TRILATERAL ENERGY SECURITY COMMITTEE

SECURING THE FUTURE OF LNG: CHALLENGES AND COLLABORATIVE SOLUTIONS FOR THE U.S., SOUTH KOREA, AND JAPAN

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As global energy demands rise, the liquefied natural gas (LNG) sector has become crucial for ensuring energy security worldwide. The United States, South Korea, and Japan, as significant players in the global LNG market, face a unique set of challenges and opportunities in their pursuit of stable and sustainable energy sources. The U.S. is positioned as a leading exporter of LNG. Figure 1 shows that the U.S. is the largest single supplier in the LNG spot market and has significant market share for contract prices as well.[1] However, the figure also shows the volatility of the LNG market, with prices roughly doubling in 2022 due to the conflict in Europe between Russia and Ukraine, and that the US export price in both the spot and contract market is among the highest. Given the complex interdependencies in the LNG market, robust collaboration and strategic planning will be necessary to ensure the U.S. is able to competitively export LNG to enhance U.S. security and the security of its allies.

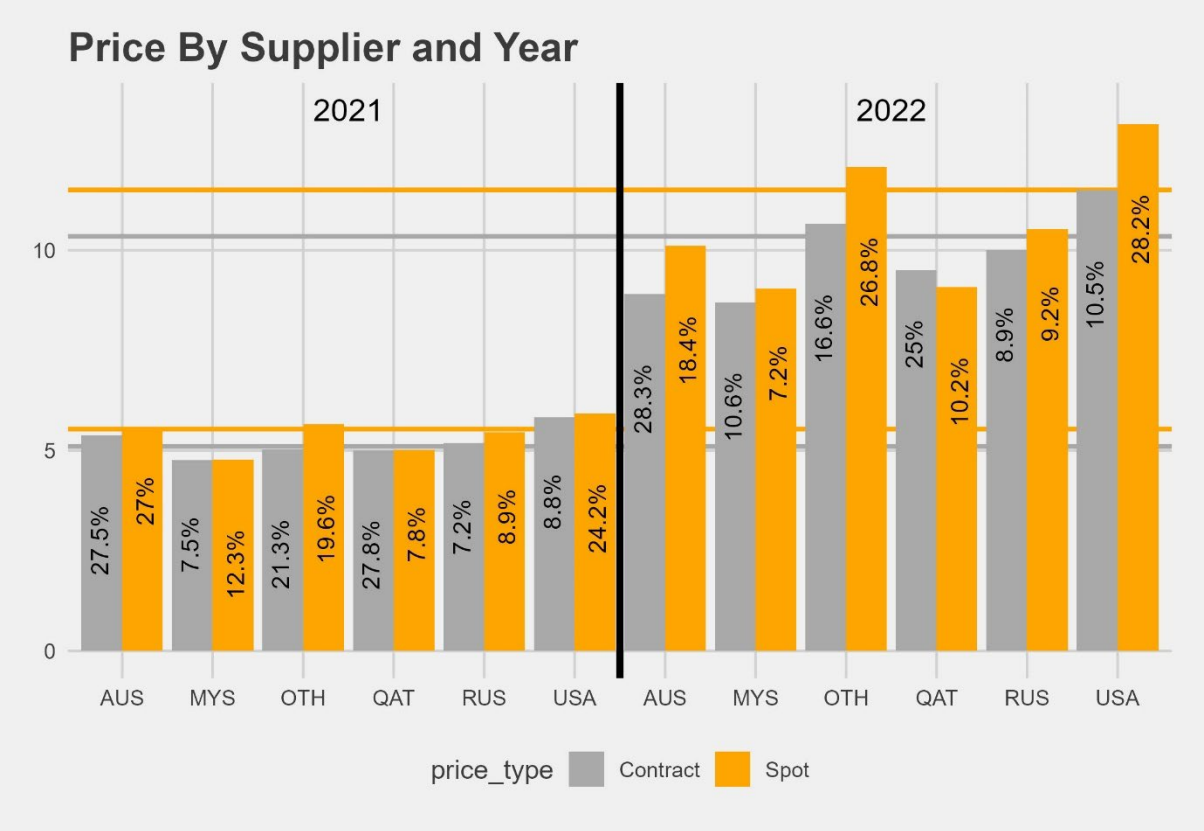


Figure 1: USD per Thousand Cubic Feet. Horizontal lines are unweighted market averages. Percentage labels in the bars denote market share. Suppliers are labeled using ISO-3 codes, OTH="Other".

