Global Green Chemicals Public Company Limited (GGC)

2024 CDP Corporate Questionnaire 2024

Word version

Important: this export excludes unanswered questions
This document is an export of your organization's CDP questionnaire response. It contains all data points for questions that are answered or in progress. There may be questions or data points that you have been requested to provide, which are missing from this document because they are currently unanswered. Please note that it is your responsibility to verify that your questionnaire response is complete prior to submission. CDP will not be liable for any failure to do so.
Terms of disclosure for corporate questionnaire 2024 - CDP

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02/13/2025, 03:22 am

Contents

C1. Introduction

(1.1) In which language are you submitting your response?

Select from:

☑ English

(1.2) Select the currency used for all financial information disclosed throughout your response.

Select from:

☑ THB

(1.3) Provide an overview and introduction to your organization.

(1.3.2) Organization type

Select from:

☑ Publicly traded organization

(1.3.3) Description of organization

Global Green Chemicals Public Company Limited or GGC is the first Oleochemical manufacturer in Thailand and is the Green Flagship Company of PTT Global Chemical Group. The company is committed to being the leading Oleochemical producer in the global market, along with continually creating economic sustainability for the agricultural and industrial sectors of Thailand. Currently, GGC's main products include Methyl Ester or B100 that is used as component in high speed diesel fuel, with a production capacity of 500,000 tons per year, Fatty Alcohol that is used as a main ingredient in cosmetics, surfactant, and various pharmaceuticals, with a production capacity of 100,000 tons per year, and pure Glycerin, which is an ingredient widely used in cosmetics and pharmaceuticals, with a production capacity of 51,000 tons per year. GGC's Production bases are located in the Hemaraj Eastern Industrial Estate (Map Ta Phut), Rayong Province and in the Thai Eastern Industrial Estate, Chonburi Province. In which, the entire GGC's products derived from raw materials from local crude palm oil, and are commercially distributed to both domestic and international customers. Additionally, in order to become the leader of green chemical company, GGC has established GGC Biochemical Company Limited (GGC Bio) where it has operated and continuously invested in green chemical business. GGC Biochemical Company Limited (GGC Bio) holds 50 percent of GGC KTIS Bioindustrial Co., Ltd. (GKBI), a joint venture of GGC Biochemical Company Limited (GGC Bio) and KTIS Bioethanol Company Limited (KTBE). GKBI determines to expand the investment in biochemical business through investing and constructing 1) Sugarcane Processing Plants 2) Ethanol Processing Plant 3) Biomass Power Plants with electricity selling services for other organization and 4) Related infrastructure investments. As a result, the expected commercial operation date of a new plant is in the first quarter of 2023. GKBI is also the manufacturer of ethanol, "E100", a composition of gasoline, with a nameplate capacity of

600,000 liter per day (186 million liter per year or 147,000 ton per year). Since 2019, GGC has established GGC Biochemical Co., Ltd. at the Nakhonsawan Biocomplex (NBC) in collaboration with KTIS Bioethanol Co., Ltd. and Kaset Thai International Sugar Corporation Public Company Limited and Nakhon Sawan Biocomplex (NBC) Phase 2. GGC focuses on investments, both domestic and international, to develop low-carbon products. The program covers the production of biofuels and utilities that use sugar cane as the raw material as well as bio-chemcial produts. For Sustainability, 2023 marked GGC's milestone in becoming a world-class sustainable entity, evident in our participation in the Paris Agreement, an accord under the United Nations Framework Convention on Climate Change. To elaborate, GGC has set an ambitious goal of a 20% reduction in scope 1 and 2 GHG Emissions by 2030 and set the goal of reducing Scope 3 emissions by 50% by 2050 compared to the base year 2020. Therefore, GGC conducts development of business in pursuit of the Net Zero emissions goal by 2050 through the Decarbonization Pathway action plan, which consists of operating Efficiency-Driven, Portfolio-Driven, Compensation Driven business operations, as well as a plan to expand the scope of operations to cover GHG Scope 3 (other indirect emissions throughout the value chain). Furthermore, GGC's strategy includes active engagement with suppliers and customers across the value chain to promote GHG reduction and circularity and become a partnership with industry associations and policy makers to accelerate the progress to become Net Zero Emission by 2050. With the GGC climate strategy, for scope 1 and 2 emissions, GGC focuses on the development of low carbon products & avoided emissions products with high value-added. For scope 3 emission, GGC is collecting the scope 3 emission data in categories that are absent and not verified to be able to set a target for scope 3.
[Fixed row]

(1.4) State the end date of the year for which you are reporting data. For emissions data, indicate whether you will be providing emissions data for past reporting years.

(1.4.1) End date of reporting year

12/30/2023

(1.4.2) Alignment of this reporting period with your financial reporting period

Select from:
☑ Yes

(1.4.3) Indicate if you are providing emissions data for past reporting years

Select from:
☑ Yes

(1.4.4) Number of past reporting years you will be providing Scope 1 emissions data for

Select from:

☑ 3 years

(1.4.5) Number of past reporting years you will be providing Scope 2 emissions data for

Select from:
☑ 3 years

(1.4.6) Number of past reporting years you will be providing Scope 3 emissions data for

Select from:
☑ 3 years
[Fixed row]

(1.4.1) What is your organization’s annual revenue for the reporting period?

17719000000

(1.5) Provide details on your reporting boundary.

	Is your reporting boundary for your CDP disclosure the same as that used in your financial statements?
	Select from: ☑ Yes

[Fixed row]

(1.6) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?

ISIN code - bond

(1.6.1) Does your organization use this unique identifier?

Select from:

☑ Yes

(1.6.2) Provide your unique identifier

TH7920010009 (Local), TH7920010017 (Foreign)

ISIN code - equity

(1.6.1) Does your organization use this unique identifier?

Select from:

☑ No

CUSIP number

(1.6.1) Does your organization use this unique identifier?

Select from:

☑ No

Ticker symbol

(1.6.1) Does your organization use this unique identifier?

Select from:

☑ No

SEDOL code

(1.6.1) Does your organization use this unique identifier?

Select from:
☑ No

LEI number

(1.6.1) Does your organization use this unique identifier?

Select from:
☑ No

D-U-N-S number

(1.6.1) Does your organization use this unique identifier?

Select from:
☑ No

Other unique identifier

(1.6.1) Does your organization use this unique identifier?

Select from:
☑ No
[Add row]

(1.7) Select the countries/areas in which you operate.

Select all that apply
☑ Thailand

(1.14) In which part of the chemicals value chain does your organization operate?

Other chemicals
☑ Specialty organic chemicals

(1.24) Has your organization mapped its value chain?

(1.24.1) Value chain mapped

Select from:

☑ Yes, we have mapped or are currently in the process of mapping our value chain

(1.24.2) Value chain stages covered in mapping

Select all that apply

☑ Upstream value chain

(1.24.3) Highest supplier tier mapped

Select from:

☑ Tier 1 suppliers

(1.24.4) Highest supplier tier known but not mapped

Select from:

☑ Tier 2 suppliers

(1.24.7) Description of mapping process and coverage

GGC places great importance on value chain management; therefore, the company emphasizes efficient supply chain management. This encompasses key partner selection processes and risk assessments of supplier operations, considering environmental, social, and good governance factors. Concurrently, GGC aims to create customer satisfaction and respond to evolving customer needs. GGC develops recommendations or measures to improve suppliers and promotes and supports the capacity development of partners. Moreover, GGC conducts customer satisfaction surveys through the Customer eQTM Index, a tool and criterion recognized globally for evaluating overall organizational management systems. The company gathers customer suggestions and complaints to formulate plans to accurately address customer needs. Additionally, GGC analyzes customer requirements to develop future business development and marketing strategies.
[Fixed row]

(1.24.1) Have you mapped where in your direct operations or elsewhere in your value chain plastics are produced, commercialized, used, and/or disposed of?

(1.24.1.1) Plastics mapping

Select from:

☑ No, and we do not plan to within the next two years

(1.24.1.5) Primary reason for not mapping plastics in your value chain

Select from:

☑ Judged to be unimportant or not relevant

(1.24.1.6) Explain why your organization has not mapped plastics in your value chain

In determining the significant of impact from plastics. GGC has no plastic use and generation of plastic waste, plastic is considered a less significant material compared to other environmental issues, including climate change, for GGC's operations. Consequently, there will be no report on the plastics issue this year. [Fixed row]

C2. Identification, assessment, and management of dependencies, impacts, risks, and opportunities

(2.1) How does your organization define short-, medium-, and long-term time horizons in relation to the identification, assessment, and management of your environmental dependencies, impacts, risks, and opportunities?

Short-term

(2.1.1) From (years)

0

(2.1.3) To (years)

5

(2.1.4) How this time horizon is linked to strategic and/or financial planning

Risk assessment is an integral part of the Company's corporate strategy as well as investment and business planning that cover short term risks, medium term risks, long term risks and emerging risks. In addition, GGC has also developed emergency plans for unexpected incident.

Medium-term

(2.1.1) From (years)

6

(2.1.3) To (years)

10

(2.1.4) How this time horizon is linked to strategic and/or financial planning

Risk assessment is an integral part of the Company's corporate strategy as well as investment and business planning that cover short term risks, medium term risks, long term risks and emerging risks. However, GGC realizes that the medium term risks might occur sooner than when the risks was expected, GGC has developed adaptation plan to cope with the risks.

Long-term

(2.1.1) From (years)

11

(2.1.2) Is your long-term time horizon open ended?

Select from:

☑ No

(2.1.3) To (years)

30

(2.1.4) How this time horizon is linked to strategic and/or financial planning

Risk assessment is an integral part of the Company's corporate strategy as well as investment and business planning that cover short term risks, medium term risks, long term risks and emerging risks. The long term risk management plan also includes GGC new business in the future to prepare for responding plan.
[Fixed row]

(2.2) Does your organization have a process for identifying, assessing, and managing environmental dependencies and/or impacts?

	Process in place	Dependencies and/or impacts evaluated in this process
	Select from: ☑ Yes	*Select from:* ☑ Both dependencies and impacts

[Fixed row]

(2.2.1) Does your organization have a process for identifying, assessing, and managing environmental risks and/or opportunities?

	Process in place	Risks and/or opportunities evaluated in this process	Is this process informed by the dependencies and/or impacts process?
	Select from: ☑ Yes	*Select from:* ☑ Both risks and opportunities	*Select from:* ☑ Yes

[Fixed row]

(2.2.2) Provide details of your organization's process for identifying, assessing, and managing environmental dependencies, impacts, risks, and/or opportunities.

Row 1

(2.2.2.1) Environmental issue

Select all that apply

☑ Climate change

(2.2.2.2) Indicate which of dependencies, impacts, risks, and opportunities are covered by the process for this environmental issue

Select all that apply

☑ Dependencies

☑ Impacts

☑ Risks

☑ Opportunities

(2.2.2.3) Value chain stages covered

Select all that apply

☑ Direct operations

☑ Upstream value chain

☑ Downstream value chain

(2.2.2.4) Coverage

Select from:

☑ Partial

(2.2.2.5) Supplier tiers covered

Select all that apply

☑ Tier 1 suppliers

(2.2.2.7) Type of assessment

Select from:

☑ Qualitative and quantitative

(2.2.2.8) Frequency of assessment

Select from:

☑ Annually

(2.2.2.9) Time horizons covered

Select all that apply

☑ Short-term

☑ Medium-term

☑ Long-term

(2.2.2.10) Integration of risk management process

Select from:

☑ Integrated into multi-disciplinary organization-wide risk management process

(2.2.2.11) Location-specificity used

Select all that apply

☑ Site-specific

☑ National

(2.2.2.12) Tools and methods used

Enterprise Risk Management

☑ Enterprise Risk Management

International methodologies and standards

☑ IPCC Climate Change Projections

(2.2.2.13) Risk types and criteria considered

Acute physical

☑ Drought

☑ Flood (coastal, fluvial, pluvial, ground water)

Chronic physical

☑ Changing temperature (air, freshwater, marine water)

Policy

☑ Carbon pricing mechanisms

☑ Changes to national legislation

Market

☑ Changing customer behavior

Reputation

☑ Negative press coverage related to support of projects or activities with negative impacts on the environment (e.g. GHG emissions, deforestation & conversion, water stress)

Technology

☑ Data access/availability or monitoring systems

Liability

☑ Non-compliance with regulations

(2.2.2.14) Partners and stakeholders considered

Select all that apply

☑ Customers

☑ Employees

☑ Investors

☑ Suppliers

☑ Regulators

☑ Local communities

(2.2.2.15) Has this process changed since the previous reporting year?

Select from:

☑ No

(2.2.2.16) Further details of process

GGC manages enterprise risks under the ISO 31000 - Risk Management scope and COSO Enterprise Risk Management guidelines and institutes a risk management policy for all. GGC integrates climate-related risks into its corporate-wide risk management process by identifying, assessing, and managing risks at both corporate and unit levels. This process involves continuous monitoring, using key risk indicators (KRIs) for early warnings, and reporting to the Enterprise Risk Management Committee (ERMC) monthly and to the Board and Risk Management Committee (RMC) quarterly. GGC's risk management policy ensures ongoing efficiency by dividing risks into two categories: Corporate Risks, risks from external factors with impacts on corporate business strategy, and risks with impacts on the efficiency of its business performance and corporate goals under the short-term and long-term corporate strategic plans, and Operational Risks, risks from operational process of the organization which have in place the management process or internal control system, and clear risk owners. Risk factors will be identified and assessed, and mitigation measures of operational level defined. GGC identifies climate-related risks that could disrupt value chain operations, affect the achievement of strategic business objectives, or materially impact its license to operate, including potential reputation issues. For physical climate risks, GGC uses IPCC scenarios RCP 1.9, 4.5, and 8.5, and for transition risks, it employs the STEPS and NZE scenarios from the IEA. The scope of risk identification, assessment and management covers the entire value chain including upstream activities (Tier-1 and non-tier 1suppliers), operations and downstream activities (customers). The timeframe of evaluation are in shot-term (current-5 years) medium (5-10 years) and long-term (10 years). Risk identification and assessment process; Identification: GGC identifies climate-related risks to determine situations or scenarios that could interrupt along value chain operations, affect the reasonable expectation of achieving the company's strategy and business objectives or materially impact the license to operate (including reputation issues). In terms of measuring severity of impact, GGC has defined the following criteria (Thresholds) for the risks events in different categories. Assessment: Short-, medium- and long-term opportunities and risks are assessed once a year in the context of the forecasting and the budgeting/planning process by Risk owners at BU. Opportunities and risks are potential which are deviated from set targets and planned/forecast EBITDA or net income above 10% would consider as substantive. Short-term and medium-term risks deviated from planned/forecast EBITDA or net income will be further assessed. All opportunities and risks are then analyzed and prioritized. The top risks and opportunities (in terms of the expected financial impact as well as the non-financial impact) are complied together with the measures. The climate-related risks and opportunities, according to the quantitative result, can be located in one of the four regions in the risk matrix: (low risk, monitored within the business unit), Yellow (medium risk, action plan required), Orange (high risk, mitigation plan with monthly reports), and Red (extreme risk, requiring a special mitigation team and monthly reporting).
[Add row]

(2.2.7) Are the interconnections between environmental dependencies, impacts, risks and/or opportunities assessed?

(2.2.7.1) Interconnections between environmental dependencies, impacts, risks and/or opportunities assessed

Select from:
☑ Yes

(2.2.7.2) Description of how interconnections are assessed

GGC has conducted an assessment of its environmental dependencies, impacts, risks, and opportunities, recognizing the interconnections between these issues. The results from these assessments will be used to identify key points and problematic areas to find solutions or mitigate impacts. This will help enhance the efficiency of resource allocation significantly. Additionally, the assessment includes evaluating risks associated with financial impacts. The results from this financial impact assessment will be applied to business and financial planning to enhance the efficiency of financial decision-making and investments related to environmental aspects towards long-term resilience and value creation.
[Fixed row]

(2.3) Have you identified priority locations across your value chain?

(2.3.1) Identification of priority locations

Select from:

☑ No, but we plan to within the next two years

(2.3.7) Primary reason for not identifying priority locations

Select from:

☑ No standardized procedure

(2.3.8) Explain why you do not identify priority locations

GGC has conducted the overview of the Biodiversity Risks Assessment and Water Risks Assessment through the WWF Biodiversity Suite and WWF Water Risk Filter Suites. The assessment is an overall assessment with the main focus on the own operations of GGC. The upstream and downstream location locations are selected from representatives of the suppliers and customers respectively. The result of the assessment indicates that there are no location in a high risks area both for biodiversity and water assessment. However, GGC is planned to conduct a full assessment in the near future and thoroughly sample the suppliers and customers in more details of the risks category and analysis.
[Fixed row]

(2.4) How does your organization define substantive effects on your organization?

Risks

(2.4.1) Type of definition

Select all that apply

☑ Qualitative

☑ Quantitative

(2.4.2) Indicator used to define substantive effect

Select from:

☑ EBITDA

(2.4.3) Change to indicator

Select from:

☑ % decrease

(2.4.4) % change to indicator

Select from:

☑ 1-10

(2.4.6) Metrics considered in definition

Select all that apply

☑ Frequency of effect occurring

☑ Time horizon over which the effect occurs

☑ Likelihood of effect occurring

(2.4.7) Application of definition

Climate change is important to the company's strategy and business growth. GGC defined substantive financial or strategic impact from the possibilities of risks ranging from business related risks to climate related risks that could interrupt our value chain and operations, or affect the ability to achieve the company's strategy and business objectives, or materially impact the license to operate (including reputation issues). The climate related risks include acute physical risks including drought and flood, chronic related risks include the risen of temperature and transitional risks include regulatory, reputation and technical risks. a) Financial: Impacts on GGC's EBITDA/ cash flow or subsidiaries' EBITDA/cash flow above 10% b) Health, Safety and Environment: involvement in severe injury case and above environmental impact of magnitude, but reversible with mitigation actions c) Partner/customer: reduction of sales volume by 10-20%, or loss of contract with suppliers and customers d) Regulation: Violation of laws and regulations e) Brand/reputation/social: Above concern/complaints of public

groups/organizations, and impact on local communities, but reversible with long-term mitigation f) Goal/achievement: Above business disruption and unachievable corporate goals The risk level of the above category will be evaluated based on probability and magnitude of impact: a) Probability of occurrence (Rarely, Unlikely, Possible, Probable) b) Magnitude of Impact (Minor, Moderate, Major, and Severe) Considering the combination of the magnitude of impacts with the probability of occurrence, the risk factors with low financial impact, but high probability, might also be classified as 'high risk' occurrence as well.

Opportunities

(2.4.1) Type of definition

Select all that apply

☑ Qualitative

☑ Quantitative

(2.4.2) Indicator used to define substantive effect

Select from:

☑ EBITDA

(2.4.3) Change to indicator

Select from:

☑ % increase

(2.4.4) % change to indicator

Select from:

☑ 1-10

(2.4.6) Metrics considered in definition

Select all that apply

☑ Frequency of effect occurring

☑ Time horizon over which the effect occurs

☑ Likelihood of effect occurring

(2.4.7) Application of definition

Climate change is important to the company's strategy and business growth. GGC defined substantive financial or strategic impact from the possibilities of risks and opportunities ranging from business related risks and opportunity that could interrupt or benefit our value chain and operations, negatively or positively affect the ability to achieve the company's strategy and business objectives, or materially impact the license to operate (including reputation issues). The climate related opportunities include transitional opportunities namely regulatory, reputation and technical aspects. a) Financial: Impacts on GGC's EBITDA/ cash flow or subsidiaries' EBITDA/cash flow above 10% b) Partner/customer: improvement of sales volume by 10-20%, or secure contract with suppliers and customers c) Brand/reputation/social: Beneficial to brand and perception of the products which results in positive brand recognition d) Goal/achievement: Above business disruption and unachievable corporate goals The opportunity level of the above category will be evaluated based on probability and magnitude of impact: a) Probability of occurrence (Rarely, Unlikely, Possible, Probable) b) Magnitude of Impact (Minor, Moderate, Major, and Severe)
[Add row]

C3. Disclosure of risks and opportunities

(3.1) Have you identified any environmental risks which have had a substantive effect on your organization in the reporting year, or are anticipated to have a substantive effect on your organization in the future?

Climate change

(3.1.1) Environmental risks identified

Select from:

☑ Yes, both in direct operations and upstream/downstream value chain

Plastics

(3.1.1) Environmental risks identified

Select from:

☑ No

(3.1.2) Primary reason why your organization does not consider itself to have environmental risks in your direct operations and/or upstream/downstream value chain

Select from:

☑ Not an immediate strategic priority

(3.1.3) Please explain

Due to no plastic use and generation of plastic waste, plastic is considered a less significant material compared to other environmental issues, including climate change, for GGC's operations. Consequently, there will be no report on the plastics issue this year.
[Fixed row]

(3.1.1) Provide details of the environmental risks identified which have had a substantive effect on your organization in the reporting year, or are anticipated to have a substantive effect on your organization in the future.

Climate change

(3.1.1.1) Risk identifier

Select from:

☑ Risk1

(3.1.1.3) Risk types and primary environmental risk driver

Acute physical

☑ Drought

(3.1.1.4) Value chain stage where the risk occurs

Select from:

☑ Upstream value chain

(3.1.1.6) Country/area where the risk occurs

Select all that apply

☑ Thailand

(3.1.1.9) Organization-specific description of risk

Thailand is a country that is ranked among the top countries most affected by physical climate risk. Our business relies on agricultural feedstock as our main raw material, palm oil and sugarcane, which are vulnerable to change in climate patterns especially drought and flood. Drought is the most impactful to our main feedstocks, which is sugarcane and palm oil production and their quality. This will lead to increase of feedstock cost to our biochemical business. As a result of risk assessment throughout value chain, drought and flood is likely to have medium-high impact on upstream activity, especially on the reduction of productivity from acute physical climate event resulting in soaring prices and feedstock shortage which can be so severe to cause GGC plants to lower its production capacity or even shutdown. This results in loss of revenue, increased cost of feedstock, and narrowed profit margin for GGC.

(3.1.1.11) Primary financial effect of the risk

Select from:

☑ Decreased revenues due to reduced production capacity

(3.1.1.12) Time horizon over which the risk is anticipated to have a substantive effect on the organization

Select all that apply

☑ Medium-term

(3.1.1.13) Likelihood of the risk having an effect within the anticipated time horizon

Select from:

☑ Likely

(3.1.1.14) Magnitude

Select from:

☑ Medium-high

(3.1.1.16) Anticipated effect of the risk on the financial position, financial performance and cash flows of the organization in the selected future time horizons

The extreme drought event driving up sugarcane price this may result in the financial impact on additional feedstock cost. GGC runs the scenario analysis of RCP1.9, RCP4.5 and RCP8. In the timeframe of 2030 and 2050. This indicates the percentage of dry days in Nakhon Sawan, which is the main province for Sugar Cane Plantation. It is anticipated that in 2030, the extreme drought event driving up the mill gate price of sugarcane from 1,000 THB to 1,300 THB (30% increase, reference from extreme drought event in 2021). At maximum plant's capacity, this may result in the financial impact on additional feedstock cost around 450 million THB.

(3.1.1.17) Are you able to quantify the financial effect of the risk?

Select from:

☑ Yes

(3.1.1.21) Anticipated financial effect figure in the medium-term – minimum (currency)

450000000

(3.1.1.22) Anticipated financial effect figure in the medium-term – maximum (currency)

450000000

(3.1.1.25) Explanation of financial effect figure

The max number of consecutive dry days in Nakhon Sawan is likely to increase the most under RCP 1.9 (8%) both in 2030 and 2050, as well as under RCP 8.5 (7%) in 2050. The financial impact proxy is based on the extreme drought event in 2021 driving up the mill gate price of sugarcane from 1,000 THB to 1,300 THB (30% increase). At maximum plant's capacity, this may result in the financial impact on additional feedstock cost around 450 million THB. For oil palm, 2017 extreme flood event in the southern region where most of oil palm was produced, was reported to drive up the cost of Fresh Fruit Bunches (FFB) by 40% from 4.20 THB/kg to 7 THB/ton. Due to the complex cost structure of crude palm oil, the financial impact in increased feedstock cost cannot be directly estimated.

(3.1.1.26) Primary response to risk

Policies and plans

☑ Develop drought emergency plans

(3.1.1.27) Cost of response to risk

14400000

(3.1.1.28) Explanation of cost calculation

The cost of responses have been calculated from water back up plan investment, which is calculated from water consumption per day (800 m3/day) x 300 THB per m3 x 60 (days) 14,400,000 THB. The timescale for construction of rain harvesting and water storage as part of water backup plan would be 1-2 years.

(3.1.1.29) Description of response

Upstream mitigation measures for feedstock soaring price and shortage include 1) monitoring of water situation across Thailand region and prepare to diversify supply sources of palm oil and sugarcane so that when the flood and drought occurs there are alternative sources of feedstock. there is no cost of diversifying or changing supply sources due to it is part of normal procurement operation. 2) The use of derivatives on feedstock price to reduce financial risk from price volatility. Furthermore, 3) GGC also has planned to construct rain harvesting and water storage system for its suppliers in order to handle water scarcity issues. The water back-up plan also affect the direct cost of GGC.

Climate change

(3.1.1.1) Risk identifier

Select from:

☑ Risk2

(3.1.1.3) Risk types and primary environmental risk driver

Policy

☑ Carbon pricing mechanisms

(3.1.1.4) Value chain stage where the risk occurs

Select from:

☑ Direct operations

(3.1.1.6) Country/area where the risk occurs

Select all that apply

☑ Thailand

(3.1.1.9) Organization-specific description of risk

Thailand is a country that is ranked among the top countries most affected by physical climate risk. Our business relies on agricultural feedstock as our main raw material, palm oil and sugarcane, which are vulnerable to change in climate patterns especially drought and flood. Drought is the most impactful to our main feedstocks, which is sugarcane and palm oil production and their quality. This will lead to increase of feedstock cost to our biochemical business. As a result of risk assessment throughout value chain, drought and flood is likely to have medium-high impact on upstream activity, especially on the reduction of productivity from acute physical climate event resulting in soaring prices and feedstock shortage which can be so severe to cause GGC plants to lower its production capacity or even shutdown. This results in loss of revenue, increased cost of feedstock, and narrowed profit margin for GGC.

(3.1.1.11) Primary financial effect of the risk

Select from:

☑ Increased direct costs

(3.1.1.12) Time horizon over which the risk is anticipated to have a substantive effect on the organization

Select all that apply

☑ Medium-term

☑ Long-term

(3.1.1.13) Likelihood of the risk having an effect within the anticipated time horizon

Select from:

☑ Likely

(3.1.1.14) Magnitude

Select from:

☑ Medium-high

(3.1.1.16) Anticipated effect of the risk on the financial position, financial performance and cash flows of the organization in the selected future time horizons

To mitigate the impact of future carbon taxes, GGC needs to increase its investment in environmental initiatives. By utilizing the future projection under the IEA's Stated Policies (STEPS) and Net Zero Emissions 2050 (NZE) scenarios representing "Worst Case Scenario" and "Business as Usual Scenario". Under the 2 circumstances, the carbon price was 416 THB/tonne CO2 for STEPS 2030, 928 THB/tonne CO2 for STEPS 2050, 800 THB/tonne CO2 for NZE 2030, and 5,763 THB/tonne CO2 for NZE 2050.

(3.1.1.17) Are you able to quantify the financial effect of the risk?

Select from:

☑ Yes

(3.1.1.21) Anticipated financial effect figure in the medium-term – minimum (currency)

53000000

(3.1.1.22) Anticipated financial effect figure in the medium-term – maximum (currency)

100000000

(3.1.1.23) Anticipated financial effect figure in the long-term – minimum (currency)

102000000

(3.1.1.24) Anticipated financial effect figure in the long-term – maximum (currency)

622000000

(3.1.1.25) Explanation of financial effect figure

GGC conducted the scenario analysis on our future projection under the IEA's Stated Policies (STEPS) and Net Zero Emissions 2050 (NZE) scenarios. GGC evaluated the potential financial implications that may arise from the implementation of a carbon tax mechanism under the "worst-case" assumption that GGC would need to pay carbon tax for 100% of its emissions every year. It is assumed that the STEPS scenario is representative of GGC's ""business-as-usual"" scenario while NZE represents a "low carbon" scenario. GGC's forecasted scope 1 and 2 emissions (without considering any interventions and reduction initiatives) was multiplied by the IEA World Energy Outlook 2022 carbon price forecast. The carbon price was 416 THB/tonne CO2 for STEPS 2030, 928 THB/tonne CO2 for STEPS 2050, 800 THB/tonne CO2 for NZE 2030, and 5,763 THB/tonne CO2 for NZE 2050. The transition scenario analysis results indicated that by 2030, carbon tax costs would potentially range from 53 million THB under STEPS to 100 million THB under NZE. By 2050, carbon tax costs would potentially range from 102 million THB under STEPS to 622 million THB under NZE. Therefore the potential financial impact figure was determined as a range of 53 million THB to 622 million THB, reflecting minimum and maximum potential impacts.

(3.1.1.26) Primary response to risk

Infrastructure, technology and spending

☑ Increase investment in R&D

(3.1.1.27) Cost of response to risk

24000000

(3.1.1.28) Explanation of cost calculation

The cost of response is calculated from the company's investment on the major environmental investments such as the reduction of steam consumption at methanol distillation investment (14,000,000 THB) and the installation of second reboiler (economizer) for steam saving (10,000,000 THB), both of these projects are expected to provide a cost saving of around 5,000,000 THB per year. Therefore, the total cost of response is 24,000,000 THB. Moreover, GGC plans to increase investment on low carbon process technology and renewable energy that can significantly mitigate impact from carbon price regulation in the near future. The timescale of environmental investment would be 5-10 years.

(3.1.1.29) Description of response

GGC has planned to increase capital expenditure directed for increasing the share of renewable energy consumption, enhancing energy efficiency in GGC operation and investing more in low carbon/decarbonization technology.
[Add row]

(3.1.2) Provide the amount and proportion of your financial metrics from the reporting year that are vulnerable to the substantive effects of environmental risks.

