Strong growth in global LNG demand, primarily driven by China’s state-led coal-to-gas switching policy to curb pollution, has renewed interest in sanctioning liquefaction projects globally. However, significant transformation in the LNG markets has disrupted the traditional business model, wherein long-term, oil-linked, take-or-pay contracts with large, creditworthy buyers support final investment decision (FID) on LNG projects.

In this paper, we will discuss how the LNG industry could adapt to the changing market conditions and sustain growth.

Amid growing liquidity in LNG markets, buyers are demanding shorter contracts and greater volume and destination flexibility. New LNG importers have different characteristics and demand drivers compared to traditional large markets such as Japan and South Korea.

The LNG value chain is becoming more complex and less integrated. This transformation is opening up new business opportunities and encouraging a wide range of players to participate and collaborate across the LNG value chain. Portfolio players and commodity traders are playing an important role in connecting new and diverse sources of supply and demand, while managing associated risks. They are also supporting FID on LNG projects, as buyers, financiers or project partners. LNG companies are starting to invest in different parts of the value chain to create optionality and harvest value from every gas molecule produced.
China’s state-led drive promoting coal-to-gas switching to curb pollution has had a profound impact on the global liquefied natural gas (LNG) market. From concerns of sub-par growth, China’s demand now undergirds strong growth in global LNG markets, which have expanded at 6.6% CAGR over the 2014-2017 period to reach 290 million tonnes per annum (MTPA).¹ In turn, this expansion has renewed interest in sanctioning a second wave of liquefaction projects globally. As of this writing, at least 15 LNG export projects with more than 200 MTPA of capacity are competing to reach final investment decision (FID) by 2019.² However, the industry is still searching for suitable commercial models to underpin new LNG supply. A key question is: how do LNG projects reach FID amid growing competition, while meeting the changing commercial framework expectations of buyers?

Significant transformation in the LNG markets has disrupted the traditional business model, wherein long-term, oil-linked, take-or-pay contracts with large, creditworthy buyers support FID on LNG export projects. Trends include:

**Growing liquidity in LNG markets.** Amid the recent supply surplus and low LNG prices, buyers are demanding shorter contracts and greater volume and destination flexibility. In the global LNG market, the share of spot and short-term trade — contracts of less than five years — has doubled over the last decade, to nearly 30% in 2017.³ Term contracts concluded over the past five years have an average volume of 0.9 MTPA and an average length of 10.4 years.⁴ This is less than half of the conventional industry standard of 25 years.

![LNG contracts (2014-2018): by length](image)

Source: International Group of Liquefied Natural Gas Importers (GIIGNL), EY analysis

In the coming years, LNG markets will gain liquidity as additional projects come online and long-term contracts expire, releasing LNG volumes. Notably, Japanese long-term contracts accounting for 25 MTPA of supply are due to expire by the end of 2024.⁵

**Diversifying mix of LNG suppliers and buyers.** LNG exports mix is diversifying with the rise in US LNG exports. The trend will likely continue as liquefaction projects in new geographies such as Africa and Canada start production in coming years. The number of LNG-importing countries has increased from just 10 in 2000 to 40 at the end of 2017.⁶ According to the International Energy Agency (IEA), emerging Asian economies (including China, India and Southeast Asia) are estimated to account for 80% of the

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¹ GIIGNL, EY analysis
² This excludes projects sanctioned in 2018 and expansion projects in Qatar, Nigeria and Papua New Guinea. Source: EY analysis
³ 2018 World LNG Report, International Gas Union (IGU), 4 July 2018
⁴ GIIGNL, EY analysis
⁵ GIIGNL, EY analysis
⁶ Shell LNG outlook 2017, Shell LNG outlook 2018
incremental LNG imports through 2040. Their combined share in the global LNG trade is expected to more than double over this period, to 60%.\(^7\)

Unlike traditional large importers such as Japan and South Korea, emerging Asia comprises several markets with distinct features and energy policies. LNG demand in many countries is fragmented, price-sensitive and limited by infrastructural constraints, making it difficult to fulfill. Liberalization in many emerging markets is expected to increase the role of small, private and often inexperienced and risk-averse LNG buyers.

\textbf{Changing LNG demand drivers.} In new import markets, LNG will compete with piped imports and domestic production. LNG supply will also need to adapt as the role of gas in power generation evolves to enable greater penetration of intermittent renewable energy, while industrial needs become a key driver of baseload demand. According to the IEA, flexible requirements will account for nearly half of LNG imports into emerging Asia in 2040.\(^8\)

\begin{center}
\textbf{Composition of LNG imports: 2040}
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\includegraphics[width=0.5\textwidth]{Composition_of_LNG_imports_2040.png}
\end{figure}

\textbf{Source: IEA}

\textbf{LNG pricing dilemma:} LNG trade in Asia continues to be predominantly oil-linked. Rising exports of gas-linked LNG from the US have caught the interest of Asian buyers. However, the shift has been slow due to relatively low oil prices and the risks of using gas benchmarks that do not reflect the dynamics of the Asian market. Buyers’ expectations of affordable LNG also need to be balanced with energy security considerations. Many liquefaction projects may not be viable at prices that recently stoked demand in new LNG import markets.