[1] 2021 and 2022 were chose as benchmark years due to data availability for spot market quantities by exporter. Calculations were made by authors using UNCOMTRADE and GIIGNL data.

The importance of LNG extends beyond mere energy supply; it encompasses economic stability and geopolitical considerations. As countries transition towards cleaner energy solutions, LNG is increasingly recognized not only as a bridge fuel, but also a potential long-term energy source, which is abundant, less carbon-intensive than sources like coal and oil, and stable. However, the U.S. LNG industry faces challenges such as prolonged permitting processes, regulatory inefficiencies, and an uncertain investment environment, which are now exacerbated by structural cost inflation and acute labor shortages. These challenges not only hinder the timely development of critical infrastructure but also threaten the competitive positioning of U.S. LNG in the global market.

This paper aims to explore the multifaceted challenges facing the U.S., South Korea, and Japan in their LNG endeavors and to propose actionable solutions to enhance energy security. By examining the intricacies of permitting and safety regulations, market dynamics, long-term competitiveness, and future-proofing strategies, this analysis seeks to provide a comprehensive framework for stakeholders to navigate the complexities of the LNG landscape, with a particular emphasis on energy security implications. Recent forecasts, such as those from Shell, predict that LNG demand will grow by more than 50% by 2040, underscoring the importance of collaborative efforts in this sector. Ultimately, fostering a resilient and collaborative approach among these three nations is essential for a stable energy future, promoting security and economic growth.

Critical Challenges

Permitting and Regulatory Framework Inefficiencies

Problem:

Safety and environmental regulatory inefficiencies in the U.S. stem from a complex web of federal and state requirements, which can result in overlapping jurisdictions and unclear responsibilities among agencies. This fragmentation not only prolongs the permitting process but also creates uncertainty for investors and developers (Ciccantell, 2020). Furthermore, the Federal Energy Regulatory Commission (FERC) has faced challenges in balancing the need for swift approvals with rigorous environmental assessments, which can lead to legal interventions that stall projects (Frank Rusco, 2018). For instance, the cancellation of permits for projects like Rio Grande LNG and Texas LNG highlighted the consequences of inadequate environmental analyses, as FERC was found to have failed in conducting thorough assessments of climate impacts and environmental justice concerns (Nicholas Cunningham, 2024a). The need for comprehensive Environmental Impact Statements (EIS) often results in lengthy review processes, which can deter investment and hinder the timely development of critical infrastructure (Ciccantell, 2020).

Prolonged permitting and construction processes for new LNG projects, delays project timelines, increases costs, and creates uncertainty for investors. Permit processing times for LNG projects can vary considerably based on factors such as the type of facility, region, and year of submission. For example, permits for LNG terminal facilities can take up to 18 months to process. Effective coordination between federal and state agencies is often lacking, leading to delays due to overlapping or conflicting requirements. Additionally, a shortage of qualified experts for reviewing applications exacerbates bottlenecks in the permitting process (Ciccantell, 2020). The submission of incomplete applications can further hinder timely approvals, as can significant policy changes that impact the regulatory environment, particularly for proposed investments by non-Free Trade Agreement (FTA) countries, which face more rigorous public interest reviews by the Department of Energy (DOE) (U.S. Congress, 2024).

For non-FTA countries, the Department of Energy (DOE) applies a more rigorous public interest review for LNG export authorization compared to the streamlined process for FTA countries (Jessica Fore Bousky & Jerrod L. Harrison, 2016). The involvement of diverse governmental structures, including tribal authorities, adds another layer of complexity, contributing to uncertainty in timelines (Frank Rusco, 2018). Moreover, balancing climate change concerns with the need for energy infrastructure development often leads to legal interventions and additional delays in the Federal Energy Regulatory Commission (FERC) permitting process (Ciccantell, 2020). Addressing these multifaceted challenges is essential for fostering a more efficient and predictable environment for LNG development, thereby enhancing the U.S.'s position as a reliable supplier of LNG to meet the growing energy demands of countries like South Korea and Japan. The overall need for LNG is to maintain the global stability of its supply and demand. Efforts to ensure an adequate scalable low Greenhouse gas emission electricity supply continue, especially as higher GHG (Greenhouse Gas) intensity assets are de-carbonized. This balance is crucial for meeting the energy needs of countries like South Korea and Japan.

