

Material Issues Impact Valuation for External Stakeholders in 2023

PTT Global Chemical Public Company Limited

Materiality Assessment Approach

GC has reviewed key sustainability issues related to both internal and external business operations throughout 2023 by taking into consideration the company's risks and stakeholder expectations and assessing the identified significant impacts on the environment, society, and all related stakeholders to prioritize them.



1. Understand the organization's context

- 1.1** Review all business activities, relationships, sustainability context, and stakeholders in a value chain.
- 1.2** Conduct global trend and peer reviews across the industry to predetermine material topics.
- 1.3** Engage with stakeholders to help identify impacts.



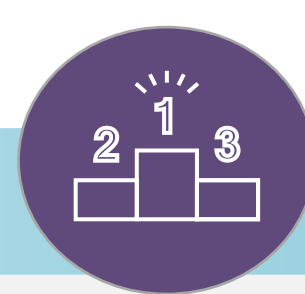
2. Identify actual and potential impacts

- 2.1** Identify impacts (actual, potential, positive, and negative)
- 2.2** Seek to understand the concerns of stakeholders by consulting with them directly or with experts.
- 2.3** Assess how the organization can shape business activities to deliver positive impacts and address negative impacts.
- 2.4** Revisit the online survey questionnaires and conduct online surveys to gather stakeholder opinions.
- 2.5** Development an interview guide and conduct stakeholder interviews.



3. Assess the significance of the impacts

- 3.1** Assess the significance of identified impacts to prioritize them by conducting quantitative and qualitative analysis.




4. Prioritize the most significant impacts for reporting

- 4.1** Set a threshold to determine which topics are material.
- 4.2** Group impacts into topics.
- 4.3** Test material topics with global trends, experts, or peers.
- 4.4** Propose selected material topics to the highest governance body for approval.
- 4.5** Determine what to report for each material topic.

Material Issues for External Stakeholders

Impact Level

Impact Level ระดับผลกระทบ	Disclosure Location ช่องทางที่เปิดเผย	Key Contents เนื้อหาที่รายงาน
 Very High สูงมาก	Integrated Sustainability Report/Website รายงานความยั่งยืน แบบบูรณาการ/เว็บไซต์	<ul style="list-style-type: none"> Impact on stakeholders Management guidelines Key operations (according to the interest of stakeholders) Online disclosure of performance ผลกระทบต่อผู้มีส่วนได้เสีย แนวทางการบริหารจัดการ การดำเนินงานที่สำคัญ (ตามความสนใจของผู้มีส่วนได้เสีย) เปิดเผยการดำเนินการบนเว็บไซต์
 High สูง		
 Medium ปานกลาง	Website เว็บไซต์	<ul style="list-style-type: none"> Online disclosure of performance เปิดเผยการดำเนินการบนเว็บไซต์
 Medium ปานกลาง		

Material Topic ประเด็นที่สำคัญ	
	1. Climate Strategy and Energy Management กลยุทธ์ด้านการเปลี่ยนแปลงสภาพภูมิอากาศและการบริหารจัดการพลังงาน
	2. Product Stewardship/Sustainable Product ความรับผิดชอบต่อผลิตภัณฑ์/ผลิตภัณฑ์ที่ยั่งยืน
	3. Innovation Management การบริหารจัดการนวัตกรรม
	4. Governance and Compliance การกำกับดูแลกิจการที่ดีและจรรยาบรรณทางธุรกิจ และการปฏิบัติตามกฎหมายและ กฎ ระเบียบที่เกี่ยวข้อง
	5. Occupational Health and Safety อาชีวอนามัยและความปลอดภัย
	6. Circular Economy เศรษฐกิจหมุนเวียน
	7. Risk and Crisis Management การบริหารจัดการความเสี่ยง

