

# Risk

# Management

## **RISK MANAGEMENT AND RISK FACTORS**

### **RISK MANAGEMENT**

In 2020, GC faced with the enormous and unexpected crisis (Black Swan) from the coronavirus disease 2019 (COVID-19) pandemic that sent ripples across the world and caused immense impact on global economies as well as human life and health together with the impacts of the price volatility brought on by the ongoing U.S.-China trade war that has begun since 2019. Additionally, GC faced negative factors as a result of a crude oil price war and water shortages in Thailand. However, with the robust risk management system, GC appointed the specific committees to manage these new risks. One such committee was the COVID-19 infection Prevention and Control committee, which was responsible for monitoring the pandemic situation, establishing preventive measures, assigning the majority of employees to Work from Home, and formulating strict guidelines for preventing transmission among personnel as well as in sensitive processes and areas so as to ensure business continuity. Furthermore, GC promptly act to support all concerned parties, such as medical professionals and affected individuals, so that everyone could overcome the crisis together. As for drought-related risks, GC appointed the Water Management Taskforce and the "Supply Chain Management Taskforce for year 2020 Drought to prescribe internal and external management measures, conduct availability planning, and oversee the management of customers, suppliers, and stakeholders with maximum efficiency. Furthermore, in response to impacts from the slowdown of the global economy and industries as well as lockdown measures in countries that were part of GC's supply chain, the Company introduced measures to reduce expenses, review investment plans, revise production and sales plans, as well as adjust the product portfolio

to cope with the rapidly changing market. GC was able to handle these challenges effectively, maintain its liquidity, minimize impact on its business operations, and ultimately lead the Company through the crisis from good cooperation from all parties. This testifies to the standard of GC' risk management, which is systematically developed and integrated across the organization through the application of information technology. In addition, GC has implemented a risk management policy alongside strategic management to ensure that the Company will be able to handle current and future crises and uncertainties as well as turn risks into business opportunities so as to achieve sustainable growth in keeping with its business plans and major goals within the defined risk appetite.

In 2020, GC was ranked first in the Dow Jones Sustainability Indices (DJSI) for risk and crisis management for the second consecutive year, representing GC's internationally accepted risk management standards. GC's risk management adheres to the COSO ERM (2017) framework by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) and the ISO 31000:2018 standard by the International Organization for Standardization (ISO), as well as the Thai Corporate Governance Code for Listed Companies 2017. It also integrates GC's policies, rules, and standards related to governance, risk management and internal control, and compliance (known as GRC), to incorporate risk management into GC's internal management so as to protect and create sustainable value for the organization.

### **RISK MANAGEMENT STRUCTURE**

GC's risk management structure is organized into three levels: corporate, business units, and operations. At the corporate level, the Board-appointed Risk Management Committee (RMC) is responsible for

defining the direction of risk management guided by the risk appetite, risk policy, and five risk management frameworks: corporate, foreign exchange, price-and-spread, subsidiaries, and investment. It is also tasked with monitoring and providing recommendations on the management of risks towards the achievement of GC's strategic and business goals. Furthermore, The Enterprise Risk Management Committee (ERMC), which is comprised of executive officers from each function, is responsible for regularly monitoring risk management progress to ensure alignment with the policies, objectives, risk appetite, and risk management frameworks approved by the Risk Management Committee.

For specific business risks, GC has prescribed risk management at the business unit and function level or appointed specific committees to enhance flexibility and ensure that the risk management is consistent with the operational environment, as detailed below:

- **The Value Chain Management (VCM) Committee** is responsible for closely monitoring and managing pricing, foreign exchange, and supply chain risks on a weekly basis, using the risk management frameworks approved by the Risk Management Committee.
- **GC Group's Sustainable Development Committee (SDC)** is responsible for monitoring sustainable development performance and management to ensure appropriate sustainability risk management for its business operations both at present and in the future.
- **The Investment Committee (IC)** is responsible for overseeing and reviewing investment projects to ensure compatibility to GC's strategies as well as supervising risk assessment and risk management measures for such projects to ensure that their objectives are accomplished.
- **Other Committees include GC Operational Excellence Committee**, responsible for the management of risks related to production

reliability and compliance with plant-related laws, regulations, requirements, and standards; **the Safety, Health and Environment Governance Committee**, responsible for the management of safety, health, and environmental risks; the Digital and **Information Technology Governance Committee**, responsible for overseeing the management of digital and information technology as well as cybersecurity.

In 2020, GC faced with the challenges of the COVID-19 pandemic, droughts, and the enforcement of new laws and regulations related its business operations, GC appointed additional committees and ad hoc working teams to handle the management of such risks, as detailed below:

- **The Corona virus infection Prevention and Control committee** is responsible for closely monitoring the COVID-19 situation, defining preventive measures consistent with the rapidly changing situation, and prescribing guidelines and practices to ensure business continuity.
- **The Water Management Taskforce and the Supply Chain Management Taskforce** for year 2020 Drought are tasked with prescribing internal and external management measures to cope with droughts as well as establishing operational plans and overseeing the management of customers, suppliers, and stakeholders to maximize efficiency.
- **The Personal Data Protection Act Working Team** is responsible for ensuring that work plans, guidelines, and practices comply with the Personal Data Protection Act.

At the business unit/function level, the corporate risk direction is applied through the head of each business unit/function and integrated into the management of risks at the operation levels, which include both operation risks and process risks. At the corporate level, GC oversees risk management for subsidiaries in accordance with the guidelines set forth in GC Way of Conduct to ensure uniformity.