Solution:

To address regulatory and permitting challenges the establishment of formal mechanisms for federal-state coordination within the Natural Gas Act (NGA) is suggested, such as joint task forces or memoranda of understanding (MOUs) to facilitate concurrent reviews and information sharing (EPA, 2006). While implementing these mechanisms may be complex, incremental steps can be taken to improve coordination and efficiency. Drawing lessons from Canada's Impact Assessment Act (IAA), transferable reforms for the U.S. National Environmental Policy Act (NEPA) process could include implementing statutory timelines for environmental reviews, developing strategic environmental assessments, creating a substitution framework for state reviews, and enhancing inter-agency coordination (Government of Canada, 2024). These reforms would require careful planning and phased implementation to address the

practical challenges involved. Moreover, reforms to FERC's EIS process can involve enhancing coordination and transparency among agencies, strengthening the pre-filing process, adopting parallel processing, expanding categorical exclusions, and using Programmatic Environmental Impact Statements (PEIS) (Ted Boling & Kerensa Gimre, 2024). While these changes may not be straightforward, pilot programs and stakeholder consultations can help identify and address potential obstacles. These mechanisms could also include fast-track options for projects that warrant prioritization due to geopolitical challenges, such as exports to Asia in the event of disruption. Implementing fast-track options would require clear criteria and robust oversight to ensure that expedited processes do not compromise environmental and safety standards.

Ensuring that permits are not rescinded, as occurred when FERC cancelled permits for the Rio Grande LNG and Texas LNG projects, is another critical solution. An effective guarantee process to prevent permit cancellations should include early and proactive engagement with regulators and communities, integration of environmental justice measures, and strict adherence to emissions reduction commitments. Key elements of such a process could involve adopting a regulatory certainty timeline and extending export authorizations for longer periods (Nicholas Cunningham, 2024b). Furthermore, a comprehensive EIS process that thoroughly addresses potential concerns upfront, including stakeholder consultation and analyses of environmental justice impacts and carbon capture, is crucial (FERC, 2024). Protective provisions safeguarding approved projects from regulatory changes are also important (Mark Bononi, 2024). Lessons from past cancellations highlight the need for rigorous and legally defensible environmental analyses, meaningful consultation with stakeholders, and comprehensive initial risk assessments. Congressional amendments to the NGA, such as those proposed in H.R. 7176, could also insulate LNG projects from executive branch pauses by giving FERC sole approval authority for non-FTA exports (U.S. Congress, 2024). However, the DOE currently handles the public interest review for non-FTA exports, which includes commercial and geopolitical considerations that may not align with FERC's technical review capabilities.

When environmental or safety regulatory issues lead to production halts, a rapid and efficient mechanism should be in place to address the problems and allow operations to resume promptly. This approach would minimize economic disruptions while ensuring that safety concerns are adequately resolved. The need for such swift action is underscored by the potential for delays in the FERC permitting process due to balancing climate change concerns with pipeline certifications, which can lead to legal interventions (Rosselot et al., 2022). To illustrate the need for rapid resumption of operations after a production halt, the triad should look into Floating LNG (FLNG) projects. These projects have demonstrated operational flexibility, allowing for quicker adjustments and restarts compared to traditional land-based facilities. Therefore, having a mechanism to quickly rectify safety issues can prevent prolonged shutdowns and further complications in the regulatory landscape.

Market Uncertainty

Problem:

The U.S. investment environment for LNG projects is marked by significant uncertainty, primarily due to fluctuating market conditions, regulatory changes, and geopolitical factors that can significantly impact supply and demand dynamics. The investment challenges for fossil fuels are global, but the U.S. faces unique structural barriers due to domestic policy fragmentation and market-specific risks. While global LNG markets face decarbonization pressures, U.S. projects face three overlapping risks: Policy Incoherence (contradictions between state incentives such as Texas Chapter 312, and federal emissions rules), litigation exposure (climate nuisance lawsuits against LNG terminals), and Private Finance Reliance (absence of JOGMEC-style federal credit guarantees for Asian buyers). This uncertainty is exacerbated by volatile natural gas prices, which are influenced by both domestic production levels and international market trends, making it challenging for investors to forecast returns on long-term projects (Ciccantell, 2020). Additionally, the evolving energy policy landscape, particularly regarding climate change initiatives and emissions regulations, raises concerns about the future viability of fossil fuel investments, including LNG. Also, rapid changes occurring due to the back-and-forth nature of the U.S. political landscape can deter investors. The lack of consistent subsidy programs or incentives for LNG infrastructure further complicates the investment landscape, as potential investors seek assurances of stable returns in a competitive environment (Ciccantell, 2020). Subsidies can be a tool to counterbalance foreign advantages. Many Asian buyers now require carbon-neutral certifications which adds to the cost, a gap targeted incentives could close. It is essential for policymakers to foster a more stable and predictable investment climate, ultimately enhancing the country's competitiveness as a reliable LNG supplier in the global market.

There is also investment uncertainty outside of the U.S., particularly through Multilateral Development Banks (MDBs). MDBs like the Asian Development Bank (ADB) are becoming increasingly selective in their support for LNG projects, prioritizing those that align with long-term low-carbon transition strategies and the Paris Agreement. Projects must demonstrate emissions reductions by displacing other fossil fuels, prove economic viability considering the social cost of carbon, and exhibit flexibility for future decarbonization. This growing pressure on MDBs to align with climate goals means that projects lacking a clear decarbonization strategy may struggle to secure this type of funding (Sakari Oksanen, 2021). This will also affect the expansion of US LNG exports.

Solution:

One key solution is the implementation of robust subsidy programs alongside corporate tax reductions or credits. These incentives are intended to encourage the development

of new LNG facilities, the expansion of existing ones, and the upgrading of current infrastructure for enhanced natural gas production efficiency. While it is true that the U.S. is actively promoting and subsidizing alternative energy sources to transition from fossil fuels, the LNG sector still plays a crucial role in the current energy landscape and transition period. Effective subsidy programs already exist within the U.S., such as the Industrial Tax Exemption Program (ITEP) in Louisiana (Nicholas Cunningham, 2024b) and the Chapter 312 Property Tax Abatement Program in Texas (Ciccantell, 2020), which have provided benefits to LNG facilities. Additionally, programs like the Quality Jobs (QJ) Program in Louisiana and federal initiatives such as the Gasification Systems Program and the Advanced Technology Vehicles Manufacturing Loan Program support LNG infrastructure and related technological advancements (U.S. Department of Energy, n.d.). Building upon these successful precedents and potentially extending tax benefits to LNG exporters, mirroring the structure of incentives for renewable energy under the IRA, could provide a more certain financial landscape and stimulate further investment, including from U.S. subsidiaries of Asian companies purchasing U.S. LNG. Additionally, targeted incentives for carbon-neutral LNG, such as subsidies or tax breaks, can help U.S. suppliers meet the international demand from Asian buyers who require carbon-neutral certifications.

Another significant solution is the expansion of LNG agreements, including Free Trade Agreements (FTAs), to incorporate common credit enhancement mechanisms and payment security structures, drawing inspiration from successful models like Japan's JOGMEC (Japan Organization for Metals and Energy Security), JBIC (Japan Bank for International Cooperation), and NEXI (Nippon Export Investment Insurance). JOGMEC offers financial backing to Japanese companies through various means such as equity participation, loans, and debt guarantees, thereby strengthening their financial standing for substantial energy projects (JOGMEC, n.d.). Similarly, Korea Gas Corporation (KOGAS), one of the largest LNG buyers globally, has partnered with U.S. firms on several long-term contracts and infrastructure investments. South Korea's robust financial institutions and industrial conglomerates such as SK and Hyundai are well-positioned to co-invest in midstream LNG assets, enhancing energy cooperation. Establishing similar cooperative frameworks among the U.S. government and key Asian buyers, such as Korea and Japan, could help mitigate financial risks for these buyers and provide increased assurance for long-term LNG contracts, particularly in the event of unforeseen disruptions or policy shifts. The credit guarantee facilities offered by the Export-Import Bank of the United States (EXIM) are also relevant in this context, as they ensure the repayment of foreign debt obligations, thus reducing financial risks for Asian entities investing in U.S. LNG projects.