Remark: Sustainability Dimensions
หมายเหตุ : มิติความยั่งยืน

 Environmental
สิ่งแวดล้อม

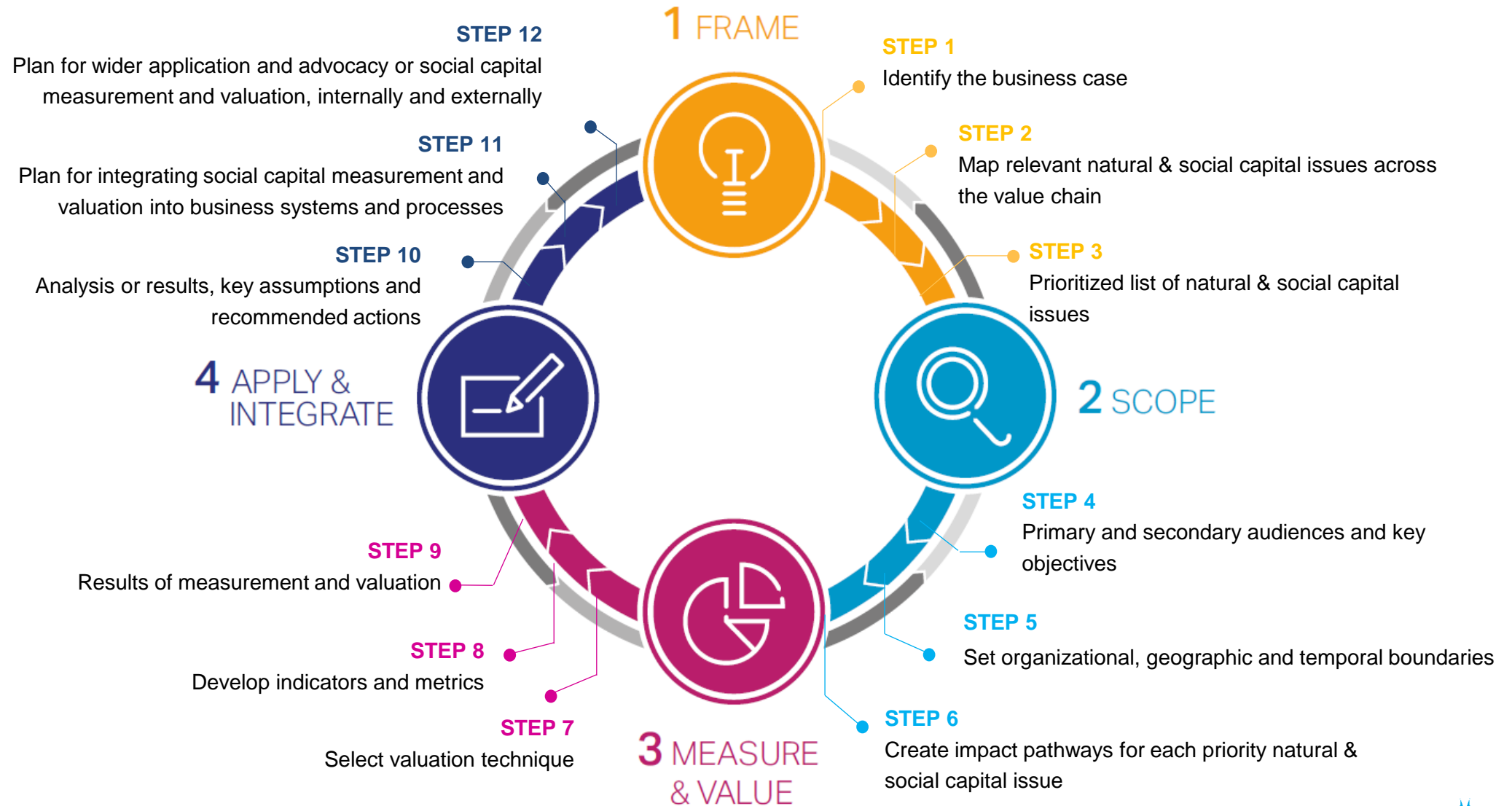
 Social
สังคม

 Governance & Economic
เศรษฐกิจ

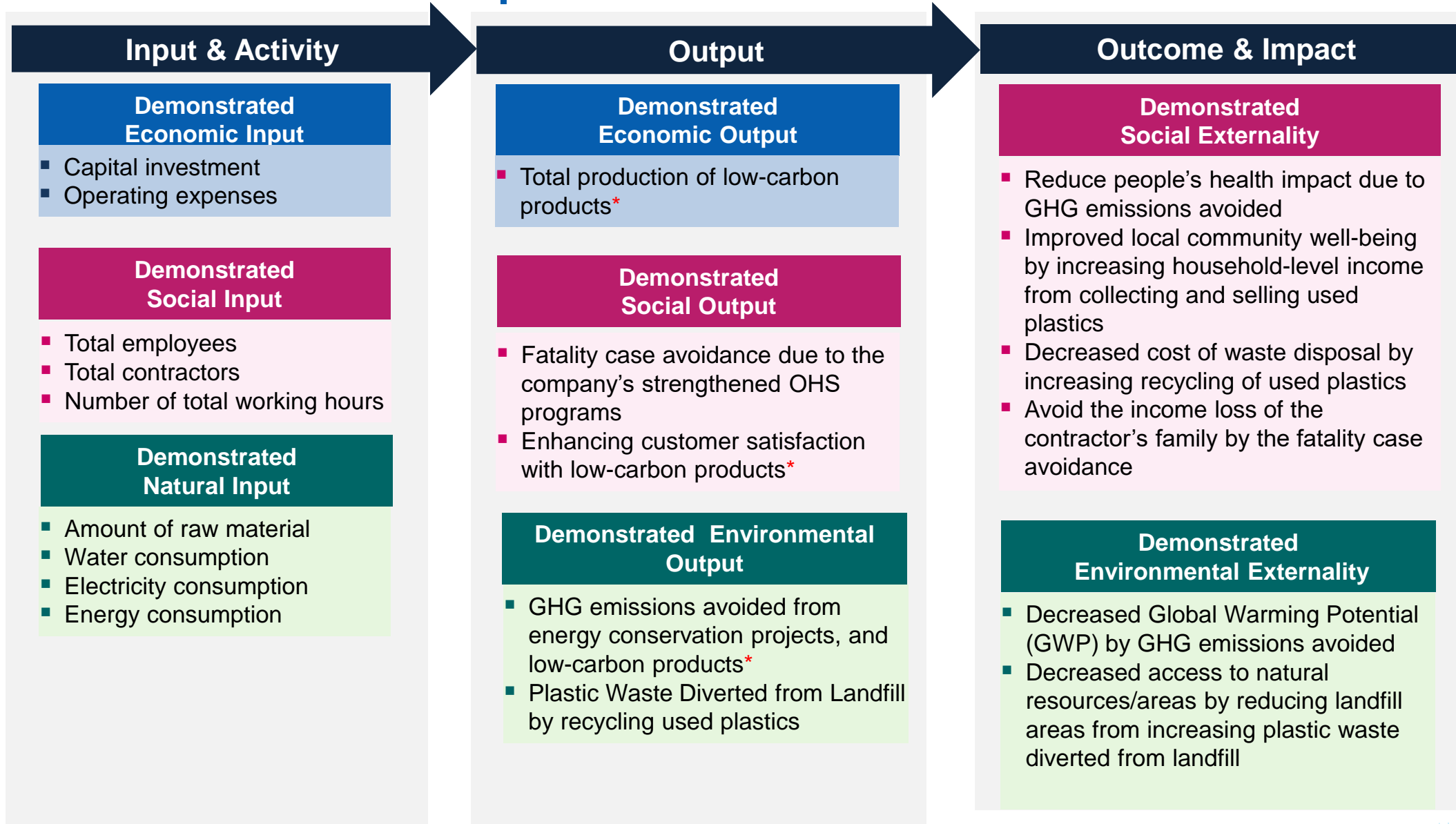
In 2023, three of the most important material topics, which are “**Climate Strategy and Energy Management**”, “**Product Stewardship/Sustainable Product**”, and “**Occupational Health and Safety**” were selected to conduct impact valuation converting the output metrics to an impact metric to measure the societal or environmental external impact.

Impact Valuation

Adapted Four Stages of Natural & Social Capital Protocol



Material Issues Impact Valuation for External Stakeholders



Remark: *Low-carbon products include 1) Methyl Ester or B100, which is the raw material for biodiesel, and 2) Recycled Plastic Resin from ENVICCO

Impact 1 – Climate Strategy and Energy Management

Cause of the impact: Operations, Products/Services, and Supply chain with >50% of business activity

External stakeholder(s)/ Impact area(s) evaluated: Society, Environment and Consumers/End users

Topic relevance on external stakeholders: Greenhouse gas (GHG) emissions not only increase global warming potential but also affect human health which may increase people's medical expenses and finally, may decrease people's quality of life. However, if GHG is reduced, it will reduce the impact on society and the environment.