## RISK MANAGEMENT TOOLS

GC has adopted various risk management tools, including risk maps, mitigation plans, and key risk indicators (KRIs). The Monte Carlo Simulation is also used to model impact on operating results in the form of Value at Risk (VaR), while hedging is conducted to protect the Company from foreign exchange risks and price volatility. Operation risk management (ORM) are also employed as a tool for the management of production reliability, safety, occupational health, and environment. In addition, GC also utilizes control self-assessment (CSA) as a tool to evaluate the adequacy of internal control system. GC also keeps track of changes in key external factors and emerging risks through an Early Warning System (EWS), employs a sensitivity analysis tool, and conducts stress testing to assess impacts and establishing proactive risk mitigation measures.

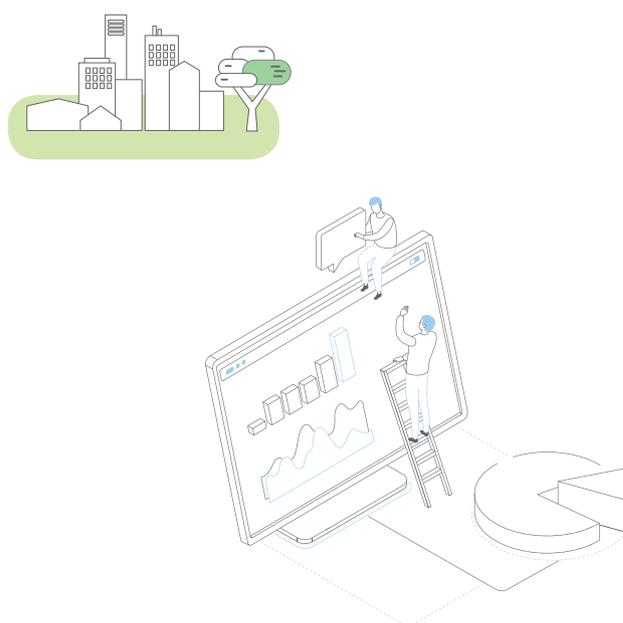
## RISK MANAGEMENT CULTURE

GC strives to foster an organization-wide culture of risk management to ensure its stable and sustainable advancement through six components: 1) Governance, 2) Leadership, 3) Risk management structure, 4) Risk management techniques, 5) Communication, and 6) Risk management knowledge and understanding building. GC oversees risk management by defining policy, objectives, risk appetite, and risk management frameworks and has a risk management structure that covers every level. It has also defined the roles, duties, and guidelines for the Board of Directors, Executives, and employees to raise their awareness. Risks are also considered for all activities and regular work procedures, using suitable risk management tools and techniques for the nature of such risks. Furthermore, risk management performance is closely monitored and reported to GC's Executives and Board of Directors on a regular basis. GC also communicates risk issues and foster an understanding of risk management through its Executives, newsletters, and training programs regularly.

In 2020, GC held training programs for Executives and employees, covering topics of governance, risk management and internal control, and Governance, Risk management, and Compliance (GRC). Training programs such as Fundamental of Enterprise Risk Management, Intermediate of Enterprise Risk Management, and Business Continuity Management were conducted. Sessions led by internal and external experts providing updates on business situations, future trends, and emerging risks were also held for all related parties to develop their ability to identify and assess risks as well as establishing risk management measures. Furthermore, the Company expanded its Integrated GC initiative to its subsidiaries, held executive workshops, and communicated with employees through newsletters and e-Learning.

## RISK FACTORS

In response to a series of crises in 2020, GC has analyzed the business environment based on both internal and external factors, along with relevant economic, social, political, technological, industrial, competition, and other trends to define corporate risk factors for the present and the future and identify emerging risks, which can be categorized into the three groups as summarized below.



## CURRENT BUSINESS-RELATED RISK FACTORS

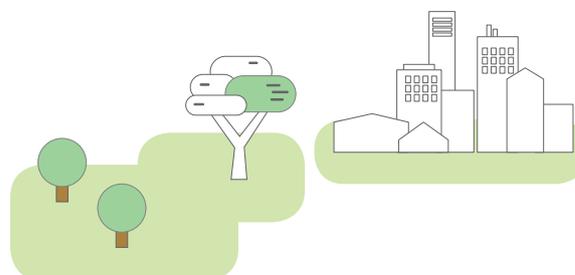
| Corporate Risk Factor  | Important Mitigation Measures   |
|--|---|
| <p><u>Operational and Safety Risk</u></p> <p>GC strives to maintain high operational standards. To this end, it places the utmost importance on managing its operation and safety risks to ensure that the production processes are both safe and reliable. GC has thus continuously applied the GC Management System (GCMS) and Process Safety Management (PSM) System, with the goal of achieving world-class PSM.</p> | <p>GC has continuously carried out the following measures to maintain the operational reliability and safety.</p> <ul style="list-style-type: none"> <li>• Collaborate with PTT Group experts to continuously assess Operational Excellence Management System (OEMS) to ensure its performance and effectiveness together with raising reliability by enhancing technical standards and maintenance to maintain operations stability within the first-quartile level.</li> <li>• Cooperate with external consultants to strengthen GC's Process Safety Management, raising it to an international standard within the 2017-2022 timeframe, while focusing on the development of all Executives levels as role model to inspire safety practices, enhance the capabilities of employees at the operations level, and raise their awareness.</li> <li>• Foster a positive safety mindset through the B-CAREs culture and elevate operational discipline.</li> <li>• Apply digital technology, such as sensors and advanced analytic tools, to data analysis. Enhance machinery efficiency through Equipment Foresight, which possesses a warning system for potential equipment malfunctions, and Asset Performance Management, which possesses a system that analyzes maintenance data to define suitable maintenance strategies.</li> <li>• Assign specialist employees to monitor irregularities via online systems, such as the Wireless Sensor for Online Condition Monitoring and the Online Corrosion Monitoring, and consult on-site maintenance units during operations through Remote Advisory to enhance efficiency and prevent unplanned downtime.</li> <li>• Assess the supplier operation management results including utility system to ensure efficient machinery maintenance as well as operational safety and continuity of supplier, which ultimately enhances operational reliability.</li> <li>• Build experts and develop internal personnel, using the knowledge jointly developed with consultants, and promote knowledge management between business units so as to transfer standards and knowledge to all business units and across GC Group.</li> <li>• Apply the ISO 45001/ OHSAS 18001 standard for management systems of occupational health and safety, ISO 22301 standard for business continuity management systems (BCMS), and the Incident Management System (IMS) to the management of emergencies and crises that may lead to business interruption so as to mitigate impacts from such incidents and/or minimize recovery time. GC also conducts crisis management drills and business continuity planning (BCP) on a regular basis.</li> <li>• GC Group has the necessary insurance to lessen impacts resulting from unforeseen incidents.</li> </ul> |

