

RISK MANAGEMENT AND RISK FACTORS

Risk Management

PTT Global Chemical Public Company Limited (GC) places great importance on continuously improving our risk management system to make sure it is an integrated process that covers the entirety of our company. Information technology has been utilized to increase organizational efficiency. Our policies are geared towards making sure that strategic growth is managed by effective risk management. This ensures the company is capable of handling current and future disruptive events, in addition to providing a framework to seek potential business opportunities to support sustainable growth. GC adheres to the COSO (The Committee of Sponsoring Organizations of the Treadway Commission) and ISO 31000 (International Organization for Standardization), as well as the Corporate Governance Code and anti-corruption principles. In 2018, GC was ranked in the top 10 global chemical companies by the Dow Jones Sustainability Indices (DJSI) for the sixth consecutive year, which also assesses risk management across companies. This achievement reflects the company's standards of Risk and Crisis Management which is on par with international standards.

Risk Management Structure

GC's risk management is organized into three levels: corporate, business unit and operation. At the corporate level, the Risk Management Committee (RMC) and Enterprise Risk Management Committee (ERMC) has been formed. The RMC establishes policies, frameworks, and provides suggestions and advice on behalf of the Board of Directors. Likewise, the ERMC closely monitors our risk management structure every month and is comprised of Executive Officers from various business units.

Fluctuating feedstock and product prices, as well as currency exchange rates present a more volatile risk towards the company as they can fluctuate daily. To make sure we are agile enough to respond, the Value Chain Management Committee (VCM) which holds weekly meetings to manage these risks under risk management framework approved by the RMC.

At the business unit and plant or subsidiary operation level, the same corporate risk management applies to ensure that all three levels are aligned.

Risk Management Tools

We have studied and adopted several risk management tools to carry out our risk assessment. Risks has been assessed and prioritized on a risk map and followed up the progress by using mitigation plans and key risk indicators (KRI). We have also applied the Monte Carlo simulation technique to model impacts to our operating results using value at risk (VAR) as a metric. Furthermore, we have identified emerging risks using an early warning system (EWS) to increase preparedness and forms a proactive approach to risk mitigation.

Risk Management Culture

We have promoted a risk management culture throughout our company in order help support stable and sustainable growth. To this end, we have adhered to our risk management policy and guidelines and continue to monitor its progress at both management and operational levels. Moreover, we have developed channels to communicate knowledge about risk management to the RMC, ERMC and staff through newsletters, training sessions and an e-learning platform.

In 2018, we appointed more persons to drive and strengthen aspects regarding GRC (Governance, Risk Management & Internal Control and Compliance) at the business unit and operating level. This is to increase compliance with our policies and working efficiency, in addition to fostering the right mindset in all our employees and ingraining it in our company's working culture.

Risk Factors

We have analyzed both internal and external business environments, along with relevant economic societal, political, technological, industrial and competitor trends to define our corporate risks. These risks can be categorized into three groups as follows:

Risk Factors Pertinent to our Current Business

Corporate Risk Factors

Operation and Safety Risk

The company strives to maintain our operational at high levels. To this end, we place the utmost importance on managing our operation and safety risks to make sure our production processes are both safe and reliable. Our Operational Excellence Management System (OEMS) and Process Safety Management (PSM) are utilized continuously. The aim is to develop our PSM to meet world class standards.

Sales & Marketing Risk

GC's performance results are also dependent upon our ability to maintain sales revenue levels. Especially in the volatile business condition, demand/supply imbalances, trade wars and geopolitics are example of the factors contributing towards market instability.

Important Mitigation Measures

- Collaborate with the PTT Group's experts to assess the OEMS in terms of performance and effectiveness. Also, improve reliability with consultant by enhancing technical standard and maintenance to maintain stable operation within 1st Quartile levels.
 - Promote a culture within the whole company that prides itself on applying safety in all aspects of work, whereby a good example must be set from the executives and management level downwards.
 - From the knowledge that we learned from consultant, we build up the expert and capable employees to share such knowledge to all business units and subsidiary companies.
 - Utilize the Business Continuity Management System (BCMS) and develop Incident Management System (IMS) to manage emergency and crisis events which might interrupt GC's business. This is to lessen the impact from these events, and/or to reduce the recovery period. The Business Continuity Plan (BCP) is regularly rehearsed.
 - GC and its subsidiaries have the necessary insurance to lessen impacts resulting from operational failures.
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- Closely monitor market situation to plan sales and production accordingly with such situation. Moreover, GC applies derivatives and/or advance sales-and-purchase agreements to protect itself from the risk of price, spread as well as inventory hedging complied with policy and framework approved by the RMC and closely controlled and monitored by the Value Chain Management (VCM).
 - Diversifying product portfolio and defining sales portfolio including expand to emerging market such as CLMV.
 - Enter into the end-use market and acquire new customers who are interested in developing high-performance products which are distinguished by their technology and innovation and meets the needs of the end-use consumer. As a result, we have created a Customer Solution Center with the purpose of building relationships between us, our partners and customers.



