costs of Grid Electricity: We compare the costs of grid electricity to those of renewable energy.
- Renewable Energy Penetration: We look at how much of the total electricity generation in our region comes from renewable sources.

Calculating Cost Savings:
With the collected data, we perform two key calculations to determine our cost savings:

Savings from Offsite Renewable Energy Procurement:

- We estimate the amount of offsite renewable energy we will need by considering our total electricity demand and the percentage of renewables available in the market.
- We then calculate the cost difference between renewable energy and grid electricity.
- By multiplying these factors, we determine the savings from procuring renewable energy instead of relying solely on grid electricity.

Savings from Onsite Renewable Energy Generation:

- We evaluate the amount of electricity we generate through our onsite renewable systems.
- We compare the cost of generating our own renewable energy to the cost of purchasing it from external sources.
- This comparison gives us the savings achieved from generating renewable energy onsite.

Financial Impact:
As shown under “Strategy” pillar, the total financial benefit from our renewable energy adoption is the sum of the savings from both offsite procurement and onsite generation. These savings will directly enhance our operating expenses, leading to increased revenue and profit.

Metrics & Targets

Osotspa is committed to achieving carbon neutrality in 2050, with a view to reducing our impact on the environment and contributing to an equitable future. This also includes align corporate direction on sustainability with Net Zero by 2065 in line with the Thai government's targets. We have put in place a complete set of metrics and targets that will be used to assess and coordinate our progress towards this objective.

We measure and report our GHG emissions across our operations, including direct emissions (Scope 1) and indirect emissions from purchased electricity (Scope 2). These metrics allow us to identify emission hotspots, prioritize reduction efforts, and monitor our progress towards carbon neutrality.

In alignment with our commitment to carbon neutrality by 2050, we have set interim reduction targets to ensure progress is made in a measurable and transparent manner. These targets are designed to drive emission reductions in line with Thailand NDC. We regularly review and update these targets as we strive to achieve our long-term carbon neutrality goal.

At Osotspa, we recognize the critical importance of addressing climate change and the role that corporate leadership plays in driving sustainable practices. As part of our commitment to environmental stewardship, climate-related KPIs considerations are systematically integrated into our executive remuneration framework as a part of Osotspa's sustainability journey. This encompasses GHG emissions performance, climate-related risks and opportunities assessment, setting measurable targets and transparency and reporting.

Metrics & Targets

Organizational Boundary and Emissions Coverage

Osotspa Public Company Limited (Osotspa) has defined its organizational boundary for greenhouse gas (GHG) emissions reporting using the operational control approach. Under this approach, Osotspa includes all operations over which it has the authority to introduce and implement operating policies. This decision aligns with the GHG Protocol and ensures comprehensive coverage of all facilities, that activity data is available, where Osotspa can influence emission reduction, removal and offsetting initiatives.

Under the operational control approach, a company includes all operations where it has the authority to introduce and implement operating policies. This enables Osotspa to have a direct impact on emission reduction initiatives and sustainability practices. Moreover, Operational control provides clear accountability for emissions, as Osotspahas direct responsibility for the operations included within this boundary. This aligns with corporate governance principles and helps in setting and achieving carbon neutral 2050 target. Ultimately, collecting activity data from operations under control is often more straightforward than gathering data from equity-owned entities where the company may not have direct operational influence. This simplifies the process of data collection, verification, reporting, and target setting.

In 2024, Osotspa has collected activity data from entities and facilities to calculate GHG emissions scope 1 and 2 which covers 100% by revenue.

Entity/Facility	Included or Excluded
Siam Cullet Co.,ltd	Included 100% of scope 1 and 2
Siam Glass Ayutthaya Co.,ltd.	Included 100% of scope 1 and 2
Siam Glass Industries Co.,ltd.	Included 100% of scope 1 and 2
Siam BEV Manufacturing Co.,ltd.	Included 100% of scope 1 and 2
Greensville Co.,ltd.	Included 100% of scope 1 and 2
Osotspa Beverage Co.,Ltd.	Included 100% of scope 1 and 2
Osotspa Enterprise Co.ltd.	Included 100% of scope 1 and 2
O2C Co.,ltd.	Included 100% of scope 1 and 2
Oyura Co.,ltd.	Included 100% of scope 1 and 2
Innovation of Experience	Included 100% of scope 1 and 2
Oventure PTE.LTD.	Included 100% of scope 1 and 2
Osotspa Enterprises Singapore Pte. Ltd.	Included 100% of scope 1 and 2
Osotspa Loi Hein Co., Ltd.	Included 100% of scope 1 and 2
Advanz Beverage Manufacturing Co.,ltd.	Included 100% of scope 1 and 2
Osotspa VTA Joint Stock Company	Included 100% of scope 1 and 2
Osotspa Innovation Centre Co., Ltd.	Included 100% of scope 1 and 2
Osotspa Dairy Co., Ltd.	Included 100% of scope 1 and 2
SSB Enterprise Co., Ltd.	Included 100% of scope 1 and 2