| Corporate Risk Factor  | Important Mitigation Measures   |
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| <p><u>Price Volatility Risk</u></p> <p>The COVID-19 pandemic has brought on a global economic downturn and affected demand for petroleum and petrochemicals. Although OPEC+ joined hands to decrease production capacity to reduce crude supply surplus and stabilize the price, the demand slump caused the prices and spreads of both petroleum and petrochemicals to be highly volatile, significantly impacting GC's operating results.</p>  | <p>The following are the measures that GC has put forth to mitigate its price volatility risks.</p> <ul style="list-style-type: none"> <li>• Closely monitor market situations, feedstock prices, and product prices to revise production and sales plans throughout the value chain to ensure compatibility with rapidly changing situations, including switching production modes and adjusting the product portfolio and sales proportion to serve the demand of the end-use market.</li> <li>• Review feedstock sourcing and agreement terms to ensure compatibility with the market situation. Hold meetings with related parties to closely monitor feedstock purchases, production volumes, and production plans.</li> <li>• Manage price and spread risks and carry out inventory hedging through derivative securities and/or advance purchase agreements according to the policy and frameworks defined by the Risk Management Committee, under the close supervision and monitoring of the Value Chain Management (VCM) Committee.</li> </ul>                                    |
| <p><u>Sale &amp; Marketing Risk</u></p> <p>The ability to maintain steady revenue is an important factor that influences GC's operating results, especially during the time of market volatility as a result of various factors, such as demand-supply imbalance, trade wars, geopolitics, the COVID-19 pandemic, and the new normal trend, which has altered consumer behavior and led to the demand for greater product diversity and convenient sales models that respond to their lifestyle.</p> | <p>GC has continuously carried out the following sales and marketing measures.</p> <ul style="list-style-type: none"> <li>• Closely monitor the market situation and adjust sales and production plans accordingly.</li> <li>• Diversify the product portfolio and define appropriate a sales portfolio according to changes in the market situation.</li> <li>• Expand towards emerging markets, such as CLMV and Southeast Asia, to create long-term sale security, as well as shift sales volumes towards higher value products in keeping with the market to maximize profitability.</li> <li>• Foster collaboration in product development with partners, develop existing markets, and acquire new customers interested in developing products with technological and innovation differentiation for a better quality of life for customers in the end-use market through GC's Customer Solution Center.</li> <li>• Develop and improve an end-to-end sales and marketing process in keeping with the changing of business context, consumer behavior, and sales channels.</li> </ul> |

| Corporate Risk Factor  | Important Mitigation Measures   |
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| <p><u>COVID-19 Pandemic Risk</u></p> <p>The COVID-19 pandemic, which began in early 2020, has not only triggered a global economic downturn but poses risks to employees and can lead to the suspension of various key activities, such as operation. GC has thus established stringent preventive measures as well as formulated and implemented business continuity management plans to ensure business continuity and minimize impacts on related parties, such as customers, suppliers, shareholders, and communities.</p> | <p>GC carries out the following measures to manage COVID-19 risks.</p> <p><u>Business continuity measures:</u></p> <ul style="list-style-type: none"> <li>• Announce an emergency response policy, appoint a working team to implement the business continuity plan (BCP), and establish the Corona virus infection Prevention and Control committee to ensure compliance with pertinent laws and notifications and establish effective COVID-19 preventive measures for GC Group.</li> <li>• Closely monitor pandemic-related developments and review measures in keeping with the situation.</li> <li>• Establish Lock Up measures for employees in the production process.</li> <li>• Assign some groups of employees to work at the headquarters and other to Work from Home, with GC providing information technology systems to support their work and heightening cybersecurity measures.</li> <li>• Establishing measures for buildings and production areas which is vital to GC's business operation, as well as measures for office buildings and shared facilities to effectively prevent COVID-19 transmission.</li> <li>• Establish a business continuity plan (BCP), carry out a BCP drill in business units and key processes, and improve the BCP based on the drill results to ensure proper implementation in an actual event.</li> </ul> <p><u>Employee care measures:</u></p> <ul style="list-style-type: none"> <li>• Provide necessary protective equipment to all employees in GC Group, such as face masks, thermometers, and alcohol spray.</li> <li>• Prioritize working from home and require strict compliance with preventive measures for employees having to enter operation areas, such as wearing face masks, getting a temperature check, disinfecting hands with sanitizers, and social distancing.</li> <li>• Introducing digital systems to report and track employee health and travel history so as to speed up COVID-19 screening, monitoring, and prevention.</li> <li>• Define employee monitoring and management measures categorized according to level and chance of contact the transmission and prepare personnel and equipment for prompt response to an emergency.</li> <li>• Communicate policies, regulations, and practices related to the prevention of COVID-19 to employees continuously.</li> <li>• Conduct screening, establish preventive measures for visitors, such as customers and contractors, and put in place measures for monitoring external parties who visit the Company.</li> </ul> <p><u>Social support measures:</u></p> <ul style="list-style-type: none"> <li>• GC Group collaborated with partners to turn the crisis into an opportunity to help society overcome this challenging time together by carrying out projects in association with related parties and contributing GC's chemicals and products to the development of medical equipment, in line with its philosophy "Chemistry for Better Living."</li> <li>• Visit sites to consult medical professionals and affected individuals so as to research and develop products that meet their needs and solve their problems effectively.</li> <li>• Develop opportunities for business expansion and collaborate with partners to drive various projects, such as the "Send Plastic Home" project to reduce plastic waste during the COVID-19 pandemic.</li> </ul> |