Climate change

(3.1.2.1) Financial metric

Select from:
☑ CAPEX

(3.1.2.2) Amount of financial metric vulnerable to transition risks for this environmental issue (unit currency as selected in 1.2)

0

(3.1.2.3) % of total financial metric vulnerable to transition risks for this environmental issue

Select from:
☑ Less than 1%

(3.1.2.4) Amount of financial metric vulnerable to physical risks for this environmental issue (unit currency as selected in 1.2)

0

(3.1.2.5) % of total financial metric vulnerable to physical risks for this environmental issue

Select from:

☑ Less than 1%

(3.1.2.6) Amount of CAPEX in the reporting year deployed towards risks related to this environmental issue

0

(3.1.2.7) Explanation of financial figures

In 2023, there are no risks from drought therefore, there are no financial or physical risk effects from agricultural products specifically sugarcane one of the main feed raw materials of GGC. Nevertheless, GGC continuously monitors changes in sugarcane prices and the yield of the sugarcanes from the farmers. To prevent any future financial risks from sugar cane supply especially from the physical risks, GGC invests in water management system project to ensure adequate water supply for sugarcane cultivation by farmers. GGC together with municipal governments and other stakeholders invests in the installation of the system and canal dredging for farmers in the areas. This can be beneficial for GGC, farmers and other stakeholders if there is drought in the future.
[Add row]

(3.5) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Select from:

☑ No, but we anticipate being regulated in the next three years

(3.5.4) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

GGC realizes that any carbon price mechanism, such as carbon trading under cap & trade scheme, carbon tax or carbon offset price, can affect GGC in term of increasing the operational expense proportional to the amount of GHG emission. Especially, domestic carbon price mechanism will directly affect to GGC probably in short-term according to Thailand's targets. For medium-term and long-term, the international carbon price mechanism would affect to GGC due to business expansion that is included in GGC business strategy.   Internal carbon pricing (IPC) is an effective tool for addressing the risks. Therefore, GGC has planned to initiate internal carbon pricing project to set the ICP in the near future with the following objectives; 1) To conduct climate-related risk management by applying Thailand's NDC and company target (Reduce 20% of GHG emission within 2030 and achieve net zero emission by 2065). 2) To prepare for responding stakeholder expectations 3) To Change internal behavior 4) To drive energy efficiency projects 5) To drive low-carbon investments with consideration of ICP as part of specific investment criteria for GHG emission reduction projects 6) To test investment stress and identify low-carbon opportunities e.g. increasing renewable energy and enhancing energy saving, etc. 7) To engage with suppliers 8) To raise awareness and encourage participation of GHGs reduction for both internal and external

stakeholders including shareholder, customer and community   In 2023, GGC has reviewed, identified gap with peers, and studied the suitability of internal carbon price for GGC. For the next year, GGC will continue develop the carbon pricing system and engage with both internal and external stakeholders to inform and receive feedback for improvement. Additionally, GGC plan and prepare for Trading/Offset Activities, including nature-based solutions, generating value through Environmental Attribution Certificates such as carbon credits and renewable energy certificates, and implementing internal carbon pricing. This approach will ensure GGC is ready for anticipated regulations in the next three years. GGC also anticipated regulated carbon market in Thailand is likely to be in place by year 2025 to 2030. GGC also expect Thailand's Climate Change Act to be announced by 2023, in which we could refer as a guideline to implement the carbon pricing system.

(3.6) Have you identified any environmental opportunities which have had a substantive effect on your organization in the reporting year, or are anticipated to have a substantive effect on your organization in the future?

	Environmental opportunities identified
Climate change	*Select from:* ☑ Yes, we have identified opportunities, and some/all are being realized

[Fixed row]

(3.6.1) Provide details of the environmental opportunities identified which have had a substantive effect on your organization in the reporting year, or are anticipated to have a substantive effect on your organization in the future.

Climate change

(3.6.1.1) Opportunity identifier

Select from:

☑ Opp1

(3.6.1.3) Opportunity type and primary environmental opportunity driver

Markets

☑ Other markets opportunity, please specify **:**Development and/or expansion of low emission goods and services

(3.6.1.4) Value chain stage where the opportunity occurs

Select from:

☑ Direct operations

(3.6.1.5) Country/area where the opportunity occurs

Select all that apply

☑ Thailand

(3.6.1.8) Organization specific description

With global efforts to decarbonize various sectors, biofuels have been identified as one of the key enablers of a low carbon economy transition in the short-term. Particularly for the transport sector, biofuels play an important role in decarbonizing the sector by providing low carbon solutions that can be utilized with existing technologies. A review of global biofuel market trends indicate an increase in demand with demand peaking in 2030 before gradually declining due to electrification and the utilization of alternative fuels (e.g. green hydrogen). However, looking at the near-term (i.e. up to 2030), GGC identifies opportunities in potentially increasing our ME production as there is still appetite for biofuels in upcoming years. In 2023, biofuels (Methyl Ester (ME) or B100) was one of GGC's main products and revenue stream. accounting for over 65% of GGC's total revenue.

(3.6.1.9) Primary financial effect of the opportunity

Select from:

☑ Increased revenues resulting from increased demand for products and services

(3.6.1.10) Time horizon over which the opportunity is anticipated to have a substantive effect on the organization

Select all that apply

☑ Short-term

☑ Medium-term

☑ Long-term

☑ The opportunity has already had a substantive effect on our organization in the reporting year

(3.6.1.11) Likelihood of the opportunity having an effect within the anticipated time horizon

Select from:

☑ Very likely (90–100%)

(3.6.1.12) Magnitude

Select from:

☑ Medium

(3.6.1.13) Effect of the opportunity on the financial position, financial performance and cash flows of the organization in the reporting period

GGC produces Methyl Ester, defined as a low carbon product. In 2023, Methyl Ester accounted for 65% of GGC's total revenue, amounting to 11,517,350,000 THB out of a total revenue of 17,719,000,000 THB.

(3.6.1.14) Anticipated effect of the opportunity on the financial position, financial performance and cash flows of the organization in the selected future time horizons

In GGC's transition scenario analysis, the potential financial impacts from changes in biofuel demand were identified as an opportunity. The financial impact is estimated based on the potential revenue from increased biofuel production. GGC has calculated the financial impact in the short, medium, and long term using Scenario Analysis. The analysis utilizes scenarios from the IEA, specifically the Stated Policies Scenario (STEPS) to determine the minimum financial impact, and the Net Zero Emissions by 2050 Scenario (NZE) to determine the maximum financial impact. The short-term, medium-term, and long-term financial impacts are referenced for the years 2025, 2030, and 2050, respectively.

(3.6.1.15) Are you able to quantify the financial effects of the opportunity?

Select from:

☑ Yes

(3.6.1.16) Financial effect figure in the reporting year (currency)

11517350000

(3.6.1.17) Anticipated financial effect figure in the short-term - minimum (currency)

16641849836

(3.6.1.18) Anticipated financial effect figure in the short-term – maximum (currency)

17714028970

(3.6.1.19) Anticipated financial effect figure in the medium-term - minimum (currency)

17190617335

(3.6.1.20) Anticipated financial effect figure in the medium-term - maximum (currency)

18489000178

(3.6.1.21) Anticipated financial effect figure in the long-term - minimum (currency)

13877489677

(3.6.1.22) Anticipated financial effect figure in the long-term – maximum (currency)

13397668921

(3.6.1.23) Explanation of financial effect figures

In GGC's transition scenario analysis, the potential financial impacts from change in biofuel demand was identified as an opportunity. The financial impact is estimated from the potential revenue from additional production of biofuels in the short-term (2030) by using biofuel consumption data (sourced from the IEA World Energy Outlook 2022) as a proxy for demand and projecting GGC's production of ME against the year-on-year percentage change in liquid bioenergy consumption under STEPS and NZE. To quantify the associated financial implication that may arise from this opportunity, the revenue from the forecasted production of biofuels under each of the two scenarios was estimated with the change between the base case compared to each scenario indicating the degree of opportunity. In 2025, the potential revenue from Methyl Ester is estimated at 16,641 million THB under the STEPS scenario and 17,714 million THB under the NZE scenario. In 2030, the potential revenue from Methyl Ester is projected to be 17,190 million THB under STEPS and 18,489 million THB under NZE. By 2050, the potential revenue is expected to be 13,877 million THB under STEPS, while under the NZE scenario, it is projected to be 13,397 million THB.

(3.6.1.24) Cost to realize opportunity

1430000000

(3.6.1.25) Explanation of cost calculation

GGC has set a goal to expand its eco-friendly business operations. In 2023, GGC invested in the construction of a new production facility that will focus on expanding the production of biofuels and other chemicals. This aligns with GGC's strategy to develop more environmentally friendly products, meet increasing market demand, and elevate its products to the level of High-Value Products (HVP). The investment in this new plant amounts to approximately 1,430,000,000 THB. The new facility will feature enhanced capabilities in high-stability power distribution, steam production and distribution, water production, and wastewater treatment, ensuring that the new plant is environmentally friendly and minimizes its impact on the environment.

(3.6.1.26) Strategy to realize opportunity

GGC has established a climate strategy known as the "3 drivens," which consists of Efficiency-driven, Portfolio-driven, and Compensation-driven approaches. Under the Portfolio-driven strategy, GGC plans to enhance efficiency processes and products, with a focus on Biochemicals, High-Value Products, and Sustainable Products. The company will seek business opportunities by evaluating and exploring its current operations that can be leveraged to create additional value in both the biofuel and biochemical sectors. Moreover, GGC is considering increasing its investment in products derived from Fatty Alcohol to meet the growing market demand.

Climate change

(3.6.1.1) Opportunity identifier

Select from:

☑ Opp2

(3.6.1.3) Opportunity type and primary environmental opportunity driver

Energy source

☑ Shift toward decentralized energy generation

(3.6.1.4) Value chain stage where the opportunity occurs

Select from:

☑ Direct operations

(3.6.1.5) Country/area where the opportunity occurs

Select all that apply

☑ Thailand

(3.6.1.8) Organization specific description

The shift from fuel oil to biogas presents significant opportunities for GGC. Typically, GGC uses fuel oil as fuel for the Hot Oil and Steam Boiler Package, but fuel oil emits high levels of greenhouse gases. To address this, GGC is exploring the use of biogas as an alternative to fuel oil. This transition is expected to reduce greenhouse gas emissions from the production process and lower energy costs, as biogas is more cost-effective than fuel oil. This ultimately can bring about low carbon in the production of GGC's products, contributing to the company's strategy of advocating for low carbon products.

(3.6.1.9) Primary financial effect of the opportunity

Select from:

☑ Reduced direct costs

(3.6.1.10) Time horizon over which the opportunity is anticipated to have a substantive effect on the organization

Select all that apply

☑ Short-term

(3.6.1.11) Likelihood of the opportunity having an effect within the anticipated time horizon

Select from:

☑ Very likely (90–100%)

(3.6.1.12) Magnitude

Select from:

☑ Medium-high

(3.6.1.14) Anticipated effect of the opportunity on the financial position, financial performance and cash flows of the organization in the selected future time horizons

The financial impact is based on the investment opportunity in a biogas power plant. The energy produced by the biomass power plant will be self-consumed, resulting in operating cost savings due to lower energy price. Thus, the calculation of financial effect will take into consideration of the cost avoided from buying steam from outside sources in the timeframe of 7 years.

(3.6.1.15) Are you able to quantify the financial effects of the opportunity?

Select from:

☑ Yes

(3.6.1.17) Anticipated financial effect figure in the short-term - minimum (currency)

19750000

(3.6.1.18) Anticipated financial effect figure in the short-term – maximum (currency)

19750000

(3.6.1.23) Explanation of financial effect figures

The financial impact come from cost saving from biogas power plant. The cost savings from reducing fuel oil purchases by incorporating biogas into the production process. The fuel oil usage will reduced by 80% from switching to biogas, influencing lower cost of purchasing fuel by THB 15,750,000. Moreover, GGC's waste water is used for the biogas generation. Thus, the cost saving of THB 4,000,000 also derived from the reduction of waste water treatment cost, as the waste water has been sent to produced biogas instead, which improving the circular economy of the company. Ultimately, by switching to biogas, GGC will be able to reduce fuel costs (from outside sources) by 19,750,000 THB per year over a period of seven years.

(3.6.1.24) Cost to realize opportunity

70000003

(3.6.1.25) Explanation of cost calculation

GGC has invested 70,000,000 THB in infrastructure to be compatible with biogas at its ME 2 plant, with the project expected to be completed by 2024. Once operational, the switch to biogas will reduce fuel costs and lower maintenance expenses, resulting in savings of 19,750,000 THB.

(3.6.1.26) Strategy to realize opportunity

GGC has established a climate strategy known as the "3-drivens", which consist of Efficiency -Driven, Portfolio-Driven and Compensation-Driven. GGC's Efficiency-driven strategy focuses on enhancing energy efficiency. One key initiative under this strategy is the transition from using fuel gas to biogas. This shift not only improves energy efficiency and reduces production costs but also lowers greenhouse gas emissions, contributing to GGC's goal of achieving Net Zero emissions by 2050. Furthermore, the adoption of biogas enhances the sustainability of GGC's products, reinforcing their portfolio as Sustainable Products. Additionally, this transition helps reduce maintenance costs by minimizing equipment downtime.
[Add row]

(3.6.2) Provide the amount and proportion of your financial metrics in the reporting year that are aligned with the substantive effects of environmental opportunities.

Climate change

(3.6.2.1) Financial metric

Select from:

☑ Revenue

(3.6.2.2) Amount of financial metric aligned with opportunities for this environmental issue (unit currency as selected in 1.2)

16478670000

(3.6.2.3) % of total financial metric aligned with opportunities for this environmental issue

Select from:

☑ 61-70%

(3.6.2.4) Explanation of financial figures

As consumers nowadays are increasingly paying attention to the environmental and social sustainability of the products they buy (i.e. home care and personal care), the consumer product companies who are our customers are looking for low carbon and sustainable raw materials. Having certified low carbon and sustainable products, thus, provides a big market opportunity for GGC. The development of low carbon products and/or sustainable products also allows GGC to comply with trade regulations such as Carbon Border Adjustment Mechanism (CBAM), which opens the market in other regions and provides competitive advantage for both GGC and our customers. The emerging Carbon Offsetting and Reduction Scheme in Aviation (CORSIA) will also push the airline companies to source low carbon fuels which presents an opportunity for GGC to capture in terms of Sustainable Aviation Fuel (SAF) and other advanced biofuels. The reported financial impact figure was calculated from current low carbon product (Pre-cut and main-cut fatty alcohol) and product the helps third-party to avoid emission (Bio-Methyl Ester) which accounts for 93 percent of GGC revenue in 2023. For more information, in 2023, the sales revenue from Pre-cut and main-cut fatty alcohol were 4,961,320,000 THB, and the sales revenue from Bio-Methyl Este was 11,517,350,000 THB, or 16,478,670,000 THB in total. This is accounted for 65% of total revenue in 2023.
[Add row]

C4. Governance

(4.1) Does your organization have a board of directors or an equivalent governing body?

(4.1.1) Board of directors or equivalent governing body

Select from:

☑ Yes

(4.1.2) Frequency with which the board or equivalent meets

Select from:

☑ Quarterly

(4.1.3) Types of directors your board or equivalent is comprised of

Select all that apply

☑ Executive directors or equivalent

☑ Non-executive directors or equivalent

☑ Independent non-executive directors or equivalent

(4.1.4) Board diversity and inclusion policy

Select from:

☑ Yes, and it is publicly available

(4.1.5) Briefly describe what the policy covers

The GGC nomination and appointment of board director must be transparent and clear. The nominated director must be qualified a conflict of interest and the board diversity. The board diversity is focus on ratio of female directors and independent director, the diversity of race and nationality.

(4.1.6) Attach the policy (optional)

ggc-cg-and-business-coc-en.pdf
[Fixed row]

(4.1.1) Is there board-level oversight of environmental issues within your organization?

	Board-level oversight of this environmental issue
Climate change	*Select from:* ☑ Yes
Biodiversity	*Select from:* ☑ Yes

[Fixed row]

(4.1.2) Identify the positions (do not include any names) of the individuals or committees on the board with accountability for environmental issues and provide details of the board's oversight of environmental issues.

Climate change

(4.1.2.1) Positions of individuals or committees with accountability for this environmental issue

Select all that apply
☑ Board chair

(4.1.2.2) Positions' accountability for this environmental issue is outlined in policies applicable to the board

Select from:
☑ Yes

(4.1.2.3) Policies which outline the positions' accountability for this environmental issue

Select all that apply

☑ Board mandate

(4.1.2.4) Frequency with which this environmental issue is a scheduled agenda item

Select from:

☑ Scheduled agenda item in every board meeting (standing agenda item)

(4.1.2.5) Governance mechanisms into which this environmental issue is integrated

Select all that apply

☑ Reviewing and guiding annual budgets

☑ Overseeing the setting of corporate targets

☑ Monitoring progress towards corporate targets

☑ Approving corporate policies and/or commitments

☑ Approving and/or overseeing employee incentives

☑ Overseeing and guiding the development of a climate transition plan

☑ Overseeing and guiding major capital expenditures

☑ Monitoring the implementation of the business strategy

☑ Monitoring the implementation of a climate transition plan

☑ Overseeing and guiding the development of a business strategy

☑ Monitoring compliance with corporate policies and/or commitments

(4.1.2.7) Please explain

The Corporate Governance and Sustainable Development Committee (CG&SD), is appointed by the board of directors, consists of at least three directors and at least one of them as well as the Chairman must be an independent director. The current members of the CG&SD are all independent directors, with a three-year term of office, or term ending upon termination of GGC's directorship status or resignation or removal. The CG&SD performs its duties as assigned by the Board in defining guidelines, providing recommendations on policy and procedures in relation to the code of conduct and business ethics, in line with corporate governance principles before submitting the report to the Board and management. The CG&SD also monitored CG implementation, conducted assessment and reviewed related policies and procedures to be in compliance with corporate governance principles (code) and in line with those of the Securities and Exchange Commission, Thailand (SEC), the Stock Exchange of Thailand (In 2023, The CG&SD held five meetings in total in carrying out their tasks related to the Environmental related agendas including climate related issued as well as Corporate Governance and Code of Conduct. They also followed up the progress of the Company's sustainable development operation in accordance with the international standard, United Nations Charter (UN Global Compact). They also approved the 2023 sustainable development plan in line with its strategies, global situations, and dynamic challenges along with monitoring the targets against the Net Zero Target within 2050. Moreover, the board chair also established the Risk Management Committee (RMC). The RMC defines effective risk management methods, monitors their effectiveness, provides input on potential risks in investment projects, manages joint ventures and contracts, promotes internal control assessment, and ensures compliance with laws and international standards. Monitored, provided opinions, and made recommendations on corporate-level risk and crisis management for 2023 and also provided opinions on the mitigation measures for emerging risks. Considered and commented on the improvement and reviewed the risk management framework in various aspects i.e., raw material and product price fluctuation, inventory management, investment in key projects, and foreign exchange rates. - Monitored, provided comments, and suggestions on the biodiesel market situation and risk management related to prices and price differences (hedging). Furthermore, the RMC followed

up on the operational results of inventory risk management on a quarterly basis to mitigate the impact of stock loss and exchange rate movements. Additionally, the RMC made suggestions on preparing and seeking guidelines for the use of Green or Carbon Credits. The CG&SD and RMC regularly submitted the reports on the progress of the development to the Board for further advice and recommendations to take better care of stakeholders.

Biodiversity

(4.1.2.1) Positions of individuals or committees with accountability for this environmental issue

Select all that apply

☑ Board chair

(4.1.2.2) Positions' accountability for this environmental issue is outlined in policies applicable to the board

Select from:

☑ Yes

(4.1.2.3) Policies which outline the positions' accountability for this environmental issue

Select all that apply

☑ Board mandate

(4.1.2.4) Frequency with which this environmental issue is a scheduled agenda item

Select from:

☑ Scheduled agenda item in every board meeting (standing agenda item)

(4.1.2.5) Governance mechanisms into which this environmental issue is integrated

Select all that apply

☑ Reviewing and guiding annual budgets

☑ Overseeing the setting of corporate targets

☑ Monitoring progress towards corporate targets

☑ Approving corporate policies and/or commitments

☑ Approving and/or overseeing employee incentives

☑ Overseeing and guiding major capital expenditures

☑ Monitoring the implementation of the business strategy

☑ Overseeing and guiding the development of a business strategy

☑ Monitoring compliance with corporate policies and/or commitments

(4.1.2.7) Please explain

The Corporate Governance and Sustainable Development Committee (CG&SD), is appointed by the board of directors, consists of at least three directors and at least one of them as well as the Chairman must be an independent director. The current members of the CG&SD are all independent directors, with a three-year term of office, or term ending upon termination of GGC's directorship status or resignation or removal. The CG&SD performs its duties as assigned by the Board in defining guidelines, providing recommendations on policy and procedures in relation to the code of conduct and business ethics, in line with corporate governance principles before submitting the report to the Board and management. The CG&SD also monitored CG implementation, conducted assessment and reviewed related policies and procedures to be in compliance with corporate governance principles (code) and in line with those of the Securities and Exchange Commission, Thailand (SEC), the Stock Exchange of Thailand. In 2023, The CG&SD held five meetings in total in carrying out their tasks related to the Environmental related agendas including Biodiversity issues as well as Corporate Governance and Code of Conduct. They also followed up the progress of the Company's sustainable development operation in accordance with the international standard, United Nations Charter (UN Global Compact). They also approved the 2023 sustainable development plan in line with its strategies, global situations, and dynamic challenges along with monitoring the targets against the Net Zero Target within 2050. Moreover, the board chair also established the Risk Management Committee (RMC). The RMC defines effective risk management methods, monitors their effectiveness, provides input on potential risks in investment projects, manages joint ventures and contracts, promotes internal control assessment, and ensures compliance with laws and international standards. Monitored, provided opinions, and made recommendations on corporate-level risk and crisis management for 2023 and also provided opinions on the mitigation measures for emerging risks. Considered and commented on the improvement and reviewed the risk management framework in various aspects i.e., raw material and product price fluctuation, inventory management, investment in key projects, and foreign exchange rates. - Monitored, provided comments, and suggestions on the biodiversity related risks Furthermore, the RMC followed up on the operational results of biodiversity risk management on a quarterly basis to mitigate the impact of stock loss and exchange rate movements. Additionally, the RMC made suggestions on preparing and seeking guidelines for biodiversity management approaches and action plans.
[Fixed row]

(4.2) Does your organization’s board have competency on environmental issues?

Climate change

(4.2.1) Board-level competency on this environmental issue

Select from:
☑ Yes

(4.2.2) Mechanisms to maintain an environmentally competent board

Select all that apply
☑ Consulting regularly with an internal, permanent, subject-expert working group
☑ Engaging regularly with external stakeholders and experts on environmental issues

☑ Regular training for directors on environmental issues, industry best practice, and standards (e.g., TCFD, SBTi)

☑ Having at least one board member with expertise on this environmental issue

(4.2.3) Environmental expertise of the board member

Additional training

☑ Training in an environmental subject by a certified organization, please specify :o The Executive Program in Energy Literacy for a Sustainable Future, Thailand Energy Academy TEA)

Experience

☑ Executive-level experience in a role focused on environmental issues

☑ Management-level experience in a role focused on environmental issues

☑ Experience in an organization that is exposed to environmental-scrutiny and is going through a sustainability transition

☑ Active member of an environmental committee or organization

[Fixed row]

(4.3) Is there management-level responsibility for environmental issues within your organization?

	Management-level responsibility for this environmental issue
Climate change	*Select from:* ☑ Yes
Biodiversity	*Select from:* ☑ Yes

[Fixed row]

(4.3.1) Provide the highest senior management-level positions or committees with responsibility for environmental issues (do not include the names of individuals).

Climate change

(4.3.1.1) Position of individual or committee with responsibility

Executive level

☑ Chief Executive Officer (CEO)

(4.3.1.2) Environmental responsibilities of this position

Dependencies, impacts, risks and opportunities

☑ Managing environmental dependencies, impacts, risks, and opportunities

Policies, commitments, and targets

☑ Monitoring compliance with corporate environmental policies and/or commitments

☑ Measuring progress towards environmental corporate targets

Strategy and financial planning

☑ Developing a business strategy which considers environmental issues

☑ Developing a climate transition plan

☑ Implementing a climate transition plan

☑ Implementing the business strategy related to environmental issues

Other

☑ Providing employee incentives related to environmental performance

(4.3.1.4) Reporting line

Select from:

☑ Reports to the board directly

(4.3.1.5) Frequency of reporting to the board on environmental issues

Select from:

☑ Quarterly

(4.3.1.6) Please explain

Chief Executive Officer (CEO) a chairperson of Management Committee, which approved the corporate Key Performance Indicators (KPIs), which are an integral process of business strategy monitoring. One of the KPIs is directly linked to the decarbonization path, which is considered as a climate transition plan to for GHG emission reduction through operational efficiency and new product portfolio. Subsequently, the corporate KPIs will be cascaded to C-Suites' and relevant employee's KPIs. The corporate KPIS will be accounted for 70% of C-suites individual KPIs. Therefore, the CEO bears the responsibility of providing climate-related employee incentives through the setting of corporate KPIs. Once the corporate KPIs are established, the CEO oversees the monitoring of progress against climate-related corporate targets and updates and reports the progress to the board of directors quarterly. Moreover, the CEO plays an importance role in approving the climate strategy for the period 2023-2030, aiming to achieve net-zero emissions by 2050. This involves developing and implementing a climate transition plan consisting of three pillars: efficiency-driven, portfolio-driven, and compensation-driven. Additionally, the CEO actively manages climate-related risks and identifies opportunities for the company through the reviewing of corporate risk assessment and physical and transitional climate related risks analysis.

Biodiversity

(4.3.1.1) Position of individual or committee with responsibility

Executive level

☑ Chief Executive Officer (CEO)

(4.3.1.2) Environmental responsibilities of this position

Dependencies, impacts, risks and opportunities

☑ Assessing environmental dependencies, impacts, risks, and opportunities

☑ Managing environmental dependencies, impacts, risks, and opportunities

Policies, commitments, and targets

☑ Measuring progress towards environmental corporate targets

☑ Setting corporate environmental targets

Strategy and financial planning

☑ Developing a business strategy which considers environmental issues

☑ Developing a climate transition plan

☑ Implementing a climate transition plan

(4.3.1.4) Reporting line

Select from:

☑ Reports to the board directly

(4.3.1.5) Frequency of reporting to the board on environmental issues

Select from:

☑ Quarterly

(4.3.1.6) Please explain

Chief Executive Officer (CEO) a chairperson of Management Committee, which approved the corporate Key Performance Indicators (KPIs), which are an integral process of business strategy monitoring. CEO actively oversees the biodiversity risks and impacts that might affect the operational performance of the company. Moreover, the CEO is also responsible of validate and approve any biodiversity targets, management plans, and biodiversity linked business strategy. In 2023, the CEO has signed the GGC biodiversity statement to commit to biodiversity related targets.

Climate change

(4.3.1.1) Position of individual or committee with responsibility

Committee

☑ Risk committee

(4.3.1.2) Environmental responsibilities of this position

Dependencies, impacts, risks and opportunities

☑ Assessing environmental dependencies, impacts, risks, and opportunities

☑ Managing environmental dependencies, impacts, risks, and opportunities

Policies, commitments, and targets

☑ Measuring progress towards environmental corporate targets

(4.3.1.4) Reporting line

Select from:

☑ Reports to the board directly

(4.3.1.5) Frequency of reporting to the board on environmental issues

Select from:

☑ Quarterly

(4.3.1.6) Please explain

The Chief Risk Officer or Risk Management Committee (RMC) is responsible for defining and reviewing policies, risk appetite, and the scope of risk management, including climate-related risks. This serves as an operational framework for GGC's risk management process, with a focus on early warning signs, managing and assessing climate-related risks and opportunities. The objective is to monitor and ensure that risks are identified and prioritized by assessing their impact and likelihood, while also pursuing business opportunities. Moreover, at GGC, together with CEO, CRO will also be responsible of overseeing sustainability strategies and Climate Related Strategies. CRO will monitor and oversee the progress update of the corporate climate related targets. CRO will also attend the board update meeting in terms of sustainability progress. This can help GGC to incorporate climate related risks/ actions into the ERM process, which brings about seamless action plans towards the climate related development. Overall, RMC provides quarterly reports on its performance to the board.

Climate change

(4.3.1.1) Position of individual or committee with responsibility

Executive level

☑ Other C-Suite Officer, please specify **:**Enterprise Risk Management Committee (ERMC)

(4.3.1.2) Environmental responsibilities of this position

Dependencies, impacts, risks and opportunities

☑ Assessing environmental dependencies, impacts, risks, and opportunities

☑ Managing environmental dependencies, impacts, risks, and opportunities

(4.3.1.4) Reporting line

Select from:

☑ Reports to the Chief Risks Officer (CRO)

(4.3.1.5) Frequency of reporting to the board on environmental issues

Select from:

☑ Quarterly

(4.3.1.6) Please explain

The C-Suite Officer or Enterprise Risk Management Committee (ERMC) takes the lead in the management of climate risks, which includes the identification, assessment, prioritization, and mitigation actions. Additionally, the ERMC is responsible for monitoring the performance of climate-related risk and opportunity management. The roles and responsibilities of ERMC are publicly disclosed in the TCFD report, which includes steering and monitoring of regular risk management actions, leading climate risks management process covering identification, assessment and prioritization and mitigation actions, monitor climate related risk/opportunity management performance and assign working group or any department responsible for managing climate related risk to propose a prevention plan as warnings increase or when such risks pose a significant threat to the business operations. The progress and outcomes are reported directly to the Risk Management Committee (RMC) on a quarterly basis.
[Add row]

(4.5) Do you provide monetary incentives for the management of environmental issues, including the attainment of targets?

Climate change

(4.5.1) Provision of monetary incentives related to this environmental issue

Select from:

☑ Yes

(4.5.2) % of total C-suite and board-level monetary incentives linked to the management of this environmental issue

14

(4.5.3) Please explain

The Corporate Key Performance Indicators (KPIs) in sustainability at GGC are fully aligned with the company's Climate Strategy 2023-2030. GGC has established a target of reducing 20% of Scope 12 emissions by 2030. This commitment reflects GGC's dedication to achieving Net Zero Emissions by 2050. The Corporate KPIs, which later will be cascaded into 70% of C-Suites KPIs, also includes the company performance against a Climate-related sustainability index (e.g. CDP Climate Changes Scores and Thailand Sustainability Assessment (THSI)). Moreover, the Corporate KPIs also emphasize in product development aspects as part of the portfolio driven that fuels the R&D Development of low carbon products. The aforementioned topics consider as 20% and the corporate KPIs is accounted for 70%. Therefore, the KPI percentage of total C-suite and board-level monetary incentives linked to the management of this environmental issue is 70%x20% 14%.
[Fixed row]

(4.5.1) Provide further details on the monetary incentives provided for the management of environmental issues (do not include the names of individuals).