Climate Strategy and Energy Management is GC's most important material issue. We have created a balance between business growth and environmental responsibility while supporting the Sustainable Development Goals (SDGs) and reducing GHG emissions (scope 1 & 2) to net zero by 2050. Accordingly, we have implemented efficient resource management by implementing various energy conservation projects and adjusted long-term business portfolio in specialty chemicals 30% and Bio Circularity businesses 7% of the long-term adjusted EBITDA into low-carbon businesses by 2030 (Portfolio-driven) to reduce GHG emissions from operations and avoid impacts on both Society and the Environment in a sustainable manner such as **decreasing the social cost of carbon** that will avoid the decreased people's quality of life and **Decreased Global Warming Potential (GWP)**.

External Impacts:

Output Metric	Output Valuation	External stakeholder(s)/ impact area(s) evaluated	Type of Impact	Impact Valuation	Impact Valuation Result in 2023	Impact Metric	Reference
GHG Emission Avoided	<ul style="list-style-type: none"> GHG emissions are avoided by energy conservation projects is 54,341 tCO₂e GHG emissions are avoided by using GC's low-carbon products i.e. <ul style="list-style-type: none"> Methyl ester* or B100 760,610 tCO₂e Recycled plastic resin from ENVICCO** 30,000 tCO₂e 	Society	Positive	Social cost caused/ avoided	Decreased social cost of carbon by GHG emissions avoided from energy conservation projects and low-carbon products, so people's health impact will be lessened by 1,586,549,791 THB***	Social cost of carbon	<ul style="list-style-type: none"> IRIS, 2021. Social Impact Objectives (OD6247). v5.2. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990
		Environment	Positive	Environmental value lost/ gained	Decreased Global Warming Potential (GWP) by GHG emissions avoided from energy conservation projects and low-carbon products 844,951 tCO₂e	Global Warming Potential (GWP)	<ul style="list-style-type: none"> IRIS, 2021. Greenhouse Gas Emissions Avoided or Reduced (PI2764). v5.2. https://www.epa.gov/ghgemissions/understanding-global-warming-potentials
	GHG emission 8,170,000 tCO ₂ e (Scope1 and 2)	Society	Negative	Social cost caused/ avoided	Increased social cost of carbon by GHG emission, so people's health impact will be increased: 15,340,666,842 THB***	Social cost of carbon	<ul style="list-style-type: none"> IRIS, 2021. Social Impact Objectives (OD6247). v5.2. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990

Note: * Methyl Ester, which is commonly known as pure biodiesel fuel or "B100", is a clean burning renewable fuel made from natural plant oil such as palm oil, rapeseed oil, soybean oil, etc.

**ENVICCO is a high-quality recycled plastic resin production plant that meets global standards with the largest end-to-end production process in Southeast Asia.

***The social cost of carbon (SCC) represents the estimated cost of damage done by emitting one additional metric ton of carbon dioxide-equivalent, and the value is calculated by using the SCC which is \$54 per metric ton of carbon dioxide in 2020 dollars with 3% discount rate (https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf) and the average exchange Rates in 2023 which is 34.7719 THB per USD (Exchange Rates UK, <https://www.exchangerates.org.uk/USD-THB-spot-exchange-rates-history-2023.html>).



Impact 2 – Product Stewardship/ Sustainable Product and Circular Economy

Cause of the impact: Operations, Products/Services, and Supply chain with >50% of business activity

External stakeholder(s)/ Impact area(s) evaluated: Society and Environment

Topic relevance on external stakeholders: Product Stewardship/ Sustainable Product is one of the most important material issues of GC. GC has continuously developed sustainable and circularity product and focuses on investment in bio-based raw materials, bioplastic, and recycled materials and formulated an end-to-end plastic waste management plan through collaborations with public and private partners. As this help strengthen business responsibility, it also helps create a business ecosystem that seeks to optimize resource utilization, reduce waste, and transform waste into value-added products.

