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Overcoming Challenges Emerging in LNG Market after Its Development and Structural Changes over a Half Century

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Everyone agrees that liquefied natural gas accounts for a major share of Japan's energy mix, particularly the power generation mix. LNG replaced nuclear energy after nuclear power plants were shut down in the wake of the Fukushima nuclear power plant accident triggered by the Great East Japan Earthquake in 2011, becoming a major electricity source in Japan. LNG for city gas services has also expanded. As a major energy source, LNG has thus supported Japan's economy and society. LNG has achieved the most remarkable growth among energy sources as LNG consumption has expanded not only in Japan, which had long remained the largest LNG market, but also in the rest of the world including Asia. While natural gas and renewable energy have expanded their markets substantially, international LNG trade growth has outdone pipeline gas trade expansion. LNG has thus increased its significance in the global energy mix and in international energy trade.

LNG has increased its presence as a significant energy source in Japan and the world for a wide range of basic reasons. First, LNG is a clean energy source featuring the least air pollutant emissions among fossil fuels. Second, LNG also features the least CO_2 emissions among fossil fuels, contributing to climate change countermeasures. Third, LNG supply sources are widely distributed, making LNG suitable for stable supply under long-term contracts. Fourth, LNG has improved its convenience through the expansion of its supply flexibility amid the market development. Fifth, competitive supply sources have been developed, leading supply expansion to stimulate market development. Sixth, both the LNG supply and demand sides have promoted initiatives to improve LNG's competitiveness as an energy source, including economic efficiency and convenience. Seventh, policy initiatives have been implemented to expand the LNG market.

While continuing to develop, the LNG market has undergone various structural changes. First, LNG demand expansion in Asia as the center of the global LNG market has driven growth in the market. Second, the gravity center of the Asian LNG market has structurally shifted to China, India, the Association of Southeast Asian Nations and South Asia from traditional LNG markets including Japan, South Korea and Taiwan. Japan had initiated LNG imports in Asia, followed by South Korea and Taiwan. In a symbolic structural shift, China has replaced Japan as the world's largest LNG market. Over a half century, Japan had remained the largest LNG market. Third, the supply side has promoted large LNG development projects to meet demand expansion, led by Qatar, Australia, the United States and Russia. New LNG-exporting countries have emerged, contributing to the diversification and wider distribution of LNG supply sources. Among the four major LNG exporters, the United States has achieved a symbolically rapid expansion in LNG exports, taking advantage of the shale revolution to develop into one of the largest LNG exporters. U.S. LNG exports have exploited their flexibility and a unique pricing approach to dramatically change the global LNG market. Fourth, the abovementioned changes have increased LNG market flexibility and brought about spot or short-term transaction growth, leading LNG and natural gas prices to enhance

their linkage among major markets in the world. In addition to the traditional pricing approach of indexing LNG prices to costs for crude oil imports into Japan, an approach of linking LNG prices to U.S. Henry Hub natural gas prices has been made available, contributing to expanding the spot LNG market with other factors and increasing the influence of spot prices. In this way, LNG pricing approaches have been diversified.

As the abovementioned market development and structural changes have continued over a half century since the 1970s, LNG has grown important in the international energy market. While the LNG market is expected to further develop, various uncertainties and challenges have recently emerged regarding its future course.

The biggest challenge is the impact of the accelerated decarbonization. Group of 20 and other major countries have declared their carbon neutrality goals for the middle of the 21st century, enhancing their attitude toward decarbonization. Natural gas introduction and expansion had been viewed as contributing to low-carbonization initiatives to suppress and cut greenhouse gas emissions as much as possible. Now that net zero emission goals are set out, however, a growing view is that constraints would be exerted on the conventional or traditional use of natural gas and LNG as part of fossil fuels. Last May, the International Energy Agency released its “Net Zero by 2050” report based on the backcasting approach, giving a shocking picture where global natural gas demand in 2050 would decline by about 60% from the present level. It also indicated that new upstream oil and gas development investment would no longer be required due to lower demand in the Net Zero scenario. Major media organizations reported this indication.

Anti-fossil fuel pressure has been the strongest on coal. However, the pressure has seemingly grown on natural gas and LNG. In such situation, downside pressure on finance for natural gas and LNG development projects has emerged in the financial industry amid the accelerating decarbonization trend. Downside pressure on finance is feared to exert grave constraints on future natural gas and LNG supply.

However, we must acknowledge that decarbonization pathways and schedules may widely differ by country or region. In Asia, the expansion of natural gas and LNG should be viewed as remaining a cost-effective means to reduce CO_2 emissions over a long period of time. It is necessary to globally promote an understanding that the combination of the promotion of non-fossil energy sources such as renewable energy and nuclear, the use of natural gas and LNG, the long-term decarbonization of fossil fuels and negative emission technologies will support the promotion of steady emission cuts and decarbonization in a manner to meet Asian conditions. Natural gas is expected to play a key role in the production of blue hydrogen and ammonia, bridging the transition to CO_2-free fuels over a long term. It is extremely significant for emerging market and developing economies and Asia to minimize costs for transition to decarbonization. The cost minimization approach can become a key means to avoid the escalation of the north-south dispute over climate change.

Another key challenge has emerged from simultaneous energy price spikes since last year. The sharp price hikes for all energy sources have led people to pay attentions to other important issues than decarbonization and carbon neutrality regarding energy. As energy is an indispensable good, how to secure stable energy supply and hold down energy cost hikes has become an urgent challenge. Even advanced economies are politically, economically and socially vulnerable to energy price hikes. Such vulnerability is serious particularly for low-income countries and people. While

decarbonization initiatives are pursued, how to hold down energy cost hikes has become a key challenge. At a time when decarbonization initiatives are feared to produce green inflation, it is important to secure adequate investment in fossil fuels including natural gas and LNG. Global talks should be sparked to promote understanding about this point and prevent inadequate constraints from being imposed on finance for necessary investment.

At the same time, initiatives should be taken to stabilize LNG supply and prices. Energy market stakeholders in such areas as supply, consumption and finance, should continue efforts to develop the LNG market to avoid excessively high or low prices and allow LNG to continue playing key roles in the future.

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