Climate change

(4.5.1.1) Position entitled to monetary incentive

Board or executive level

☑ Chief Executive Officer (CEO)

(4.5.1.2) Incentives

Select all that apply

☑ Bonus - % of salary

☑ Bonus – set figure

☑ Salary increase

(4.5.1.3) Performance metrics

Targets

☑ Achievement of environmental targets

Strategy and financial planning

☑ Achievement of climate transition plan

Emission reduction

☑ Reduction in absolute emissions

(4.5.1.4) Incentive plan the incentives are linked to

Select from:

☑ Both Short-Term and Long-Term Incentive Plan, or equivalent

(4.5.1.5) Further details of incentives

GGC has established the climate strategy in order to achieve the climate strategy targets and goals. Consequently, GGC has embedded the climate related targets into the corporate KPIs, which is an integral role for monitoring the progress against targets. The corporate KPIS later cascaded into the executive's KPIs, including the KPIs for CEO and other relevant C-Suites that overlook the operational and commercial site of GGC's businesses. Therefore, the KPIs evaluation structure for CEO and other C-Suites would consist of Corporate KPIs, which account for 70 % and Personal KPIs, which account for 30 %, reflecting the compensation structure for our CEO, relevant C-Suites and employees. The Corporate and CEO KPIs in 2023 is aligned with sustainability development under the decarbonization roadmap, which consists of the achievement of Corporate Sustainability Assessment, the RSPO Execution, low carbon product development and most importantly the reducing 20% of Scope 12 emissions by 2023 target, which will lead to achieving net zero in 2050 considering as a long-term target. As a result, the CEO KPIs evaluation and monetary rewards will depend on this climate related targets and the abilities to achieve the targets both short-term and long-term. The CEO will be given performance evaluation from the score of 1 (the least satisfaction performance) to 5 (the most satisfaction performance). The monetary compensation will be allocated to relevant executives based on their performance. The CEO Executive will receive a bonus and other monetary rewards if they can score 3 or above.

(4.5.1.6) How the position’s incentives contribute to the achievement of your environmental commitments and/or climate transition plan

The Corporate Key Performance Indicators (KPIs) in sustainability at GGC are fully aligned with the company's Climate Strategy 2023-2030. As per the guidelines set by the Task Force on Climate-Related Financial Disclosures (TCFD), GGC has established an ambition target of reducing 20% of Scope 12 emissions by 2030. This commitment reflects GGC's dedication to achieving Net Zero Emissions by 2050 and building business resilience in anticipation of a low carbon future, consistent with

a 2C or lower scenario. The strategy undergoes regular revision to ensure effectiveness and alignment with national and global targets. Moreover, the Corporate KPIs also includes the company performance against a Climate-related sustainability index (e.g. CDP Climate Changes Scores and Thailand Sustainability Assessment (THSI)) in order to drive the company's Sustainability recognition and improve company's performance in terms of sustainability aspects.

Climate change

(4.5.1.1) Position entitled to monetary incentive

Board or executive level

☑ Other C-Suite Officer, please specify **:**Operational Excellence Officer (OE)

(4.5.1.2) Incentives

Select all that apply

☑ Bonus - % of salary

☑ Bonus – set figure

☑ Salary increase

(4.5.1.3) Performance metrics

Targets

☑ Achievement of environmental targets

Emission reduction

☑ Reduction in absolute emissions

(4.5.1.4) Incentive plan the incentives are linked to

Select from:

☑ Both Short-Term and Long-Term Incentive Plan, or equivalent

(4.5.1.5) Further details of incentives

GGC has established the climate strategy in order to achieve the climate strategy targets and goals. Consequently, GGC has embedded the climate related targets into the corporate KPIs, which is an integral role for monitoring the progress against targets. The corporate KPIS later cascaded into the executive's KPIs, including the KPIs for CEO and other relevant C-Suites that overlook the operational and commercial site of GGC's businesses. Therefore, the KPIs evaluation structure for CEO and other C-Suites would consist of Corporate KPIs, which account for 70 % and Personal KPIs, which account for 30 %, reflecting the compensation structure for our CEO, relevant C-Suites and employees. One of the C-Suites namely Operational Excellence Officer (OE), who leads the operational activities of the business also receive the KPIs. The Corporate KPI and the KPI of Operational Excellence (OE) are aligned with sustainability development under the decarbonization roadmap, which consists of the achievement of Corporate Sustainability Assessment, the RSPO Execution, low carbon product development and most importantly the reducing 20% of Scope 12 emissions by 2023 target, which will lead to achieving net zero in 2050 considering as a long-term target. As a result, the OE's KPI evaluation and monetary rewards will depend on this climate related targets and the abilities to achieve the targets both short-term and long-term. The Operational Excellence (OE) will be given performance evaluation from the score of 1 (the least satisfaction performance) to 5 (the most satisfaction performance). The monetary compensation will be allocated to relevant executives based on their performance. The OE Executive will receive a bonus and other monetary rewards if they can score 3 or above.

(4.5.1.6) How the position's incentives contribute to the achievement of your environmental commitments and/or climate transition plan

The Corporate Key Performance Indicators (KPIs) in sustainability are aligned with GGC's Climate Strategy 2023-2030 which has been approved by the board. According to Task Force on Climate-Related Financial Disclosures (TCFD) of GGC Climate Strategy 2023- 2030 aims to transform the company into a global sustainable organization with Net Zero Emissions by 2050. The decarbonization roadmap, one of the KPIs plays a crucial component in this strategy. Within the strategy, the Efficiency Driven pillar focuses on low carbon/renewable heat and power, process efficiency measures and advanced technology, which will be monitor and manage by the Operational Excellence Executive. With the Efficiency Driven pillar, it helps GGC accelerates climate transition plan and contributing significantly to the achievement of GGC sustainability KPI objectives.

Climate change

(4.5.1.1) Position entitled to monetary incentive

Board or executive level

☑ Other C-Suite Officer, please specify **:**Commercial Excellence Officer (CE)

(4.5.1.2) Incentives

Select all that apply

☑ Bonus - % of salary

☑ Bonus – set figure

☑ Salary increase

(4.5.1.3) Performance metrics

Strategy and financial planning

☑ Increased investment in environmental R&D and innovation

☑ Increased proportion of revenue from low environmental impact products or services

(4.5.1.4) Incentive plan the incentives are linked to

Select from:

☑ Both Short-Term and Long-Term Incentive Plan, or equivalent

(4.5.1.5) Further details of incentives

GGC has established the climate strategy in order to achieve the climate strategy targets and goals. Consequently, GGC has embedded the climate related targets into the corporate KPIs, which is an integral role for monitoring the progress against targets. The corporate KPIS later cascaded into the executive's KPIs, including the KPIs for CEO and other relevant C-Suites that overlook the operational and commercial site of GGC's businesses. Therefore, the KPIs evaluation structure for CEO and other C-Suites would consist of Corporate KPIs, which account for 70 % and Personal KPIs, which account for 30 %, reflecting the compensation structure for our CEO, relevant C-Suites and employees. One of the C-Suites namely Commercial Excellence Officer (CE), who leads the commercial activities of the business also receives the KPIs. The Corporate KPI and the KPI of Commercial Excellence (CE) are aligned with sustainability development under the decarbonization roadmap, which consists of the achievement of Corporate Sustainability Assessment, the RSPO Execution, low carbon product development and most importantly the reducing 20% of Scope 12 emissions by 2023 target, which will lead to achieving net zero in 2050 considering as a long-term target. As a result, the CE's KPI evaluation and monetary rewards will depend on this climate related targets and the abilities to achieve the targets both short-term and long-term. The Commercial Excellence (CE) will be given performance evaluation from the score of 1 (the least satisfaction performance) to 5 (the most satisfaction performance). The monetary compensation will be allocated to relevant executives based on their performance. The CE Executive will receive a bonus and other monetary rewards if they can score 3 or above.

(4.5.1.6) How the position's incentives contribute to the achievement of your environmental commitments and/or climate transition plan

The Corporate Key Performance Indicators (KPIs) in sustainability are aligned with GGC's Climate Strategy 2023-2030 which has been approved by the board. According to Task Force on Climate-Related Financial Disclosures (TCFD) of GGC Climate Strategy 2023- 2030 aims to transform the company into a global sustainable organization with Net Zero Emissions by 2050. The decarbonization roadmap, one of the KPIs plays a crucial component in this strategy. Within the strategy, the Efficiency Driven pillar focuses on low carbon/renewable heat and power, process efficiency measures and advanced technology, which will be monitor

and manage by the Operational Excellence Executive. With the Efficiency Driven pillar, it helps GGC accelerates climate transition plan and contributing significantly to the achievement of GGC sustainability KPI objectives.
[Add row]

(4.6) Does your organization have an environmental policy that addresses environmental issues?

	Does your organization have any environmental policies?
	Select from: ☑ Yes

[Fixed row]

(4.6.1) Provide details of your environmental policies.

Row 1

(4.6.1.1) Environmental issues covered

Select all that apply
☑ Climate change

(4.6.1.2) Level of coverage

Select from:
☑ Organization-wide

(4.6.1.3) Value chain stages covered

Select all that apply
☑ Direct operations

☑ Upstream value chain

☑ Downstream value chain

(4.6.1.4) Explain the coverage

GGC is committed to continually enhancing our effectiveness in the management of Quality, Security, Safety, Occupational Health, the Environment, and Business Continuity. This policy covers the entire operation of the Company involving all executives, employees, related personnel at all level, vendors, and contractors.

(4.6.1.5) Environmental policy content

Environmental commitments

☑ Commitment to comply with regulations and mandatory standards

☑ Commitment to take environmental action beyond regulatory compliance

☑ Commitment to stakeholder engagement and capacity building on environmental issues

Climate-specific commitments

☑ Commitment to net-zero emissions

☑ Commitment to not invest in fossil-fuel expansion

Additional references/Descriptions

☑ Reference to timebound environmental milestones and targets

(4.6.1.6) Indicate whether your environmental policy is in line with global environmental treaties or policy goals

Select all that apply

☑ Yes, in line with the Paris Agreement

(4.6.1.7) Public availability

Select from:

☑ Publicly available

(4.6.1.8) Attach the policy

GGC QSHEB Statement.pdf

Row 2

(4.6.1.1) Environmental issues covered

Select all that apply

☑ Biodiversity

(4.6.1.2) Level of coverage

Select from:

☑ Organization-wide

(4.6.1.3) Value chain stages covered

Select all that apply

☑ Direct operations

☑ Upstream value chain

☑ Downstream value chain

(4.6.1.4) Explain the coverage

The commitment of GGC has supported biodiversity and ecosystem, covering key stakeholders including own operations, key suppliers, and business partners.

(4.6.1.5) Environmental policy content

Environmental commitments

☑ Commitment to avoidance of negative impacts on threatened and protected species

☑ Commitment to comply with regulations and mandatory standards

☑ Commitment to take environmental action beyond regulatory compliance

☑ Commitment to stakeholder engagement and capacity building on environmental issues

(4.6.1.6) Indicate whether your environmental policy is in line with global environmental treaties or policy goals

Select all that apply

☑ Yes, in line with the Paris Agreement

(4.6.1.7) Public availability

Select from:

☑ Publicly available

(4.6.1.8) Attach the policy

ggc-biodiversity-commitment-en.pdf
[Add row]

(4.10) Are you a signatory or member of any environmental collaborative frameworks or initiatives?

(4.10.1) Are you a signatory or member of any environmental collaborative frameworks or initiatives?

Select from:

☑ Yes

(4.10.2) Collaborative framework or initiative

Select all that apply

☑ Task Force on Climate-related Financial Disclosures (TCFD)

☑ UN Global Compact

(4.10.3) Describe your organization's role within each framework or initiative

In 2023, GGC has established the Task Force on Climate Related Financial Disclosure (TCFD) to disclose guidelines on climate change management, strategies and goals, GGC's greenhouse gas reduction, as well as the relevant risk assessment results. The TCFD Disclosure can be found in https://www.ggcplc.com/storage/document/climate-strategy/ggc-tcfd-disclosure.pdf Moreover, GGC has signed the UN Global Compact Membership to take part in being a business organization that supports business operations with social responsibility on the basis of voluntary and practical measures. GGC has become

membership since 2018 and has received advanced level for its Communication on Progress. The communication on progress for 2023 can be found in https://unglobalcompact.org/participation/report/cop/advanced/467265.
[Fixed row]

(4.11) In the reporting year, did your organization engage in activities that could directly or indirectly influence policy, law, or regulation that may (positively or negatively) impact the environment?

(4.11.1) External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the environment

Select all that apply

☑ Yes, we engaged directly with policy makers

☑ Yes, we engaged indirectly through, and/or provided financial or in-kind support to a trade association or other intermediary organization or individual whose activities could influence policy, law, or regulation

(4.11.2) Indicate whether your organization has a public commitment or position statement to conduct your engagement activities in line with global environmental treaties or policy goals

Select from:

☑ Yes, we have a public commitment or position statement in line with global environmental treaties or policy goals

(4.11.3) Global environmental treaties or policy goals in line with public commitment or position statement

Select all that apply

☑ Paris Agreement

(4.11.4) Attach commitment or position statement

ggc-tcfd-disclosure.pdf

(4.11.5) Indicate whether your organization is registered on a transparency register

Select from:

☑ Yes

(4.11.6) Types of transparency register your organization is registered on

Select all that apply

☑ Voluntary government register

(4.11.7) Disclose the transparency registers on which your organization is registered & the relevant ID numbers for your organization

Thailand Greenhouse Gas Management Organization (TGO) Thailand Business Council for Sustainable Development (TBCSD) Global Compact Network Thailand (UNGC) Roundtable on Sustainable Palm Oil (RSPO) The Federation of Thai Industries (FTI)

(4.11.8) Describe the process your organization has in place to ensure that your external engagement activities are consistent with your environmental commitments and/or transition plan

GGC has in place the process to ensure that our activities are consistent with the overall climate change strategy. This begins with the result from risk and opportunity assessment process. The areas of risks and opportunities where GGC can better safeguard our risks and enhance our opportunities though external engagement will be emphasized for further activities. The stakeholders involved such as governmental agencies, trade associations, etc. are identified along with channel of engagement i.e. through a roundtable, club or working group. The discussion on the direction and progress of these engagement activities are brought into to Sustainability Development Committee meeting on quarterly basis to ensure corporatewide consistency with GGC climate strategy. Thus far, GGC has announced our public commitment to become a net zero organization in line with Paris Agreement which aims to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels, meaning that all of our external stakeholder engagement activities are moving towards this direction.
[Fixed row]

(4.11.1) On what policies, laws, or regulations that may (positively or negatively) impact the environment has your organization been engaging directly with policy makers in the reporting year?

Row 1

(4.11.1.1) Specify the policy, law, or regulation on which your organization is engaging with policy makers

The Thailand Voluntary Emission Reduction Program (T-VER) encourages GHG reduction through carbon credits. TGO and IEA are studying a Cap and Trade policy for the chemical sector, with legislation expected within five years. Carbon pricing, whether through trading, tax, or offsets, may increase GGC's operational

expenses. These costs could be embedded in utility expenses or require direct payment. Regulations on carbon pricing and taxes are imminent due to the upcoming climate change act.

(4.11.1.2) Environmental issues the policy, law, or regulation relates to

Select all that apply

☑ Climate change

(4.11.1.3) Focus area of policy, law, or regulation that may impact the environment

Financial mechanisms (e.g., taxes, subsidies, etc.)

☑ Carbon taxes

☑ Emissions trading schemes

(4.11.1.4) Geographic coverage of policy, law, or regulation

Select from:

☑ National

(4.11.1.5) Country/area/region the policy, law, or regulation applies to

Select all that apply

☑ Thailand

(4.11.1.6) Your organization’s position on the policy, law, or regulation

Select from:

☑ Support with no exceptions

(4.11.1.8) Type of direct engagement with policy makers on this policy, law, or regulation

Select all that apply

☑ Participation in working groups organized by policy makers

☑ Participation in voluntary government programs

(4.11.1.9) Funding figure your organization provided to policy makers in the reporting year relevant to this policy, law, or regulation (currency)

0

(4.11.1.10) Explain the relevance of this policy, law, or regulation to the achievement of your environmental commitments and/or transition plan, how this has informed your engagement, and how you measure the success of your engagement

GGC has engaged with Thailand Greenhouse Gas Management Organization (TGO) to take action in solving climate change problems by utilizing mechanisms in effectively reducing GHG emission, while also taking into account the three dimensions of balance: Economy, environment and society. As parts of GHG emission reduction, GGC has continuously supported TGO through sharing information to TGO and planning to join the Thailand Voluntary Emission Reduction Program (T-VER) in the next few years to participate in GHG emission reduction program and to generate carbon credits. GGC also periodically engages with the government agencies related to the environmental protection to share information, particularly regarding the law and regulation affecting to the company. From this engagement, GGC has contributed information to create a more sustainable business sector, including climate change matter, and supportive policy. GGC also keeps up-to-date with new legislation to be imposed by the government. To elaborate, GGC closely follow up on the draft of the Climate Change Act that aims to enforce Carbon Tax and Emissions Trading Scheme (ETS) to prepare implementation plan. The risks will be considered in strategic plan with potential changes in national policy and regulation on climate change. The company need to control and limit GHG emissions to comply with the regulations.

(4.11.1.11) Indicate if you have evaluated whether your organization's engagement on this policy, law, or regulation is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.1.12) Global environmental treaties or policy goals aligned with your organization's engagement on this policy, law or regulation

Select all that apply

☑ Paris Agreement

[Add row]

(4.11.2) Provide details of your indirect engagement on policy, law, or regulation that may (positively or negatively) impact the environment through trade associations or other intermediary organizations or individuals in the reporting year.

Row 1

(4.11.2.1) Type of indirect engagement

Select from:

☑ Indirect engagement via a trade association

(4.11.2.4) Trade association

Asia and Pacific

☑ Other trade association in Asia and Pacific, please specify :UNGC

(4.11.2.5) Environmental issues relevant to the policies, laws, or regulations on which the organization or individual has taken a position

Select all that apply

☑ Climate change

(4.11.2.6) Indicate whether your organization's position is consistent with the organization or individual you engage with

Select from:

☑ Consistent

(4.11.2.7) Indicate whether your organization attempted to influence the organization or individual's position in the reporting year

Select from:

☑ Yes, we publicly promoted their current position

(4.11.2.8) Describe how your organization's position is consistent with or differs from the organization or individual's position, and any actions taken to influence their position

The UN Global Compact (UNGC) is a United Nations framework for sustainable development, promoting corporate social responsibility through voluntary and practical measures. It aims to align business strategies and operations with the Ten Principles covering human rights, labor, environment, and anti-corruption. The initiative encourages businesses to integrate these principles into their activities and to take action in support of UN goals, including the Sustainable Development Goals (SDGs). The UNGC strives to create a sustainable global economy that provides opportunities for all, balancing economic, social, and environmental development. GGC is a member adhering to the UNGC guidelines.

(4.11.2.9) Funding figure your organization provided to this organization or individual in the reporting year (currency)

175000

(4.11.2.10) Describe the aim of this funding and how it could influence policy, law or regulation that may impact the environment

GGC support UNGC through being a membership. GGC will comply all the issues in the Ten Principles to be a part of the strategy down to the action plans until it is embedded in the company culture and day-to-day operations. GGC will also engage in collaborative projects, which advance the broader development goals of the United Nations, particularly the Sustainable Development Goals. Moreover, GGC will make a clear statement of this commitment to UNGC's stakeholders and the general public, and annually submit a Communication on Progress (COP), as a key requirement, which describes our company's efforts to implement the Ten Principles. In addition, GGC garnered acclaim by UN Global Compact as one of the world's 41 LEAD entities indicating that GGC excellently followed the UNGC framework and the ten principles.

(4.11.2.11) Indicate if you have evaluated whether your organization's engagement is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.2.12) Global environmental treaties or policy goals aligned with your organization's engagement on policy, law or regulation

Select all that apply

☑ Paris Agreement

Row 2

(4.11.2.1) Type of indirect engagement

Select from:

☑ Indirect engagement via a trade association

(4.11.2.4) Trade association

Asia and Pacific

☑ Other trade association in Asia and Pacific, please specify **:**The German Agency for International Cooperation or (GIZ)

(4.11.2.5) Environmental issues relevant to the policies, laws, or regulations on which the organization or individual has taken a position

Select all that apply

☑ Climate change

(4.11.2.6) Indicate whether your organization's position is consistent with the organization or individual you engage with

Select from:

☑ Consistent

(4.11.2.7) Indicate whether your organization attempted to influence the organization or individual's position in the reporting year

Select from:

☑ Yes, we publicly promoted their current position

(4.11.2.8) Describe how your organization's position is consistent with or differs from the organization or individual's position, and any actions taken to influence their position

The German International Cooperation Agency (GIZ) is a German government organization that works on international cooperation for sustainable development. GIZ operates on behalf of public and private entities in Germany and abroad, including governments, the European Union, the United Nations, the World Bank, and other funding organizations. GIZ assists Thailand in developing climate change policies and supporting private sector investment in food and agriculture. GGC and GIZ collaborate on the Sustainable and Climate-Friendly Palm Oil Production and Procurement in Thailand (SCPOPP) project to promote and develop small farmers to meet the Roundtable on Sustainable Palm Oil (RSPO) standards.

(4.11.2.9) Funding figure your organization provided to this organization or individual in the reporting year (currency)

4400000

(4.11.2.10) Describe the aim of this funding and how it could influence policy, law or regulation that may impact the environment

In 2021, GGC and GIZ launched Sustainable and Climate-Friendly Palm Oil Production and Procurement in Thailand (SCPOPP) to promote and develop the caliber of small farmers up to the Roundtable on Sustainable Palm Oil (RSPO) standard, a key tool to carve marketing opportunities for Thailand's sustainable palm oil, enabling it to access world markets and still continue to support until these days. The total expense regarding the collaboration with GIZ in 2022-2023 is 15,720,000 THB. In 2023, the expense is accounted for 4,400,000.

(4.11.2.11) Indicate if you have evaluated whether your organization's engagement is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.2.12) Global environmental treaties or policy goals aligned with your organization's engagement on policy, law or regulation

Select all that apply

☑ Paris Agreement

Row 3

(4.11.2.1) Type of indirect engagement

Select from:

☑ Indirect engagement via a trade association

(4.11.2.4) Trade association

Asia and Pacific

☑ Other trade association in Asia and Pacific, please specify :The Roundtable on Sustainable Palm Oil (RSPO)

(4.11.2.5) Environmental issues relevant to the policies, laws, or regulations on which the organization or individual has taken a position

Select all that apply

☑ Climate change

(4.11.2.6) Indicate whether your organization's position is consistent with the organization or individual you engage with

Select from:

☑ Consistent

(4.11.2.7) Indicate whether your organization attempted to influence the organization or individual's position in the reporting year

Select from:

☑ Yes, we publicly promoted their current position

(4.11.2.8) Describe how your organization's position is consistent with or differs from the organization or individual's position, and any actions taken to influence their position

The Roundtable on Sustainable Palm Oil (RSPO) is a non-profit organization that supports stakeholders related to palm oil businesses such as palm farmers, consumer product manufacturers, palm oil retailers, financial institutions, NGOs in environmental and social development, etc. Combatting land use change (carbon stock) and promoting low carbon palm oil farming and milling are some of the components that RSPO drives that could have a significant impact on climate change. This is consistent with GGC's position, as GGC has worked on the Sustainable and Climate-Friendly Palm Oil Production and Procurement in Thailand (SPOPP) for the past years. GGC aims to enhance the sustainable agricultural practices for palm oil production through RSPO.

(4.11.2.9) Funding figure your organization provided to this organization or individual in the reporting year (currency)

120000

(4.11.2.10) Describe the aim of this funding and how it could influence policy, law or regulation that may impact the environment

Together with the Deutsche Gesellschaft für International Zusammernarbeit (GIZ), Thailand, GGC launched the Sustainable and Climate-Friendly Palm Oil Production and Procurement in Thailand (SPOPP) Project to promote and develop the caliber of small farmers up to the Roundtable on Sustainable Palm Oil (RSPO) standard, a key tool to carve marketing opportunities for Thailand's sustainable palm oil, enabling it to access world markets. GGC also continues to support the RSPO in order to advocate for farmers to measuring, monitoring and controlling their potential environmental and social impacts, including Climate-Related Risks, Biodiversity Related Risks, Labor Practices and Human Rights Related Risks. GGC believes that RSPO can potentially influence the law and regulation through the adoptions from the supply side and the awareness from the demand site.

(4.11.2.11) Indicate if you have evaluated whether your organization's engagement is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.2.12) Global environmental treaties or policy goals aligned with your organization's engagement on policy, law or regulation

Select all that apply

☑ Paris Agreement

Row 4

(4.11.2.1) Type of indirect engagement

Select from:

☑ Indirect engagement via a trade association

(4.11.2.4) Trade association

Asia and Pacific

☑ Other trade association in Asia and Pacific, please specify **:**The Federation of Thai Industries (F.T.I)

(4.11.2.5) Environmental issues relevant to the policies, laws, or regulations on which the organization or individual has taken a position

Select all that apply

☑ Climate change

(4.11.2.6) Indicate whether your organization's position is consistent with the organization or individual you engage with

Select from:

☑ Consistent

(4.11.2.7) Indicate whether your organization attempted to influence the organization or individual's position in the reporting year

Select from:

☑ Yes, we publicly promoted their current position

(4.11.2.8) Describe how your organization's position is consistent with or differs from the organization or individual's position, and any actions taken to influence their position

The Federation of Thai Industries is a non-profit organization that strengthens Thailand's private business institutions which will enable the continuity of the industrial sector's development mechanism in combination with the country's economic development and protection of national interest in the global economy. It also aims to promote good practices in energy efficiency, environmental stewardship, resource utilization and GHG reduction across the industry, which is the crucial role to advocate for decarbonization pathway and conduct climate related actions in the industrial sectors and other related sectors in Thailand. This is in line with GGC's target to become net zero in 2050 along with targets to reduce 20% of GHG Emission by 2030.

(4.11.2.9) Funding figure your organization provided to this organization or individual in the reporting year (currency)

30000

(4.11.2.10) Describe the aim of this funding and how it could influence policy, law or regulation that may impact the environment

GGC has joined and supported F.T.I as a member to shares information for contributing to enhance business competitiveness and establishing good and sustainable practices, and educating the public on social and environmental issues, to ensure that the operations will lead to sustainable development. The funding amount will sponsor F.T.I to organize a consortium, discussion session and knowledge sharing which help enhance the capacity of stakeholder that would participate, including companies, government, communities both local and national scale in Thailand. The output would later ultimately help influence the future law and regulations for climate-related policy.

(4.11.2.11) Indicate if you have evaluated whether your organization's engagement is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.2.12) Global environmental treaties or policy goals aligned with your organization's engagement on policy, law or regulation

Select all that apply

☑ Paris Agreement

Row 5

(4.11.2.1) Type of indirect engagement

Select from:

☑ Indirect engagement via a trade association

(4.11.2.4) Trade association

Asia and Pacific

☑ Other trade association in Asia and Pacific, please specify **:**Thailand Business Council for Sustainable Development (TBCSD)

(4.11.2.5) Environmental issues relevant to the policies, laws, or regulations on which the organization or individual has taken a position

Select all that apply

☑ Climate change

(4.11.2.6) Indicate whether your organization's position is consistent with the organization or individual you engage with

Select from:

☑ Consistent

(4.11.2.7) Indicate whether your organization attempted to influence the organization or individual's position in the reporting year

Select from:

☑ Yes, we publicly promoted their current position

(4.11.2.8) Describe how your organization's position is consistent with or differs from the organization or individual's position, and any actions taken to influence their position

Thailand Business Council for Sustainable Development (TBCSD) is an organization that promotes environmental awareness within the business sector under the concept of sustainable development. It focuses on sustainable development in three areas: development of sustainability policies in Thailand, building business competitiveness and good and sustainable practices, and educating the public on social and environmental issues. This includes the development and advocacy for climate action to combat any climate-related risks, in line with GGC's target to become net zero in 2050 along with targets to reduce 20% of GHG Emission by 2030.

(4.11.2.9) Funding figure your organization provided to this organization or individual in the reporting year (currency)

250000

(4.11.2.10) Describe the aim of this funding and how it could influence policy, law or regulation that may impact the environment

GGC is a member of the TBCSD to exchange information on its business operations to promote the social and environmental responsibility for chemical industry sector, which also supports the UN SDGs. The funding amount will sponsor TBCSD to organize projects, discussion session and knowledge sharing which help enhance the capacity of stakeholder that would participate, including companies, government, communities both local and national scale in Thailand. The output would later ultimately help influence the future law and regulations for climate-related policy in Thailand.

(4.11.2.11) Indicate if you have evaluated whether your organization's engagement is aligned with global environmental treaties or policy goals

Select from:

☑ Yes, we have evaluated, and it is aligned

(4.11.2.12) Global environmental treaties or policy goals aligned with your organization's engagement on policy, law or regulation

Select all that apply

☑ Paris Agreement

[Add row]

(4.12) Have you published information about your organization's response to environmental issues for this reporting year in places other than your CDP response?

Select from:

☑ Yes

(4.12.1) Provide details on the information published about your organization's response to environmental issues for this reporting year in places other than your CDP response. Please attach the publication.

Row 1

(4.12.1.1) Publication

Select from:

☑ In voluntary sustainability reports

(4.12.1.3) Environmental issues covered in publication

Select all that apply

☑ Climate change

(4.12.1.4) Status of the publication

Select from:

☑ Complete

(4.12.1.5) Content elements

Select all that apply

☑ Governance

☑ Strategy

☑ Emissions figures

☑ Emission targets

☑ Other, please specify **:**Other Metrics

(4.12.1.6) Page/section reference

Highlight performance Metrics Document Page 17-18 (PDF P.19-20), Decarbonization Pathway document Page 42 (PDF P. 44), Climate Strategy, Document Page 129 - 130 (PDF P. 131-132) Efficiency Driven, Document Page 131-136 (PDF P. 133 – 138) Portfolio Driven, Document Page 174-187 (PDF P. 176-189) Carbon sequestration and Compensation document Page 137-139, BSI Verification according to GRI PDF Page 231-233

(4.12.1.7) Attach the relevant publication

integrated-sustainability-report-2023.pdf

(4.12.1.8) Comment

GGC disclosed our water response in Integrated Sustainability Report (ISR) 2023. The GC's ISR report is in accordance of GRI with BSI third party verification for Sustainabiltiy Report. The ISR also reports the statement of financial positions and financial highlights which are audited by KPMG, an independent accountant firm. Several indicators that are related to climate disclosure have been verified by third party. Those indicators include GRI 305-1 Direct Scope 1 GHG Emissions, 305-2 Energy Indirect GHG Emissions (Scope 2), 305-3 Indirect GHG (Scope 3), 302-1 Energy Consumption within Organization and 302-3 Energy Intensity.
[Add row]

C5. Business strategy

(5.1) Does your organization use scenario analysis to identify environmental outcomes?

Climate change

(5.1.1) Use of scenario analysis

Select from:
☑ Yes

(5.1.2) Frequency of analysis

Select from:
☑ Every two years
[Fixed row]

(5.1.1) Provide details of the scenarios used in your organization's scenario analysis.