Osotspa Greenhouse Gas Emissions Breakdown

Our Environmental performance cover the activities of the entire company with the same consolidation as used in financial reporting and refer to the financial year.
(1st January 2024 to 31st December 2024.)

Scopes and Categories	2020	2021	2022	2023	2024	Target in 2024
Scope 1 (Total – tCO2e)	165,476	182,988	186,256	153,645	122,149	**163,905**
Scope 1 Coverage (%)	*100%*	*100%*	*100%*	*100%*	100%	***100%***
Scope 2 Location-Based (Total)	80,332	88,258	100,324	88,190	70,208	**86,415**
Scope 2 Location-Based Coverage (%)	*100%*	*100%*	*100%*	*100%*	*100%*	***100%***
Scope 2 Market-Based (Total)	80,332	88,258	98,199	84,581	70,208	**86,415**
Scope 2 Market-Based Coverage (%)	*100%*	*100%*	*100%*	*100%*	*100%*	***100%***
Scope 3 (Total – tCO2e)	n/a	285,684	274,682	327,831	388,433	**367,000**
Category 1: Purchased goods	n/a	211,919	217,719	279,670	341,086	
Category 1 Coverage (%)	*n/a*	*85%*	*85%*	*85%*	*85%*	***100%***
Category 3: Fuel- and energy-related activities	n/a	73,765	56,963	48,161	47,347	
Category 3 Coverage (%)	*n/a*	*85%*	*85%*	*85%*	*85%*	***100%***

Osotspa is in the process of developing a comprehensive internal data management system to enhance the accuracy and completeness of Scope 3 greenhouse gas (GHG) emissions accounting. In the reporting year 2024, the company successfully completed GHG emissions calculations for two material categories in alignment with the GHG Protocol:

- Purchased Goods and Services (Category 1) – covering emissions associated with the procurement of raw materials and packaging, based on volume data and applicable emission factors.
- Fuel- and Energy-Related Activities (Category 3) – encompassing upstream emissions from the production and transportation of energy consumed, including fuel, gasoline, and gas.

The internal data management system will continue to be refined to support the inclusion of additional material Scope 3 categories, thereby enabling a more holistic understanding of Osotspa's value chain emissions and identifying opportunities for further emission reductions.

All GHG emissions data disclosed have undergone external verification by an independent third party in accordance with the Global Reporting Initiative (GRI) Disclosure standards, ensuring transparency, accuracy, and credibility.

Furthermore, in 2024, Osotspa publicly disclosed its CDP Climate Change report for the first time. This milestone underscores the company's strong commitment to environmental stewardship and its active participation in the global effort to address climate change.

Operational Greenhouse Gas Emissions Breakdown

Scopes 1 & 2 GHG Source Breakdown	Explanation
Scope 1 emissions	
Stationary combustion fuels and equipment - combustion of fuels either fossil fuel or bioenergy in stationary equipment such as boilers, furnaces, etc.	The calculation has been conducted using primary data of the procurement and consumption of energy (e.g. diesel, natural gas and bioenergy), and then multiplied by national-average emissions factors provided by TGO. This includes all combustion activities within operation (i.e. controlled or owned by OSP), for example boilers, furnace, trucks and company fleet.
Mobile combustion fuels and vehicle - combustion of fuels in transportation devices such as automobiles, trucks, etc.	
Fugitive emissions - intentional and unintentional releases such as equipment leaks from joints, seals, packing, gaskets, as well as fugitive emissions from refrigerant leakage, wastewater treatment, etc.	Fugitive emissions from wastewater treatment are calculated by estimating methane emissions using default emissions formula by TGO and wastewater characteristics. For refrigerant leakage, emissions are calculated based on the type and quantity of refrigerant used, its global warming potential, and the amount leaked during equipment operation and maintenance.
Process emissions - emissions from physical or chemical processes such as CO2 emissions result from the decomposition of raw materials (e.g., limestone, soda ash) during the melting process.	To calculate process emissions from glass manufacturing, quantify the CO2 emissions by measuring the amount of raw materials (i.e. limestone and soda ash used). Ultimately, determine the CO2 generated from their decomposition during melting using stoichiometric calculations based on their chemical composition and the reaction equations.
Scope 2 Location-based emissions	
Purchased-Electricity	Calculate the emissions by multiplying the electricity consumption from both the grid and solar panels installed in the operating sites by the national grid's emission factor.
Purchased-Steam	n/a
Scope 2 Market-based emissions	
Purchased-Electricity	The calculation has been conducted by multiplying total electricity consumption with supplier-specific emission factor. This reflects actual climate impact from the activity.
Purchased-Steam	n/a