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\textsuperscript{7} World Energy Outlook 2018, \textit{IEA}, November 2018
\textsuperscript{8} World Energy Outlook 2018, \textit{IEA}, November 2018
}
How could the LNG industry adapt to the changing market conditions and sustain growth?

Adapting to changing dynamics in the LNG market will require greater collaboration between buyers and sellers to expand the middle ground and spread risk and returns so that they are economically palatable for all players. Restructuring ownership and commercial arrangements could help allocate risks to investors that are better situated to absorb and manage them.

**Disintegration of the LNG value chain:** The LNG value chain is becoming more complex and less integrated, with more distinct upstream and downstream activities. Unlike conventional point-to-point delivery from liquefaction terminal to end consumer, LNG molecules can now change multiple hands or take several routes to reach the market. This transformation is opening up new business opportunities and encouraging a wide range of players to participate and collaborate across the LNG value chain.

**Growing role of intermediaries:** Portfolio players and commodity traders are playing an important role in connecting new and diverse sources of supply and demand, while managing associated risks. Portfolio deals are increasingly preferred, accounting for 50% of total deal volume (in MTPA) in 2017, up from 28% in 2014. The “big four” commodity traders (Glencore, Vitol, Gunvor and Trafigura) accounted for roughly one-tenth of global LNG trade in 2017. According to Wood Mackenzie, uncontracted demand by the seven largest global LNG buyers is expected to quadruple from current levels to 80 MTPA by 2030.

Without large and creditworthy end users, portfolio players and commodity traders are supporting FID on LNG projects, as long-term buyers, financiers or project partners.

► The presence of portfolio players enabled LNG Canada, the first major greenfield project since 2015, to reach FID without signing offtake agreements. FIDs on Tortue FLNG (Phase 1) in Mauritania and Senegal and Coral South FLNG in Mozambique were supported by an integrated oil company (IOC) agreeing to purchase the projects’ entire output.

► Commodity traders are graduating from pure trading to long-term deals and seeking ownership of export and import projects. For instance, Vitol has signed a preliminary long-term deal to procure LNG from the Driftwood LNG export terminal in the US. Trafigura has also inked agreements to buy LNG from US liquefaction projects.

Portfolio players and commodity traders are also helping buyers with low credit ratings by extending credit lines. They have also been supporting the development of LNG import and regasification infrastructure in new import markets, such as Pakistan and Bangladesh.

**Value chain integration:** Oil majors’ investment in the gas business has typically focused on the supply side. Involvement in the complete supply chain, from well to end customer, creates optionality and helps companies

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9. GIIGNL, EY analysis
harvest value from every gas molecule produced. LNG companies are starting to invest in different parts of the value chain for various benefits:

<table>
<thead>
<tr>
<th>Storage</th>
<th>LNG import terminals</th>
<th>End-use applications</th>
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<tr>
<td>▶ Access to storage could help LNG sellers cater to seasonal demand and benefit from regional arbitrage opportunities. ▶ Storage could also act as a last resort for unsold LNG cargoes and thereby provide a floor price and lower risks.</td>
<td>▶ LNG import terminals could provide economic access to new or growing LNG import markets, tap demand constrained by lack of infrastructure, and differentiate sellers in markets that lack third-party-access provisions. ▶ Aid from LNG sellers in developing import infrastructure in target markets could also incentivize LNG buyers to sign long-term supply deals on proposed liquefaction projects.</td>
<td>▶ Investment in downstream and end-use gas businesses could provide long-term demand certainty to support upstream and LNG projects, or to develop new applications and markets.</td>
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Creative and technologically advanced solutions (such as floating storage and regasification units, integrated LNG-to-power projects, and small-scale LNG or LNG by trucks) have made it possible to pursue downstream integration in an economic and flexible manner, as well as achieve lower lead times for demand.

**Development of gas trading hubs and price indices**: As LNG flows from a diverse supply base into Asia, regional spot markets and pricing indices will be needed to help determine prices and make the LNG trade more transparent and standardized. This, in turn, could lower barriers to entry for smaller players, boost market liquidity and facilitate the creation of risk management tools to enable investment in LNG projects. However, the lack of sizable local production, LNG import and storage infrastructure, and cross-country pipelines pose challenges. A well-functioning gas trading hub may require several years to establish.
What key considerations should LNG players keep in mind as they navigate the new market landscape?