| Corporate Risk Factor  | Important Mitigation Measures  |
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| <p><u>Water Crisis Risk</u></p> <p>In 2020, droughts grew in severity as a result of a low water amount, which was in turn a result of low rainfall in 2019. Consequently, there was a risk of water shortages across Rayong, which could interrupt the production or increase GC's production costs as a result of additional water procurement expenses. Therefore, GC had to manage its water resources to ensure that they would be sufficient to support its operations as well as future projects.</p> | <p>GC has implemented the following steps in preparation for droughts.</p> <p><u>Internal management measures:</u></p> <ul style="list-style-type: none"> <li>• Formulate the structure of working teams according to GC's business continuity plan; appoint the Water Management Taskforce to establish both internal and external water management measures and closely monitor the water situation: and appoint the Supply Chain Management Taskforce for year 2020 Drought to draw up the business continuity plan, manage the supply chain, including feedstock, electricity, steam, and utilities, as well as report outcomes to the Management on a regular basis.</li> <li>• Implement tangible water management initiatives for GC Group, such as drawing up water consumption plans for each plant, establishing water consumption reduction plans for each plant with 3Rs (Reduce, Reuse, Recycle), provide additional water from external sources, preparing a pipeline system to divert water from GC's reservoirs, and enhancing the capacity of the wastewater reverse osmosis (WWRO) system and the seawater reverse osmosis (SWRO) system.</li> <li>• Providing additional water supply from external sources.</li> </ul> <p>With these internal management measures, GC successfully reduced reliance on external water sources by over 30%.</p> <p><u>External management measures:</u></p> <ul style="list-style-type: none"> <li>• Monitor and analyze water levels in Rayong and neighboring provinces consistently to assess the situation and potential water shortage risks</li> <li>• Assign representatives to join meetings with agencies related to water management and Rayong War Room to monitor the water situation, exchange information, discuss collaboration, and keep track of the government's projects.</li> <li>• Monitor and keep the water level and quality within the defined criteria to prevent impact on the production in GC's plants.</li> <li>• Collaborate with the public and private sectors to drive drought prevent measures as well as water resource management and development projects through the working team of the water management of Eastern Thailand.</li> </ul> <p><u>Long-term water management measures:</u></p> <p>Besides the aforementioned internal and external water management measures, GC has also established long-term measures to ensure efficient and sustainable water management and drought preparedness.</p> <ul style="list-style-type: none"> <li>• Installing additional wastewater reverse osmosis systems (WWRO) in plants.</li> <li>• Study new technologies for future adoption, such as the zero liquid discharge (ZLD) system and the evaporative loss reduction system for cooling towers.</li> </ul> |

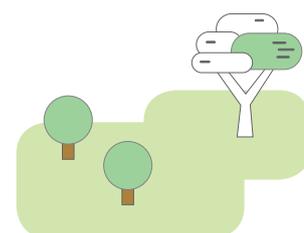
| Corporate Risk Factor   | Important Mitigation Measures   |
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| <p><u>Counterparty Risks</u></p> <p>The COVID-19 pandemic has triggered a global economic downturn, accompanied by signs of a financial crisis, such as rising non-performing loans (NPL) and announcements of bankruptcy and business reorganization by large domestic and international companies. If the situation persists, GC's customers, suppliers, and counterparties may experience a lack of financial liquidity, which may affect their ability to service debt and deliver products. GC has thus established counterparty risk management measures to protect its liquidity as well as manage its relations with customers, suppliers across the value chain, financial institutions, as well as suppliers and vendors.</p> | <p>GC has carried out the following measures to prevent and minimize counterparty risks.</p> <ul style="list-style-type: none"> <li>• Increase the frequency of checking the credit rating of suppliers through the annual ranking of Credit Rating Agency and the daily Credit Swap Default Index (CDS Index). Increase the frequency of analyzing and reviewing supplier risk assessment according to GC's policy and criteria, and review payment conditions for current suppliers upon request to ensure their liquidity.</li> <li>• Review the suitability of obtaining additional trade credit insurance and closely follow up on customer payment.</li> <li>• Consider unwinding a commodity hedging agreement at the appropriate time upon detecting that the counterparty has increased financial risks.</li> <li>• Review lead time in order to plan production, maintenance, equipment procurement, and pre-orders.</li> <li>• Closely follow up on supplier delivery.</li> <li>• Purchase from multiple suppliers or countries to diversify risk and maintain the number of suppliers of products that are essential to production, such as chemicals and catalysts.</li> </ul> |



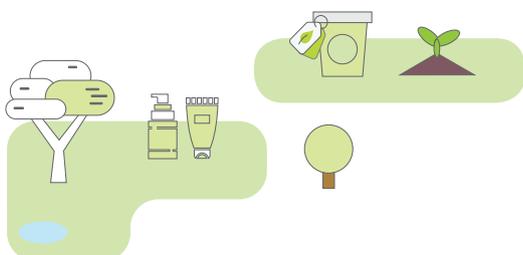
## FUTURE BUSINESS-RELATED RISK FACTORS

Successful execution of defined strategies plays a vital role in the achievement of long-term corporate goals. However, as the volatility and rapid changes of the business environment may affect the ability to successfully implement its strategies, GC has taken the following steps to manage risk factors related to its future business operations.