Risk Factors Pertinent to our Future Business

The successful execution of established strategies leads to the achievement of long-term goals, but such execution may be coupled with volatility and rapid changes in the business environment. Therefore, we have managed risk factors that are related to our future business operations.

Corporate Risk Factors	Important Mitigation Measures
<p><u>Innovation Risk</u></p> <p>The company focuses on innovation to develop new products with increased value, meeting the demands of the market. As such, the development of our capability to carry out research with commercially feasible results is another important factor for the company's future growth.</p>	<ul style="list-style-type: none">• Find innovation opportunities through the Corporate Venture Capital (CVC) and Technology Scouting to enhance capability and knowledge of researchers and/or innovation investment.• Process to assess and manage investment risks associated with innovation, which includes monitoring the process of projects which have already been invested in.• Implement digital innovations, such as big data analytics, to increase competitiveness and agility.• Recruit external experts to fast strengthen innovation capability and related technology to serve targeted customers' expectation.
<p><u>Long-Term Feedstock Risk</u></p> <p>The situation of natural gas and condensate from the Gulf of Thailand's volume has been alleviated from the announcement of Petroleum Concession (Erawan and Bongkot) as the Cabinet Resolution on December 13th, 2018. However, GC still continuously have placed importance on feedstock management to maintain our competitive advantage for our existing business.</p>	<ul style="list-style-type: none">• GC is carrying out the construction of Olefins Reconfiguration Project which increase flexibility in feedstock selection by using Naphtha and LPG as main feedstock.• Consecutively explore possibility and study on using and importing alternative economical feedstock.• Closely monitor progress and work plan of the new petroleum operator.
<p><u>Investment Risk</u></p> <p>Investments which support our long-term growth gives rise to risks which require close monitoring. This includes selecting the right technologies to invest in and management of resources for the company to achieve its long-term expansion goals.</p>	<ul style="list-style-type: none">• Implement a Stage Gate Process to govern investment decisions from the opportunity seeking stage until investment approval. For projects that require high capital investment, the RMC considers the adequacy of risk assessment performed and the mitigation measures chosen.• Systematically monitor to ensure the investment project progress implemented as planned.• Perform a look back analysis to monitor completed projects and use the lessons learned to improve the investment process to increase the success of future investments.
<p><u>JV Partnership Management Risk</u></p> <p>In the case that we grow our business through finding partners who have the expertise and experience in the target business, GC shall manage business partner's expectation to achieve the JV target objectives.</p>	<ul style="list-style-type: none">• Form a JV management team to collaborate with our business partners at all levels to ensure that the JV partnership is aligned with its own targets along with GC's strategy.• Find synergy opportunities and ways to expand the business with JV partners to foster good working relationships by growing together.• Communicate and continuously implement GC Way of Conduct to a company under GC.

Corporate Risk Factors

Important Mitigation Measures

People & Organization Risk

Our strategic growth plans are always supported by the development of our human resources. For the effective operation and long-term growth of our business both in Thailand and overseas, we need to prepare enough staff and ensure staff's readiness in terms of their knowledge and skills.

- Reorganize human resources management system, define the roles & responsibilities and required workforces of each team as well as effectively recruit the right people to increase our competitiveness in future.
- Develop managers at all levels as defined in people portfolio and continuously develop the high potential employees (Top Talent) to support our long-term growth plan.
- Continuously, strengthen our organizational culture by pushing GC SPIRIT through the four core behaviors.

Policy & Regulatory Change Risk

We strictly adhere to any laws, regulations and policies imposed by the government. Change of these laws and regulations can have impact on an operation or an investment opportunity. As a result, GC monitor these changes regularly and adjust our operation to address the changes.

- GC setup working team to closely monitors important news and information related to proposed changes in regulations and communicate to related functions in GC to prepare for such change as well as consider our rights and use such policy & regulation as input to assess the economic feasibility of our investments.
- We have introduced policies and clear guidelines to prevent corruption and made this information publicly available on our website. Our process complies with the Prevention and Suppression of Corruption Act and declare our intention to fight against corruption. GC was certified as a member of the Private Sector Collective Action Coalition against Corruption (CAC) – Thailand's private sector movement against corruption and 2nd re-certified in 2017. Furthermore, we assess the corruption risk for internal activities which require contact with any government officials. Every year, we review our own compliance, the results of which are presented to the Audit Committee, the Corporate Governance Committee and the Board of Directors. This is to ensure that the company has processes in place to combat corruption, including adequate internal control with sufficient coverage of the business.