About Greenhouse Gas Emissions

The displayed greenhouse gas emissions figures were calculated in accordance with The Greenhouse Gas Protocol, The Thai CFO quantification standard by Thailand Greenhouse Gas Management Organization (TGO). Emissions are also be measured its greenhouse gas emissions in accordance with the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004).
Reporting Boundaries:

- Direct emissions (Scope 1) emitted through activities from OSP's operations, including fossil fuel combustion, CO2 generated through processing and the fugitive emissions. This also includes the equal removal assumption of direct CO2 biogenic emissions
- Indirect emissions (Scope 2) occur from the utilization of grid electricity throughout the reporting year, including power directly purchased from Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA).
- Other indirect emissions (Scope 3) emitted by OSP's suppliers, employees, customers, investees, and borrowers.

Inclusions and Exclusions:

- The GHG inventory covers the seven direct greenhouse gases under the Kyoto Protocol: Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), and Nitrogen trifluoride (NF3)
- In 2024, Osotspa reports all emissions data that calculated from full operational control entities included overseas units.
- Regarding scope 3 calculation, Osotspa reports the significant emissions from Category 1: Purchased Good and Services and Category 3: Fuel and energy related activities. Osotspa are now working on other related categories and data coverage expansion for reporting improvement as well.

Calculation Approach (Scope 1):
The Scope 1 Emission data is calculated from four major categories of usage. The first category is stationary combustion fuels and equipment, which primarily involves the usage of fuel and gas in the factory's engines and equipment. The second category is mobile combustion fuels and vehicles, which mainly encompasses the fuel and gas usage in the factory's cars and the company's fleet. The third category is fugitive emissions, which predominantly originate from refrigerants and CO2 fire extinguishers. The fourth category is process emissions, which mainly arise from CO2 emissions in chemical processes during the factory's activities.

Calculation Approach (Scope 2):
The Scope 2 Emission data is calculated from the actual purchase of grid electricity from the Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA). This calculation includes the electricity consumption from renewable sources on a location-based basis, as used by entities under Osotspa's operational control.

Calculation Approach (Scope 3):
The Scope 3 Emission data is reported in two categories as previously described. Category 1, which covers purchased goods and services, is calculated based on the purchase of raw materials for production and packaging. Category 3, which encompasses fuel and energy-related activities, is calculated from the upstream activities involved in obtaining fuel, gasoline, and gas.

Other Related Metrics

Reporting Related Metric	Unit	2020	2021	2022	2023	2024
Energy Management						
Operational energy consumed	Gigajoules (GJ)	2,714,111	2,898,933	3,167,520	2,729,090	2,105,745
percentage grid electricity	Percentage (%)	20.61%	21.83%	22.33%	22.49%	24.17%
percentage renewable energy	Percentage (%)	4.29%	4.49%	4.58%	5.63%	12.66%
Coverage	Percentage (%)	100%	100%	100%	100%	100%
Water Management						
Total water withdrawal	Cubic meters (m^3)	3,010,826	3,116,522	2,922,198	2,565,987	2,460,591
Total water consumption	Cubic meters (m^3)	2,832,423	2,525,930	2,513,948	2,015,291	1,614,946
Total water recycle and water reuse	Cubic meters (m^3)	219,498	349,337	291,335	201,547	256,225
Percentage with High or Extremely High Baseline Water Stress	Percentage (%)	n/a	n/a	n/a	91.67%	91.67%
Coverage of assessment	Percentage (%)	n/a	n/a	n/a	100%	100%
Description of water management risks and discussion of strategies and practices to mitigate those risks	NA	We strictly monitor wastewater quantity & quality in compliance with local requirements and regularly report the results to the responsible functions for appropriate management. By applying the 3Rs principle, the Company continues to pursue improvements in wastewater management through process efficiency and technology advancement in order to increase water recycle/reuse rates.				
Waste Management						
Total food loss and food waste	tonne	13,324.52	12,453.49	13,469.31	12,210.99	12,341.40
Food waste disposed and repurposed	tonne	11,534.06	9,335.22	10,506.85	9,418.37	8,463.95
Food waste disposed	tonne	1,790.46	3,118.28	2,962.46	2,792.63	3,877.45
Total food loss and food waste intensity per unit of beverage sales	tons per million Baht	0.080	0.137	0.135	0.132	0.175
Data coverage	Percentage (%)	100	100	100	100	100