Lastly, establishing an emergency protocol to fast-track LNG supply to market during crises abroad could enhance ally security and U.S. geopolitical interests. This protocol could be utilized during emergencies and potentially include associated price controls.

During the 2022 EU crisis, U.S. LNG exports surged 137%, but spot prices fluctuated wildly. An advance agreement would institutionalize coordination, mirroring Japan's JOGMEC system trusted by Asian buyers (Gavin Maguire, 2022). Without a protocol, risks include increased market volatility, investment uncertainty, energy security issues, and delayed emergency responses. The underlying goal is to enhance the reliability and stability of U.S. natural gas supply, thereby fostering greater investor confidence in the long-term security of LNG projects. Government to Government agreements on emergency gas sharing can enhance energy security and improve stability for the allies.

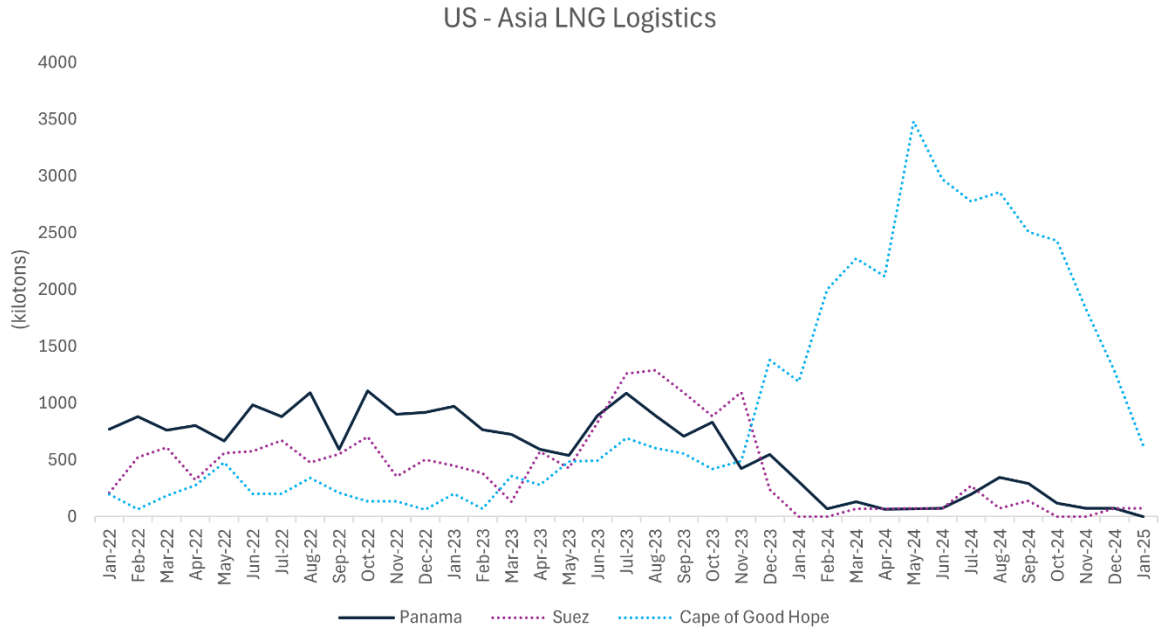
Long-term Competitiveness

Problem:

U.S. LNG projects face several challenges in terms of competitiveness, including potentially higher pre-Final Investment Decision (pre-FID) costs compared to projects in other regions like Qatar, although the sources do not provide a direct comparative analysis detailing the specific regulatory delays contributing to this difference. However, prolonged permitting processes in the U.S. can increase construction costs (Poten & Partners, 2024). Regulatory agencies have recognized this issue and have improved the process by allowing the projects to pay facility payments/actions, but this has led to increased pre-FID costs. Additionally, the need for more flexible contracts is becoming increasingly important to attract Asian buyers seeking supply security amid energy transition uncertainties. While long-term contracts remain vital for securing financing, a balance with flexible terms that allow for resale or diversion of cargoes is crucial for enhancing competitiveness.