Climate change

(5.1.1.1) Scenario used

Physical climate scenarios
☑ RCP 1.9

(5.1.1.2) Scenario used SSPs used in conjunction with scenario

Select from:
☑ No SSP used

(5.1.1.3) Approach to scenario

Select from:

☑ Qualitative and quantitative

(5.1.1.4) Scenario coverage

Select from:

☑ Organization-wide

(5.1.1.5) Risk types considered in scenario

Select all that apply

☑ Acute physical

(5.1.1.6) Temperature alignment of scenario

Select from:

☑ 1.5°C or lower

(5.1.1.7) Reference year

2021

(5.1.1.8) Timeframes covered

Select all that apply

☑ 2030

☑ 2050

(5.1.1.9) Driving forces in scenario

Local ecosystem asset interactions, dependencies and impacts

☑ Changes to the state of nature

☑ Changes in ecosystem services provision

☑ Climate change (one of five drivers of nature change)

(5.1.1.10) Assumptions, uncertainties and constraints in scenario

The number of heavy rainfall day is associated with the potential occurrence of flood which may affect the production of our critical feedstock - palm oil. The number of consecutive dry days was associated with the drought which could affect the production of our critical feedstock - sugarcane.

(5.1.1.11) Rationale for choice of scenario

The time horizon was in 2030 and 2050. The analysis was based on anomalies of these two parameters from 1995-2014 baseline under RCP 1.9, RCP 4.5 and RCP 8.5 scenarios. The data source was based on Climate Change Knowledge Portal, World Bank Group. Public accessibility and robustness of information were the main criteria used in our parameter and analytical choice selection.

Climate change

(5.1.1.1) Scenario used

Physical climate scenarios

☑ RCP 4.5

(5.1.1.2) Scenario used SSPs used in conjunction with scenario

Select from:

☑ No SSP used

(5.1.1.3) Approach to scenario

Select from:

☑ Qualitative and quantitative

(5.1.1.4) Scenario coverage

Select from:

☑ Organization-wide

(5.1.1.5) Risk types considered in scenario

Select all that apply

☑ Acute physical

(5.1.1.6) Temperature alignment of scenario

Select from:

☑ 2.0ºC - 2.4ºC

(5.1.1.7) Reference year

2021

(5.1.1.8) Timeframes covered

Select all that apply

☑ 2030

☑ 2050

(5.1.1.9) Driving forces in scenario

Local ecosystem asset interactions, dependencies and impacts

☑ Changes to the state of nature

☑ Changes in ecosystem services provision

☑ Climate change (one of five drivers of nature change)

(5.1.1.10) Assumptions, uncertainties and constraints in scenario

The number of heavy rainfall day is associated with the potential occurrence of flood which may affect the production of our critical feedstock - palm oil. The number of consecutive dry days was associated with the drought which could affect the production of our critical feedstock - sugarcane.

(5.1.1.11) Rationale for choice of scenario

The time horizon was in 2030 and 2050. The analysis was based on anomalies of these two parameters from 1995-2014 baseline under RCP 1.9, RCP 4.5 and RCP 8.5 scenarios. The data source was based on Climate Change Knowledge Portal, World Bank Group. Public accessibility and robustness of information were the main criteria used in our parameter and analytical choice selection.

Climate change

(5.1.1.1) Scenario used

Physical climate scenarios

☑ RCP 8.5

(5.1.1.2) Scenario used SSPs used in conjunction with scenario

Select from:

☑ No SSP used

(5.1.1.3) Approach to scenario

Select from:

☑ Qualitative and quantitative

(5.1.1.4) Scenario coverage

Select from:

☑ Organization-wide

(5.1.1.5) Risk types considered in scenario

Select all that apply

☑ Acute physical

(5.1.1.6) Temperature alignment of scenario

Select from:

☑ 4.0ºC and above

(5.1.1.7) Reference year

2021

(5.1.1.8) Timeframes covered

Select all that apply

☑ 2030

☑ 2050

(5.1.1.9) Driving forces in scenario

Local ecosystem asset interactions, dependencies and impacts

☑ Changes to the state of nature

☑ Changes in ecosystem services provision

☑ Climate change (one of five drivers of nature change)

(5.1.1.10) Assumptions, uncertainties and constraints in scenario

The number of heavy rainfall day is associated with the potential occurrence of flood which may affect the production of our critical feedstock - palm oil. The number of consecutive dry days was associated with the drought which could affect the production of our critical feedstock - sugarcane.

(5.1.1.11) Rationale for choice of scenario

The time horizon was in 2030 and 2050. The analysis was based on anomalies of these two parameters from 1995-2014 baseline under RCP 1.9, RCP 4.5 and RCP 8.5 scenarios. The data source was based on Climate Change Knowledge Portal, World Bank Group. Public accessibility and robustness of information were the main criteria used in our parameter and analytical choice selection.

Climate change

(5.1.1.1) Scenario used

Climate transition scenarios

☑ IEA NZE 2050

(5.1.1.3) Approach to scenario

Select from:

☑ Qualitative and quantitative

(5.1.1.4) Scenario coverage

Select from:

☑ Organization-wide

(5.1.1.5) Risk types considered in scenario

Select all that apply

☑ Policy

(5.1.1.6) Temperature alignment of scenario

Select from:

☑ 1.5°C or lower

(5.1.1.7) Reference year

2022

(5.1.1.8) Timeframes covered

Select all that apply

☑ 2030

☑ 2050

(5.1.1.9) Driving forces in scenario

Stakeholder and customer demands

☑ Consumer attention to impact

☑ Impact of nature service delivery on consumer

☑ Other stakeholder and customer demands driving forces, please specify :External stakeholder pressure to have clear disclosure on climate -related activities, governance, and strategy

Regulators, legal and policy regimes

☑ Global regulation

☑ Global targets

Relevant technology and science

☑ Data regime (from closed to open)

Macro and microeconomy

☑ Domestic growth

(5.1.1.10) Assumptions, uncertainties and constraints in scenario

The carbon price that GGC has to pay in 2030 and 2050 may vary depending on the price of carbon under different scenarios and the amount of excess GHG emission against IEA NZE 2050 (aligning with SBTi Net Zero standard) trajectory and Nationally Determined Contribution (NDC) trajectory which is equivalent to IEA APS in national context.

(5.1.1.11) Rationale for choice of scenario

The time horizon was in 2030 and 2050. The chosen scenario were IEA NZE 2050 and NDC which were used to estimate excess emission in Business-As-Usual and current target scenario. The data source of carbon price was based on IEA World Energy Outlook 2021. Public accessibility and robustness of information were the main criteria used in our parameter and analytical choice selection.

Climate change

(5.1.1.1) Scenario used

Climate transition scenarios

☑ IEA STEPS (previously IEA NPS)

(5.1.1.3) Approach to scenario

Select from:

☑ Qualitative and quantitative

(5.1.1.4) Scenario coverage

Select from:

☑ Organization-wide

(5.1.1.5) Risk types considered in scenario

Select all that apply

☑ Policy

☑ Market

(5.1.1.6) Temperature alignment of scenario

Select from:

☑ 1.6°C - 1.9°C

(5.1.1.7) Reference year

2022

(5.1.1.8) Timeframes covered

Select all that apply

☑ 2030

☑ 2050

(5.1.1.9) Driving forces in scenario

Stakeholder and customer demands

☑ Consumer attention to impact

☑ Impact of nature footprint on reputation

☑ Other stakeholder and customer demands driving forces, please specify **:**External stakeholder pressure to have clear disclosure on climate -related activities, governance, and strategy

Regulators, legal and policy regimes

☑ Global regulation

☑ Global targets

Relevant technology and science

☑ Data regime (from closed to open)

Macro and microeconomy

☑ Domestic growth

(5.1.1.10) Assumptions, uncertainties and constraints in scenario

The IEA Net Zero Emissions 2050 (NZE) scenario reflects a pathway for the global energy sector to achieve net zero emissions and limit global warming to 1.5 C in 2100 where advanced economies are expected to reach net zero missions ahead of other economies. 1. Carbon price - Rapidly increasing carbon price over time with carbon price being most intense under the NZE scenario. 2. Biofuel demand - Increasing biofuel market demand in the near-term which will peak in 2030 before gradually declining as newer technologies become available.

(5.1.1.11) Rationale for choice of scenario

The time horizon was in 2030 and 2050. The chosen scenario were IEA STEPS and NZE 2050 which reflects a "business-as-usual" scenario and a "low carbon" scenario, respectively. The data source of carbon price was based on IEA World Energy Outlook 2022. Public accessibility and robustness of information were the main criteria used in our parameter and analytical choice selection.
[Add row]

(5.1.2) Provide details of the outcomes of your organization’s scenario analysis.

Climate change

(5.1.2.1) Business processes influenced by your analysis of the reported scenarios

Select all that apply

☑ Risk and opportunities identification, assessment and management

☑ Strategy and financial planning

☑ Resilience of business model and strategy

☑ Capacity building

☑ Target setting and transition planning

(5.1.2.2) Coverage of analysis

Select from:

☑ Organization-wide

(5.1.2.3) Summarize the outcomes of the scenario analysis and any implications for other environmental issues

Scenario analysis result The climate-related physical risk and opportunity assessment was conducted to identify the potential risk impacts regarding flooding and drought in specific provinces where feedstock is primarily obtained for different climate change scenarios (RCP1.9, RCP4.5, and RCP8.5). It was found that the physical effects of climate change could result in a 13-14% reduction in palm oil production by 2030 and a 15-22% reduction by 2050. Similarly, sugarcane production is projected to decrease by 25-35% by 2050. These reductions are expected to significantly impact feedstock costs for GGC. To address this, GGC has incorporated these findings into GGC's corporate strategy and financial planning to improve competitiveness through regular business practices, focusing on securing feedstock in the future. This involves optimizing cost efficiency throughout the supply chain, including procurement, sourcing, and risk assessment for fluctuating raw material prices and procurement contracts. The climate-related transition risk and opportunity assessment of potential risk impacts of the carbon price and changing biofuel demand under Stated Policies (STEPS) and Net Zero Emissions 2050 (NZE) scenarios suggested that a carbon price could increase operational expenses for GGC in proportion to their GHG emissions. This means that GGC may have to pay for excess emissions. In the worst-case scenario, if GGC had to pay for 100% of its emissions without taking any action to reduce GHG, the net profit would decrease by 2.84% in 2030 and 4.65% in 2050 compared to the scenario with moderate intervention. To counteract this, GGC has set GHG emission targets and established its business model and strategies together with a transition plan based on the Bio-Circular Economy plans that aim to reduce GHG Scope 1 and 2 emissions by 20% by 2030 and achieve net zero GHG emissions by 2050, which include 3 key strategies: Efficiency-Driven: Using technology to increase production efficiency and increase the use of renewable energy and alternative energy in production processes, Portfolio-Driven: Investing in low-carbon projects, such as increasing the use of renewable energy which aligns with GGC's Climate Strategy 2023-2030, and Compensation-Driven: selecting technology-based and using nature-based carbon capture and storage to store and compensate GHG that cannot be reduced from the production process. Additionally, the shift in biofuel demand due to electric vehicle adoption and the availability of alternative clean fuels will directly impact GGC's revenue from biofuel sales for on-road vehicles. Assuming the 2022 revenue from methyl ester as the base case, the change in biofuel demand may lead to a revenue increase of 4.22% in 2030 and 1.32% in 2050 under the moderate intervention scenario. In the net zero emissions scenario, there is a revenue increase of 7.55% in 2030 and a decrease of 2.18% in 2050. To adapt to potential decreases in biofuel demand from on-road vehicles, GGC plans to expand its portfolio to capitalize on opportunities in the sustainable aviation fuel (SAF) market through a capacity-building program that encourages GGC's employees at all levels to

enhance their knowledge about sustainable fuel through training. This move aligns with the expected increase in biofuel demand from the SAF market, driven by decarbonization efforts outlined in the IEA's net zero emissions scenario and supported by ICAO's CORSIA guidelines for the aviation industry to achieve net zero emissions by 2050, which aligns with GGC's Climate Strategy 2023-2030 under Portfolio Driven.
[Fixed row]

(5.2) Does your organization's strategy include a climate transition plan?

(5.2.1) Transition plan

Select from:

☑ Yes, we have a climate transition plan which aligns with a 1.5°C world

(5.2.3) Publicly available climate transition plan

Select from:

☑ Yes

(5.2.4) Plan explicitly commits to cease all spending on, and revenue generation from, activities that contribute to fossil fuel expansion

Select from:

☑ Yes

(5.2.5) Description of activities included in commitment and implementation of commitment

GGC has implemented Efficiency Driven, Portfolio Driven, and Compensation Driven strategies to reduce greenhouse gas emissions in Scope 1 and Scope 2 by 2023 and achieve Net Zero by 2050. Efficiency Driven strategies involve enhancing operational efficiency through the use of low-carbon or renewable energy sources and optimizing operational processes. Portfolio Driven strategies focus on investing in environmentally friendly businesses, such as those producing low-carbon products. Compensation Driven strategies involve applying natural carbon absorption methods and seeking carbon capture technologies to support achieving these goals with maximum efficiency.

(5.2.7) Mechanism by which feedback is collected from shareholders on your climate transition plan

Select from:

☑ Our climate transition plan is voted on at AGMs and we also have an additional feedback mechanism in place

(5.2.8) Description of feedback mechanism

GGC held Opportunity Day and Analysis Meeting to communicate and engage with shareholders which include various agendas concerning the business activities, business strategies, update of sustainability progress as well as climate related strategies. One of the agendas include climate transition plan. GGC has informed the shareholders about GGC's Decarbonization Strategy which outlines the journey for GGC to become a Net Zero company. The strategies can divide into four pillars: Efficiency Driven, Compensation Driven, Portfolio Driven and ESG Leadership. GGC sees climate change as an important issue. Therefore, GGC has set a target to reduce 20% of GHG emission Scope 1 and Scope 2 by 2030 and become Net Zero by 2050. Furthermore, the meeting is also providing an opportunity for shareholders through questionnaires documents to share their feedbacks and expectation for GGC in order to improve and accelerate the process to achieve the targets. Furthermore, GGC also hold an Annual General Shareholders' Meeting where GGC distributed series of questionnaires for stakeholders to ask about their opinions regarding Low Carbon Transition Plan, Energy Management & Climate Change, Circular Economy & Eco-efficiency, Sustainable Water Management and Biodiversity. The questionnaires can be found here: https://docs.google.com/forms/d/e/1FAIpQLSdUG1M2cS-jdtGpLXZ2jyv8J-3FiKLWgSe9CJwVbZTsumQsIg/formResponse

(5.2.9) Frequency of feedback collection

Select from:

☑ More frequently than annually

(5.2.10) Description of key assumptions and dependencies on which the transition plan relies

GGC has employed robust, internationally recognized information and tools to craft climate-related scenarios that are both reliable and meaningful. These scenarios consider key assumptions, such as the impact of climate-related policies, macroeconomic trends, local weather patterns, demographics, energy usage, and availability of natural resources. We draw upon publicly available sources to inform these assessments. The scenario analysis was carried out in 2022.

(5.2.11) Description of progress against transition plan disclosed in current or previous reporting period

GGC develops transition plans and resilience strategies by continuously assessing any uncertainties including market conditions, regulations, consumer trends, and potential opportunities. This approach ensures that GGC remains adaptive and proactive in navigating climate challenges while capitalizing on emerging opportunities. From all the transition drivers included in the screening process, we selected one risk (carbon price) and one opportunity (biofuel demand) to further explore in this year's assessment. Our Net Zero Pathway responds to the scenario consideration that embraces three pillars: (1) Efficiency-Driven, (2) Portfolio-Driven, and (3) Compensation-Driven.

(5.2.12) Attach any relevant documents which detail your climate transition plan (optional)

ggc-tcfd-disclosure (1).pdf,integrated-sustainability-report-2023.pdf,20240301-ggc-one-report-2023-en (1).pdf

(5.2.13) Other environmental issues that your climate transition plan considers

Select all that apply

☑ No other environmental issue considered

[Fixed row]

(5.3) Have environmental risks and opportunities affected your strategy and/or financial planning?

(5.3.1) Environmental risks and/or opportunities have affected your strategy and/or financial planning

Select from:

☑ Yes, both strategy and financial planning

(5.3.2) Business areas where environmental risks and/or opportunities have affected your strategy

Select all that apply

☑ Products and services

☑ Upstream/downstream value chain

☑ Investment in R&D

☑ Operations

[Fixed row]

(5.3.1) Describe where and how environmental risks and opportunities have affected your strategy.

Products and services

(5.3.1.1) Effect type

Select all that apply

☑ Opportunities

(5.3.1.2) Environmental issues relevant to the risks and/or opportunities that have affected your strategy in this area

Select all that apply

☑ Climate change

(5.3.1.3) Describe how environmental risks and/or opportunities have affected your strategy in this area

As one of the main biofuel producers of Thailand, GGC integrates the climate change management into its business operation, production process as well as business strategy in order to reduce the company overall GHGs emissions in order to provide lower GHG emission products for GGC customer. Furthermore, the BCG Model (Bio-Circular-Green Economy) as one of Thailand's policy also drives GGC to produce more high value-added bio-based products for the low carbon future. In addition, the opportunity from low-carbon and sustainable product demand growth has driven GGC to develop the products made from RSPO certified feedstock as well as the development of low carbon products As a result, GCC has set the corporate KPIs have the indicators and targets on the sales drive of low carbon products and the drive of RSPO certified product sales.

Upstream/downstream value chain

(5.3.1.1) Effect type

Select all that apply

☑ Risks

(5.3.1.2) Environmental issues relevant to the risks and/or opportunities that have affected your strategy in this area

Select all that apply

☑ Climate change

(5.3.1.3) Describe how environmental risks and/or opportunities have affected your strategy in this area

Physical impacts from climate change such as drought and flooding can affect GGC and its stakeholders, either directly or indirectly, particularly palm oil and sugarcane producers. These drive GGC to develop an effective supply chain management strategy e.g. diversification of supply sources, preparation of alternative transportation route to minimize business disruption. Otherwise, the operation would be shut downed or disrupted because of lack of feedstock, logistic problem, etc. As a result of risk assessment throughout value chain, physical risks are likely to have high impact on the reduced production of feedstock resulting in increased procurement cost at an unpredictable timing, in which GGC uses the feedstock price hedging as strategy to respond to price volatility. GGC also engages and set corporate KPIs to increase the engagement with palm oil farmers through RSPO project in order to expand the sustainable supply chain for sustainable and low carbon products in the future.

Investment in R&D

(5.3.1.1) Effect type

Select all that apply

☑ Opportunities

(5.3.1.2) Environmental issues relevant to the risks and/or opportunities that have affected your strategy in this area

Select all that apply

☑ Climate change

(5.3.1.3) Describe how environmental risks and/or opportunities have affected your strategy in this area

Climate opportunities has influenced GGC to invest in low carbon product development and certification and invest in innovation to produce high value added bioproducts based using palm oil and sugarcane as a raw material. GGC also invests in biochemical products and bioplastics. This is an extension of the development of the Biocomplex project using sugar cane as a raw material. Currently, the second phase of the project is being considered to support the PLA bioplastic project, which expands the uses of BioSuccinic Acid, a biochemical that is the raw material for PBS bioplastics. The project will be undertaken with business partners, linking business operations of GC Group companies, including looking for investment opportunities in businesses with potential and operating the business in line with GGC's business growth plan as well.

Operations

(5.3.1.1) Effect type

Select all that apply

☑ Risks

☑ Opportunities

(5.3.1.2) Environmental issues relevant to the risks and/or opportunities that have affected your strategy in this area

Select all that apply

☑ Climate change

(5.3.1.3) Describe how environmental risks and/or opportunities have affected your strategy in this area

Climate physical risks could affect our operation to be disrupted or slowed down, such as drought causing water shortages for operation, flooding can disrupt the transportation to and from the plant, etc. GGC, therefore, has developed and tested the business continuity plan regularly to ensure smooth operation. Installed onsite water storage and joined the local water management working team to keep track of the water supply situation. For transition risks, Thailand's Emission Trading Schemes (ETS) developed by the Thailand Greenhouse Gas Management Organization (TGO) might be launched within the next 3-5 years, GGC have to comply the schemes, thus implementing various measure, such as energy management in accordance with ISO 50001 standards, operating and investing in a variety of energy reduction projects, e.g. a project to reduce the use of steam in the methanol purification process. Moreover, GGC will expand low carbon or renewable energy consumption from solar cells and biomass. These are also to capture climate opportunities in terms of resource efficiency and renewable energy.
[Add row]

(5.3.2) Describe where and how environmental risks and opportunities have affected your financial planning.

Row 1

(5.3.2.1) Financial planning elements that have been affected

Select all that apply

☑ Revenues

☑ Direct costs

☑ Indirect costs

☑ Capital expenditures

(5.3.2.2) Effect type

Select all that apply

☑ Risks

☑ Opportunities

(5.3.2.3) Environmental issues relevant to the risks and/or opportunities that have affected these financial planning elements

Select all that apply

☑ Climate change

(5.3.2.4) Describe how environmental risks and/or opportunities have affected these financial planning elements

All identified impact drivers in physical and transition risks have caused both direct and indirect financial impact. For Physical risks, loss of revenues and direct cost have been perceived due to the unplanned plant shutdown and assets' maintenance cost. For transition risks, upcoming mandatory carbon price mechanism and Thailand NDC triggered the company to allocate capital expenditure to support low-carbon, climate response projects such as increasing renewable energy usage in operation. For Climate-related opportunities, GGC has constructed the first phase of the Nakornsawan Bio-Complex Project consisting of a sugar cane mill with a capacity of 2.4 million tons per year, an ethanol plant with a capacity of 600,000 liters per day, and a biomass power plant with the capacity of producing 85 megawatts of electricity and 475 tons of steam per hour. This action will cause dramatic increase in GGC revenue because of the high demand bioethanol and green products around 1,600 million THB per year by 2025. Moreover, GGC continuously invested 1,430 million THB for utility provider and infrastructure for NBC phase II. The phase II project represents Thailand's first Bio Hub, run by the joint venture GGC KTIS Bio Industrial Co., Ltd. (GKBI), creating high value-added products for agricultural produce by converting them into industrial products, raise our capability for the biofuel business, and growing investment opportunities for biochemical and bioplastic businesses. Besides, the project also supports the BCG Model (Bio-Circular-Green Economy) to elevate national competitiveness and drive Thailand's achievement of Sustainable Development Goals (UN SDGs) as planned, apart from fostering confidence among business partners to invest with us further on the NBC Project. That project would capture opportunities for new low-carbon products needs and transition incentive from national and international financial support to lower transition cost. Moreover, information from scenarios analysis of both physical and transition risks help GGC to prepare mitigation or adaptation plans as well as investment plans to deal with the risks that critically impact on GGC financial position including operational status.
[Add row]

(5.4) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Methodology or framework used to assess alignment with your organization's climate transition
	Select from: ☑ Yes	*Select all that apply* ☑ Other methodology or framework

[Fixed row]

(5.4.1) Quantify the amount and percentage share of your spending/revenue that is aligned with your organization's climate transition.

Row 1

(5.4.1.1) Methodology or framework used to assess alignment

Select from:

☑ Other, please specify :a self-assessment of your financial planning against time bound KPIs outlined in your transition plan

(5.4.1.5) Financial metric

Select from:

☑ Revenue/Turnover

(5.4.1.6) Amount of selected financial metric that is aligned in the reporting year (currency)

17179100000

(5.4.1.7) Percentage share of selected financial metric aligned in the reporting year (%)

93

(5.4.1.8) Percentage share of selected financial metric planned to align in 2025 (%)

93

(5.4.1.9) Percentage share of selected financial metric planned to align in 2030 (%)

93

(5.4.1.12) Details of the methodology or framework used to assess alignment with your organization’s climate transition

In 2023, there are 4 group of products sold by GGC, methyl ester, fatty alcohol, refined glycerine and others. The revenues that align with our company's transition to a 1.5C world is calculated based on the revenue from low carbon products and products that helps third-parties to avoid emissions. In 2023, 65% of total product revenue is from the product that helps third-parties to avoid emissions, namely, Bio-Methyl Ester. Furthermore, the low carbon products namely fatty alcohol main-cut and fatty alcohol pre-cut have contributed 28% of total revenue. Thus, 93% in total. Rapidly increasing demand of Methyl Ester is difficult to determine as it is highly dependent on government's decision e.g., blending percentage, where several factors such as oil price, feedstock price, annual stock and production are at play. Despite this, we the expansion of revenue from low carbon and avoided emission products in the future, potentially through the development of other advanced biofuel and other biochemical products in the future.
[Add row]

(5.5) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

(5.5.1) Investment in low-carbon R&D

Select from:

☑ Yes

(5.5.2) Comment

GGC has established Climate Strategy 2023-2030 to become a global sustainable company with Net Zero Emission by 2050. The strategy is based on three key drivers: efficiency-driven, portfolio-driven, and compensation-driven approaches. For portfolio-driven, GGC continuously develops low-carbon products in response to the Net Zero goal and changes in customer needs towards a low-carbon society. The Company has continuously developed low-carbon products. The product life cycle has been assessed based on ISO 14040 and ISO 14044 standards for the 6th year under the certification of the Carbon Footprint Products (CFP) label and the Carbon Footprint Reduction label (CFR). The low-carbon products consist of Fatty Alcohols Main-Cut and Fatty Alcohol Pre-Cut together with avoided emissions products consisting of Methyl Ester (ME) with high value-added. The products consist of 1st Gen Biofuel, Advance Biofuel, Specialty Oleochemicals, Biochemicals, Home and Personal Products, Food Ingredients & Nutraceuticals. Examples of low-carbon projects are that GGC is in partnership with KTIS Bioethanol Co., Ltd and Kaset Thai International Sugar Corporation Public Company Limited, established GGC Biochemical Co., Ltd at the Nakhonsawan Biocomplex (NBC) with a goal of developing low-carbon products. This project focuses on manufacturing biofuels and utilities utilizing sugar cranes as a primary source of raw materials. Furthermore, GGC has participated with the public sector in developing a pilot project to produce bio-inflammable transformer oil from palm oil, utilizing technology invented in Thailand. This project serves to address the issue of oversupply of palm oil while also adding value to agricultural products in order to help farmers. This project has received funding from some of the government's investment budget. Moreover, GGC has expanded its market to agricultural chemical products that are safe for farmers through the project to produce solvent products using Methyl Ester as an ingredient, a plant-based product that can be composed naturally and is less flammable than Xylene.
[Fixed row]

(5.5.3) Provide details of your organization's investments in low-carbon R&D for chemical production activities over the last three years.

Row 1

(5.5.3.1) Technology area

Select from:

☑ Bio technology

(5.5.3.2) Stage of development in the reporting year

Select from:

☑ Basic academic/theoretical research

(5.5.3.3) Average % of total R&D investment over the last 3 years

10

(5.5.3.4) R&D investment figure in the reporting year (unit currency as selected in 1.2) (optional)

900000

(5.5.3.5) Average % of total R&D investment planned over the next 5 years

15

(5.5.3.6) Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

Currently, customers are seeking natural source materials and require improved performance of our major Petro-based fatty alcohol product, ABZ Product. GGC acknowledges this concern and developed a new product in collaboration with PTT Global Chemical Public Company Limited (GC) in 2013 called "ABZ Product" cosmetic and personal care ingredient used in sunscreen and color cosmetics. This new ABZ Product, derived from GGC's bio-based fatty alcohol feedstock, adding value to the fatty alcohol. Several products of fatty alcohol including main-cut and Pre-Cut Fatty Alcohol are considered as a Low Cabon products, which is in accordance to GGC's Climate Transition Plan through the drive of Portfolio Driven. It was qualified as a biodegradable and bio-based content product, passing the Eco Screening Criteria for safety, health, and the environment. Furthermore, this new product expands the business unit's product portfolio, providing better dispersing effect, high pigment solvency, and fewer irritant chemicals, offering a promising future for our customers and the environment.

Row 2

(5.5.3.1) Technology area

Select from:

☑ Bio technology

(5.5.3.2) Stage of development in the reporting year

Select from:

☑ Pilot demonstration

(5.5.3.3) Average % of total R&D investment over the last 3 years

14.47

(5.5.3.4) R&D investment figure in the reporting year (unit currency as selected in 1.2) (optional)

0

(5.5.3.5) Average % of total R&D investment planned over the next 5 years

48.56

(5.5.3.6) Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

GGC has partnered with the National Energy Technology Center (ENTEC) to create open innovations and a pilot project for producing less flammable bio-transformer oil from palm oil. This technology was invented in Thailand and the integrated pilot field-testing aims to promote sustainable commercial use. The collaboration involved various sectors, including key organizations in the transformer oil industry and major users of transformers in the country such as the Electricity Generating Authority of Thailand (EGAT), Metropolitan Electricity Authority (MEA), and the Provincial Electricity Authority (PEA), as well as the national organization responsible for developing industrial product standards. The company received 70% government financial support from the Program Management Unit Competitiveness (PMUC), equivalent to 20.8 million THB. Through cooperation with government organizations, the time to market for this project was reduced by at least 3 years, which included shortening the period for product testing and developing the national industrial standard for bio-transformer oil. In 2023, the production capacity was increased by developing a pilot scale production system capable of producing more than 300-400 litres per batch of bio-transformer oil. The oil produced will be utilized in the actual field test by the Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA) in the next phase. This project aims to address the issue of palm oil oversupply, which has been worsening annually. It also seeks to increase the value of palm oil in Thailand by 565%, surpassing the added value of cooking oil and biodiesel at 67% and 23% respectively.

Row 3

(5.5.3.1) Technology area

Select from:

☑ Bio technology

(5.5.3.2) Stage of development in the reporting year

Select from:

☑ Small scale commercial deployment

(5.5.3.3) Average % of total R&D investment over the last 3 years

0

(5.5.3.4) R&D investment figure in the reporting year (unit currency as selected in 1.2) (optional)

25950

(5.5.3.5) Average % of total R&D investment planned over the next 5 years

1

(5.5.3.6) Explain how your R&D investment in this technology area is aligned with your climate commitments and/or climate transition plan

GGC expands its market to agricultural chemical products that are safe for farmers and users. To meet the needs of customers, GGC has studied the development of solvents in the insecticide group from methyl ester, which is a product of GGC and is derived from low carbon products raw material (Methyl Ester). The solvent will increase the solubility of the Active Ingredient used to eliminate insects. It has a mild scent. It is a plant-based product. It can decompose naturally. It is also more fire retardant since methyl esters are safe chemicals and less flammable than Xylene. This year, GGC distributed the product to many customer groups, which is a customer base increase of more than 254% from 2022. GGC will continue to expand its customer base by 57% in 2024
[Add row]

(5.10) Does your organization use an internal price on environmental externalities?

	Use of internal pricing of environmental externalities	Environmental externality priced
	Select from: ☑ Yes	*Select all that apply* ☑ Carbon

[Fixed row]

(5.10.1) Provide details of your organization’s internal price on carbon.

