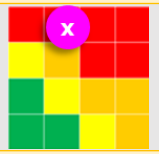
Cyber Security

Emerging Risk	Cyber Security
Source of Risk/Category	Technological/Operation Risk
Time frame of impact	Short to medium term (2-5 yrs)
Level of potential impact of the risk	Risk Level: Extremely (Red) Impact: 4 /Likelihood: 2 (Unlikely) 
Scenario	Cyber-threats and cybersecurity are on the rise, with impacts seen in various forms, including theft of key data, virus attacks, ransomware, and system penetration to seize control of public utility systems. Cybersecurity is another factor potentially affecting goal achievement. In 2020, the spread of COVID-19 had shaken many industries and companies. PTT had closely monitored the situation and launched Work from Anywhere policy, allowed employees to work anywhere via virtual private network (VPN) system, which might cause cyber attack easier.
Impact	Due to COVID-19, PTT takes more seriously preventive and mitigation actions to curb the risk of becoming a target, which would have severe repercussions on corporate confidence and image among stakeholders. A list of cyber threats that could happen to PTT (or have been reported of attempt once), Malicious E-mail, URLs and attachments, Malwares and Trojans, Hacking, Spear-Phishing, Leakage of Confidential information and information theft, System shutdown of major facilities such as Network and Data centre, etc. The result of accomplished cyber threats vary from small disturbances to tremendous impact like business and operational disruption as well as devaluation of brand image. This includes critical information thefts from PTT and customers, computer virus attacks, ransomwares, and penetration to the organization's important infrastructure control systems.
Mitigation	As for cybersecurity risk prevention of corporate digital system access through the Work from Anywhere mode, PTT commands a roaming security system designed to ensure safe work from employees' computer access from their residences or other work sites. The VPN system access boasts a network with high protection and privacy; to access the network, the computer must pass PTT's security standard and self-authenticate each time. In addition, software is graded standard or nonstandard for conference calls. PTT has applied the ISO/IEC 27001 (information security system) scope of implementation to improve cybersecurity, including system inspection and assessment of risks arising from information system loopholes; installation of Line of Defense tools (involving the intrusion prevention system (IPS) antivirus and AI in the investigation and monitoring of threats); development of an IT security policy under the ISO/IEC 27032 international standard, embracing IT and OT (operation technology) by using the service of the Security Operation Center (SOC) of PTT Digital Solutions in surveillance and prevention of key software or hardware from penetration or authorized access around the clock. In place is a test to locate loopholes of a given service (application vulnerability assessment). This year PTT abolished the use of USB storage with its computers while adding multi-factor authentication for access to critical work systems and Cloud Security. In addition, PTT commands a BCM system in case of threats facing its information system. When emergencies arise that could affect business, PTT coordinates with network entities actions to control the situation and mitigate impacts in parallel with workforce education, including PTT's education and phishing mail tests among the workforce, followed by close outcome measurement.