| Corporate Risk Factor   | Important Mitigation Measures   |
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| <p><b>Investment Risk</b></p> <p>GC makes investments to enhance its competitiveness and foster long-term growth and sustainability. To this end, it places great importance on the management of investment-related risks in terms of financing, technology selection, resource management, and other sustainability-related issues.</p> <p>The global economic slowdown brought about by COVID-19 has reduced demand for GC's products as well as decreased the prices and spreads. This, when coupled with falling oil prices triggered by an oil price war, has had significant impact on GC's 2020 operating results. In addition, the emergence of "new normal" trends will also make investment after 2020 more challenging in terms of prioritizing projects in keeping with GC's goals and strategic direction while also maintaining its credit rating.</p> | <p>GC has introduced the following risk management measures.</p> <ul style="list-style-type: none"> <li>• Prioritize projects and consider investment approaches that generate operating results that can be used as funding in the short term, in line GC's goals and strategic direction.</li> <li>• Consider approaches to increasing investment capacity while also maintaining GC's credit rating, liquidity, and financial discipline according to GC's financial policy.</li> <li>• Implement a stage-gate process to govern investment decisions from the opportunity-seeking stage to investment approval by the Investment Supervision Committee, according to GC's corporate investment management (CIM) process. For projects requiring high capital investment, the Risk Management Committee shall provide recommendations and review the adequacy of risk assessment and mitigation measures to supplement the decision to grant approval.</li> <li>• Systematically monitor investment projects to ensure they progress as planned.</li> <li>• Perform a lookback analysis to evaluate completed projects and use lessons learned to improve GC's investment management and increase the opportunities for the success on future investments.</li> <li>• Include and consider sustainability issues, such as eco-friendly technology and greenhouse gas emission reduction, into investment criteria.</li> <li>• Seek opportunities to invest in businesses with sustainable long-term growth and good return on investment, using investment models suitable for the situation and "new normal" trends.</li> </ul> |



| Corporate Risk Factor   | Important Mitigation Measures   |
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| <p><u>Competitiveness Risk</u></p> <p>In response to the high volatile business environment, the entry of new players, intense market competition, shift of consumer behaviors, “new normal” trends, and unforeseen circumstances, such as the COVID-19 pandemic, GC must enhance its strength and resilience to maintain its competitive advantage and ability to operate its businesses sustainably in the face of challenges and uncertainties brought on by external factors.</p> | <p>GC has implemented the following competitiveness risk management measures.</p> <ul style="list-style-type: none"> <li>• Manage feedstock and improve production units to ensure feedstock flexibility in compatibility with the market situation and to gain maximum benefits.</li> <li>• Apply modern technology so as to enhance production and operational efficiency, reduce costs and losses, and create added value.</li> <li>• Add value through integrated management across the value chain including create synergy between plants under GC Group and within PTT Group to enhance capabilities and competitiveness.</li> <li>• Focus on creating an integrated chain connecting the downstream and upstream petrochemical businesses so as to maximize the value of feedstock and add diversity to GC’s product portfolio, enabling it to remain competitive in a high volatile market, accommodate the needs of the growing in downstream industry, and prepare for expansion towards high value products (HVPs).</li> <li>• Adjust the product portfolio and create added value by developing more high value products (HVPs), focusing on promptly creating products to meet the needs of customers and conducting marketing to better reach end users.</li> <li>• Enhance long-term competitiveness by seeking new business opportunities domestically and overseas, with emphasis on products with high growth rate and profitability or products with outstanding technology or new innovations so as to build up on or strengthen GC’s current businesses.</li> </ul> |



| Corporate Risk Factor  | Important Mitigation Measures   |
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| <p><u>Climate Change Adaption</u></p> <p>Climate change is among the most pressing global issues. The measures to keep the average temperature increase to under two degrees Celsius compared to the pre-industrial era have not been successful. This has led to both direct and indirect risks of great severity. Direct risks include natural disasters and droughts. Indirect risks include the introduction of stricter regulations and new standards, a change in consumer behavior, and technological change. As such, GC has to establish climate change adaption guidelines to minimize impact on production costs, competitiveness, and sustainable of future business operations.</p> | <p>GC has continuously implemented measures to reduce greenhouse gas (GHG) emissions and expanded its practices for the value chain in the future, as described below.</p> <ul style="list-style-type: none"> <li>• Appoint GC Group’s Sustainable Development Committee (SDC) to monitor and drive operations to accomplish its GHG reduction target.</li> <li>• Establish policy and frameworks to support investments in low-carbon projects so as to elevate GC’s GHG reduction initiatives.</li> <li>• Carry out GHG reduction initiatives, such as production efficiency enhancement, energy management, and energy conservation, and consider the use of renewable energy and investing in low-carbon projects according to the established plan.</li> <li>• Promote the use of renewable energy and apply the concept of eco-design according to international standards to product development process.</li> <li>• Establish strategies to transition towards low-carbon businesses by investing in downstream products, performance products, and green products, which utilize advanced production technology and release low levels of GHG.</li> <li>• Consistently monitor progress, review GHG reduction strategies and targets, and improve operations to keep pace with policies, rules, and regulations. Adopt international climate change practices to maintain GC’s climate change leadership in the Carbon Disclosure Project (CDP).</li> <li>• Participate in a pilot Internal Carbon Pricing Program organized by the Thailand Greenhouse Gas Management Organization (Public Organization) in collaboration with World Bank to apply internal carbon pricing (ICP) to the organization and elevate its GHG reduction initiatives in the future.</li> <li>• GC is in the process of expanding its initiatives to include GHG Scope 3: Other Indirect Emissions, to elevate its climate change and GHG reduction actions and strive towards becoming a world-class leader.</li> </ul> |