Another key challenge to U.S. LNG is competitiveness is transport time and cost. The location of Gulf Coast facilities means that shipments to key markets, particularly in Asia, involve greater distances and higher shipping costs. This situation places U.S. LNG at a disadvantage against suppliers from regions like Qatar and Australia, which benefit from shorter transport routes (Ciccantell, 2020). As a result, the competitive edge that U.S. LNG once held is increasingly undermined by these logistical hurdles, making it crucial for exporters to find ways to mitigate costs and improve delivery efficiency. For example, a voyage from Freeport (Texas) to Nagoya (Japan) via the Panama Canal takes approximately 25 days, while the same journey via the Suez Canal extends to 37 days. In contrast, voyages from Qatar to Japan take around 16 days, and from Australia to Japan, the duration is a mere 9 days. These differentials in voyage duration directly impact the levelized cost of delivered LNG, as longer voyages incur higher charter rates and bunkering costs over a greater period. This makes U.S. LNG from the Gulf Coast relatively more expensive to Asian markets compared to supplies from regions with shorter shipping distances, based on specific market conditions, project circumstances, and logistical considerations.

Furthermore, the Panama Canal route, a crucial passage for U.S. Gulf Coast LNG exports to Asia, faces significant challenges due to drought and congestion. Drought-related restrictions have led to reduced daily transits, almost halving the capacity of the canal (Seb Kennedy, 2024). In addition to these issues, the Panama Canal also faces frequent changes in transit systems and tariff structures, which complicate shipping logistics and add unpredictability to transit times and costs for LNG exporters.



While normalization is expected by the end of 2025 due, the threat of future drought remains. These restrictions have prompted a shift towards the Cape of Good Hope as a popular alternative route, but this adds considerable time and cost to voyages. Congestion in the Panama Canal further exacerbates these issues, causing delays and increasing transport times. The Panama Canal Authority is engaging with LNG producers to manage demand, but the uncertainty surrounding transit times and costs via this key route poses a persistent challenge for U.S. LNG exporters looking to efficiently reach Asian markets.

Solution:

One solution is to foster collaboration and coordination within multilateral development banks (MDBs), including the Asian Development Bank (ADB), for gas projects in Asia. MDBs can play a crucial role in financing energy infrastructure projects in developing countries. However, MDBs like the ADB selectively support midstream and downstream LNG projects under strict conditions, such as the project aligning with the country's long-term low-carbon transition strategy and contributing to emissions reduction by displacing other fossil fuels (Sakari Oksanen, 2021). Despite these conditions, enhanced collaboration could potentially unlock funding for strategically important LNG infrastructure that supports energy transition goals.

Private sector financing support for projects in both the U.S. and Asia is also crucial. Despite some MDBs showing hesitancy towards financing certain LNG projects (Pipeline & Gas Journal, 2025), private equity firms and investors continue to invest significantly in LNG expansion, driven by factors such as long-term contracts, projected profitability, and perceived strategic importance. Leveraging private sector investment, alongside potential conditional financing or guarantees from MDBs, is essential for the development of LNG projects and related infrastructure. Governmental support mechanisms, similar to Japan's JOGMEC (JOGMEC, n.d.) or the U.S. EXIM Bank and Development Finance Corporation (DFC), can further enhance the creditworthiness of projects and attract private investment (EXIM, n.d.). JOGMEC provides financial backing through equity participation, loans, and debt guarantees, reducing financial risk for investors. Similarly, the U.S. EXIM Bank offers credit guarantees and insurance, ensuring repayment of foreign debt obligations, and the DFC provides loans, loan guarantees, and political risk insurance to support private sector investment in developing countries. South Korean firms have shown increasing interest in securing equity stakes in U.S. LNG terminals and transportation infrastructure, seeking to diversify supply sources amid growing geopolitical risks in other regions. Allowing countries like South Korea to invest directly in U.S. midstream assets like pipelines, liquefaction facilities, and export terminals, could be more attractive than dealing with countries that restrict such investments.

Investing in human capital development for LNG project developer expertise is another key solution. The LNG industry faces a skills shortage due to an aging workforce and rapid technological advancements. To address this, strategies such as mentorship programs, specialized training, university partnerships and scholarships, career development initiatives, promoting workforce diversity, offering competitive compensation, and fostering a culture of continuous learning are essential to develop and retain the necessary expertise (Petroplan, n.d.).