Osotspa Carbon Neutral Commitment

Osotspa Public Company Limited has established a goal to achieve carbon neutrality by the year 2050. Additionally, they have set specific targets for different timeframes: an interim target to be reached by 2025, a short-term target to be achieved by 2030, and a long-term target for the year 2050.
This carbon neutrality goal and its associated targets were thoroughly reviewed and approved by various key stakeholders, including the Sustainability working team, the Executive Committee, and the NRCSD committee. In August 2023, the Board of Directors conducted a comprehensive review and officially ratified the establishment of these targets.

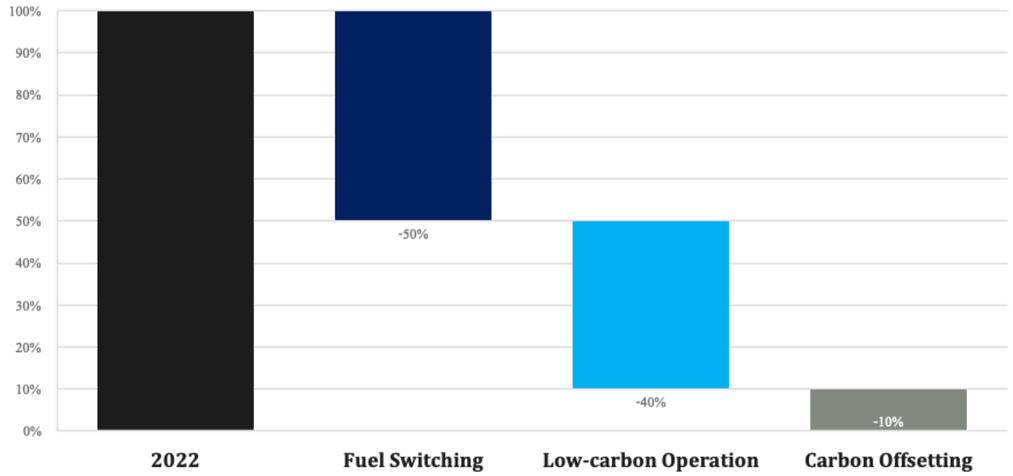
We use the following methodologies to quantify and track our GHG emissions:

- Baseline year for target: 2022
- Boundary of GHG reported: 1) Beverage Filling Plants, Personal Care Plants, Glass Factories and Label Printing Factory in Thailand 2) Beverage Filling Plants in Myanmar
- Scopes included: Scope 1 emissions (Assume equal CO2 biogenic emissions) and 2 market-base emissions
- Emission factor and methodology source: ISO 14064-1:2018, The Greenhouse Gas Protocol, The Thai CFO quantification standard by (TGO)

Interim target in 2025(Intensity target)	Short-term target in 2030(Absolute target)	Long-term target in 2050(Absolute target)
15% Intensity reduction on Scope 1 and 2	30% Absolute reduction on Scope 1 and 2	Carbon Neutrality with 90% Absolute reduction on Scope 1 and 2

Carbon Neutral by 2050
We aim to reduce 90% of Scope 1 and 2 emissions and offset residual emissions with carbon credit by 2050 through:

- Fuel Switching: Using more renewable source of energy to operate beverage and glass production which will approximately contribute around 50% or total reduction.
- Low-carbon operation: Efficiency programs, process improvement and promoting circular economy which will approximately contribute around 40% or total reduction.
- Carbon Offsetting: Purchasing Carbon Credit to offset 10% residual emissions.



Osotspa Climate Related Public Policy Engagement

Osotspa Public Company Limited is committed to supporting national and global efforts to limit global temperature rise to below 1.5°C and to achieve net-zero greenhouse gas emissions, in line with the Paris Agreement. We recognize that effective engagement in climate-related public policy plays a vital role in accelerating the transition to a low-carbon economy.