Row 1

(5.10.1.1) Type of pricing scheme

Select from:

☑ Shadow price

(5.10.1.2) Objectives for implementing internal price

Select all that apply

☑ Drive energy efficiency

☑ Drive low-carbon investment

☑ Identify and seize low-carbon opportunities

☑ Stress test investments

☑ Other, please specify **:**Stake holder expectation

(5.10.1.3) Factors considered when determining the price

Select all that apply

☑ Alignment to scientific guidance

☑ Alignment with the price of a carbon tax

☑ Cost of required measures to achieve climate-related targets

☑ Price with substantive impact on business decisions

(5.10.1.4) Calculation methodology and assumptions made in determining the price

GGC determines shadow price based on CO2 concentration in effluent stream to be reduced according to specific tech applied during investment process. By the assumption of carbon price as following 1) The carbon price is calculated by incorporating the market carbon price, peers reviews, sales volume of the business to identify the range of carbon price for GGC. The selected methodology is also aligned with scientific guidance. 2) Utilizing a weighted average of carbon pricing alongside sales volume metrics within each targeted market or region, integrated with considerations for CBAM. 3) In cases of uncertainty, opt for the higher carbon price. 4) GGC's carbon price to be revisit annually as per business plan 5) Carbon pricing profile for each region to be monitored according to country/region's policy, market and regulation movements

(5.10.1.5) Scopes covered

Select all that apply

☑ Scope 1

☑ Scope 2

(5.10.1.6) Pricing approach used – spatial variance

Select from:

☑ Uniform

(5.10.1.8) Pricing approach used – temporal variance

Select from:

☑ Evolutionary

(5.10.1.9) Indicate how you expect the price to change over time

The carbon price is expected to increase in the future as Thailand announced a Nationally Determined Contribution (NDC) to reduce 40 % by 2030 and the Net Zero goal by 2065. The carbon price may be embedded in utility cost (electricity and steam) in upstream or GGC may have to pay directly i.e., in case of carbon tax and offset. Carbon price will affect GGC by increasing the operational expense proportional to the amount of GHG emission of the organization.

(5.10.1.10) Minimum actual price used (currency per metric ton CO2e)

521.57

(5.10.1.11) Maximum actual price used (currency per metric ton CO2e)

869.47

(5.10.1.12) Business decision-making processes the internal price is applied to

Select all that apply

☑ Capital expenditure

☑ Operations

☑ Value chain engagement

(5.10.1.13) Internal price is mandatory within business decision-making processes

Select from:

☑ Yes, for some decision-making processes, please specify **:**Investment of a new product, Investment of a new assets, Investment of a new technology

(5.10.1.14) % total emissions in the reporting year in selected scopes this internal price covers

100

(5.10.1.15) Pricing approach is monitored and evaluated to achieve objectives

Select from:

☑ Yes

(5.10.1.16) Details of how the pricing approach is monitored and evaluated to achieve your objectives

The result from scenario analysis was used to inform the strategy and GHG target setting. It is also used to estimate the cost GHG may have to pay per ton of GHG emission in order to evaluate the cost-effectiveness of investment projects. It is also used to set a reference for overall investment cost to comply with strategy and target. This will also be used in target revision to escalate our commitment in alignment with Paris Agreement and SBTi Net Zero target standard in the future.
[Add row]

(5.11) Do you engage with your value chain on environmental issues?

	Engaging with this stakeholder on environmental issues	Environmental issues covered
Suppliers	*Select from:* ☑ Yes	*Select all that apply* ☑ Climate change
Customers	*Select from:* ☑ Yes	*Select all that apply* ☑ Climate change
Investors and shareholders	*Select from:* ☑ Yes	*Select all that apply* ☑ Climate change
Other value chain stakeholders	*Select from:* ☑ Yes	*Select all that apply* ☑ Climate change

[Fixed row]

(5.11.1) Does your organization assess and classify suppliers according to their dependencies and/or impacts on the environment?

Climate change

(5.11.1.1) Assessment of supplier dependencies and/or impacts on the environment

Select from:

☑ Yes, we assess the dependencies and/or impacts of our suppliers

(5.11.1.2) Criteria for assessing supplier dependencies and/or impacts on the environment

Select all that apply

☑ Contribution to supplier-related Scope 3 emissions

☑ Dependence on ecosystem services/environmental assets

☑ Other, please specify **:**ESG Risk screening

(5.11.1.3) % Tier 1 suppliers assessed

Select from:

☑ 100%

(5.11.1.4) Define a threshold for classifying suppliers as having substantive dependencies and/or impacts on the environment

GGC has a supplier screening process concerning business relevance and sector-specific risks, ESG risks. GGC also identifies supplier with substantive risks through the risks level in terms of Biodiversity and Water Risk, which concerning the Dependency and Impacts. The results are gathered from the assessment of using WWF Biodiversity and Water Risk Filter. Therefore, the substantive suppliers are the significant suppliers with high spending, high potential ESG, Biodiversity and Water Risks.

(5.11.1.5) % Tier 1 suppliers meeting the thresholds for substantive dependencies and/or impacts on the environment

Select from:

☑ Less than 1%

(5.11.1.6) Number of Tier 1 suppliers meeting the thresholds for substantive dependencies and/or impacts on the environment

3
[Fixed row]

(5.11.2) Does your organization prioritize which suppliers to engage with on environmental issues?

Climate change

(5.11.2.1) Supplier engagement prioritization on this environmental issue

Select from:

☑ Yes, we prioritize which suppliers to engage with on this environmental issue

(5.11.2.2) Criteria informing which suppliers are prioritized for engagement on this environmental issue

Select all that apply

☑ Material sourcing

☑ Procurement spend

☑ Regulatory compliance

☑ Product safety and compliance

☑ Supplier performance improvement

☑ In line with the criteria used to classify suppliers as having substantive dependencies and/or impacts relating to climate change

(5.11.2.4) Please explain

GGC has a supplier screening process that takes into account business relevance and sector-specific risks of suppliers, including resource usage, operational efficiency, and emissions. This process covers Environmental, Social, and Governance (ESG) aspects. For suppliers to be eligible to do business with GGC, they must pass all assessments. In addition, GGC has conducted a biodiversity risk assessment using the WWF Biodiversity Risk Filter, incorporating both physical and reputational risks. This assessment aligns with the TNFD framework to identify and evaluate biodiversity impacts and dependencies within the operational areas of key suppliers based on procurement spend and significance. Furthermore, GGC has participated in a supplier sustainability management assessment according to the standards and methodologies of a recognized industry initiative called EcoVadis. This platform is used to evaluate and monitor its suppliers' sustainability performance, considering criteria such as environmental issues, labor and human rights, ethics, and sustainable procurement. From the assessment above, GGC can identify the suppliers to engage with in order to bring about sustainability approaches to the value chain.
[Fixed row]

(5.11.5) Do your suppliers have to meet environmental requirements as part of your organization’s purchasing process?

Climate change

(5.11.5.1) Suppliers have to meet specific environmental requirements related to this environmental issue as part of the purchasing process

Select from:

☑ Yes, environmental requirements related to this environmental issue are included in our supplier contracts

(5.11.5.2) Policy in place for addressing supplier non-compliance

Select from:

☑ Yes, we have a policy in place for addressing non-compliance

(5.11.5.3) Comment

In case of the supplier violates provision of supplier code of conduct, GGC may issue a warning letter and halt or cancel further transactions with the said supplier. In this case, the supplier is not entitled to any compensation from the company.
[Fixed row]

(5.11.6) Provide details of the environmental requirements that suppliers have to meet as part of your organization's purchasing process, and the compliance measures in place.

Climate change

(5.11.6.1) Environmental requirement

Select from:
☑ Compliance with an environmental certification, please specify :RSPO, Complying with regulatory requirements, ISO14001 standard and/or environmental are related to energy and GHG emission management

(5.11.6.2) Mechanisms for monitoring compliance with this environmental requirement

Select all that apply
☑ Certification
☑ First-party verification
☑ Supplier scorecard or rating
☑ Supplier self-assessment

(5.11.6.3) % tier 1 suppliers by procurement spend required to comply with this environmental requirement

Select from:
☑ 100%

(5.11.6.4) % tier 1 suppliers by procurement spend in compliance with this environmental requirement

Select from:

☑ 51-75%

(5.11.6.7) % tier 1 supplier-related scope 3 emissions attributable to the suppliers required to comply with this environmental requirement

Select from:
☑ 100%

(5.11.6.8) % tier 1 supplier-related scope 3 emissions attributable to the suppliers in compliance with this environmental requirement

Select from:
☑ 100%

(5.11.6.9) Response to supplier non-compliance with this environmental requirement

Select from:
☑ Retain and engage

(5.11.6.10) % of non-compliant suppliers engaged

Select from:
☑ 100%

(5.11.6.11) Procedures to engage non-compliant suppliers

Select all that apply
☑ Providing information on appropriate actions that can be taken to address non-compliance

(5.11.6.12) Comment

GGC holds an annual assessment of the ESG performance of its active suppliers. The ESG assessment covers occupational health & safety, environment, human rights, labor, as well as ethics and compliance with laws, rules and regulations, according to the company's procurement policy, resulting in sustainable business growth together. Under the environmental aspect includes a consideration whether the company has environmental policy and management process in place such as

ISO14001 standard and/or environmental policy which are related to energy and GHG emission management or requirements and activities in relation to the environmental issues, such as RSPO and Environmental Policy apart from the ISO 14001 Standard.
[Add row]

(5.11.7) Provide further details of your organization's supplier engagement on environmental issues.

Climate change

(5.11.7.2) Action driven by supplier engagement

Select from:

☑ Upstream value chain transparency and human rights

(5.11.7.3) Type and details of engagement

Capacity building

☑ Provide training, support and best practices on how to mitigate environmental impact

(5.11.7.4) Upstream value chain coverage

Select all that apply

☑ Tier 1 suppliers

☑ Tier 2 suppliers

(5.11.7.5) % of tier 1 suppliers by procurement spend covered by engagement

Select from:

☑ 1-25%

(5.11.7.6) % of tier 1 supplier-related scope 3 emissions covered by engagement

Select from:

☑ 1-25%

(5.11.7.8) Number of tier 2+ suppliers engaged

50

(5.11.7.9) Describe the engagement and explain the effect of your engagement on the selected environmental action

GGC has set a quantitative threshold for measuring success through the aims to encourage 800 smallholder farmers to become certified by the Roundtable on Sustainable Palm Oil (RSPO) by 2024. This certification aims to meet the demands of customers who value social, economic, and environmental responsibility in the sourcing of raw materials. GGC has partnered with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Thailand, and the Thailand Oil Palm Smallholder Academy (TOPSA) to launch the Sustainable Palm Oil Production and Procurement in Thailand (SPOPP) Project. This project aims to promote sustainability, provide training programs, and enhance the capabilities of small farmers, who are the primary producers in the Thai palm oil supply chain, to meet the standards set by the RSPO. In 2023, the TOPSA course featured more 7 oil palm mills participated in the training on educating about the preparation to expand the knowledge of sustainable palm oil plantations to smallholder farmers, in which 1,154 smallholder farmers have been participating in the event. The TOPSA curriculum includes 5 important topics: RSPO sustainable Palm Oil Production Standard, Group Management, Farming, Environment and Society. The RSPO is a crucial tool for accessing global markets and creating market opportunities for sustainable palm oil from Thailand. The outcome of the engagement includes the increased of incomes from selling the RSPO certification, which has been estimated to increase by 17,433 THB per Rai per year and drive the RSPO adoption by 102,499 ton per year.

(5.11.7.10) Engagement is helping your tier 1 suppliers meet an environmental requirement related to this environmental issue

Select from:

☑ Yes, please specify the environmental requirement **:**SPOPP program helps promotes small farmers to achieve the Roundtable on Sustainable Palm Oil (RSPO) certification, which is a principle for avoiding deforestation and promote sustainable palm oil cultivation, reducing risks to the environment

(5.11.7.11) Engagement is helping your tier 1 suppliers engage with their own suppliers on the selected action

Select from:

☑ Yes

[Add row]

(5.11.9) Provide details of any environmental engagement activity with other stakeholders in the value chain.

Climate change

(5.11.9.1) Type of stakeholder

Select from:

☑ Customers

(5.11.9.2) Type and details of engagement

Education/Information sharing

☑ Run an engagement campaign to educate stakeholders about the environmental impacts about your products, goods and/or services

(5.11.9.3) % of stakeholder type engaged

Select from:

☑ 51-75%

(5.11.9.4) % stakeholder-associated scope 3 emissions

Select from:

☑ 100%

(5.11.9.5) Rationale for engaging these stakeholders and scope of engagement

As part of GGC's sustainability campaign, the company collaborates with these customers on solutions, drive sustainable procurement and ultimately strengthening the sustainable value chain. GGC is engaging in education and information sharing with significant customers—those with high purchasing volumes—to promote sustainability throughout the entire value chain. Through an engagement campaign, GGC educates these customers about the environmental impacts of its products, goods, and services. The 63% of customers are contributed from the customers' spending of OR, GC, and IRPC from the PTT Group. GGC presents the Sustainability initiatives to inform and initiate the collaboration with those customers in at least in a yearly basis.

(5.11.9.6) Effect of engagement and measures of success

GGC has set the threshold to measure success through aiming to communicate and educate the sustainability programs to at least 30% of the customer spends every year. As a result, in 2023, there are 63% of Total customers' spends that GGC has reached out and conducted the engagement with. The outcomes of GGC's engagement will help its customers better understand GGC's sustainability goals and commitment to achieving sustainability throughout the entire value chain—from raw materials and production processes to the end customer. The training also emphasizes on promoting an efficient, transparent, and verifiable procurement system that can reduce potential risks, as well as a comprehensive inspection process. The engagement allows the exchange of information between the PTT Group on their

current and future initiatives, targets, requirements and expectations. This brings about a better alignment and expectation between the parties as well as enhancing the Sustainable Procurement Protocol.

Climate change

(5.11.9.1) Type of stakeholder

Select from:

☑ Customers

(5.11.9.2) Type and details of engagement

Education/Information sharing

☑ Run an engagement campaign to educate stakeholders about the environmental impacts about your products, goods and/or services

(5.11.9.3) % of stakeholder type engaged

Select from:

☑ 1-25%

(5.11.9.4) % stakeholder-associated scope 3 emissions

Select from:

☑ 100%

(5.11.9.5) Rationale for engaging these stakeholders and scope of engagement

GGC keeps track of environmental indicators i.e. GHG emissions, energy consumption, water usage and waste disposal and report through the sustainability report annually. We also share in-depth environmental data with interested customers (mostly home care and personal care products) to enable environmental reporting and product improvement. For example, we engages annually with Colgate-Palmolive Company on GHG data sharing. We also provide the Sustainability Development with CRODA Singapore, one of our major customers, in an on-going basis. The customers under this scope of engagement are estimated to account for nearly 100% of scope 3: processing of sold products of GGC.

(5.11.9.6) Effect of engagement and measures of success

The engagement between GGC and Colgate, Unilever, CRODA Singapore and many more customers trigger GGC to do more on GHG emissions and water usage measurement. GGC is aspired to share environmental information which is useful to all partners along the value chain. In addition, due to the engagement, GGC supplied RSPO palm oil certified as a sustainable product with No Deforestation, No Peat, and No Exploitation (NDPE) commitment to Colgate-Palmolive, Unilever, CRODA Singapore and other customers that required such products for supporting GGC and the customers' sustainability strategy. The quantitative threshold to measure the success including maintain the RSPO products sales to customers by 5% of total sales. In 2023, the revenue from Colgate-Palmolive, Unilever, CRODA Singapore and other customers who purchased RSPO Glycerin and RSPO Fatty Alcohol are accounted for approximately 5% and 7% of total sales in 2023 respectively. The effect of the engagement to enhance the RSPO Raw Material includes the drive of demand for RSPO through requirement from customers to supply RSPO products. This can lead to more adoption of RSPO Certification from suppliers including farmers. This will create a positive impact to the environment and society through responsible agricultural, no deforestation and responsible labor practices. The RSPO certified palm oil can increase the income of farmer by up to USD10 per ton of FA feedstock.
[Add row]

(5.12) Indicate any mutually beneficial environmental initiatives you could collaborate on with specific CDP Supply Chain members.

Row 1

(5.12.1) Requesting member

Select from:

(5.12.2) Environmental issues the initiative relates to

Select all that apply
☑ Climate change

(5.12.4) Initiative category and type

Other
☑ Other initiative type, please specify **:**Education/information sharing

(5.12.5) Details of initiative

GGC keeps track of environmental indicators, i.e., GHG emissions, energy consumption, water usage, and waste disposal, and reports through the sustainability report annually. We also share in-depth environmental data with interested customers (mostly home care and personal care products) to enable environmental reporting and product improvement. For example, we engage annually with Colgate Palmolive Company on GHG data sharing. The customers under this scope of engagement are estimated to account for the majority of scope 3: processing of sold products of GGC. The engagement between GGC and Colgate triggered GGC to do more on GHG emissions and water usage measurement. GGC aspires to share environmental information, which is useful to all partners along the value chain. In addition, due to the engagement, GGC supplied RSPO-certified palm oil as a sustainable product with a No Deforestation, No Peat, and No Exploitation (NDPE) commitment to Colgate Palmolive for supporting its sustainability strategy in 2023.

(5.12.6) Expected benefits

Select all that apply

☑ Other, please specify **:**To be determined as we are still at the beginning of engagement process. The result from information sharing could lead to future cross-value chain initiatives that reduces both our operational emission, customer emission and upstream emission

(5.12.7) Estimated timeframe for realization of benefits

Select from:

☑ Other, please specify **:**To be determined as we are still at the beginning of engagement process. The result from information sharing could lead to future cross-value chain initiatives that reduces both our operational emission, customer emission and upstream emission

(5.12.8) Are you able to estimate the lifetime CO2e and/or water savings of this initiative?

Select from:

☑ Yes, lifetime CO2e savings only

(5.12.9) Estimated lifetime CO2e savings

0

(5.12.11) Please explain

To be determined as we are still at the beginning of engagement process. The result from information sharing could lead to future cross-value chain initiatives that reduces both our operational emission, customer emission and upstream emission.
[Add row]

(5.13) Has your organization already implemented any mutually beneficial environmental initiatives due to CDP Supply Chain member engagement?

	Environmental initiatives implemented due to CDP Supply Chain member engagement	Primary reason for not implementing environmental initiatives	Explain why your organization has not implemented any environmental initiatives
	Select from: ☑ No, but we plan to within the next two years	*Select from:* ☑ Not an immediate strategic priority	*GGC is in the process of developing a procedure to implement environmental initiatives.*

[Fixed row]

C6. Environmental Performance - Consolidation Approach

(6.1) Provide details on your chosen consolidation approach for the calculation of environmental performance data.

Climate change

(6.1.1) Consolidation approach used

Select from:

☑ Operational control

(6.1.2) Provide the rationale for the choice of consolidation approach

GGC uses operational control to compile environmental performance data based on the GHG Protocol Corporate Standard. Under this approach, the company has full authority to introduce and implement its operating policies at the operational level. With this method, GGC foresees opportunities to improve company management, enabling more effective decision-making and increased efficiency.

Plastics

(6.1.1) Consolidation approach used

Select from:

☑ Operational control

(6.1.2) Provide the rationale for the choice of consolidation approach

In determining the significant of impact from plastics. GGC focuses on only operational control. Due to no plastic use and generation of plastic waste, plastic is considered a less significant material compared to other environmental issues, including climate change, for GGC's operations. Consequently, there will be no report on the plastics issue this year.

Biodiversity

(6.1.1) Consolidation approach used

Select from:

☑ Operational control

(6.1.2) Provide the rationale for the choice of consolidation approach

GGC has assessed the biodiversity risks in terms of the location based specifically for own operation. GGC utilize the WWF Biodiversity Risk Filter and WWF Water Risk Filter, which concerns the dependency and impacts of GGC's own operation. The analysis in 2022 and 2023 considered as a high-level analysis. GGC plans to conduct in depth analysis in the future.
[Fixed row]

C7. Environmental performance - Climate Change

(7.1) Is this your first year of reporting emissions data to CDP?

Select from:
☑ No

(7.1.1) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

	Has there been a structural change?
	Select all that apply ☑ No

[Fixed row]

(7.1.2) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?
	Select all that apply ☑ No

[Fixed row]

(7.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

Select all that apply

☑ IPCC Guidelines for National Greenhouse Gas Inventories, 2006

☑ ISO 14064-1

☑ Thailand Greenhouse Gas Management Organization: The National Guideline Carbon Footprint for organization

☑ The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

(7.3) Describe your organization's approach to reporting Scope 2 emissions.

(7.3.1) Scope 2, location-based

Select from:

☑ We are reporting a Scope 2, location-based figure

(7.3.2) Scope 2, market-based

Select from:

☑ We are reporting a Scope 2, market-based figure

(7.3.3) Comment

GGC purchased electricity from the Electricity Generating Authority of Thailand (EGAT), Provincial Electricity Authority (PEA). For market based GGC purchases the electricity from GPSC and other suppliers with specific purchase contract and agreement from GPSC and other supplier.
[Fixed row]

(7.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?

Select from:

☑ No

(7.5) Provide your base year and base year emissions.

Scope 1

(7.5.1) Base year end

12/31/2020

(7.5.2) Base year emissions (metric tons CO2e)

33333

(7.5.3) Methodological details

GGC calculates GHG Scope 1 emissions using methodologies from the IPCC Vol. 2 Guidelines for National Greenhouse Gas Inventories and the IPCC Fifth Assessment Report (AR5-100 year). GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 2 (location-based)

(7.5.1) Base year end

12/31/2020

(7.5.2) Base year emissions (metric tons CO2e)

85630

(7.5.3) Methodological details

GGC purchased electricity from both the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA), which are grid-based and use a mix of generation technologies and purchase electricity from the Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 (location-based) emissions in 2020 are calculated based on methodologies from the IPCC Fifth Assessment Report (AR5-100 year) and using the national default value of the

emission factor from the Thai National LCI Database and the specific emission factor provided by GPSC. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 2 (market-based)

(7.5.1) Base year end

12/31/2020

(7.5.2) Base year emissions (metric tons CO2e)

59481

(7.5.3) Methodological details

In addition to grid-purchased electricity from EGAT and PEA, GGC purchases electricity from Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 (market-based) emissions in 2020 are calculated using the emission factor provided by GPSC. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 1: Purchased goods and services

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

500194.97

(7.5.3) Methodological details

GGC calculates Scope 3 Category 1 emissions in 2020 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with organizational guidance for quantifying and reporting greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of purchased goods and services and uses emissions factors from the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018 and Ecoinvent 2.2 as well as using GWP values from IPCC 2007 GWP 100a. The category involves GHG emissions from raw materials or purchased feedstock upstream in the value chain. GGC has been using seven materials, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), palm stearin (PS), crude glycerin and methanol, as the main

feedstocks in the production line contributing to Scope 3 emission of the company. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 2: Capital goods

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0

(7.5.3) Methodological details

Category 2 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0

(7.5.3) Methodological details

Category 3 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Scope 3 category 4: Upstream transportation and distribution

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

11167.9

(7.5.3) Methodological details

GGC calculates Scope 3 Category 4 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of upstream transportation and distribution including the transportation and distribution of Refined Palm Oil (RPO), Palm Sterine (PS), Palm Fatty Acid Distillate (PFAD) Refined bleached Deodorized Palm Kernel Oil (RBDPKO), Methanol by using truck and transportation of methanol and RPO by using Boat. (iii) Emissions factors: Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 5: Waste generated in operations

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

676.17

(7.5.3) Methodological details

GGC calculates Scope 3 Category 5 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from average data method and spend-based method of waste generated in operations including transportation of hazardous waste and non-hazardous waste using trucks, as well as the amounts of hazardous waste, non-hazardous waste, general waste, contaminated water, and sweet water, the emission factors from IPCC Chapter 5: Incineration and Open Burning of Waste, IPCC Guidelines for National Greenhouse Gas Inventories - Volume 5: Waste, and the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 6: Business travel

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

1.8

(7.5.3) Methodological details

GGC calculates Scope 3 Category 6 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of business travel. The emission factors are calculated from Defra, 2010. The category includes domestic air travelling, business class for business purpose. The GWP values are based on IPCC 2007 GWP 100a.

Scope 3 category 7: Employee commuting

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

370.43

(7.5.3) Methodological details

GGC calculates Scope 3 Category 7 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from average data method of employee commuting including commuting of employee using personal car (gasohol), personal car (diesel) and rented van for employees (diesel), emission factors from IPCC Vol.2 and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 8: Upstream leased assets

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Category 8 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Scope 3 category 9: Downstream transportation and distribution

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

9796.32

(7.5.3) Methodological details

GGC calculates Scope 3 Category 9 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from Quantity and monetary of downstream transportation and distribution including transportation of products by trucks and boat, emission factors from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018, and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Scope 3 category 10: Processing of sold products

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Scope 3 Category 10 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Scope 3 category 11: Use of sold products

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

GGC does include the "Use of Sold Products" category in its Scope 3 emissions calculations. However, due to the nature of GGC's products such as Glycerin, Fatty Alcohol, and Methyl Ester, which are utilized in downstream processes, the emissions attributable to GGC in these categories are effectively zero. This outcome is based on the understanding that the emissions associated with the use and end-of-life treatment of these products fall under the responsibility of the downstream operators. Therefore, although these categories are factored into GGC's calculations, they contribute zero emissions to GGC's overall Scope 3 emissions total.

Scope 3 category 12: End of life treatment of sold products

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

GGC does include the "End of Life Treatment of Sold Products" category in its Scope 3 emissions calculations. However, due to the nature of GGC's products such as Glycerin, Fatty Alcohol, and Methyl Ester, which are utilized in downstream processes, the emissions attributable to GGC in these categories are effectively zero. This outcome is based on the understanding that the emissions associated with the use and end-of-life treatment of these products fall under the responsibility of the downstream operators. Therefore, although these categories are factored into GGC's calculations, they contribute zero emissions to GGC's overall Scope 3 emissions total.

Scope 3 category 13: Downstream leased assets

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Scope 3 Category 13 does not apply to GGC because GGC does not lease assets.

Scope 3 category 14: Franchises

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

GGC operates without a franchise business. Therefore, scope 3 emissions for franchises are not applicable to GGC

Scope 3 category 15: Investments

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Scope 3 emission from investment was included in emission Scope 1 and 2 form operation.

Scope 3: Other (upstream)

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Scope 3 other (upstream) is not applicable to for GGC

Scope 3: Other (downstream)

(7.5.1) Base year end

12/31/2021

(7.5.2) Base year emissions (metric tons CO2e)

0.0

(7.5.3) Methodological details

Scope 3 other (downstream) is not applicable to for GGC
[Fixed row]

(7.6) What were your organization’s gross global Scope 1 emissions in metric tons CO2e?

Reporting year

(7.6.1) Gross global Scope 1 emissions (metric tons CO2e)

28450

(7.6.3) Methodological details

GGC calculates GHG Scope 1 emissions using methodologies from the IPCC Vol. 2 Guidelines for National Greenhouse Gas Inventories and the IPCC Fifth Assessment Report (AR5-100 year). GGC’s GHG data collection and reporting boundary in 2023 covers 100% of GGC’s own operations.

Past year 1

(7.6.1) Gross global Scope 1 emissions (metric tons CO2e)

29817

(7.6.2) End date

12/30/2022

(7.6.3) Methodological details

GGC calculates GHG Scope 1 emissions using methodologies from the IPCC Vol. 2 Guidelines for National Greenhouse Gas Inventories and the IPCC Fifth Assessment Report (AR5-100 year). GGC's GHG data collection and reporting boundary in 2022 covers 100% of GGC's own operations.

Past year 2

(7.6.1) Gross global Scope 1 emissions (metric tons CO2e)

30509

(7.6.2) End date

12/30/2021

(7.6.3) Methodological details

GGC calculates GHG Scope 1 emissions using methodologies from the IPCC Vol. 2 Guidelines for National Greenhouse Gas Inventories and the IPCC Fifth Assessment Report (AR5-100 year). GGC's GHG data collection and reporting boundary in 2021 covers 100% of GGC's own operations.

Past year 3

(7.6.1) Gross global Scope 1 emissions (metric tons CO2e)

33333

(7.6.2) End date

12/30/2020

(7.6.3) Methodological details

GGC calculates GHG Scope 1 emissions using methodologies from the IPCC Vol. 2 Guidelines for National Greenhouse Gas Inventories and the IPCC Fifth Assessment Report (AR5-100 year). GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.
[Fixed row]

(7.7) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

(7.7.1) Gross global Scope 2, location-based emissions (metric tons CO2e)

83908

(7.7.2) Gross global Scope 2, market-based emissions (metric tons CO2e) (if applicable)

73708

(7.7.4) Methodological details

GGC purchased electricity from both the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA), which are grid-based and use a mix of generation technologies and purchase electricity from the Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 emissions in 2023 are calculated based on methodologies from the IPCC Fifth Assessment Report (AR5-100 year) and using both the national default value of the emission factor from the Thai National LCI Database. The market-based emissions considered only electricity purchased from GPSC and use specific emission factors from GPSC to calculate. GGC's GHG data collection and reporting boundary in 2023 covers 100% of GGC's own operations.

Past year 1

(7.7.1) Gross global Scope 2, location-based emissions (metric tons CO2e)

84066

(7.7.2) Gross global Scope 2, market-based emissions (metric tons CO2e) (if applicable)

67954

(7.7.3) End date

12/30/2022

(7.7.4) Methodological details

GGC purchased electricity from both the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA), which are grid-based and use a mix of generation technologies and purchase electricity from the Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 emissions

in 2022 are calculated based on methodologies from the IPCC Fifth Assessment Report (AR5-100 year) and using both the national default value of the emission factor from the Thai National LCI Database. The market-based emissions considered only electricity purchased from GPSC and use specific emission factors from GPSC to calculate. GGC's GHG data collection and reporting boundary in 2022 covers 100% of GGC's own operations.

Past year 2

(7.7.1) Gross global Scope 2, location-based emissions (metric tons CO2e)

76728

(7.7.2) Gross global Scope 2, market-based emissions (metric tons CO2e) (if applicable)

61358

(7.7.3) End date

12/30/2021

(7.7.4) Methodological details

GGC purchased electricity from both the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA), which are grid-based and use a mix of generation technologies and purchase electricity from the Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 emissions in 2021 are calculated based on methodologies from the IPCC Fifth Assessment Report (AR5-100 year) and using both the national default value of the emission factor from the Thai National LCI Database. The market-based emissions considered only electricity purchased from GPSC and use specific emission factors from GPSC to calculate. GGC's GHG data collection and reporting boundary in 2021 covers 100% of GGC's own operations.

Past year 3

(7.7.1) Gross global Scope 2, location-based emissions (metric tons CO2e)

85630

(7.7.2) Gross global Scope 2, market-based emissions (metric tons CO2e) (if applicable)

59481

(7.7.3) End date

12/30/2020

(7.7.4) Methodological details

GGC purchased electricity from both the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA), which are grid-based and use a mix of generation technologies and purchase electricity from the Global Power Synergy Public Company Limited (GPSC). Therefore, GHG Scope 2 emissions in 2020 are calculated based on methodologies from the IPCC Fifth Assessment Report (AR5-100 year) and using both the national default value of the emission factor from the Thai National LCI Database. The market-based emissions considered only electricity purchased from GPSC and use specific emission factors from GPSC to calculate. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.
[Fixed row]

(7.8) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

(7.8.1) Evaluation status

Select from:
☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

541297.54

(7.8.3) Emissions calculation methodology

Select all that apply
☑ Spend-based method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

(7.8.5) Please explain

GGC calculates Scope 3 Category 1 emissions in 2023 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with organizational guidance for quantifying and reporting greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of purchased goods and services and uses emissions factors from the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018 and Ecoinvent 2.2 as well as using GWP values from IPCC 2007 GWP 100a. The category involves GHG emissions from raw materials or purchased feedstock upstream in the value chain. GGC has been using seven materials, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), palm stearin (PS), crude glycerin and methanol, as the main feedstocks in the production line contributing to Scope 3 emission of the company. GGC's GHG data collection and reporting boundary covers 100% of GGC's own operations.