The need for more flexible contracts to enhance the competitiveness of U.S. LNG is also emphasized (Eric Yep & Surabhi Sahu, 2024). Asian LNG buyers are increasingly seeking flexible contracts without destination restrictions to ensure supply security amid energy transition uncertainties. U.S. LNG's lack of destination restrictions provides a competitive advantage. However, the expanded interpretation of the Jones Act could potentially infringe on this flexibility by imposing shipping mode constraints. The Jones Act requires that goods transported between U.S. ports be carried on ships that are U.S.-built, U.S.-owned, and U.S.-crewed, which could limit the options for LNG shipping and increase costs. A successful strategy could involve a mix of long-term agreements to secure financing and flexible contracts to attract buyers seeking optionality (Tazmyn Gounden, 2024). The U.S. government can further support this by providing credit guarantee facilities and promoting stable Henry Hub pricing. These measures are not about direct market intervention but rather about creating a more stable and predictable

investment environment. Publishing federal-level key statistics on LNG is another important measure. Increased transparency through the publication of reliable data can improve market understanding, reduce uncertainty, and potentially attract more investment in the U.S. LNG sector.

For transport challenges, one potential solution is the expansion of the Panama Canal. The Panama Canal Authority is engaging with LNG producers as water levels recover, indicating ongoing efforts to address drought-related restrictions (Angeles Rodriguez, 2024). However, restrictions on daily transits are expected to persist, with full normalization potentially occurring in 2025. Expanding the canal's capacity could alleviate congestion and potentially accommodate larger LNG carriers (like Q-Max class). Also, modifying the auction process to increase quotas for LNG carriers will improve the competitiveness of U.S. LNG.

Another solution involves exploring alternative routes for LNG pipelines to export from the U.S. West Coast, specifically Alaska or Mexico. The feasibility of these alternatives is contingent on both cost and timeline considerations. Significant infrastructural challenges are associated with the Alaska LNG project, including its remote location and the high costs of constructing lengthy permafrost-resistant pipelines (Sam Reynolds and Christopher Doleman, 2025). Furthermore, securing finalized long-term purchase commitments, essential for project financing, remains a hurdle for the Alaska project. Therefore, while West Coast exports offer potentially shorter voyage durations to Asia, significant infrastructural investments and overcoming existing challenges such as Panama Canal issues, and frequent changes in transit systems and tariff structures, are necessary to make them viable alternatives.

Future-Proofing Deficits

Problem:

The United States currently enjoys growing advantages in the global LNG market, but to sustain its position as a leading energy exporter, it faces the challenge of future-proofing its industry in the face of evolving energy landscapes and technological advancements. Many of the import partners of the U.S., like South Korea and Japan, have aggressive decarbonization policy roadmaps. While projections are evolving with the surge in energy demand expected from AI and data centers, many forecasters still expect global gas demand to decline significantly by 2050 (Kateryna Filippenko & Massimo Di Odoardo, 2024). Ensuring long-term competitiveness will require proactive measures to adapt to a world increasingly focused on decarbonization and alternative energy sources.

Currently, technology for the U.S. to future-proof its status as an energy supplier is underdeveloped. Carbon Capture, Utilization, and Storage (CCUS), which would allow LNG use with substantially lower emissions, is not currently viable at scale in many import markets. Derivative fuels like hydrogen and ammonia face costs challenges

related to storage and transport that will need to be overcome with research and development. Additionally, emerging technology for small-modular nuclear reactors needs better design collaboration and standardization and massive investment in uranium enrichment supply chains to reshore to the U.S. from Russia.

Solution:

One crucial aspect of future proofing is the need to invest in and develop technologies that can reduce the carbon footprint and GHG emissions, such as methane, from LNG. This includes advancements in carbon capture, utilization, and storage (CCUS) technologies, Electrification of LNG Facilities, advancement in Methane Leak Detection and Repair, which are essential for LNG to remain viable under net-zero emissions policies. It is crucial to consider the electrification of LNG facilities which can significantly reduce the carbon footprint of LNG operations, aligning them with global decarbonization goals. Furthermore, the U.S. needs to continue to explore and potentially transition towards hydrogen-based fuels, leveraging its existing LNG expertise. This could involve adapting LNG infrastructure for hydrogen transport or focusing on exporting hydrogen derivatives like ammonia. The existing research collaboration between the U.S., Japan, and South Korea on energy security provides a foundation for building partnerships in hydrogen technology development and export.