**Reduce cost:** LNG export projects need to be cost-competitive amid growing capital discipline and stringent portfolio optimization. Notably, the next wave of LNG projects has relatively lower capex requirements compared with the last one.

Developers of recently sanctioned LNG projects or those awaiting FID have used various strategies to cut costs. A majority of projects sanctioned since 2015 were small or additional trains at existing plants. Companies have also used floating LNG technology or adopted a modular approach to project development utilizing small (~1 MTPA) factory-made liquefaction trains. Getting contractors involved early and sharing more of the risks via outcome-based payments have also helped lower project costs and LNG prices. Beyond capex, lower costs at different stages of the LNG production cycle — from upstream to liquefaction, shipping, tanker building, regasification to transportation and distribution – could lend competitive advantages. And because cost overruns and delays in the LNG industry are well-documented, producers also need to enhance their focus on managing projects to ensure they are delivered within budget and on schedule.

**Adapt to changing needs of buyers:** LNG sellers need to adapt to the changing mix of LNG buyers and offer customized solutions to meet their needs, including on pricing, seasonal demand, contract flexibility and supply base diversification. Contract and destination flexibility in US LNG projects has enabled traders to commit to long-term offtake agreements. Flexibility to deliver LNG to various import terminals across China is a notable feature of PetroChina’s recent supply deal with Qatar.
Multiple price indices have been used in recently concluded LNG contracts. For instance, long-term LNG contracts signed with Mozambique LNG are linked to five different price indices. A recent preliminary deal involving a US LNG export project was indexed to an Asian benchmark instead of the US Henry Hub. In addition, US LNG delivered in India in early 2018 was linked to a blend of crude oil and US gas prices. Better understanding of gas price indices globally and their key drivers could help sellers and buyers make informed decisions.

**Manage contract risks**: LNG players will need to strengthen their contract and risk management skills as they increasingly do business with a large and diverse pool of LNG suppliers and offtakers with varying volumes, contract terms and pricing indices. Companies also need to manage complexities arising from flexible scheduling, destination and take-or-pay terms in LNG contracts, as well as their growing exposure to spot trade.

**Build a diversified portfolio**: Liquefaction projects are capital intensive. For producers, a well-diversified portfolio provides optionality for allocating their limited capital to the most competitive projects. Companies with a portfolio of supply options are also relatively less impacted by delays or cancellations caused by external factors such as regulation, environmental concerns or trade protectionism. On the other hand, buyers can leverage a wider variety of LNG sources and suppliers to diversify or upgrade their LNG supply mix. Intermediate or end-use buyers could divest stakes in costly and risky projects, or replace expiring contracts with LNG volumes from new sources. Buyers need to develop their ability to assess supply sources and seller capabilities and choose the ones that are best positioned to meet their needs of flexibility and energy security.

**Identify the “field of play”**: LNG players willing to expand their presence in the LNG value chain need to identify areas of competitive advantage and adopt strategies to play to their strengths and meet their risk-return expectations. For instance, capital-constrained producers may use LNG offtake to complement their own production without having to make upfront capital commitments in a liquefaction project. Companies willing to focus on marketing or downstream businesses could rely on LNG project owners to manage long-cycle production and liquefaction. Much like the development of oil, such strategies lead to optimized upstream and downstream segments rather than vertical integration under one company.

**Boost returns**: Low returns is one of the key reasons investment has been stifled in downstream and end-use gas businesses in the past. One of the ways to overcome this challenge is to use a razorblade model, wherein profits from LNG sales locked in over a long period more than offset low or negative returns from the downstream asset. Investing in a portfolio of related downstream businesses — such as gas or fuel retail, electric vehicle charging stations or convenience stores — could also boost overall returns.

**Devise a market entry strategy**: LNG players will need to carefully choose a suitable strategy to enter and build a presence in new import markets. Pilot projects based on floating technology could provide quick and economic market access along with flexibility to exit in case the market does not develop as anticipated. Companies may also consider partnerships with local players to share risk and capital while gaining local know-how. The nature of a

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company’s involvement — for instance, whether as an operator or non-operator — will also determine the extent of control over project execution, delivery and operations, as well as risks.

**What does the future look like?**
Large portfolio players, primarily oil majors, have a greater competitive advantage than other players in the race to catch the next wave of LNG development. Enabled by strong balance sheets, access to low-cost capital, logistical know-how, risk management capabilities and marketing experience, portfolio investors are expected to play a prominent role in facilitating LNG supply and demand growth. Current trends suggest that LNG markets could evolve to resemble oil markets, with distinct upstream and downstream businesses. Upstream and liquefaction projects could be increasingly financed on the basis of general rather than specific contracts with customers. Growth in LNG supply could drive global demand. LNG, like oil, will probably have price and return cycles. Companies that quickly recognize changing trends and innovate creative solutions and new business models will have stronger chances to survive or even thrive in the long run.