Capital goods

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

The category "Capital goods" has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Fuel-and-energy-related activities (not included in Scope 1 or 2)

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

The category "Fuel-and-energy related activities (not included in Scope 1 or 2)" has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Upstream transportation and distribution

(7.8.1) Evaluation status

Select from:

☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

10624.89

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Spend-based method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

(7.8.5) Please explain

GGC calculates Scope 3 Category 4 emissions in 2023 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of upstream transportation and distribution including the transportation and distribution of Refined Palm Oil (RPO), Palm Sterine (PS), Palm Fatty Acid Distillate (PFAD) Refined bleached Deodorized Palm Kernel Oil (RBDPKO), Methanol by using truck and transportation of methanol and RPO by using Boat. GGC uses the Emissions factors of Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary covers 100% of GGC's own operations.

Waste generated in operations

(7.8.1) Evaluation status

Select from:

☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

14597.15

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Average data method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

(7.8.5) Please explain

GGC calculates Scope 3 Category 5 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from average data method and spend-based method of waste generated in operations including transportation of hazardous waste and non-hazardous waste using trucks, as well as the amounts of hazardous waste, non-hazardous waste, general waste, contaminated water, and sweet water, the emission factors from IPCC Chapter 5: Incineration and Open Burning of Waste, IPCC Guidelines for National Greenhouse Gas Inventories - Volume 5: Waste, and the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary in 2020 covers 100% of GGC's own operations.

Business travel

(7.8.1) Evaluation status

Select from:

☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

27.59

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Spend-based method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

(7.8.5) Please explain

GGC calculates Scope 3 Category 6 emissions in 2021 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from quantity and monetary of business travel. The emission factors are calculated from Defra, 2010. The category includes domestic air travelling, business class for business purpose. The GWP values are based on IPCC 2007 GWP 100a.

Employee commuting

(7.8.1) Evaluation status

Select from:

☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

427.24

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Average data method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

(7.8.5) Please explain

GGC calculates Scope 3 Category 7 emissions in 2023 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from average data method of employee commuting including commuting of employee using personal car (gasohol), personal car (diesel) and rented van for employees (diesel), emission factors from IPCC Vol.2 and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary covers 100% of GGC's own operations.

Upstream leased assets

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

Category 8 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Downstream transportation and distribution

(7.8.1) Evaluation status

Select from:

☑ Relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

9286.6

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Spend-based method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

(7.8.5) Please explain

GGC calculates Scope 3 Category 9 emissions in 2023 using methodologies from the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard and ISO14064-1:2006 Specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals. GGC also uses activity data from Quantity and monetary of downstream transportation and distribution including transportation of products by trucks and boat, emission factors from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018, and GWP values from IPCC 2007 GWP 100a. GGC's GHG data collection and reporting boundary covers 100% of GGC's own operations.

Processing of sold products

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

Scope 3 Category 10 has been excluded from GGC's Scope 3 emissions. This exclusion is due to the category's perceived irrelevance to GGC's business activities, primarily because of its low proportion of emissions, approximately 5% of the total Scope 1, Scope 2 and Scope 3 emissions. Furthermore, this category is not targeted for reduction by the company, and it presents a low risk and minimal impact on opportunities.

Use of sold products

(7.8.1) Evaluation status

Select from:

☑ Not relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

0

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Average data method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

(7.8.5) Please explain

GGC does include the "Use of Sold Products" category in its Scope 3 emissions calculations. However, due to the nature of GGC's products such as Glycerin, Fatty Alcohol, and Methyl Ester, which are utilized in downstream processes, the emissions attributable to GGC in these categories are effectively zero. This outcome is based on the understanding that the emissions associated with the use and end-of-life treatment of these products fall under the responsibility of the downstream operators. Therefore, although these categories are factored into GGC's calculations, they contribute zero emissions to GGC's overall Scope 3 emissions total.

End of life treatment of sold products

(7.8.1) Evaluation status

Select from:

☑ Not relevant, calculated

(7.8.2) Emissions in reporting year (metric tons CO2e)

0

(7.8.3) Emissions calculation methodology

Select all that apply

☑ Average data method

(7.8.4) Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

(7.8.5) Please explain

GGC does include the "End of Life Treatment of Sold Products" category in its Scope 3 emissions calculations. However, due to the nature of GGC's products such as Glycerin, Fatty Alcohol, and Methyl Ester, which are utilized in downstream processes, the emissions attributable to GGC in these categories are effectively zero. This outcome is based on the understanding that the emissions associated with the use and end-of-life treatment of these products fall under the responsibility of the downstream operators. Therefore, although these categories are factored into GGC's calculations, they contribute zero emissions to GGC's overall Scope 3 emissions total.

Downstream leased assets

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

Scope 3 Category 13 does not apply to GGC because GGC does not lease assets.

Franchises

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

GGC operates without a franchise business. Therefore, scope 3 emissions for franchises are not applicable to GGC

Investments

(7.8.1) Evaluation status

Select from:

☑ Not relevant, explanation provided

(7.8.5) Please explain

Scope 3 emission from investment was included in emission Scope 1 and 2 form operation.

Other (upstream)

(7.8.1) Evaluation status

Select from:
☑ Not relevant, explanation provided

(7.8.5) Please explain

Not applicable to GGC

Other (downstream)

(7.8.1) Evaluation status

Select from:
☑ Not relevant, explanation provided

(7.8.5) Please explain

Not applicable to GGC
[Fixed row]

(7.8.1) Disclose or restate your Scope 3 emissions data for previous years.

Past year 1

(7.8.1.1) End date

12/30/2022

(7.8.1.2) Scope 3: Purchased goods and services (metric tons CO2e)

504662.87

(7.8.1.3) Scope 3: Capital goods (metric tons CO2e)

0

(7.8.1.4) Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

0

(7.8.1.5) Scope 3: Upstream transportation and distribution (metric tons CO2e)

11831.37

(7.8.1.6) Scope 3: Waste generated in operations (metric tons CO2e)

10456.85

(7.8.1.7) Scope 3: Business travel (metric tons CO2e)

3.83

(7.8.1.8) Scope 3: Employee commuting (metric tons CO2e)

415.87

(7.8.1.9) Scope 3: Upstream leased assets (metric tons CO2e)

0

(7.8.1.10) Scope 3: Downstream transportation and distribution (metric tons CO2e)

8790.19

(7.8.1.11) Scope 3: Processing of sold products (metric tons CO2e)

0

(7.8.1.12) Scope 3: Use of sold products (metric tons CO2e)

0

(7.8.1.13) Scope 3: End of life treatment of sold products (metric tons CO2e)

0

(7.8.1.14) Scope 3: Downstream leased assets (metric tons CO2e)

0

(7.8.1.15) Scope 3: Franchises (metric tons CO2e)

0

(7.8.1.16) Scope 3: Investments (metric tons CO2e)

0

(7.8.1.17) Scope 3: Other (upstream) (metric tons CO2e)

0

(7.8.1.18) Scope 3: Other (downstream) (metric tons CO2e)

0

(7.8.1.19) Comment

In 2022, GGC calculated Scope 3 emissions for nine categories relevant to its business activities. These categories include Purchased goods and services, Upstream transportation and distribution, Waste generated in operations, Business travel, Employee commuting, Downstream transportation and distribution, Use of sold products, and End-of-life and treatment of sold products. All figures in Scope 3 has received 3rd party verification from.

Past year 2

(7.8.1.1) End date

12/30/2021

(7.8.1.2) Scope 3: Purchased goods and services (metric tons CO2e)

500194.97

(7.8.1.3) Scope 3: Capital goods (metric tons CO2e)

0

(7.8.1.4) Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

0

(7.8.1.5) Scope 3: Upstream transportation and distribution (metric tons CO2e)

11167.9

(7.8.1.6) Scope 3: Waste generated in operations (metric tons CO2e)

676.17

(7.8.1.7) Scope 3: Business travel (metric tons CO2e)

1.8

(7.8.1.8) Scope 3: Employee commuting (metric tons CO2e)

370.43

(7.8.1.9) Scope 3: Upstream leased assets (metric tons CO2e)

0

(7.8.1.10) Scope 3: Downstream transportation and distribution (metric tons CO2e)

9796.12

(7.8.1.11) Scope 3: Processing of sold products (metric tons CO2e)

0

(7.8.1.12) Scope 3: Use of sold products (metric tons CO2e)

0

(7.8.1.13) Scope 3: End of life treatment of sold products (metric tons CO2e)

0

(7.8.1.14) Scope 3: Downstream leased assets (metric tons CO2e)

0

(7.8.1.15) Scope 3: Franchises (metric tons CO2e)

0

(7.8.1.16) Scope 3: Investments (metric tons CO2e)

0

(7.8.1.17) Scope 3: Other (upstream) (metric tons CO2e)

0

(7.8.1.18) Scope 3: Other (downstream) (metric tons CO2e)

0

(7.8.1.19) Comment

In 2021, GGC has conducted the scope 3 assessment in a full scale and identified the relevancy of all category, updating from the previous year. As a result, GGC calculated Scope 3 emissions for nine categories relevant to its business activities. These categories include Purchased goods and services, Upstream transportation and distribution, Waste generated in operations, Business travel, Employee commuting, Downstream transportation and distribution, Use of sold products, and End-of-life and treatment of sold products

Past year 3

(7.8.1.1) End date

12/30/2020

(7.8.1.2) Scope 3: Purchased goods and services (metric tons CO2e)

785798

(7.8.1.3) Scope 3: Capital goods (metric tons CO2e)

0

(7.8.1.4) Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

3874

(7.8.1.5) Scope 3: Upstream transportation and distribution (metric tons CO2e)

0

(7.8.1.6) Scope 3: Waste generated in operations (metric tons CO2e)

0

(7.8.1.7) Scope 3: Business travel (metric tons CO2e)

0

(7.8.1.8) Scope 3: Employee commuting (metric tons CO2e)

0

(7.8.1.9) Scope 3: Upstream leased assets (metric tons CO2e)

0

(7.8.1.10) Scope 3: Downstream transportation and distribution (metric tons CO2e)

0

(7.8.1.11) Scope 3: Processing of sold products (metric tons CO2e)

0

(7.8.1.12) Scope 3: Use of sold products (metric tons CO2e)

0

(7.8.1.13) Scope 3: End of life treatment of sold products (metric tons CO2e)

0

(7.8.1.14) Scope 3: Downstream leased assets (metric tons CO2e)

0

(7.8.1.15) Scope 3: Franchises (metric tons CO2e)

0

(7.8.1.16) Scope 3: Investments (metric tons CO2e)

0

(7.8.1.17) Scope 3: Other (upstream) (metric tons CO2e)

0

(7.8.1.18) Scope 3: Other (downstream) (metric tons CO2e)

0

(7.8.1.19) Comment

In 2020, GGC calculated Scope 3 emissions for a total of two categories that are relevant to its business activities. The categories include Purchased goods and services and Fuel- and energy- related activities (not included in Scope 1 and 2).
[Fixed row]

(7.9) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	*Select from:* ☑ Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	*Select from:* ☑ Third-party verification or assurance process in place
Scope 3	*Select from:*

	Verification/assurance status
	☑ Third-party verification or assurance process in place

[Fixed row]

(7.9.1) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

Row 1

(7.9.1.1) Verification or assurance cycle in place

Select from:

☑ Annual process

(7.9.1.2) Status in the current reporting year

Select from:

☑ Complete

(7.9.1.3) Type of verification or assurance

Select from:

☑ Limited assurance

(7.9.1.4) Attach the statement

iso-14064-1-en (1).pdf

(7.9.1.5) Page/section reference

ISO 14064-1 Greenhouse Gas (GHG, PDF P.1-3

(7.9.1.6) Relevant standard

Select from:
☑ ISO14064-1

(7.9.1.7) Proportion of reported emissions verified (%)

100

Row 2

(7.9.1.1) Verification or assurance cycle in place

Select from:
☑ Annual process

(7.9.1.2) Status in the current reporting year

Select from:
☑ Complete

(7.9.1.3) Type of verification or assurance

Select from:
☑ Limited assurance

(7.9.1.4) Attach the statement

tgo-ghg-emission-assurance-statement (1).pdf

(7.9.1.5) Page/section reference

All

(7.9.1.6) Relevant standard

Select from:

☑ Thai Greenhouse Gas Management Organisation (TGO) Greenhouse Gas (GHG) Verification Protocol

(7.9.1.7) Proportion of reported emissions verified (%)

100
[Add row]

(7.9.2) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.

Row 1

(7.9.2.1) Scope 2 approach

Select from:

☑ Scope 2 market-based

(7.9.2.2) Verification or assurance cycle in place

Select from:

☑ Annual process

(7.9.2.3) Status in the current reporting year

Select from:

☑ Complete

(7.9.2.4) Type of verification or assurance

Select from:

☑ Limited assurance

(7.9.2.5) Attach the statement

iso-14064-1-en (1).pdf

(7.9.2.6) Page/ section reference

ISO 14064-1 Greenhouse Gas (GHG), PDF P.1-3

(7.9.2.7) Relevant standard

Select from:
☑ ISO14064-1

(7.9.2.8) Proportion of reported emissions verified (%)

100

Row 2

(7.9.2.1) Scope 2 approach

Select from:
☑ Scope 2 location-based

(7.9.2.2) Verification or assurance cycle in place

Select from:
☑ Annual process

(7.9.2.3) Status in the current reporting year

Select from:
☑ Complete

(7.9.2.4) Type of verification or assurance

Select from:
☑ Limited assurance

(7.9.2.5) Attach the statement

iso-14064-1-en.pdf

(7.9.2.6) Page/ section reference

ISO 14064-1 Greenhouse Gas (GHG), PDF P.1-3

(7.9.2.7) Relevant standard

Select from:
☑ ISO14064-1

(7.9.2.8) Proportion of reported emissions verified (%)

100

Row 3

(7.9.2.1) Scope 2 approach

Select from:
☑ Scope 2 market-based

(7.9.2.2) Verification or assurance cycle in place

Select from:
☑ Annual process

(7.9.2.3) Status in the current reporting year

Select from:

☑ Complete

(7.9.2.4) Type of verification or assurance

Select from:
☑ Limited assurance

(7.9.2.5) Attach the statement

tgo-ghg-emission-assurance-statement (1).pdf

(7.9.2.6) Page/ section reference

All

(7.9.2.7) Relevant standard

Select from:
☑ Thai Greenhouse Gas Management Organisation (TGO) Greenhouse Gas (GHG) Verification Protocol

(7.9.2.8) Proportion of reported emissions verified (%)

100

Row 4

(7.9.2.1) Scope 2 approach

Select from:
☑ Scope 2 location-based

(7.9.2.2) Verification or assurance cycle in place

Select from:
☑ Annual process

(7.9.2.3) Status in the current reporting year

Select from:
☑ Complete

(7.9.2.4) Type of verification or assurance

Select from:
☑ Limited assurance

(7.9.2.5) Attach the statement

tgo-ghg-emission-assurance-statement (1).pdf

(7.9.2.6) Page/ section reference

All

(7.9.2.7) Relevant standard

Select from:
☑ Thai Greenhouse Gas Management Organisation (TGO) Greenhouse Gas (GHG) Verification Protocol

(7.9.2.8) Proportion of reported emissions verified (%)

100
[Add row]

(7.9.3) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Row 1

(7.9.3.1) Scope 3 category

Select all that apply

☑ Scope 3: Business travel
☑ Scope 3: Employee commuting
☑ Scope 3: Purchased goods and services
☑ Scope 3: Waste generated in operations
☑ Scope 3: Upstream transportation and distribution
☑ Scope 3: Downstream transportation and distribution

(7.9.3.2) Verification or assurance cycle in place

Select from:

☑ Annual process

(7.9.3.3) Status in the current reporting year

Select from:

☑ Complete

(7.9.3.4) Type of verification or assurance

Select from:

☑ Limited assurance

(7.9.3.5) Attach the statement

iso-14064-1-en (1).pdf

(7.9.3.6) Page/section reference

ISO 14064-1 Greenhouse Gas (GHG Emission), PDF P.1-3 Category 3 (ISO 14064-1): Indirect GHG Emissions from transportation refer to Category 4 Upstream transport and distribution, Category 6 Business Travel, Category 7 Employee Commuting, Category 9 Downstream transport and distribution Category 4 (ISO 14064-1) refers to Total Scope 3 Emissions minus Scope 3 Transportation Related.

(7.9.3.7) Relevant standard

Select from:

☑ ISO14064-1

(7.9.3.8) Proportion of reported emissions verified (%)

100

Row 2

(7.9.3.1) Scope 3 category

Select all that apply

☑ Scope 3: Business travel
☑ Scope 3: Employee commuting
☑ Scope 3: Purchased goods and services
☑ Scope 3: Waste generated in operations
☑ Scope 3: Upstream transportation and distribution
☑ Scope 3: Downstream transportation and distribution
☑ Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)

(7.9.3.2) Verification or assurance cycle in place

Select from:

☑ Annual process

(7.9.3.3) Status in the current reporting year

Select from:

☑ Complete

(7.9.3.4) Type of verification or assurance

Select from:

☑ Limited assurance

(7.9.3.5) Attach the statement

tgo-ghg-emission-assurance-statement (1).pdf

(7.9.3.6) Page/section reference

All

(7.9.3.7) Relevant standard

Select from:
☑ Thai Greenhouse Gas Management Organisation (TGO) Greenhouse Gas (GHG) Verification Protocol

(7.9.3.8) Proportion of reported emissions verified (%)

100
[Add row]

(7.10) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Select from:
☑ Increased

(7.10.1) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

Change in renewable energy consumption

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There was no renewable energy consumption activities occurred in the reporting year.

Other emissions reduction activities

(7.10.1.1) Change in emissions (metric tons CO2e)

444

(7.10.1.2) Direction of change in emissions

Select from:
☑ Decreased

(7.10.1.3) Emissions value (percentage)

0.45

(7.10.1.4) Please explain calculation

*The change from emission reduction projects was calculated based on the sum of projects implemented in 2023 that contribute to Scope 1 and Scope 2 emission reduction, excluding renewable projects, to avoid double counting. There were 444 tCO2e avoided from emission reduction projects. Total combined Scope 1 and 2 emissions in 2022 was 97,771 tCO2e. Therefore, we arrived at the increase emission reduction in 2023 at 0.45% through the calculation of (444/97,771)*100 0.45% (a 0.45% decrease in emissions)*

Divestment

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:
☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There were no merger activities occurred in the reporting year.

Acquisitions

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:
☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There were no merger activities occurred in the reporting year.

Mergers

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There were no merger activities occurred in the reporting year.

Change in output

(7.10.1.1) Change in emissions (metric tons CO2e)

4387

(7.10.1.2) Direction of change in emissions

Select from:

☑ Increased

(7.10.1.3) Emissions value (percentage)

4.48

(7.10.1.4) Please explain calculation

*This increase in emissions can be attributed to the increase in energy consumption during the temporary shutdown of operations for maintenance purposes. Total Scope 1 and 2 emissions in 2022 were 97,771 tCO2e.The Total Scope 1 and 2 emissions in 2023 were 102,158. Therefore, the Scope 1 and 2 has increased by 4,387 tCO2e (102,158-97,771 4,387) from last year. As a result, we arrived at 4.49% through (4,387 /97,771) * 100 4.48% (a 4.48% increase in emissions).*

Change in methodology

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There was no change in reporting boundary in the reporting year.

Change in boundary

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There was no change in reporting boundary in the reporting year.

Change in physical operating conditions

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

Due to the context of our operating country, the change in physical operating conditions is not Applicable and not accounted for.

Unidentified

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:

☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There were no unidentified activities occurred in the reporting year.

Other

(7.10.1.1) Change in emissions (metric tons CO2e)

0

(7.10.1.2) Direction of change in emissions

Select from:
☑ No change

(7.10.1.3) Emissions value (percentage)

0

(7.10.1.4) Please explain calculation

There were no other activities occurred in the reporting year.
[Fixed row]

(7.10.2) Are your emissions performance calculations in 7.10 and 7.10.1 based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Select from:
☑ Market-based

(7.12) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

Select from:
☑ No

(7.15) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Select from:
☑ Yes

(7.15.1) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used global warming potential (GWP).

Row 1

(7.15.1.1) Greenhouse gas

Select from:
☑ CO2

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

28054.86

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 2

(7.15.1.1) Greenhouse gas

Select from:

☑ CH4

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

56.82

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 3

(7.15.1.1) Greenhouse gas

Select from:
☑ N2O

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

59.14

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 4

(7.15.1.1) Greenhouse gas

Select from:
☑ HFCs

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

278.5

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 5

(7.15.1.1) Greenhouse gas

Select from:
☑ PFCs

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

0

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 6

(7.15.1.1) Greenhouse gas

Select from:
☑ SF6

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

0

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)

Row 7

(7.15.1.1) Greenhouse gas

Select from:
☑ NF3

(7.15.1.2) Scope 1 emissions (metric tons of CO2e)

0

(7.15.1.3) GWP Reference

Select from:
☑ IPCC Fifth Assessment Report (AR5 – 100 year)
[Add row]

(7.16) Break down your total gross global Scope 1 and 2 emissions by country/area.

	Scope 1 emissions (metric tons CO2e)	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Thailand	*28450*	*93908*	*73708*

[Fixed row]

(7.17) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

Select all that apply

☑ By facility

(7.17.2) Break down your total gross global Scope 1 emissions by business facility.

Row 1

(7.17.2.1) Facility

GGC I

(7.17.2.2) Scope 1 emissions (metric tons CO2e)

309.53

(7.17.2.3) Latitude

12.695574

(7.17.2.4) Longitude

101.126806

Row 2

(7.17.2.1) Facility

GGC II

(7.17.2.2) Scope 1 emissions (metric tons CO2e)

28139.8

(7.17.2.3) Latitude

13.072901

(7.17.2.4) Longitude

101.387526
[Add row]

(7.19) Break down your organization’s total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

Chemicals production activities

(7.19.1) Gross Scope 1 emissions, metric tons CO2e

28450

(7.19.3) Comment

GGC produces 3 types of Green Chemical products comprising (1) Methyl Ester, a component of high-speed diesel fuel, (2) Fatty Alcohol, a main ingredient in cosmetics, surfactants, and various pharmaceuticals, and (3) Refined Glycerin, a common ingredient widely used in cosmetics and pharmaceuticals.
[Fixed row]

(7.20) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

Select all that apply
☑ By facility

(7.20.2) Break down your total gross global Scope 2 emissions by business facility.

	Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Row 1	*GGC I*	*65205.81*	*75405.79*
Row 2	*GGC II*	*8502.61*	*8502.61*

[Add row]

(7.21) Break down your organization’s total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

Chemicals production activities

(7.21.1) Scope 2, location-based, metric tons CO2e

83908

(7.21.2) Scope 2, market-based (if applicable), metric tons CO2e

73708

(7.21.3) Comment

GGC purchases grid-based electricity from the Electricity Generating Authority of Thailand (EGAT) and the Provincial Electricity Authority (PEA). GGC also purchases the electricity from GGC and other suppliers with specific purchase contract and agreement.
[Fixed row]

(7.22) Break down your gross Scope 1 and Scope 2 emissions between your consolidated accounting group and other entities included in your response.

Consolidated accounting group

(7.22.1) Scope 1 emissions (metric tons CO2e)

28450

(7.22.2) Scope 2, location-based emissions (metric tons CO2e)

83908

(7.22.3) Scope 2, market-based emissions (metric tons CO2e)

73708

(7.22.4) Please explain

GGC uses operational control as a consolidated accounting approach for GHG inventory covering Scope 1 and 2 and covers 100% of its own operations.

All other entities

(7.22.1) Scope 1 emissions (metric tons CO2e)

0

(7.22.2) Scope 2, location-based emissions (metric tons CO2e)

0

(7.22.3) Scope 2, market-based emissions (metric tons CO2e)

0

(7.22.4) Please explain

The GHG Emission reporting doesn’t include any other entities.
[Fixed row]

(7.23) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?

Select from:

☑ Not relevant as we do not have any subsidiaries

(7.25) Disclose the percentage of your organization's Scope 3, Category 1 emissions by purchased chemical feedstock.

Row 1

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Refine Palm Oil (RPO)

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

14.53

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used refined palm oil (RPO) 86,751,070 kg in 2023. With the emission factor obtained from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) that is 0.9607 kgCO2e/kg, there was 78,657.20 TonCO2e or 14.53% of total Scope 3

Row 2

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Palm Stearin

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

20.39

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used 71,991,110 kg of palm stearin (PS) in 2023. With the emission factor obtained from the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018), which is 1.5328 kgCO2e/kg, there were 110,347.97 TonCO2e or 20.39% of total Scope 3 emissions from purchased goods and services.

Row 3

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Palm Fatty Acid Distillate (PFAD)

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

3.55

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used 13,238,880 kg of Palm Fatty Acid Distillate (PFAD) in 2023. With the emission factor obtained from the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018), which is 1.4511 kgCO2e/kg, there were 19,210.94 TonCO2e, or 3.55% of total Scope 3 emissions from purchased goods and services.

Row 4

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Refined Bleached Deodorized Palm Kernel Oil

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

33.9

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used Refined Bleached Deodorized Palm Kernel Oil (RBDPKO) 131,182,743 kg in 2023. With the emission factor obtained from the Thai National LCI Database, TIISMTEC-NSTDA (with TGO electricity 2016-2018) that is 1.399 kgCO2e/kg, there was 183,524.66 TonCO2e or 33.90% of total scope 3 emissions from purchased goods and services.

Row 5

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Methanol

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

5.56

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used 41,744,216 kg of methanol in 2023. With the emission factor obtained from Ecoinvent 2.2, IPCC 2007 GWP 100a, which is 0.7212 kgCO2e/kg, there were 30,105.93 TonCO2e, or 5.56% of total Scope 3 emissions from purchased goods and services.

Row 6

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Crude Palm Oil (CPO)

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

22

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used 131,317,000 kg of Crude Palm Oil (CPO) in 2023. With the emission factor obtained from the Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018), which is 0.9067 kgCO2e/kg, there were 119,065.12 TonCO2e, or 22.00% of total Scope 3 emissions from purchased goods and services.

Row 7

(7.25.1) Purchased feedstock

Select from:

☑ Other (please specify) **:**Crude Glycerin

(7.25.2) Percentage of Scope 3, Category 1 tCO2e from purchased feedstock

0.07

(7.25.3) Explain calculation methodology

GGC used purchased raw materials in the production process, including crude palm oil (CPO), refined bleached deodorized palm kernel oil (RBDPKO), refined palm oil (RPO), palm fatty acid distillate (PFAD), crude glycerin, palm stearin (PS), and methanol. The suppliers emit 541,297.54 metric tons of CO2e of Scope 3. GGC used Crude Glycerin 446,340 kg in 2023. With the emission factor obtained from Thai National LCI Database, TIIS-MTEC-NSTDA (with TGO electricity 2016-2018) that is 0.8642 kgCO2e/kg, there was 385.73TonCO2e or 0.07% of total Scope 3 emission from purchased goods and services.
[Add row]

(7.25.1) Disclose sales of products that are greenhouse gases.

Carbon dioxide (CO2)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Methane (CH4)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Nitrous oxide (N2O)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Hydrofluorocarbons (HFC)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Perfluorocarbons (PFC)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Sulphur hexafluoride (SF6)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.

Nitrogen trifluoride (NF3)

(7.25.1.1) Sales, metric tons

0

(7.25.1.2) Comment

We have no sales of greenhouse gases products.
[Fixed row]

(7.26) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Row 1

(7.26.1) Requesting member

Select from:

(7.26.2) Scope of emissions

Select from:

☑ Scope 1

(7.26.4) Allocation level

Select from:

☑ Company wide

(7.26.6) Allocation method

Select from:

☑ Allocation based on the volume of products purchased

(7.26.7) Unit for market value or quantity of goods/services supplied

Select from:

☑ Currency

(7.26.8) Market value or quantity of goods/services supplied to the requesting member

43205000

(7.26.9) Emissions in metric tonnes of CO2e

69.37

(7.26.10) Uncertainty (±%)

5

(7.26.11) Major sources of emissions

GGC emitted in scope 1 by the combustion of fuel oil for steam generation as the main emission source

(7.26.12) Allocation verified by a third party?

Select from:
☑ Yes

(7.26.13) Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

GGC conducted corporate GHG accounting, which has been verified by third party. Major sources of emissions were based on primary data collection.

(7.26.14) Where published information has been used, please provide a reference

-

Row 2

(7.26.1) Requesting member

Select from:

(7.26.2) Scope of emissions

Select from:
☑ Scope 2: market-based

(7.26.4) Allocation level

Select from:
☑ Company wide

(7.26.6) Allocation method

Select from:

☑ Allocation based on the volume of products purchased

(7.26.7) Unit for market value or quantity of goods/services supplied

Select from:

☑ Currency

(7.26.8) Market value or quantity of goods/services supplied to the requesting member

43205000

(7.26.9) Emissions in metric tonnes of CO2e

179.725

(7.26.10) Uncertainty (±%)

5

(7.26.11) Major sources of emissions

Scope 2 Electricity purchased from Thai grid and direct PPA is partially fossil-based. Steam generation from our supplier is based on fossil fuel

(7.26.12) Allocation verified by a third party?

Select from:

☑ Yes

(7.26.13) Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

GGC conducted corporate GHG accounting, which has been verified by third party. Major sources of emissions were based on primary data collection.

(7.26.14) Where published information has been used, please provide a reference

-

Row 3

(7.26.1) Requesting member

Select from:

(7.26.2) Scope of emissions

Select from:

☑ Scope 3

(7.26.3) Scope 3 category(ies)

Select all that apply

☑ Category 6: Business travel

☑ Category 7: Employee commuting

☑ Category 11: Use of sold products

☑ Category 1: Purchased goods and services

☑ Category 5: Waste generated in operations

☑ Category 12: End-of-life treatment of sold products

☑ Category 4: Upstream transportation and distribution

☑ Category 9: Downstream transportation and distribution

(7.26.4) Allocation level

Select from:

☑ Company wide

(7.26.6) Allocation method

Select from:

☑ Allocation based on the volume of products purchased

(7.26.7) Unit for market value or quantity of goods/services supplied

Select from:

☑ Currency

(7.26.8) Market value or quantity of goods/services supplied to the requesting member

43205000

(7.26.9) Emissions in metric tonnes of CO2e

1405.12

(7.26.10) Uncertainty (±%)

5

(7.26.11) Major sources of emissions

GGC emitted and reported scope 3 emissions from purchased goods and services, energy transmission loss only in fuel-and-energy-related activities (not included in Scope 1 or 2), upstream transportation, waste generation from the operation, business travel, employee commuting, downstream transportation, use of sold products and end-of-life treatment of sold products. In 2023, All of the reported Scope 3 GHG emissions were verified by a third party.