| Corporate Risk Factor   | Important Mitigation Measures   |
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| <p data-bbox="183 280 518 309"><u>People and Organization Risk</u></p> <p data-bbox="183 320 574 952">Given the highly uncertain business environment, “New Normal” trends, and more intense competition, GC places importance on enhancing the adaptability and resilience of the organization and its people to accommodate changes in work models or business environments as well as new business opportunities. The Company thus strives to enhance their efficiency to improve GC’s competitiveness in current businesses and be able to meet future business needs efficiently and continuously.</p> | <p data-bbox="595 280 1412 353">GC places importance on people development and has continuously carried out the following initiatives to ensure GC’s preparedness.</p> <p data-bbox="595 398 678 427"><u>People</u></p> <ul data-bbox="595 439 1412 952" style="list-style-type: none"> <li>• Prepare succession plans that are in time for retiring executives and adequate for GC’s growth plan.</li> <li>• Create a Learning and Development Platform that focuses on self-learning through technology.</li> <li>• Plan to Apply artificial intelligence (AI) to the long-term development of the L&amp;D Platform so as to improve learning efficiency through analysis and link the platform to other related systems.</li> <li>• Develop talents with knowledge and competency compatible with GC’s strategic plan through action-based activities and overseas exchange programs to support GC Group’s business expansion.</li> <li>• Establishing a people transformation plan to enhance their capabilities and strengthen a digital culture in support of a more technologically drive work model in the future.</li> </ul> <p data-bbox="595 996 742 1025"><u>Organization</u></p> <ul data-bbox="595 1037 1412 1433" style="list-style-type: none"> <li>• Conducted an end-to-end Lean &amp; Process Improvement to enhance resilience, adaptability, agility, and effectiveness (Fit, Fast, Flexible &amp; Effective) as part of the “FiT Project.”</li> <li>• Promote cross-functional collaborations to foster cooperation within the organization.</li> <li>• Introduce working from Home (WFH) as a new mode of working to ensure safety and meet the needs of younger generations.</li> <li>• Use technology to improve the workplace environment to enable people from to work anywhere under irregular circumstances as well as promote transparency and accountability and reduce costs.</li> </ul> <p data-bbox="595 1478 678 1507"><u>Culture</u></p> <ul data-bbox="595 1518 1412 1955" style="list-style-type: none"> <li>• Continuously foster an organization culture through GC SPIRIT, expressed through 4 Core Behaviors, focusing on creating a sense of urgency in employees at all levels to ensure their preparedness for changes.</li> <li>• Foster employee engagement as part the organizational culture by prioritizing employee safety and by encouraging them to adopt new ways of working to achieve efficiency.</li> <li>• Communicate clearly to all groups of employees on a regular basis through multiple channels.</li> <li>• Monitor and conduct employee opinion surveys periodically, and use the results to enhance efficiency.</li> </ul> |

## EMERGING RISK FACTORS

In response to changes in trends and business factors, both existing risk factors that have become more volatile and emerging risk factors that have changed more rapidly and grown more complex, GC has monitored emerging risk factors and trends to ensure that proactive mitigation measures are in place before they impact the business.

| Corporate Risk Factor   | Important Mitigation Measures   |
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| <p data-bbox="181 566 496 663"><u>Change of Business Structure from Upcoming Accelerated Trends</u></p> <p data-bbox="181 672 572 1218">The COVID-19 pandemic has accelerated several global trends previously believed to take many more years to be fully realized, allowing them to have impact on the structure of the chemical industry and old business models at a faster rate. This has made the establishment of GC's strategies and directions more complex as these trends involve a number of interconnected factors and cannot be predicted based on past data. The three global trends that will have significant impact on the world's chemical industry in the next 3-5 years are as follows.</p> <p data-bbox="181 1261 384 1290"><b>1) Sustainability:</b></p> <p data-bbox="181 1296 572 2056">Society, consumers, and stakeholders have put more pressure on the chemical industry to address intensifying environmental issues, such as the increase of waste that accompanies the adjustment to the new normal and natural disasters that have grown increasingly severe due to unsuccessful attempts to manage climate change. This has led to the widespread adoption of the circular economy concept as well as more stringent enforcement of laws and regulations, both of which affect GC. Impacts include reduced demand for existing plastic and chemical products and higher product costs due to expenses required to ensure compliance with more stringent laws and regulation, not to mention impact on GC's corporate image as the world's leading chemical</p> | <p data-bbox="595 566 1404 633">GC regularly monitors and analyzes changes in global trends as well as establishes and reviews strategic measures to ensure timely adjustment.</p> <p data-bbox="595 678 991 707"><u>Measures for trends in sustainability:</u></p> <p data-bbox="595 716 1404 857">GC strives to elevate corporate sustainability and link to its corporate strategies to create a balance among three dimensions (economic, social, and environmental) and support the achievement of the Sustainable Development Goals (SDGs). To this end, it carries out the following:</p> <ul data-bbox="595 866 1404 2056" style="list-style-type: none"> <li>• Continuously integrate the circular economy concept into business operations under three frameworks: (1) Smart Operating, (2) Responsible Caring, and (3) Loop Connecting.</li> <li>• Expand its circular economy initiatives and become a circular economy leader that collaborates with public and private sectors across the supply chain.</li> <li>• Increase collaboration with customers to create business value and opportunities for expansion in related businesses, such as bioplastics, recycled plastics, and medical products.</li> <li>• Offer opinions, propose guidelines, or take part in establishing sustainability standards with agencies/institutes to ensure their alignment with sustainability practices of the private sector and Thailand's regulations so as to set an assessment guideline or benchmark for sustainability standards both nationally and globally.</li> <li>• Raise awareness among consumers to create an accurate understanding of plastic waste issues and create alliances with the public and private sectors to address solutions to solve the problems using the circular economy concept through various projects, such as Upcycling the Oceans, Thailand/ Upcycling Plastic Waste, ThinkCycle Bank, and Public Private Partnership (PPP Plastic). In 2020, GC launched Send Plastic Home, organized the Circular Living Symposium 2020: Tomorrow Together, and developed Digital Drop Points to promote proper plastic waste separation, recycling, and upcycling for maximum resource efficiency.</li> <li>• Establish climate change action management guidelines consistent with SDG 13 - Climate Action and set targets to reduce GHG emissions directly produced by GC's business operations and created by energy purchase from external parties, focusing on the use of renewable resources, production efficiency enhancement through the adoption of technologies and digital systems, energy management and energy conservation projects, and the use of alternative energy. GC is also in the process of expanding its initiatives to include the target of reduce indirect GHG emissions (GHG Scope 3: Other Indirect Emissions).</li> </ul> |