Another crucial solution involves expedited drafting of Small Modular Reactor (SMR)-related regulations. SMRs represent a promising nuclear technology that could provide a reliable and low-carbon source of energy. With projections indicating a significant reduction in global gas demand by 2050, it is essential to discuss alternative energy sources like SMRs, as they could play a crucial role in the energy transition by providing low-carbon energy solutions that complement LNG. Clear and timely regulations to streamline licensing, international standardization and grid integration are essential to provide the necessary framework for the development and deployment of SMRs, encouraging investment and innovation in this sector. By fostering partnerships, collaborations, and consortium participations, potentially involving both domestic and international entities, the risks and financial burdens associated with SMR development can be shared, and insurance, offtake guarantees, and liability pooling can be managed through these partnerships, further enhancing the stability and attractiveness of investments in this sector. Supportive government policies are also needed to facilitate these collaborations.

Supporting joint uranium enrichment facility building and operations in the U.S. is also important. This measure aims to strengthen the U.S.'s nuclear fuel supply chain and enhance its role in the global nuclear energy market. Collaborating with international partners on such ventures can be a sensitive and complex process, but it will provide access to technology, expertise, and potentially new export opportunities for enriched uranium, further diversifying the U.S. energy export portfolio beyond fossil fuels.

Each of these solutions will require continued support and investment from all three countries' governments and businesses.

Conclusion

The challenges and opportunities facing U.S. LNG exports, particularly from the Gulf Coast, underscore the need for strategic reforms to enhance competitiveness and ensure long-term viability in the global energy market. Key challenges include the lengthy and uncertain permitting processes for LNG projects, driven by fragmented federal-state coordination, and policy shifts. Additionally, transportation inefficiencies such as longer shipping times to Asia compared to competitors like Qatar and Australia, coupled with drought-induced congestion in the Panama Canal - erode the economic advantages of U.S. LNG exports.

To address these issues, regulatory streamlining is critical. Implementing federal-state coordination mechanisms (e.g., joint task forces or memoranda of understanding) could expedite permit approvals and reduce redundancies. Legal strategies, such as standardizing pre-filing procedures and adopting Canada's Impact Assessment Act (IAA) model with statutory timelines, offer pathways to accelerate environmental reviews while maintaining compliance with the National Environmental Policy Act (NEPA). Furthermore, establishing an LNG trade committee focused on Asia-U.S. collaboration could harmonize standards, fast-track approvals, and strengthen political and business networks.

Infrastructure investments are equally vital. Expanding port capacities, developing alternative shipping routes (e.g., Arctic corridors), and upgrading Panama Canal water management systems would mitigate transport delays. Concurrently, embracing methane emissions reduction protocols under the U.S. Methane Emissions Reduction Program (MERP) aligns with global sustainability demands, enhancing the appeal of U.S. LNG in environmentally conscious markets like Japan and South Korea.

In conclusion, while the U.S. has established itself as a significant LNG exporter, maintaining this advantage requires a forward-looking approach that is defined by collaboration, innovation, and regulatory agility. This involves actively addressing permitting bottlenecks, optimizing logistics, and aligning with global sustainability standards by pursuing decarbonization technologies for LNG, strategically investing in the development and export of hydrogen-based fuels, fostering innovation in nuclear energy, and strengthening international collaborations to navigate the evolving global energy landscape. By addressing these challenges, the U.S. can effectively future proof its position as a leading energy exporter in the decades to come.

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Haruo (Harry) Maeda is the President & CEO of ITOCHU Korea Ltd. He graduated from Nagoya University with a degree in Nuclear Engineering. Throughout his career at ITOCHU Corporation, he has held various senior positions, including Group General Manager of the Nuclear Energy Group and Managing Director of Itochu Petroleum Co. (Singapore) Ltd.

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Jinsoo Kim is the Dean of Hanyang Intercollege and a Professor in the Department of Earth Resources and Environmental Engineering at Hanyang University. He holds a Ph.D. in Energy Systems Engineering from Seoul National University. His research focuses on resource economics, energy policy, and economic analysis of energy projects. He is a member of the Energy Policy Council at the Ministry of Trade, Industry and Energy and has received multiple teaching awards from Hanyang University.

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