Personnel Development to Sustain Business Growth

Emerging Risk	Personnel Development to Sustain Business Growth
Source of Risk/Category	Human Resource Development/Business Risk
Time frame of impact	Long term (5 – 10 yrs)
Level of potential impact of the risk	Risk Level: Extremely (Red) Impact: 3 /Likelihood: 3 (Possible) 
Scenario	With dynamic innovation or technological progress resulting in disruptive technology that changes customers' needs and current business flows, PTT values the determination of PTT Group's business strategic directions to accommodate changing directions of the economy, society, energy, technology, and consumers' behavior that align with global megatrends. If PTT's strategies cannot promptly cater to such change, it could suffer from impacts on businesses and performance. A new strategy of establishing a New S-Curve has therefore been devised to pursue opportunities and develop new business models to handle upcoming changes. A new set of vision, direction, and future business strategies has been mapped out by an annual Top Executive Thinking Session (TTS) and a Strategic Thinking Session (STS) among senior PTT Group executives. The resulting business strategies then translate into five-year business plans, which are then integrated with risk management plans. The key success factor to implement New S-Curve strategy is employee' capabilities. Skilled employees are vital asset for company as they play a large role in developing new business for sustainable growth.
Impact	PTT has been experiencing swift expansion due to the growth in investment here and abroad together with its pursuit of new business opportunities through new business investment, the introduction of advanced technology and innovations to drive business operations. As a result, unless PTT can groom skillful, experienced personnel in time and in adequate supply, this could harm its businesses and long-term goal achievement. Digital technological reform affecting business disruptions in several industries has prompted PTT to groom its employees by adjusting their core competency sets to match strategies, corporate directions, and risks from external factors, not to mention assessment of personnel competency in parallel with capacity building
Mitigation	PTT developed its employee capacity through two key components. 1) Employees are redeveloped in core competency through arrangement by the PTT Leadership and Learning Institute (PLLI). The redevelopment program provides them with knowledge of technological and digital trends, overall change management, and a basic concept of innovation development to be able to apply and handle changes and step up as change leaders. 2) Employees are redeveloped in functional competency for each business through arrangement by the Functional Academy. The redevelopment program provides training and in-depth skills of each business with real practices. In addition, to accommodate the execution of strategic directions by each business unit, PTT has laid down a structure supporting work and allocated personnel required to meet the needs of each business unit. At the same time, personnel management proceeds through the mechanism of career path management. Each career path features a manpower review where key positions are identified along with individual development plans to develop specialized skills for each career path along with leadership development and promotion of overall learning for PTT Group. These moves ensure that PTT will constantly command an adequate supply of quality executives and employees.

Disruption by Clean Energy & New Business Development

Emerging Risk	Disruption by Clean Energy & New Business Development
Source of Risk/Category	Technological/Strategic Risk
Time frame of impact	Long term (5 – 10 yrs)
Level of potential impact of the risk	Risk Level: Extremely (Red) Impact: 4 /Likelihood: 4 (Likely) 
Scenario	With dynamic innovation or technological progress resulting in disruptive technology that changes customers' needs and current business flows, PTT values the determination of PTT Group's business strategic directions to accommodate changing directions of the economy, society, energy, technology, and consumers' behavior. A new strategy of establishing a New S-Curve has therefore been devised to pursue opportunities and develop new business models to handle upcoming changes. A new set of vision, direction, and future business strategies has been mapped out by an annual Top Executive Thinking Session (TTS) and a Strategic Thinking Session (STS) among senior PTT Group executives. The resulting business strategies then translate into five-year business plans, which are then integrated with risk management plans.
Impact	To cope with the clean-energy disruption, PTT needs to transform itself to align with global megatrends. This is due to technological innovation including the falling costs of renewables and energy storage, along with the environmental policies and regulatory reform. These changes are most apparent in many countries, especially in the EU. Also, innovations in energy storage and digital technology might keep these costs down. If PTT's strategies cannot promptly cater to such change, it could suffer from impacts on businesses and performance.
Mitigation	To lay down a long-term growth platform, PTT exercised the Reimagination strategy to manage risk of disruption by Clean Energy. Invest and develop businesses related to renewable energy and New Energy, together with the new business expansion in 'Life Science'; including the pharmaceutical, nutrition, and medical devices businesses. The objective is to replace the growth of the hydrocarbon value chain portion, as well as the support of renewable energy projects for the sustainability of people and country. PTT accelerates business development and growth (New S-Curve) to offset the growth ratio of the hydrocarbon business group. Several instances are illustrated here. 1. Investment joint venturing in Global Renewable Power Co., Ltd. (GRP), to grow overseas investment in renewable-energy power plants. 2. Founding of Swapand Go Co., Ltd., to invest in the EV battery business and commercial unveiling of EV charging stations. 3. Founding of Innobic (Asia) Co., Ltd., to invest in life science businesses, namely the pharmaceutical business (where we co-developed a cancer drug plant with the Government Pharmaceutical Organization), nutrition business, and medical device business – the team in cooperation with the Department of Medical Services invented gauze for commercial sale, made from biocellulose consisting mainly of micro-organism-based pure cellulose.