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| <p>producer. However, this trend also presents an opportunity for GC to become a leader in sustainability, meet the environmental needs of consumers and society, elevate its competitiveness, and create added value for stakeholders in a sustainable manner.</p> <p><b>2) Demographics and Geopolitical Tensions:</b></p> <p>Demographics and geopolitical tensions are playing a greater role in the global economy. In addition, partly due to the COVID-19, many countries have reduced reliance on others and pulled supply chains back home, resulting in increased deglobalization and protectionism. More importantly, several countries have also introduced product standards and trade protection measures to gain an advantage both in international competition and competition between the eastern and western hemispheres. This is especially true with China, which has become the center of the chemical industry and economic prosperity, and India, which appears to be following in China's footsteps. As a result, the chemical industry will be faced with different standards and significantly more economic restrictions.</p> <p><b>3) Accelerated Digital Transformation:</b></p> <p>Accelerated digital advancement results in accelerated impacts on the chemical industry. For instance, as artificial intelligence (AI) is adopted to enhance capabilities and decision-making, reduce costs, gain a competitive advantage, and increase operational transparency, it will increase automation and ultimately change the old way of working or business model. Therefore, GC needs to remain alert and keep pace with these developments.</p> | <ul style="list-style-type: none"> <li>Establish an integrated water management strategy consistent with national and international standards to ensure efficient water management and water security for GC's business operations and minimize potential impact of shortage of water for ecosystem conservation and consumption in communities.</li> </ul> <p><u>Measures for trends in demographics and geopolitical tensions:</u></p> <p>GC focus on establish measures to ensure flexibility and optionality in terms of market and products as well as be able to adjust with agility amid uncertainties and foster sales and profit security. The measures introduced are as follows.</p> <ul style="list-style-type: none"> <li>Create long-term sales stability by expanding towards markets in Southeast Asia, China, and India, which are high-growth markets and net importers, as well as taking advantage of the advantageous location and GC's network, such as sales office and distribution networks in target countries.</li> <li>Build sales agility in strategic markets. GC has planned to add sales offices in China to cover key areas and gain prompt access to customer needs and market situations. In India, GC has compiled knowledge and fostered relations with government agencies, private organizations, and business partners.</li> <li>Plan product development to respond to the needs for high value products (HVPs) in end-use markets by co-developing products with B2B business partners across the value chain.</li> <li>Plan market development strategies, focusing on creating demand in home base and strategic countries by tapping into existing customer bases and generating demand to develop new customer bases.</li> <li>Keep abreast of product standards and trade protection measures of various countries to establish response guidelines with relevant government agencies or plan suitable allocation of sales to each country or end market.</li> </ul> <p><u>Measures for trends in accelerated digital transformation:</u></p> <p>GC strives to applies digital technology to organization transformation to ensure adaptability and survival amid uncertainties. To this end, GC takes the following actions.</p> <ul style="list-style-type: none"> <li>Apply digital technology to the operational efficiency enhancement of two areas: <ul style="list-style-type: none"> <li>Smart Operation: This area consists of Smart Plant and Smart Sales and Marketing. For the former, digital technology is applied to the integration of the management system of all plants. For the latter, digital technology is introduced to promptly access and respond to customer needs.</li> <li>Smart Office: This area consists of Smart Work Process and Smart Workplace. For the former, new technologies are introduced to enhance the effectiveness of support operations across the organization. For the latter, digital technology is introduced to enable employees to work anywhere under irregular circumstances, promote transparency and accountability, and reduce expenses.</li> </ul> </li> <li>Improve fundamental technology, such as infrastructure, data and data management systems, and cybersecurity systems.</li> <li>Continuously foster digital capabilities and a digital culture among GC's personnel.</li> </ul> |