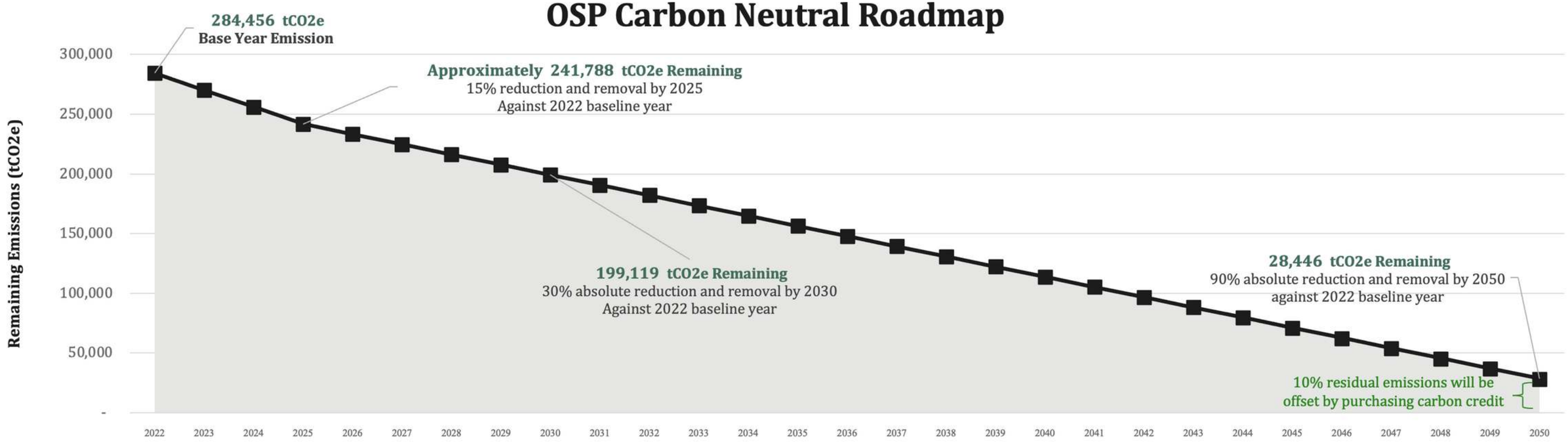
As part of this commitment, Osotspa works in collaboration with public and private stakeholders, including through our membership in the Thailand Carbon Neutral Network (TCNN). We expect all trade associations with which we are affiliated to align their climate policy positions with the Paris Agreement. Where misalignment exists, we will engage constructively and take appropriate action—up to and including the potential discontinuation of membership.

To guide our climate policy engagement, Osotspa has established a structured management approach consisting of the following key activities:

- **Policy Alignment Assessment:** Periodically review public policies and the climate-related positions of trade associations to evaluate consistency with the Paris Agreement.
- **Monitoring and Oversight:** Continuously track climate policy developments and assess alignment risks related to association memberships.
- **Stakeholder Engagement:** Actively engage with both internal and external stakeholders to foster shared understanding and alignment on climate policy priorities.
- **Transparency and Disclosure:** Publicly report Osotspa's climate policy engagement activities, including positions taken by relevant trade associations and any actions taken in response to misalignment.

Through these actions, Osotspa seeks to ensure that our influence—direct and indirect—supports a science-based, policy-aligned, and transparent pathway toward climate resilience.

OSP Carbon Neutral Roadmap



Fuel Switching

- Switch to biomass boiler and waste heat boiler
- Hybrid furnace to combine the use between natura gas and electricity boost up
- Cullet preheating
- Absorption chiller
- EV fleet transition with RECs*
- Solar PV installation
- Feasibility study on the use of bio-oil with sustainable sourcing, oxy-fuel and hydrogen fuel options

Low-carbon operation

- Machine modification to reduce energy consumption
- Buildings and facilities with energy-efficiency technologies (e.g., IoT, Sensors, etc.) and Implementing energy saving program*
- To use the best option for low-carbon or zero GWP refrigerants in 2050*
- 90% cullet ratio up and light weight bottle
- Partnering with external parties on circular economic programs
- Carbon Removal technology and Nature based solution*

Carbon Offsetting

- Purchasing RECs to support renewable energy generation and consumption*
- Purchasing carbon credit to support reduction and removal activities in Thailand and to reach Carbon Neutral by 2050*