Climate Change Risk

Climate change remains a recurring issue on the international stage with continual emphasis on reducing greenhouse gas emissions. Altering our current processes to accommodate these reductions will inevitably affect our production costs which may increase. Likewise, the external effects brought about by an increasingly turbulent climate such as flooding, and drought can change consumer behavior. There may be more support for products and technology which are more environmentally friendly with increasing barriers to marketing.

- Form a climate change team to push forward, monitor activities related with climate, for example, manage energy usage to be more efficient and support the use of renewable energy by considering environmentally friendly technology as criteria for our future investments. Moreover, implement Eco-Design principles for product development process. Therefore, GC will be able to reduce greenhouse gas emissions as our target which aligned with governmental policy and the COP21 Paris agreement.
- Get involved in the Thailand Voluntary Emission Trading Scheme or Thailand V-ETS to prepare for the buying/selling of permits for greenhouse gas emission allowances.
- Encourage GC's product to receive a labels carbon footprint product (CFP), carbon footprint reduction (CFR) and PTT Green for Life.
- Water management using control measures such as 3Rs (Reduce, Reuse, Recycle), increasing the efficiency of water usage in our process, increasing effectiveness of water desalination in the seawater reverse osmosis (SWRO) unit as well as working with agencies in the eastern Thailand to develop water resources.

Emerging Risk Factors

From the volatile and unexpectedly change in business condition, GC has consecutively monitored emerging risks to ensure that the company has prepared proactive mitigation measures in time sooner than impact to our business.

Corporate Risk Factors

Plastic Waste Risk

Issues of environmental degradation are becoming increasing important, especially the use of single-use plastics and to manage the trash. Thus, consumer behavior may change in the future which will affect our business operations.

Important Mitigation Measures

- Apply circular economy concept which aims to reuse process waste as feedstock. For example, Upcycling the Oceans, Thailand is a project that has been kick-started by GC, the Tourism Authority of Thailand and the Ecoalf foundation to recycle plastic waste from the ocean.
- Cooperate with relevant teams along the value chain to benefit from the use of petrochemical products as well as preserving the environment together with collaborate with various external public and private agencies to promote a plastic circular economy in Thailand. For example, Public-Private Partnership for Plastic and Waste Management (PPP Plastic) project which is collaboration among government, business sector, and civil society to cope with plastic and waste sustainably pilot in Rayong province.
- Develop bioplastics business by considering both usage and market base, in addition to looking into biodegradable plastics to meet the needs of consumers who are against single-use plastics.
- Support corporation with sociality to sort plastic waste and cooperate with business partner to build plastics recycling plant prototype in future recycle business.

Digital Technology Transformation Risk

Technology now plays an integral role in business operations and our day-to-day lives, with any changes posing a digital technology transformation factor to the company. As a result, we have closely monitored and analyzed these changes, as well as concentrated on restructuring the company to deal with this factor. To maintain or grow our competitiveness, we utilize these technologies to our benefit, such as using them to increase the efficiency of our production processes.

- Develop digital projects to serve with our business.
- Restructure our communication channels, implementation of systems to deal with vast amounts of data, as well as cybersecurity.
- Build staff's capabilities, altering the way we work, and managing changes in digital projects to make sure that we receive the benefits in digital technology.

Corporate Risk Factors

Cyber Threat Risk

Increased dependence on technology leads to increased risk from cyber threats to our production processes and all our operating platforms which rely on internet connection. The theft of important information, or interruption of production process which will affect the reliability and reputation of the company.

Eastern Economic Corridor Development Plan Risk

As the company's current business is concentrated on the Eastern seaboard, we need to monitor EEC plans closely as this favors our business expansion whereby any delays can become a lost opportunity.

Important Mitigation Measures

- Monitor and be alert new cyber security threats for both plants and offices. Also, perform penetration tests and vulnerability assessments regularly to be proactive in planning preventative mitigation measures.
 - Carry out cybersecurity drills and disaster recovery tests regularly to manage and lessen the impacts should the said events occur to ensure business continuity.
 - Implement Information Security International standard and in 2018, we also additionally implement the Guidelines for Cyber Security.
 - Continuously, build up awareness of cyber security, for example, how to defend against cyber threats, IT laws related to employees. Moreover, the company also regularly performs phishing tests for staff to become more cautious in utilizing IT communication platforms.
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- Study plans outlined in the EEC focusing on our target industries to manage technological, human, natural resources to meet the requirements of projects being developed in our strategic plan.

GC believes that by following the aforementioned mitigation measures, we will be able to minimize risk, increase opportunity to sustainable growth and allow us to achieve our business goals according to our direction and strategies.