GC starts the implementation of end-to-end plastic management with the commercial operation of a high-quality food-grade recycled plastic resin production plant under ENVICCO Limited to optimize resource efficiency and create value for used plastic. This supports GC's long-term strategy relating to Circular Economy promotes end-to-end plastic waste management and creates jobs in communities in accordance with Thailand's BCG Model (Bio-Circular-Green Economy Model). This also **generates both social and environmental impacts** to our stakeholders which include 1) **Improved local community well-being** by increasing household-level income from collecting and selling used plastics, 2) **Decreased cost of waste disposal** by increasing recycling of used plastics, and 3) **Decreased access to natural resources/areas** by reducing landfill areas from increasing plastic waste diverted from landfill

External Impacts:

Output Metric	Output Valuation	External stakeholder(s)/ impact area(s) evaluated	Type of Impact	Impact Valuation	Impact Valuation Result in 2023	Impact Metric	Reference
Plastic Waste Diverted from Landfill	Plastic waste is diverted from landfill in Thailand by recycling used plastics 60,000 tons/year	Society	Positive	Social cost caused/ avoided	Decreased cost of waste disposal by increasing recycling of used plastics 96,000,000 THB/year	Decreased cost of waste disposal	<ul style="list-style-type: none"> IRIS, 2021. Non-hazardous Waste Avoided (PI8177). v5.2. https://www.saensukcity.go.th/images/sanitation/doc/sanitation-division-service-charge.pdf
		Environment	Positive	Environmental value lost/ gained	Decreased access to natural resources/areas 380 Rai by reducing landfill areas from increasing plastic waste diverted from landfill	Amount of decreased access to natural resources/areas	<ul style="list-style-type: none"> IRIS, 2021. Non-hazardous Waste Avoided (PI8177). v5.2. https://mfuic2012.mfu.ac.th/electronic_proceeding/Documents/00_PDF/O-SC-D/O-SC-D-006.pdf
	Single used Plastic waste is sent to landfill in Thailand 263,000 tons/year production	Society	Negative	Social cost caused/ avoided	Increased cost of waste disposal 420,800,000 THB/year	Increased cost of waste disposal	<ul style="list-style-type: none"> IRIS, 2021. Non-hazardous Waste Avoided (PI8177). v5.2. https://www.saensukcity.go.th/images/sanitation/doc/sanitation-division-service-charge.pdf
Amount of Collected PET/HDPE Bottles for Recycling	Amount of community collect PET/HDPE Bottles for Recycling 222.73 tons/year	Society	Positive	Increase/decrease in household-level income	Improved local community well-being by increasing household-level income from collecting and selling used plastics by 4,000,000 THB/year	Quality of life improvement: Amount of increased household-level income	<ul style="list-style-type: none"> IRIS, 2021. Non-hazardous Waste Avoided (PI8177). v5.2.
			Positive	Social Return on Investment (SROI)	37	SROI	<ul style="list-style-type: none"> https://www.socialvaluelab.org.uk/wp-content/uploads/2016/09/SROI-a-guide-to-social-return-on-investment.pdf



Impact 3 – Occupational Health and Safety

Cause of the impact: The operation of the business value chain with >50% of business activity

External stakeholder(s)/ Impact area(s) evaluated: External employees (contractors)

Topic relevance on external stakeholders: Occupational Health and Safety is one of the most important material issues of GC. GC assesses the external impacts which are vital to external employees such as contractors due to incidents or accidents from operations. GC recognizes and takes into account impacts on not only employees but also external stakeholders. Therefore, professional OHS management has been implemented in order to ensure that the workplace is safe and prevent work-related injuries and illnesses to both internal and external workers.

We measure the outputs of OHS by using various KPIs such as Total Recordable Injury Rate (TRIR), Lost Time Injury Frequency Rate (LTIFR), fatality, and lost workday. We also measure the OHS impact such as **Avoided income loss from fatality case avoidance** to monitor and develop the necessary programs for improving OHS processes and avoiding/decreasing work-related incident performance and impacts.

External Impacts:

Output Metric	Output Valuation	External stakeholder(s)/ impact area(s) evaluated	Type of Impact	Impact Valuation	Impact Valuation Result in 2023	Impact Metric	Reference
Number of Fatalities	1 fatality case avoidance due to the company's strengthened OHS programs	Society	Positive	Quantified quality of life impacted	Avoid the income loss of the contractor's family by the fatality case avoidance due to the company's strengthened OHS programs 2,803,680 THB/case*	Avoided income loss from fatality case avoidance	<ul style="list-style-type: none"> IRIS, 2021. Occupational Illnesses (OI7060). v5.2.

Note:

*The value is calculated by using the Thai minimum wage in Rayong, Thailand which is 354 THB per day (Rayong Provincial Labour Office, <https://rayong.mol.go.th/en/minimum-wage>), 22 workdays in a month, and 30 years of working period.