**Actions under review*

2024 GHG Mitigation Performance & Initiatives

*Remarks: * Verification has been conducted by external agencies and registered with TGO for Scopes 1, 2, and 3.** Scope 3 covers data in two main categories: Category 1: Purchased Goods and Services, and Category 3: Fuel and Energy-related Activities. The Company is in the process of developing an internal data management system to enable accurate and comprehensive reporting of greenhouse gas emissions in the future*

Osotspa is committed to reducing greenhouse gas emissions in alignment with the UN Global Compact and Thailand's Climate Change Master Plan. The company assesses climate-related risks and opportunities, addressing both physical and transition risks. These risks impact various aspects of the business, including raw material availability, transportation, operational costs, consumer demand, and potential changes in environmental regulations. Osotspa actively monitors greenhouse gas emissions (Scopes 1, 2, and 3) in line with TGO standards.

In 2024, Osotspa successfully reduced its direct and indirect emissions by 45,869 tCO2e compared to 2023, driven by initiatives such as process optimization, solar panel installations, and switching to biomass fuel.

Glossary of Terms

Glossary of terms

Term	Definition
Absolute emissions	Greenhouse gas emissions, expressed in terms of weight if CO2 equivalent.
Climate-related opportunities	Refers to the potential positive impacts related to climate change on an organisation. Efforts to mitigate and adapt to climate change can produce opportunities for organisations, such as through resource efficiency and cost savings, the adoption and utilisation of low-emission energy sources, the development of new products and services, and building resilience along the supply chain. Climate-related opportunities will vary depending on the region, market and industry in which an organisation operates.
Climate-related risks	Refers to the potential negative impacts of climate change on an organisation. Physical risks emanating from climate change can be event-driven (acute) such as increased severity of extreme weather events (e.g. cyclones, droughts, floods, and fires). They can also relate to longer-term shifts (chronic) in precipitation and temperature and increased variability in weather patterns (e.g. sea level rise). Climate-related risks can also be associated with the transition to a lower-carbon global economy, the most common of which relate to policy and legal actions, technology changes, market responses and reputational considerations.
CO2e	Carbon dioxide equivalent (CO2e) is a measurement used to compare emissions from various greenhouse gases based on their global warming potential (GWP). Other gas amounts are converted into the equivalent amount of carbon dioxide to provide a single emissions metric.
Emissions scopes	Scope 1 covers emissions from sources that an organisation owns or controls directly – for example from burning fuel in our fleet of vehicles (if they're not electrically-powered). Scope 2 are emissions that a company causes indirectly and come from where the energy it purchases and uses is produced. For example, the emissions caused when generating the electricity that we use in our buildings would fall into this category. Scope 3 encompasses emissions that are not produced by the company itself and are not the result of activities from assets owned or controlled by them, but by those that it's indirectly responsible for up and down its value chain. An example of this is when we buy, use and dispose of products from suppliers. Scope 3 emissions include all sources not within the scope 1 and 2 boundaries.

Glossary of terms

Term	Definition
Emissions factor	An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant (e.g. tCO2e/ revenue generated).
Greenhouse gases (GHG)	Gaseous pollutants released into the atmosphere that amplify the greenhouse effect. Gases responsible include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride. The Greenhouse gases (GHG) are listed under the Kyoto Protocol: Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF6), and Nitrogen trifluoride (NF3).
Greenhouse Gas Protocol (GHG Protocol)	Comprehensive global standardised frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions. The GHG Protocol supplies the world's most widely used GHG accounting standards.
IPCC	Intergovernmental Panel on Climate Change.
The Paris Agreement	The Paris Agreement, often referred to as the Paris Accords or the Paris Climate Accords, is an international treaty on climate change. Adopted in 2015, the agreement covers climate change mitigation, adaptation, and finance. It adopted within the United Nations Framework Convention on Climate Change, commits all participating to limit global temperature rise to well-below 2C above pre-industrial levels and pursue efforts to limit warming to 1.5C. To adapt to changes already occurring, and to regularly increase efforts over time.

Glossary of terms

Term	Definition
PCAF	PCAF is, an abbreviation of “Partnership for Carbon Accounting Financials”, a global partnership of financial institutions that work together to develop and implement a harmonized approach to assess and disclose the greenhouse gas emissions associated with their loans and investments..
Physical Risks	The risk of increased extreme weather events including flood, drought and sea level rise.
TCFD	The Financial Stability Board Task Force on Climate-related Financial Disclosures.
Transition Risks	The risk of changes to market dynamics or sectoral economics due to governments’ response to climate change.

Thank You