(7.26.12) Allocation verified by a third party?

Select from:

☑ Yes

(7.26.13) Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

GGC emitted and reported scope 3 emissions from purchased goods and services, upstream transportation, waste generation from the operation, business travel, employee commuting, downstream transportation, use of sold products and end-of-life treatment of sold products. In 2023, All reported Scope 3 GHG emissions were verified by third party.

(7.26.14) Where published information has been used, please provide a reference

-

[Add row]

(7.27) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Row 1

(7.27.1) Allocation challenges

Select from:
☑ We face no challenges

(7.27.2) Please explain what would help you overcome these challenges

-
[Add row]

(7.28) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

(7.28.1) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

Select from:
☑ Yes

(7.28.2) Describe how you plan to develop your capabilities

Apart from allocating the emission to our customers based on revenue, GGC plans to allocate emissions based on the mass of specific products sold to customers in the future. GGC also aims to progress on expanding the quantification of scope 3 GHG emissions in other categories in order to reflect the complete emission profile across our value chain. This will be used to inform our engagement strategy to lower GHG emission across our value chain and align our emission reduction activities with Net Zero Target as suggested by Science-Based Target Initiative.
[Fixed row]

(7.29) What percentage of your total operational spend in the reporting year was on energy?

Select from:

☑ More than 0% but less than or equal to 5%

(7.30) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	*Select from:* ☑ Yes
Consumption of purchased or acquired electricity	*Select from:* ☑ Yes
Consumption of purchased or acquired heat	*Select from:* ☑ No
Consumption of purchased or acquired steam	*Select from:* ☑ Yes
Consumption of purchased or acquired cooling	*Select from:* ☑ No
Generation of electricity, heat, steam, or cooling	*Select from:* ☑ Yes

[Fixed row]

(7.30.1) Report your organization’s energy consumption totals (excluding feedstocks) in MWh.

Consumption of fuel (excluding feedstock)

(7.30.1.1) Heating value

Select from:

☑ LHV (lower heating value)

(7.30.1.2) MWh from renewable sources

0

(7.30.1.3) MWh from non-renewable sources

92145.32

(7.30.1.4) Total (renewable and non-renewable) MWh

92145.32

Consumption of purchased or acquired electricity

(7.30.1.1) Heating value

Select from:

☑ LHV (lower heating value)

(7.30.1.2) MWh from renewable sources

0

(7.30.1.3) MWh from non-renewable sources

50988.87

(7.30.1.4) Total (renewable and non-renewable) MWh

50988.87

Consumption of purchased or acquired steam

(7.30.1.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.1.2) MWh from renewable sources

0

(7.30.1.3) MWh from non-renewable sources

265893.3

(7.30.1.4) Total (renewable and non-renewable) MWh

265863.3

Consumption of self-generated non-fuel renewable energy

(7.30.1.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.1.2) MWh from renewable sources

0

(7.30.1.4) Total (renewable and non-renewable) MWh

0

Total energy consumption

(7.30.1.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.1.2) MWh from renewable sources

0

(7.30.1.3) MWh from non-renewable sources

409027.49

(7.30.1.4) Total (renewable and non-renewable) MWh

409027.49
[Fixed row]

(7.30.3) Report your organization’s energy consumption totals (excluding feedstocks) for chemical production activities in MWh.

Consumption of fuel (excluding feedstocks)

(7.30.3.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.3.2) MWh consumed from renewable sources inside chemical sector boundary

0

(7.30.3.3) MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

92145.32

(7.30.3.4) MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

(7.30.3.5) Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

92145.32

Consumption of purchased or acquired electricity

(7.30.3.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.3.2) MWh consumed from renewable sources inside chemical sector boundary

0

(7.30.3.3) MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

50988.87

(7.30.3.4) MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

(7.30.3.5) Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

50988.87

Consumption of purchased or acquired steam

(7.30.3.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.3.2) MWh consumed from renewable sources inside chemical sector boundary

0

(7.30.3.3) MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

265893.3

(7.30.3.4) MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

(7.30.3.5) Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

265893.3

Consumption of self-generated non-fuel renewable energy

(7.30.3.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.3.2) MWh consumed from renewable sources inside chemical sector boundary

0

(7.30.3.5) Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

0

Total energy consumption

(7.30.3.1) Heating value

Select from:
☑ LHV (lower heating value)

(7.30.3.2) MWh consumed from renewable sources inside chemical sector boundary

0

(7.30.3.3) MWh consumed from non-renewable sources inside chemical sector boundary (excluding recovered waste heat/gases)

409027.49

(7.30.3.4) MWh consumed from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary

0

(7.30.3.5) Total MWh (renewable + non-renewable + MWh from recovered waste heat/gases) consumed inside chemical sector boundary

409027.49
[Fixed row]

(7.30.6) Select the applications of your organization’s consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	*Select from:* ☑ No
Consumption of fuel for the generation of heat	*Select from:* ☑ No
Consumption of fuel for the generation of steam	*Select from:* ☑ Yes
Consumption of fuel for the generation of cooling	*Select from:* ☑ No
Consumption of fuel for co-generation or tri-generation	*Select from:* ☑ No

[Fixed row]

(7.30.7) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Sustainable biomass

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0

(7.30.7.8) Comment

In 2023, GGC does not consume sustainable biomass as a fuel for its operations

Other biomass

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0

(7.30.7.8) Comment

In 2023, GGC does not consume Other biomass as a fuel for its operations

Other renewable fuels (e.g. renewable hydrogen)

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0

(7.30.7.8) Comment

In 2023, GGC does not consume Other renewable fuels (e.g. renewable hydrogen)as a fuel for its operations

Coal

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0

(7.30.7.8) Comment

In 2023, GGC does not consume coal as a fuel for its operations

Oil

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

92145.11

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

92145.11

(7.30.7.8) Comment

In 2023, GGC consumed fuel oil to generate steam for its operations

Gas

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0.21

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0.21

(7.30.7.8) Comment

In 2023, GGC consumes gas as a fuel for its operations

Other non-renewable fuels (e.g. non-renewable hydrogen)

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

0

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

0

(7.30.7.8) Comment

In 2023, GGC does not consume Other non-renewable fuels (e.g. non-renewable hydrogen) as a fuel for its operations

Total fuel

(7.30.7.1) Heating value

Select from:
☑ LHV

(7.30.7.2) Total fuel MWh consumed by the organization

92145.32

(7.30.7.4) MWh fuel consumed for self-generation of heat

0

(7.30.7.5) MWh fuel consumed for self-generation of steam

92145.32

(7.30.7.8) Comment

In 2023, GGC consumed fuel oil to generate steam for its operations
[Fixed row]

(7.30.9) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

Electricity

(7.30.9.1) Total Gross generation (MWh)

0

(7.30.9.2) Generation that is consumed by the organization (MWh)

0

(7.30.9.3) Gross generation from renewable sources (MWh)

0

(7.30.9.4) Generation from renewable sources that is consumed by the organization (MWh)

0

Heat

(7.30.9.1) Total Gross generation (MWh)

0

(7.30.9.2) Generation that is consumed by the organization (MWh)

0

(7.30.9.3) Gross generation from renewable sources (MWh)

0

(7.30.9.4) Generation from renewable sources that is consumed by the organization (MWh)

0

Steam

(7.30.9.1) Total Gross generation (MWh)

91734.07

(7.30.9.2) Generation that is consumed by the organization (MWh)

91734.07

(7.30.9.3) Gross generation from renewable sources (MWh)

0

(7.30.9.4) Generation from renewable sources that is consumed by the organization (MWh)

0

Cooling

(7.30.9.1) Total Gross generation (MWh)

0

(7.30.9.2) Generation that is consumed by the organization (MWh)

0

(7.30.9.3) Gross generation from renewable sources (MWh)

0

(7.30.9.4) Generation from renewable sources that is consumed by the organization (MWh)

0
[Fixed row]

(7.30.11) Provide details on electricity, heat, steam, and cooling your organization has generated and consumed for chemical production activities.

Electricity

(7.30.11.1) Total gross generation inside chemicals sector boundary (MWh)

0

(7.30.11.2) Generation that is consumed inside chemicals sector boundary (MWh)

0

(7.30.11.3) Generation from renewable sources inside chemical sector boundary (MWh)

0

(7.30.11.4) Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0

Heat

(7.30.11.1) Total gross generation inside chemicals sector boundary (MWh)

0

(7.30.11.2) Generation that is consumed inside chemicals sector boundary (MWh)

0

(7.30.11.3) Generation from renewable sources inside chemical sector boundary (MWh)

0

(7.30.11.4) Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0

Steam

(7.30.11.1) Total gross generation inside chemicals sector boundary (MWh)

91734.07

(7.30.11.2) Generation that is consumed inside chemicals sector boundary (MWh)

91734.07

(7.30.11.3) Generation from renewable sources inside chemical sector boundary (MWh)

0

(7.30.11.4) Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0

Cooling

(7.30.11.1) Total gross generation inside chemicals sector boundary (MWh)

0

(7.30.11.2) Generation that is consumed inside chemicals sector boundary (MWh)

0

(7.30.11.3) Generation from renewable sources inside chemical sector boundary (MWh)

0

(7.30.11.4) Generation from waste heat/gases recovered from processes using fuel feedstocks inside chemical sector boundary (MWh)

0
[Fixed row]

(7.30.14) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in 7.7.

Row 1

(7.30.14.1) Country/area

Select from:
☑ Thailand

(7.30.14.2) Sourcing method

Select from:
☑ None (no active purchases of low-carbon electricity, heat, steam or cooling)

(7.30.14.10) Comment

In 2023, GGC did not actively purchase low-carbon electricity, heat, steam or cooling
[Add row]

(7.30.16) Provide a breakdown by country/area of your electricity/heat/steam/cooling consumption in the reporting year.

Thailand

(7.30.16.1) Consumption of purchased electricity (MWh)

50988.87

(7.30.16.2) Consumption of self-generated electricity (MWh)

0

(7.30.16.4) Consumption of purchased heat, steam, and cooling (MWh)

265893.3

(7.30.16.5) Consumption of self-generated heat, steam, and cooling (MWh)

91734.07

(7.30.16.6) Total electricity/heat/steam/cooling energy consumption (MWh)

408616.24
[Fixed row]

(7.31) Does your organization consume fuels as feedstocks for chemical production activities?

Select from:
☑ No

(7.39) Provide details on your organization’s chemical products.

Row 1

(7.39.1) Output product

Select from:

☑ Other, please specify :Methyl Ester

(7.39.2) Production (metric tons)

303716

(7.39.3) Capacity (metric tons)

500000

(7.39.4) Direct emissions intensity (metric tons CO2e per metric ton of product)

0.093

(7.39.5) Electricity intensity (MWh per metric ton of product)

0.1682

(7.39.6) Steam intensity (MWh per metric ton of product)

0.376

(7.39.7) Steam/ heat recovered (MWh per metric ton of product)

0

(7.39.8) Comment

GGC produces 3 types of Green Chemical products comprising (1) Methyl Ester, a component of high speed diesel fuel, with a production capacity of 500,000 tons per year; (2) Fatty Alcohol, a main ingredient in cosmetics, surfactants, and various pharmaceuticals, with a production capacity of 100,000 tons per year; and (3) Refined Glycerine, a common ingredient widely used in cosmetics and pharmaceuticals, with a production capacity of 51,000 tons per year.

Row 2

(7.39.1) Output product

Select from:

☑ Other, please specify :Fatty Alcohol

(7.39.2) Production (metric tons)

96621

(7.39.3) Capacity (metric tons)

100000

(7.39.4) Direct emissions intensity (metric tons CO2e per metric ton of product)

0.294

(7.39.5) Electricity intensity (MWh per metric ton of product)

0.53

(7.39.6) Steam intensity (MWh per metric ton of product)

2.754

(7.39.7) Steam/ heat recovered (MWh per metric ton of product)

0

(7.39.8) Comment

GGC produces 3 types of Green Chemical products comprising (1) Methyl Ester, a component of high speed diesel fuel, with a production capacity of 500,000 tons per year; (2) Fatty Alcohol, a main ingredient in cosmetics, surfactants, and various pharmaceuticals, with a production capacity of 100,000 tons per year; and (3) Refined Glycerine, a common ingredient widely used in cosmetics and pharmaceuticals, with a production capacity of 51,000 tons per year.

Row 3

(7.39.1) Output product

Select from:

☑ Other, please specify **:**Refine Glycerine

(7.39.2) Production (metric tons)

41780

(7.39.3) Capacity (metric tons)

51000

(7.39.4) Direct emissions intensity (metric tons CO2e per metric ton of product)

0.68

(7.39.5) Electricity intensity (MWh per metric ton of product)

1.222

(7.39.6) Steam intensity (MWh per metric ton of product)

6.368

(7.39.7) Steam/ heat recovered (MWh per metric ton of product)

0

(7.39.8) Comment

GGC produces 3 types of Green Chemical products comprising (1) Methyl Ester, a component of high speed diesel fuel, with a production capacity of 500,000 tons per year; (2) Fatty Alcohol, a main ingredient in cosmetics, surfactants, and various pharmaceuticals, with a production capacity of 100,000 tons per year; and (3) Refined Glycerine, a common ingredient widely used in cosmetics and pharmaceuticals, with a production capacity of 51,000 tons per year.
[Add row]

(7.45) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Row 1

(7.45.1) Intensity figure

0.231

(7.45.2) Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

102158

(7.45.3) Metric denominator

Select from:
☑ metric ton of product

(7.45.4) Metric denominator: Unit total

442116

(7.45.5) Scope 2 figure used

Select from:
☑ Market-based

(7.45.6) % change from previous year

10.26

(7.45.7) Direction of change

Select from:
☑ Decreased

(7.45.8) Reasons for change

Select all that apply

☑ Other emissions reduction activities

(7.45.9) Please explain

In 2023, GHG intensity decreased because the amount of product produced was higher than the previous year, while the volume of greenhouse gases emitted was lower than in 2022.

Row 2

(7.45.1) Intensity figure

0.000005765

(7.45.2) Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)

102158

(7.45.3) Metric denominator

Select from:

☑ unit total revenue

(7.45.4) Metric denominator: Unit total

17719000000

(7.45.5) Scope 2 figure used

Select from:

☑ Market-based

(7.45.6) % change from previous year

48.21

(7.45.7) Direction of change

Select from:

☑ Increased

(7.45.8) Reasons for change

Select all that apply

☑ Change in revenue

(7.45.9) Please explain

In 2023, GGC's revenue decreased compared to 2022. Although GGC managed to reduce its greenhouse gas emissions from the previous year, the drop in revenue from 25,084 million baht to 17,719 million baht in 2023 resulted in an increase in GHG Emission intensity.
[Add row]

(7.52) Provide any additional climate-related metrics relevant to your business.

Row 1

(7.52.1) Description

Select from:

☑ Energy usage

(7.52.2) Metric value

409920.87

(7.52.3) Metric numerator

Energy Consumption (MWh)

(7.52.4) Metric denominator (intensity metric only)

Not Applicable

(7.52.5) % change from previous year

0.27

(7.52.6) Direction of change

Select from:

☑ Decreased

(7.52.7) Please explain

In 2023, GGC is focusing on increasing product value through Efficiency-Driven. Examples of the project in 2023 include Advance Process Control at Fractionation Column of FAOH Plant, optimize cooling fan mode and coating pump for reducing energy cooling water pump.

Row 2

(7.52.1) Description

Select from:

☑ Energy usage

(7.52.2) Metric value

0.35

(7.52.3) Metric numerator

Energy Consumption (MWh) ME2

(7.52.4) Metric denominator (intensity metric only)

Ton of Production in ME2

(7.52.5) % change from previous year

2.94

(7.52.6) Direction of change

Select from:

☑ Decreased

(7.52.7) Please explain

In 2023, GGC is focusing on increasing product value through Efficiency-Driven. Examples of the project in 2023 include Advance Process Control at Fractionation Column of FAOH Plant, optimize cooling fan mode and coating pump for reducing energy cooling water pump.

Row 3

(7.52.1) Description

Select from:

☑ Energy usage

(7.52.2) Metric value

0.93

(7.52.3) Metric numerator

Energy Consumption Intensity

(7.52.4) Metric denominator (intensity metric only)

Ton of products

(7.52.5) % change from previous year

4.12

(7.52.6) Direction of change

Select from:

☑ Decreased

(7.52.7) Please explain

In 2023, GGC is focusing on increasing product value through Efficiency-Driven. Examples of the project in 2023 include Advance Process Control at Fractionation Column of FAOH Plant, optimize cooling fan mode and coating pump for reducing energy cooling water pump.

Row 4

(7.52.1) Description

Select from:

☑ Waste

(7.52.2) Metric value

7344

(7.52.3) Metric numerator

Total amount of waste generation (tons)

(7.52.4) Metric denominator (intensity metric only)

Not Applicable

(7.52.5) % change from previous year

30.96

(7.52.6) Direction of change

Select from:

☑ Decreased

(7.52.7) Please explain

In 2023, GGC has use Utilization of By-Product from Waste to Produce Growing Media for Plant, which use biological sludge from wastewater treatment as a raw material in organic fertilizer and soil improvers.
[Add row]

(7.53) Did you have an emissions target that was active in the reporting year?

Select all that apply
☑ Absolute target
☑ Intensity target

(7.53.1) Provide details of your absolute emissions targets and progress made against those targets.

Row 1

(7.53.1.1) Target reference number

Select from:
☑ Abs 1

(7.53.1.2) Is this a science-based target?

Select from:
☑ No, and we do not anticipate setting one in the next two years

(7.53.1.5) Date target was set

12/30/2021

(7.53.1.6) Target coverage

Select from:

☑ Organization-wide

(7.53.1.7) Greenhouse gases covered by target

Select all that apply

☑ Methane (CH4)

☑ Nitrous oxide (N2O)

☑ Carbon dioxide (CO2)

☑ Perfluorocarbons (PFCs)

☑ Hydrofluorocarbons (HFCs)

☑ Sulphur hexafluoride (SF6)

☑ Nitrogen trifluoride (NF3)

(7.53.1.8) Scopes

Select all that apply

☑ Scope 1

☑ Scope 2

(7.53.1.9) Scope 2 accounting method

Select from:

☑ Market-based

(7.53.1.11) End date of base year

12/30/2020

(7.53.1.12) Base year Scope 1 emissions covered by target (metric tons CO2e)

33333

(7.53.1.13) Base year Scope 2 emissions covered by target (metric tons CO2e)

59481

(7.53.1.31) Base year total Scope 3 emissions covered by target (metric tons CO2e)

0.000

(7.53.1.32) Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

92814.000

(7.53.1.33) Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100

(7.53.1.34) Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100

(7.53.1.53) Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

(7.53.1.54) End date of target

12/30/2030

(7.53.1.55) Targeted reduction from base year (%)

20

(7.53.1.56) Total emissions at end date of target covered by target in all selected Scopes (metric tons CO2e)

74251.200

(7.53.1.57) Scope 1 emissions in reporting year covered by target (metric tons CO2e)

28450

(7.53.1.58) Scope 2 emissions in reporting year covered by target (metric tons CO2e)

73708

(7.53.1.77) Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

102158.000

(7.53.1.78) Land-related emissions covered by target

Select from:

☑ No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

(7.53.1.79) % of target achieved relative to base year

-50.34

(7.53.1.80) Target status in reporting year

Select from:

☑ Underway

(7.53.1.82) Explain target coverage and identify any exclusions

GGC aims to reduce greenhouse gas emissions by 20% by 2030 compared to 2020 levels. This target applies to Scope 1 and Scope 2 emissions and is organization-wide within Thailand.

(7.53.1.83) Target objective

The target objective aligns with GGC's ambition to achieve net zero by 2060. GGC must implement a GHG reduction program and set a goal to reduce GHG emissions as a path way to Net Zero emission.

(7.53.1.84) Plan for achieving target, and progress made to the end of the reporting year

GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business

Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode, Coating Pump for reduce Energy Cooling Water Pump.

(7.53.1.85) Target derived using a sectoral decarbonization approach

Select from:

☑ No

Row 2

(7.53.1.1) Target reference number

Select from:

☑ Abs 2

(7.53.1.2) Is this a science-based target?

Select from:

☑ No, and we do not anticipate setting one in the next two years

(7.53.1.5) Date target was set

12/30/2021

(7.53.1.6) Target coverage

Select from:

☑ Organization-wide

(7.53.1.7) Greenhouse gases covered by target

Select all that apply

☑ Methane (CH4)
☑ Nitrous oxide (N2O)
☑ Carbon dioxide (CO2)
☑ Perfluorocarbons (PFCs)
☑ Hydrofluorocarbons (HFCs)
☑ Sulphur hexafluoride (SF6)
☑ Nitrogen trifluoride (NF3)

(7.53.1.8) Scopes

Select all that apply

☑ Scope 1
☑ Scope 2

(7.53.1.9) Scope 2 accounting method

Select from:

☑ Market-based

(7.53.1.11) End date of base year

12/30/2020

(7.53.1.12) Base year Scope 1 emissions covered by target (metric tons CO2e)

33333

(7.53.1.13) Base year Scope 2 emissions covered by target (metric tons CO2e)

59481

(7.53.1.31) Base year total Scope 3 emissions covered by target (metric tons CO2e)

0.000

(7.53.1.32) Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

92814.000

(7.53.1.33) Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1

100.0

(7.53.1.34) Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2

100.0

(7.53.1.53) Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100.0

(7.53.1.54) End date of target

12/30/2050

(7.53.1.55) Targeted reduction from base year (%)

100

(7.53.1.56) Total emissions at end date of target covered by target in all selected Scopes (metric tons CO2e)

0.000

(7.53.1.57) Scope 1 emissions in reporting year covered by target (metric tons CO2e)

28450

(7.53.1.58) Scope 2 emissions in reporting year covered by target (metric tons CO2e)

73708

(7.53.1.77) Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

102158.000

(7.53.1.78) Land-related emissions covered by target

Select from:

☑ No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

(7.53.1.79) % of target achieved relative to base year

-10.07

(7.53.1.80) Target status in reporting year

Select from:

☑ Underway

(7.53.1.82) Explain target coverage and identify any exclusions

GGC has set a long-term companywide target in 2021 to reduce scope 12 GHG reduction by 20% by 2030 compared to base year in 2020. This covers 100% of scope 1 and 2 emission without any exclusion of significant sources of emissions. This target covered GGC own operation which includes ME1, ME2 operational plant. The baseline year is subject to revision should there be any additional business expansion in the future years.

(7.53.1.83) Target objective

The target objective aligns with GGC's ambition to achieve net zero by 2060. GGC must implement a GHG reduction program and set a goal to reduce GHG emissions as a path way to Net Zero emission.

(7.53.1.84) Plan for achieving target, and progress made to the end of the reporting year

GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode, Coating Pump for reduce Energy Cooling Water Pump.

(7.53.1.85) Target derived using a sectoral decarbonization approach

Select from:

☑ No

Row 3

(7.53.1.1) Target reference number

Select from:

☑ Abs 3

(7.53.1.2) Is this a science-based target?

Select from:

☑ No, and we do not anticipate setting one in the next two years

(7.53.1.5) Date target was set

08/30/2023

(7.53.1.6) Target coverage

Select from:

☑ Organization-wide

(7.53.1.7) Greenhouse gases covered by target

Select all that apply

☑ Methane (CH4)

☑ Nitrous oxide (N2O)

☑ Carbon dioxide (CO2)

☑ Perfluorocarbons (PFCs)

☑ Hydrofluorocarbons (HFCs)

☑ Sulphur hexafluoride (SF6)

☑ Nitrogen trifluoride (NF3)

(7.53.1.8) Scopes

Select all that apply

☑ Scope 3

(7.53.1.10) Scope 3 categories

Select all that apply

☑ Scope 3, Category 6 – Business travel

☑ Scope 3, Category 7 – Employee commuting

☑ Scope 3, Category 11 – Use of sold products

☑ Scope 3, Category 1 – Purchased goods and services

☑ Scope 3, Category 5 – Waste generated in operations

☑ Scope 3, Category 12 – End-of-life treatment of sold products

☑ Scope 3, Category 4 – Upstream transportation and distribution

☑ Scope 3, Category 9 – Downstream transportation and distribution

☑ Scope 3, Category 3 – Fuel- and energy- related activities (not included in Scope 1 or 2)

(7.53.1.11) End date of base year

12/30/2020

(7.53.1.14) Base year Scope 3, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)

785798

(7.53.1.16) Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)

3874

(7.53.1.17) Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)

0

(7.53.1.18) Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)

0

(7.53.1.19) Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)

0

(7.53.1.20) Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)

0

(7.53.1.22) Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)

0

(7.53.1.24) Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)

0

(7.53.1.25) Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)

0

(7.53.1.31) Base year total Scope 3 emissions covered by target (metric tons CO2e)

789672.000

(7.53.1.32) Total base year emissions covered by target in all selected Scopes (metric tons CO2e)

789672.000

(7.53.1.35) Base year Scope 3, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)

100

(7.53.1.37) Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)

100

(7.53.1.38) Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)

100

(7.53.1.39) Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)

100

(7.53.1.40) Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)

100

(7.53.1.41) Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)

100

(7.53.1.43) Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)

100

(7.53.1.45) Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)

100

(7.53.1.46) Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)

100

(7.53.1.52) Base year total Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)

100

(7.53.1.53) Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes

100

(7.53.1.54) End date of target

12/30/2050

(7.53.1.55) Targeted reduction from base year (%)

50

(7.53.1.56) Total emissions at end date of target covered by target in all selected Scopes (metric tons CO2e)

394836.000

(7.53.1.59) Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)

541297.54

(7.53.1.61) Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)

0

(7.53.1.62) Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

10624.89

(7.53.1.63) Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)

14597.15

(7.53.1.64) Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)

27.59

(7.53.1.65) Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)

427.24

(7.53.1.67) Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)

9286.6

(7.53.1.69) Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)

0

(7.53.1.70) Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)

0

(7.53.1.76) Total Scope 3 emissions in reporting year covered by target (metric tons CO2e)

576261.010

(7.53.1.77) Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)

576261.010

(7.53.1.78) Land-related emissions covered by target

Select from:

☑ No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

(7.53.1.79) % of target achieved relative to base year

54.05

(7.53.1.80) Target status in reporting year

Select from:

☑ Underway

(7.53.1.82) Explain target coverage and identify any exclusions

GGC In 2023, GGC set a long-term companywide target to reduce Scope 3 greenhouse gas (GHG) emissions by 50% by 2050, compared to the base year of 2020. This target encompasses Scope 3 categories 1, 3, 4, 5, 6, 9, 11, and 12, which are related to GGC's activities. The target covers all GHG emissions from GGC's operations beyond those specified in Scope 1 and Scope 2.

(7.53.1.83) Target objective

GGC places great importance on reducing greenhouse gas emissions and aims to create a sustainable value chain. As part of this commitment, GGC has set a target to reduce its Scope 3 indirect greenhouse gas emissions by 50% from the 2020 levels. This ambitious goal will drive both GGC and its partners toward greater sustainability in the future.

(7.53.1.84) Plan for achieving target, and progress made to the end of the reporting year

GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode, Coating Pump for reduce Energy Cooling Water Pump. Moreover, GGC also has the Portfolio Driven which invests in low-carbon businesses and product portfolio management from upstream through calculation of GHGH emissions. GGC plans to focus on 1st Gen Biofuel, Advanced Biofuel, Specialty Oleochemicals, Biochemicals, Food & Nutraceuticals. Lastly, GGC focuses on Compensation Driven that concentrates in Nature-based solutions (Reafforestation) and Technology-based solutions (CCUS)

(7.53.1.85) Target derived using a sectoral decarbonization approach

Select from:

☑ No

[Add row]

(7.53.2) Provide details of your emissions intensity targets and progress made against those targets.

Row 1

(7.53.2.1) Target reference number

Select from:

☑ Int 1

(7.53.2.2) Is this a science-based target?

Select from:

☑ No, and we do not anticipate setting one in the next two years

(7.53.2.5) Date target was set

12/30/2020

(7.53.2.6) Target coverage

Select from:

☑ Organization-wide

(7.53.2.7) Greenhouse gases covered by target

Select all that apply

☑ Carbon dioxide (CO2)

☑ Methane (CH4)

☑ Nitrous oxide (N2O)

☑ Hydrofluorocarbons (HFCs)

(7.53.2.8) Scopes

Select all that apply

☑ Scope 1

☑ Scope 2

(7.53.2.9) Scope 2 accounting method

Select from:

☑ Market-based

(7.53.2.11) Intensity metric

Select from:

☑ Metric tons CO2e per unit revenue

(7.53.2.12) End date of base year

12/30/2020

(7.53.2.13) Intensity figure in base year for Scope 1 (metric tons CO2e per unit of activity)

0.0000018312

(7.53.2.14) Intensity figure in base year for Scope 2 (metric tons CO2e per unit of activity)

0.0000032676

(7.53.2.33) Intensity figure in base year for all selected Scopes (metric tons CO2e per unit of activity)

0.0000050988

(7.53.2.34) % of total base year emissions in Scope 1 covered by this Scope 1 intensity figure

100

(7.53.2.35) % of total base year emissions in Scope 2 covered by this Scope 2 intensity figure

100

(7.53.2.54) % of total base year emissions in all selected Scopes covered by this intensity figure

100

(7.53.2.55) End date of target

12/30/2050

(7.53.2.56) Targeted reduction from base year (%)

100

(7.53.2.57) Intensity figure at end date of target for all selected Scopes (metric tons CO2e per unit of activity)

0.0000000000

(7.53.2.58) % change anticipated in absolute Scope 1+2 emissions

100

(7.53.2.60) Intensity figure in reporting year for Scope 1 (metric tons CO2e per unit of activity)

0.0000016056

(7.53.2.61) Intensity figure in reporting year for Scope 2 (metric tons CO2e per unit of activity)

0.0000041598

(7.53.2.80) Intensity figure in reporting year for all selected Scopes (metric tons CO2e per unit of activity)

0.0000057654

(7.53.2.81) Land-related emissions covered by target

Select from:

☑ No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

(7.53.2.82) % of target achieved relative to base year

-13.07

(7.53.2.83) Target status in reporting year

Select from:

☑ Underway

(7.53.2.85) Explain target coverage and identify any exclusions

GGC has set a long-term companywide target in 2021 to become net zero in scope 12 GHG emission by 2050 compared to base year in 2020. This covers 100% of scope 1 and 2 emission without any exclusion of significant sources of emissions. This target covered GGC own operation which includes ME1, ME2 operational plant. The baseline year is subject to revision should there be any additional business expansion in the future years.