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| <p data-bbox="183 280 419 309"><u>Technology Disruption</u></p> <p data-bbox="183 313 571 862">The rapid development of technology and digital technology, coupled with the advent of the new normal in the post-COVID era, has prompted leading companies to seek and adopt emerging technology to increase resilience, strengthen competitiveness, as well as create differentiation and new business opportunities. Technological advances may also create disruptions, altering or replacing old business models, productions, working methods, and products with new ones. Examples of technological advances impacting GC are as follows.</p> <ul data-bbox="183 866 571 2065" style="list-style-type: none"> <li data-bbox="183 866 571 1025">• The Crude Oil-to-Chemicals (COTC) technology has given producers a significant cost advantage and will affect GC's cost competitiveness.</li> <li data-bbox="183 1030 571 1254">• Due to advances in battery technology, electric vehicles will replace cars with internal combustion engines between 2027-2030, which will reduce fuel demand and can affect GC's revenue and existing businesses.</li> <li data-bbox="183 1258 571 1646">• The Internet of Things (IoT), Artificial Intelligence (AI), robotics, 5G, blockchain, advanced data analysis, and the development of SMART Factory in the petrochemical industry have increased production and operational efficiency. This may affect GC's long-term competitiveness if it fails to adopt suitable technologies in a timely manner.</li> <li data-bbox="183 1650 571 1874">• Innovation and production technology, such as the development of composite materials or high-performance materials and 3D printing, can meet customer needs and create a competitive advantage.</li> <li data-bbox="183 1879 571 2065">• Mechanical recycling and chemical recycling technology will become increasingly important due to pressure from consumers and more stringent environmental regulations.</li> </ul> | <p data-bbox="595 280 1404 380">GC aims to take advantage of technology in preparation for changes in highly volatile businesses to enhance its competitiveness and seek new business opportunities. To this end, GC has taken the following actions.</p> <ul data-bbox="595 385 1404 1505" style="list-style-type: none"> <li data-bbox="595 385 1404 571">• Utilize corporate venture capital (CVC) as a tool to learn about emerging technologies and create an opportunity to enter new businesses, grow high value businesses (HVB), and promote access to new technology that helps maintain the competitiveness of GC's current businesses as well as technology that supports GC's sustainability goals.</li> <li data-bbox="595 575 1404 716">• Foster market intelligence regarding new technology and business models through companies that GC invests in and through collaborations for the study and trial of technology so as to improve GC's operational efficiency and reduce its costs.</li> <li data-bbox="595 721 1404 862">• Keep abreast of technological advances, study feasibility, and improve the technology adoption process to enhance the competitiveness of GC's existing businesses as well as businesses that are built on or add value to GC's current products so as to maintain competitiveness.</li> <li data-bbox="595 866 1404 1164">• Apply digital technology to operational efficiency improvement in support of organization transformation. The objectives and outcomes are categorized into three levels: (1) Digitization, which focuses efficiency and productivity enhancement (2) Digital Transformation of Function (DTF), which focuses on changing working processes and methods and adopting advanced analytics; and (3) Digital Transformation of Business (DTB), which focuses on creating opportunities to expand into new businesses or alter existing businesses.</li> <li data-bbox="595 1169 1404 1393">• Joint invest with partners with readiness in terms of innovation and production technology so as to speed up entry into new HVB markets, such as collaborating with a partner with compound plastic expertise to enter the automotive part market and collaborating with a partner with technology and access to bioplastic and recycled plastic markets so as to expand towards green products and offer alternatives to consumers.</li> <li data-bbox="595 1397 1404 1505">• Seek opportunities to invest in high value businesses (HVB), focusing on products with high growth rate and profitability that meet consumer needs under megatrends.</li> </ul> |

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| <p data-bbox="183 280 572 309"><u>Cyber Threats &amp; Data Security Risk</u></p> <p data-bbox="183 320 572 1245">GC aims to become a data-driven organization to elevate its competitiveness and foster resilience in a highly complex and uncertain business landscape. To this end, digital technology and the Internet of Things (IoT) have been increasingly utilized. This includes the use of online platforms for work and virtual conferences, the expansion of e-commerce channels, robotics, cloud computing and storage, and the use of AI to design and management supply chain systems. However, cyberattacks have grown increasingly advanced and diverse accordingly, with a rise in internet scams based on news of current events. This presents cyberthreats to GC's production system and operational networks connected to the internet and can lead to interruptions to its production or operation systems or confidentiality and personal data breaches.</p> <p data-bbox="183 1294 572 1731">Therefore, GC places great importance on cybersecurity risk management and data security as well as oversees compliance with relevant laws and regulations, such as the Personal Data Protection Act and the Cybersecurity Act. GC's failure to manage these risks would not only affect its business continuity, credibility, and reputation, but could also lead to lawsuits seeking significant damages.</p> | <p data-bbox="595 280 1412 342">GC has continuously monitored cyberthreats and established measures to prevent and minimize them as follows.</p> <ul data-bbox="595 353 1412 1805" style="list-style-type: none"> <li>• Establish and announce regulations on GC's IT Security Policy to ensure efficient use of IT systems and networks and to provide guidelines for GC and its subsidiaries.</li> <li>• Develop IT security infrastructure, such as OT Security Operation.</li> <li>• Monitor and prepare for new threats to both GC's offices and plants and perform tests and assessments regularly to put in place a proactive preventive plan before an attack takes place.</li> <li>• Carry out cybersecurity drills and disaster recovery tests regularly to ensure prompt response and minimize impacts on GC's information systems.</li> <li>• Implement an information security management system and asset security practices in accordance with international cyber-related standards.</li> <li>• Implement multi-factor authentication for important work systems.</li> <li>• Continuously foster cybersecurity awareness to keep pace with the situation, new forms of cyberattacks that accompany, and the exponential increase in the use of digital technology. Educate employees on forms of cyberattacks, how to defend against them, as well as relevant IT laws.</li> <li>• Regularly perform phishing tests to encourage employees to exercise caution when using information systems.</li> <li>• Introduce cybersecurity measures for Working from Home (WFH).</li> <li>• Keep track of the government's laws and regulations related to IT security to prepare for their enactment.</li> <li>• Appoint the Personal Data Protection Act Working Team and hire consultants to establish plans, practices, and guidelines related to the personal data of GC's related parties to ensure alignment with the Personal Data Protection Act.</li> <li>• Establish and announce a personal data protection policy to oversee personal data management to ensure security, effectiveness, and compliance with laws related to personal data protection.</li> <li>• Define GC's personal data management structure, assign responsible officers, and make preparations for the acquisition of a technology system to support the management of personal data held by GC as required by laws.</li> <li>• Use communication and training programs to foster an understanding among employees and representatives of GC's subsidiaries about the significance of personal data protection and make preparations in accordance with the established handbook, practices, and plans in anticipation of the upcoming enactment of the Personal Data Protection Act.</li> <li>• Establish data governance plans to ensure data accuracy, integrity, safety, and accessibility in order for GC to become a data-driven organization.</li> </ul> |

GC believes that these mitigation measures can help GC minimize risks, increase opportunities for sustainable growth, and achieve business goals according to its established direction and strategic plans.