(7.53.2.86) Target objective

The target objective aligns with GGC's ambition to achieve net zero by 2060. GGC must implement a GHG reduction program and set a goal to reduce GHG emissions as a path way to Net Zero emission

(7.53.2.87) Plan for achieving target, and progress made to the end of the reporting year

GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Pre-treatment Vacuum Ejector Motive Steam Optimization, Switch Mode Time Reduction Project, Increase COD Treatment in the Wastewater Treatment System Efficiency Project, Reduction of ME Residue at Biodiesel Process Plant, Recovery Oil Loss from Wastewater Project.

(7.53.2.88) Target derived using a sectoral decarbonization approach

Select from:

☑ No

[Add row]

(7.54) Did you have any other climate-related targets that were active in the reporting year?

Select all that apply

☑ Net-zero targets

☑ Other climate-related targets

(7.54.2) Provide details of any other climate-related targets, including methane reduction targets.

Row 1

(7.54.2.1) Target reference number

Select from:

☑ Oth 1

(7.54.2.2) Date target was set

12/30/2022

(7.54.2.3) Target coverage

Select from:

☑ Organization-wide

(7.54.2.4) Target type: absolute or intensity

Select from:

☑ Absolute

(7.54.2.5) Target type: category & Metric (target numerator if reporting an intensity target)

Energy productivity

☑ megawatt hours (MWh)

(7.54.2.7) End date of base year

12/30/2022

(7.54.2.8) Figure or percentage in base year

411001.15

(7.54.2.9) End date of target

12/30/2023

(7.54.2.10) Figure or percentage at end of date of target

408329.6425

(7.54.2.11) Figure or percentage in reporting year

409920.87

(7.54.2.12) % of target achieved relative to base year

40.4370940377

(7.54.2.13) Target status in reporting year

Select from:

☑ New

(7.54.2.15) Is this target part of an emissions target?

This target is part of an emission which, target is set annually to achieve GGC's greenhouse gas reduction goals.

(7.54.2.16) Is this target part of an overarching initiative?

Select all that apply

☑ No, it’s not part of an overarching initiative

(7.54.2.18) Please explain target coverage and identify any exclusions

GGC has set a goal to reduce energy consumption in production by 0.65% each year compared to the previous year's energy consumption. This covers all energy consumption without any exclusion of significant sources of energy consumption. This target covered GGC own operation which includes ME I and ME II operational plants.

(7.54.2.19) Target objective

To achieve GGC's Net Zero target by 2050, reducing energy consumption is a crucial component. Therefore, GGC has set a goal to decrease energy consumption each year. Additionally, reducing energy consumption helps lower energy-related costs and environmental impacts.

(7.54.2.20) Plan for achieving target, and progress made to the end of the reporting year

GGC has a strategy focused on efficiency-driven improvements, which aim to enhance energy use capabilities. This efficiency-driven approach focuses on using low-carbon energy sources or renewable energy and process efficiency measures. These measures include capital investment for efficiency, real-time monitoring, data-driven operational optimization, and proactive maintenance. GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode and coating pump for reduce energy cooling water pump.

Row 2

(7.54.2.1) Target reference number

Select from:

☑ Oth 2

(7.54.2.2) Date target was set

12/30/2022

(7.54.2.3) Target coverage

Select from:

☑ Site/facility

(7.54.2.4) Target type: absolute or intensity

Select from:

☑ Intensity

(7.54.2.5) Target type: category & Metric (target numerator if reporting an intensity target)

Energy productivity

☑ megawatt hours (MWh)

(7.54.2.6) Target denominator (intensity targets only)

Select from:

☑ metric ton of product

(7.54.2.7) End date of base year

12/30/2023

(7.54.2.8) Figure or percentage in base year

1.12

(7.54.2.9) End date of target

12/30/2023

(7.54.2.10) Figure or percentage at end of date of target

0.9564

(7.54.2.11) Figure or percentage in reporting year

3.17

(7.54.2.12) % of target achieved relative to base year

-1253.0562347188

(7.54.2.13) Target status in reporting year

Select from:

☑ Underway

(7.54.2.15) Is this target part of an emissions target?

This target is part of an emission which, target is set annually to achieve GGC's greenhouse gas reduction goals that applies to Methyl Ester Plant 1 and plant 2.

(7.54.2.16) Is this target part of an overarching initiative?

Select all that apply

☑ No, it's not part of an overarching initiative

(7.54.2.18) Please explain target coverage and identify any exclusions

GGC has set a goal to reduce energy intensity of production at Methyl Ester Plant 1 (ME1) by 13.8% in 2023 compared to 2022. The target cover only energy consumption in ME1 of GGC.

(7.54.2.19) Target objective

To achieve GGC's Net Zero target, reducing energy consumption is a crucial component. Therefore, GGC has set a goal to decrease energy use each year. Additionally, reducing energy consumption helps lower energy-related costs.

(7.54.2.20) Plan for achieving target, and progress made to the end of the reporting year

GGC has a strategy focused on efficiency-driven improvements, which aim to enhance energy use capabilities. This efficiency-driven approach focuses on using low-carbon energy sources or renewable energy and process efficiency measures. These measures include capital investment for efficiency, real-time monitoring, data-driven operational optimization, and proactive maintenance. GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode and coating pump for reduce energy cooling water pump.

Row 3

(7.54.2.1) Target reference number

Select from:

☑ Oth 3

(7.54.2.2) Date target was set

12/30/2022

(7.54.2.3) Target coverage

Select from:

☑ Site/facility

(7.54.2.4) Target type: absolute or intensity

Select from:

☑ Intensity

(7.54.2.5) Target type: category & Metric (target numerator if reporting an intensity target)

Energy productivity

☑ megawatt hours (MWh)

(7.54.2.6) Target denominator (intensity targets only)

Select from:

☑ metric ton of product

(7.54.2.7) End date of base year

12/30/2022

(7.54.2.8) Figure or percentage in base year

0.42

(7.54.2.9) End date of target

12/30/2023

(7.54.2.10) Figure or percentage at end of date of target

0.3423

(7.54.2.11) Figure or percentage in reporting year

0.35

(7.54.2.12) % of target achieved relative to base year

90.0900900901

(7.54.2.13) Target status in reporting year

Select from:

☑ Underway

(7.54.2.15) Is this target part of an emissions target?

This target is part of the emission reduction.This target is part of an emission which, target is set annually to achieve GGC's greenhouse gas reduction goals that applies to Methyl Ester Plant 1.

(7.54.2.16) Is this target part of an overarching initiative?

Select all that apply

☑ No, it’s not part of an overarching initiative

(7.54.2.18) Please explain target coverage and identify any exclusions

GGC has set a goal to reduce energy intensity of production at Methyl Ester Plant 2 (ME2) by 18.5% in 2023 compared to 2022. The target cover only energy consumption in ME2 of GGC.

(7.54.2.19) Target objective

To achieve GGC's Net Zero target, reducing energy consumption is a crucial component. Therefore, GGC has set a goal to decrease energy use each year. Additionally, reducing energy consumption helps lower energy-related costs.

(7.54.2.20) Plan for achieving target, and progress made to the end of the reporting year

GGC has a strategy focused on efficiency-driven improvements, which aim to enhance energy use capabilities. This efficiency-driven approach focuses on using low-carbon energy sources or renewable energy and process efficiency measures. These measures include capital investment for efficiency, real-time monitoring, data-driven operational optimization, and proactive maintenance. GGC is determined to enact environmental policies covering climate change, power management, waste management, and water resource management in order to maximize the utilization of resources throughout the supply chain. GGC has established a policy of Safety, Occupational Health, Environment, and Business Continuity (QSHEB), which covers systematic environmental management, and biodiversity. GGC also manages the environment in accordance with the laws, regulations, and various standards both nationally and internationally. Moreover, GGC operated under the strategy of innovation and product development, as well as s emphasizes human resource development in research and development. GGC is focusing on building and development of research to increase product value through Efficiency-Driven. Examples of the project include Advance Process Control at Fractionation Column of FAOH Plant, Optimize cooling fan mode and coating pump for reduce energy cooling water pump.
[Add row]

(7.54.3) Provide details of your net-zero target(s).

Row 1

(7.54.3.1) Target reference number

Select from:
☑ NZ1

(7.54.3.2) Date target was set

06/15/2023

(7.54.3.3) Target Coverage

Select from:

☑ Organization-wide

(7.54.3.4) Targets linked to this net zero target

Select all that apply

☑ Abs1

☑ Abs2

☑ Int1

☑ Int2

(7.54.3.5) End date of target for achieving net zero

12/30/2050

(7.54.3.6) Is this a science-based target?

Select from:

☑ No, and we do not anticipate setting one in the next two years

(7.54.3.8) Scopes

Select all that apply

☑ Scope 1

☑ Scope 2

(7.54.3.9) Greenhouse gases covered by target

Select all that apply

☑ Methane (CH4)

☑ Nitrous oxide (N2O)

☑ Carbon dioxide (CO2)

☑ Perfluorocarbons (PFCs)

☑ Hydrofluorocarbons (HFCs)

☑ Sulphur hexafluoride (SF6)

☑ Nitrogen trifluoride (NF3)

(7.54.3.10) Explain target coverage and identify any exclusions

GGC has set a long-term companywide target in 2021 to become net zero in scope 12 GHG emission by 2050 compared to base year in 2020. This covers 100% of scope 1 and 2 emission without any exclusion of significant sources of emissions. This target covered GGC own operation which includes ME1, ME2 operational plant. The baseline year is subject to revision should there be any additional business expansion in the future years.

(7.54.3.11) Target objective

GGC has set a target to achieve a 50% reduction in Net Zero (Scope 12) emissions by 2050. This target is intended to prepare the company for future regulations in Thailand, such as Carbon tax or Emissions Trading Scheme (ETS). By setting this Net Zero goal, GGC aims to mitigate potential impacts on the company while driving improvements and advancements in its production processes to reduce greenhouse gas emissions, ultimately supporting the creation of a sustainable value chain.

(7.54.3.12) Do you intend to neutralize any residual emissions with permanent carbon removals at the end of the target?

Select from:

☑ Yes

(7.54.3.13) Do you plan to mitigate emissions beyond your value chain?

Select from:

☑ Yes, and we have already acted on this in the reporting year

(7.54.3.14) Do you intend to purchase and cancel carbon credits for neutralization and/or beyond value chain mitigation?

Select all that apply

☑ Yes, we plan to purchase and cancel carbon credits for neutralization at the end of the target

(7.54.3.15) Planned milestones and/or near-term investments for neutralization at the end of the target

GGC is intended to neutralize the unabated emissions with 3 pillars of approaches starting in 2030 or sooner in order to achieve a net zero target in 2050. 1) Efficiency Driven: GGC would like to focus on developing process efficiency measures, advanced technology and investment in Low carbon/ renewable heat and power. 2) Portfolio Driven: GGC would like to focus on developing of low carbon products & avoided emissions products with high value-added, for instance, investment in 1st Gen Biofuel, Advanced Biofuel, specialty Oleochemicals, Biochemicals and other value-added products for food & nutraceuticals 3) Compensation Driven: GGC would like to invest in carbon offset approaches including Renewable Energy Certificates (REC), which is considered for scope 2 GHG reduction and high-quality carbon credits from recognized market such as Thailand Voluntary Emission Reduction Scheme (T-VER).

(7.54.3.16) Describe the actions to mitigate emissions beyond your value chain

GGC is actively studying and implementing strategies to reduce greenhouse gas emissions through its Climate Strategy, which comprises Efficiency-driven, Portfolio-driven, and Compensation-driven approaches. For the Efficiency-driven approach, GGC is enhancing energy efficiency in its production processes to lower greenhouse gas emissions. in 2023 GGC implements Advanced Process Control at the Fractionation column at the FAOH Plant, optimizing cooling fan modes, and applying coatings pumps for reduce energy cooling water pumps as an initiative for reduce GHG emission. In the Compensation-driven approach, GGC is preparing to offset carbon through reforestation efforts and investing in Carbon Capture, Utilization, and Storage (CCUS) technology.

(7.54.3.17) Target status in reporting year

Select from:

☑ Underway

(7.54.3.19) Process for reviewing target

GGC regularly monitors and reviews its Net Zero target annually. The Sustainability Development Committee (SDC) and the Enterprise Risk Management Committee (ERMC), both at the management level, conduct the review of the targets and progress in each year and report to the Sustainable Development Committee (CG&SDC) and the Risk Management Committee (RMC) at the Board level for acknowledgment and approval. This process encompasses the approval of policies, targets, scopes, strategic plans, and directions related to climate change initiatives.
[Add row]

(7.55) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Select from:

☑ Yes

(7.55.1) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	*0*	*`Numeric input*
To be implemented	*0*	*0*
Implementation commenced	*0*	*0*
Implemented	*3*	*444*
Not to be implemented	*0*	*`Numeric input*

[Fixed row]

(7.55.2) Provide details on the initiatives implemented in the reporting year in the table below.

Row 1

(7.55.2.1) Initiative category & Initiative type

Energy efficiency in production processes

☑ Process optimization

(7.55.2.2) Estimated annual CO2e savings (metric tonnes CO2e)

140

(7.55.2.3) Scope(s) or Scope 3 category(ies) where emissions savings occur

Select all that apply

☑ Scope 1

(7.55.2.4) Voluntary/Mandatory

Select from:

☑ Voluntary

(7.55.2.5) Annual monetary savings (unit currency – as specified in C0.4)

1410000

(7.55.2.6) Investment required (unit currency – as specified in C0.4)

5490000

(7.55.2.7) Payback period

Select from:

☑ 1-3 years

(7.55.2.8) Estimated lifetime of the initiative

Select from:

☑ 3-5 years

(7.55.2.9) Comment

GGC installed a software called Advanced Process Control (APC), which is system that controls the automatic opening and closing of valves through detecting changes in temperature and Reflux Flow to the Fractionation column. By using APC, GGC can reduce the use of steam energy and the imbalance flow within the boiler, which causes higher energy usage. Therefore, GGC can reduces energy use in steam generation by 1,517.04 ton of steam per year and using APC can reduces costs by 1.41 million THB per year.

Row 2

(7.55.2.1) Initiative category & Initiative type

Energy efficiency in production processes

☑ Cooling technology

(7.55.2.2) Estimated annual CO2e savings (metric tonnes CO2e)

252

(7.55.2.3) Scope(s) or Scope 3 category(ies) where emissions savings occur

Select all that apply

☑ Scope 1

(7.55.2.4) Voluntary/Mandatory

Select from:

☑ Voluntary

(7.55.2.5) Annual monetary savings (unit currency – as specified in C0.4)

2508000

(7.55.2.6) Investment required (unit currency – as specified in C0.4)

0

(7.55.2.7) Payback period

Select from:

☑ <1 year

(7.55.2.8) Estimated lifetime of the initiative

Select from:

☑ 3-5 years

(7.55.2.9) Comment

The Optimize cooling fan mode is the initiative to reduce energy consumption in the cooling water system by reduce 1 cooling fan from 4 cooling fans. By the remove one cooling fan without affecting the temperature of the cooling water. The company was able to reduce machine operating expenses by more than 2,508,000 THB per year and GGC can save electricity usage by 600,000 kilowatt hours per year or equivalent to reducing greenhouse gas emissions by more than 252 tons of carbon dioxide equivalent per year.

Row 3

(7.55.2.1) Initiative category & Initiative type

Energy efficiency in production processes

☑ Process optimization

(7.55.2.2) Estimated annual CO2e savings (metric tonnes CO2e)

52

(7.55.2.3) Scope(s) or Scope 3 category(ies) where emissions savings occur

Select all that apply

☑ Scope 1

(7.55.2.4) Voluntary/Mandatory

Select from:

☑ Voluntary

(7.55.2.5) Annual monetary savings (unit currency – as specified in C0.4)

548609

(7.55.2.6) Investment required (unit currency – as specified in C0.4)

2888500

(7.55.2.7) Payback period

Select from:

☑ 4-10 years

(7.55.2.8) Estimated lifetime of the initiative

Select from:

☑ 3-5 years

(7.55.2.9) Comment

GGC increase the work efficiency of water pump by repainted the inside of the water pump. As a result, the surfaces of the pump is smoother, which reduces friction and increases the speed of water flow. GGC can reduce electricity use by 124,581.60 KWh/year or 52 tonCO2e and reduce operating costs about 548,609 THB per year.
[Add row]

(7.55.3) What methods do you use to drive investment in emissions reduction activities?

Row 1

(7.55.3.1) Method

Select from:

☑ Dedicated budget for other emissions reduction activities

(7.55.3.2) Comment

The project of energy conservation and energy efficiency management resulted in GGC being able to reduce energy consumption and the emission of greenhouse gases. In 2023, GGC has implemented three major emissions reduction initiatives including 1) advance process control at fractionation column of FAOH plant, 2) Optimize cooling fan mode, 3) Coating Pump for Reduce Energy Cooling Water Pump To illustrate, 1) The installed a software called advanced Process Control (APC) at Methyl Ester plant 1 can reduces steam usage 1,150 kg/hr or can reduce GHG emission 140 tonnes CO2e/year. 2) Optimize cooling fan, the initiative to increase energy efficiency which can reduce operating expenses 2,508,000 THB per year reducing GHG emission by 252 tons of carbon dioxide equivalent per year 3) Coating pump for reduce energy cooling water pump can reduce electricity use by 10,937 KWh/month or 52 tonCO2e and reduce operating costs about 548,609 THB per year.
[Add row]

(7.73) Are you providing product level data for your organization’s goods or services?

Select from:

☑ Yes, I will provide data through the CDP questionnaire

(7.73.1) Give the overall percentage of total emissions, for all Scopes, that are covered by these products.

100

(7.73.2) Complete the following table for the goods/services for which you want to provide data.

Row 1

(7.73.2.1) Requesting member

Select from:

(7.73.2.2) Name of good/ service

Refined Glycerin

(7.73.2.3) Description of good/ service

Refined glycerin a palm oil-based product derived from crude glycerin of methyl ester plant and fatty alcohol plant. The scope of carbon footprint covers the raw material sourcing and production (Cradle-to-gate)

(7.73.2.4) Type of product

Select from:

☑ Intermediate

(7.73.2.5) Unique product identifier

It is a by-product of the methyl ester and fatty a

(7.73.2.6) Total emissions in kg CO2e per unit

2445.14

(7.73.2.7) ±% change from previous figure supplied

33

(7.73.2.8) Date of previous figure supplied

08/30/2023

(7.73.2.9) Explanation of change

The production of refined glycerin has decreased by 4.8% from 2022 and the total GHG emission in 2023 has increased. However, in terms of the GHG intensity per total production remains relatively the same.

(7.73.2.10) Methods used to estimate lifecycle emissions

Select from:

☑ Other, please specify **:**Cradle to Gate

[Add row]

(7.73.3) Complete the following table with data for lifecycle stages of your goods and/or services.

Row 1

(7.73.3.1) Requesting member

Select from:

(7.73.3.2) Name of good/ service

Refined Glycerin

(7.73.3.3) Scope

Select from:

☑ Scope 1, 2 & 3

(7.73.3.4) Lifecycle stage

Select from:

☑ Cradle to gate

(7.73.3.5) Emissions at the lifecycle stage in kg CO2e per unit

3.84

(7.73.3.6) Lifecycle stage under your ownership or control

Select from:

☑ Yes

(7.73.3.7) Type of data used

Select from:

☑ Secondary

(7.73.3.8) Data quality

GGC conducted corporate GHG accounting and used the accounted data as a major source to calculate the GHG emission of the products within the scope of cradle-to-gate lifecycle stage. GGC is preparing to apply GHG product standard for help in assessing data quality in the near future. The process will help GGC to acknowledge the emission data quality to report to customers, and limitation for improving the data quality as well.

(7.73.3.9) If applicable, describe the verification/assurance of the product emissions data

GGC realizes that verification of GHG emission from products is important to provide the accurate data for customers' GHG emission accounting. This will also be helpful for customer for setting their climate-related strategy and planning actions to achieve the targets. GGC will continue to verify GHG data for the products following the Thailand Greenhouse Gas Management Organization's Guidance on Carbon Footprint of Product (CFP) and other international standards as the first priority.

[Add row]

(7.73.4) Please detail emissions reduction initiatives completed or planned for this product.

Row 1

(7.73.4.1) Name of good/ service

Refined Glycerin

(7.73.4.2) Initiative ID

Select from:
☑ Initiative 1

(7.73.4.3) Description of initiative

GGC has established the B100 steam saving project. GGC has adjusted its processes to reduce steam and electricity consumption in the Methyl Ester (B100) purification process. As a result, GGC has reduced the use of high-pressured steam by 0.92 tons per hour and reduced electricity consumption by 28.5 kWh as well as reduced GHG emission by 1,223.72 tCO2e per year or 0.0029 tCO2e per product per year.

(7.73.4.4) Completed or planned

Select from:
☑ Ongoing

(7.73.4.5) Emission reductions in kg CO2e per unit

0
[Add row]

(7.73.5) Have any of the initiatives described in 7.73.4 been driven by requesting CDP Supply Chain members?

Select from:

☑ No

(7.74) Do you classify any of your existing goods and/or services as low-carbon products?

Select from:
☑ Yes

(7.74.1) Provide details of your products and/or services that you classify as low-carbon products.

Row 1

(7.74.1.1) Level of aggregation

Select from:
☑ Group of products or services

(7.74.1.2) Taxonomy used to classify product(s) or service(s) as low-carbon

Select from:
☑ No taxonomy used to classify product(s) or service(s) as low carbon

(7.74.1.3) Type of product(s) or service(s)

Chemicals and plastics
☑ Other, please specify **:**Fatty alcohol

(7.74.1.4) Description of product(s) or service(s)

GGC focuses on continuous development of low carbon products with the goal of reducing GHG emission throughout the product life cycle. The group of GGC's products identified as low carbon product is fatty alcohol consisting of main-cut and pre-cut fatty alcohol.

(7.74.1.5) Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Select from:

☑ Yes

(7.74.1.6) Methodology used to calculate avoided emissions

Select from:

☑ Estimating and Reporting the Comparative Emissions Impacts of Products (WRI)

(7.74.1.7) Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Select from:

☑ Cradle-to-gate

(7.74.1.8) Functional unit used

Equal amount of main-cut and pre-cut fatty alcohol produced by GGC in 2023

(7.74.1.9) Reference product/service or baseline scenario used

Equal amount of conventional product in the market

(7.74.1.10) Life cycle stage(s) covered for the reference product/service or baseline scenario

Select from:

☑ Cradle-to-gate

(7.74.1.11) Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

206322.55

(7.74.1.12) Explain your calculation of avoided emissions, including any assumptions

Carbon Footprint Reduction Label (CFR) or Global Warming Reduction Label is a label that demonstrates a certified Carbon Footprint of Product (CFP) and its emissions reduction based on the TGO eligible reduction criteria. The CFR evaluation and process include the quantification and certification of base year and present year CFP and the comparison results between the base year and present year certified CFP or against its product category benchmarking threshold

announced by TGO. The product registered as CFR shall comply with the following requirements, 1. The certified CFP of its present year compared to base year certified CFP shall be reduced not less than 2% or 2. The certified CFP of its present year is equal to or less than the product category benchmarking threshold and not more than its base year certified value. (http://thaicarbonlabel.tgo.or.th/index.php?langEN&modY21Wa2RXTjBhVzl1WDJseg) Therefore, this is in accordance with the attributional approach by the Comparative Emissions Impacts of Products (WRI) where the same type of product is compared with those that would otherwise be produced in the market.

(7.74.1.13) Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

28

Row 2

(7.74.1.1) Level of aggregation

Select from:

☑ Group of products or services

(7.74.1.2) Taxonomy used to classify product(s) or service(s) as low-carbon

Select from:

☑ Other, please specify **:**Bio Methyl Ester

(7.74.1.3) Type of product(s) or service(s)

Chemicals and plastics

☑ Other, please specify **:**Bio Methyl Ester

(7.74.1.4) Description of product(s) or service(s)

GGC focuses on continuous development of low carbon products with the goal of reducing GHG emission throughout the product life cycle. The group of GGC's products identified as low carbon product is fatty alcohol consisting of main-cut and pre-cut fatty alcohol.

(7.74.1.5) Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Select from:

☑ Yes

(7.74.1.6) Methodology used to calculate avoided emissions

Select from:
☑ Estimating and Reporting the Comparative Emissions Impacts of Products (WRI)

(7.74.1.7) Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Select from:
☑ Cradle-to-gate

(7.74.1.8) Functional unit used

Equal amount of Bio Methyl Ester produced by GGC in 2023

(7.74.1.9) Reference product/service or baseline scenario used

Equal amount of conventional product in the market

(7.74.1.10) Life cycle stage(s) covered for the reference product/service or baseline scenario

Select from:
☑ Cradle-to-gate

(7.74.1.11) Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

728471.22

(7.74.1.12) Explain your calculation of avoided emissions, including any assumptions

GGC's revenue from Methyl Ester is based on product life cycle assessments conducted according to ISO 14040 and ISO 14044 standards. For the sixth consecutive year, this has been certified under the Carbon Footprint Products (CFP) label and the Carbon Footprint Reduction (CFR) label.

(7.74.1.13) Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

65
[Add row]

(7.79) Has your organization canceled any project-based carbon credits within the reporting year?

Select from:
☑ No

C11. Environmental performance - Biodiversity

(11.2) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?

(11.2.1) Actions taken in the reporting period to progress your biodiversity-related commitments

Select from:

☑ Yes, we are taking actions to progress our biodiversity-related commitments

(11.2.2) Type of action taken to progress biodiversity- related commitments

Select all that apply

☑ Law & policy

☑ Other, please specify :Biodiversity Risks Assessment within supply chain covering own operation, upstream and downstream activities. This considered as the first step of actions to identify mitigation plans

[Fixed row]

(11.3) Does your organization use biodiversity indicators to monitor performance across its activities?

	Does your organization use indicators to monitor biodiversity performance?
	Select from: ☑ No, we do not use indicators, but plan to within the next two years

[Fixed row]

(11.4) Does your organization have activities located in or near to areas important for biodiversity in the reporting year?

Legally protected areas

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ No

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas.

UNESCO World Heritage sites

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ No

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas.

UNESCO Man and the Biosphere Reserves

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ Not assessed

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas.

Ramsar sites

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ No

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas.

Key Biodiversity Areas

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ No

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas.

Other areas important for biodiversity

(11.4.1) Indicate whether any of your organization's activities are located in or near to this type of area important for biodiversity

Select from:

☑ Not assessed

(11.4.2) Comment

GGC has utilized the WWF Biodiversity Risk Filter tools to determine and assess location specific risks with the boundary includes upstream, own operation, adjacent area and downstream. The WWF Biodiversity Suite has followed the Taskforce on Nature-related Financial Disclosures (TNFD) methodology for risks classification and the assessment of impacts on Biodiversity and dependencies on Biodiversity. The type of area important for biodiversity that is included in the platform are Legally Protected Areas, UNESCO World Heritage Sites, Ramsar Sites, Key Biodiversity. The locations are site specific based. As a result, GGC's own operations and the representative sites of suppliers and customers are identified as medium risks in terms of biodiversity and are not located in the important biodiversity areas. [Fixed row]

C13. Further information & sign off

(13.1) Indicate if any environmental information included in your CDP response (not already reported in 7.9.1/2/3, 8.9.1/2/3/4, and 9.3.2) is verified and/or assured by a third party?

	Other environmental information included in your CDP response is verified and/or assured by a third party
	Select from: ☑ Yes

[Fixed row]

(13.1.1) Which data points within your CDP response are verified and/or assured by a third party, and which standards were used?

Row 1

(13.1.1.1) Environmental issue for which data has been verified and/or assured

Select all that apply

☑ Climate change

(13.1.1.2) Disclosure module and data verified and/or assured

Environmental performance – Climate change

☑ Emissions breakdown by country/area

☑ Emissions reduction initiatives/activities

☑ All data points in module 7

(13.1.1.3) Verification/assurance standard

Climate change-related standards

☑ ISO 14064-1

(13.1.1.4) Further details of the third-party verification/assurance process

GGC has acquired the verification statement in accordance to ISO 14064-1. The assurance engagement covered GGC's operations and activities in Thailand (Bangkok, Chonburi and Rayong)

(13.1.1.5) Attach verification/assurance evidence/report (optional)

iso-14064-1-en.pdf

Row 2

(13.1.1.1) Environmental issue for which data has been verified and/or assured

Select all that apply

☑ Climate change

(13.1.1.2) Disclosure module and data verified and/or assured

Environmental performance – Climate change

☑ Emissions breakdown by country/area

☑ Emissions reduction initiatives/activities

☑ All data points in module 7

(13.1.1.3) Verification/assurance standard

Climate change-related standards

☑ Thai Greenhouse Gas Management Organization (TGO)

(13.1.1.4) Further details of the third-party verification/assurance process

GGC issues an annual public assurance statement. This year, 2023 served as the verifier using the Thai Greenhouse Gas Management Organization (TGO) standard. The scope of GHG emission cover Direct GHG emissions (Scope 1), Energy Indirect GHG emissions (Scope2) and Other Indirect GHG emissions (Scope3). The assurance engagement covered GGC's operations and activities in Thailand (Bangkok, Chonburi and Rayong)

(13.1.1.5) Attach verification/assurance evidence/report (optional)

tgo-ghg-emission-assurance-statement.pdf

Row 3

(13.1.1.1) Environmental issue for which data has been verified and/or assured

Select all that apply

☑ Climate change

(13.1.1.2) Disclosure module and data verified and/or assured

Environmental performance – Climate change

☑ Product footprint

(13.1.1.3) Verification/assurance standard

General standards

☑ Other general verification standard, please specify **:**Thailand Greenhouse Gas Management Organization (TGO)'s Carbon Footprint Reduction

(13.1.1.4) Further details of the third-party verification/assurance process

Thailand Greenhouse Gas Management Organization's Product Carbon Footprint. The Thailand Greenhouse Gas Management Organization (Public Organization) or TGO has promoted the CFO implementation project focused on promoting targeted organizations in conducting their GHG disclosure and verification. The project aims to follow tasks, including, 1) capacity building on quantifying GHG emissions and removals from production processes and services in order to initiate effective GHG reduction approaches for organizations, 2) strengthening environmental performance and building up capability on global market competitiveness of organizations for both industrial and business sectors, and 3) preparing GHG reporting readiness for industries and services in case that the government has to deploy the mandatory GHG reporting policy in the future and to create accessibility for the Thai voluntary carbon market.

(13.1.1.5) Attach verification/assurance evidence/report (optional)

integrated-sustainability-report-2023-185.pdf
[Add row]

(13.2) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

	Additional information	Attachment (optional)
	Not Applicable	*ggc-tcfd-disclosure-2023.pdf*

[Fixed row]

(13.3) Provide the following information for the person that has signed off (approved) your CDP response.

(13.3.1) Job title

Managing Director (MD) (Equivalent to Chief Executive Officer (CEO))

(13.3.2) Corresponding job category

Select from:

☑ Chief Executive Officer (CEO)
[Fixed row]