

LNG Supply and Demand Outlook: With special focus on Southeast Asia

3rd LNG Supply, Storage & Transportation Philippines Forum 2016
13-14 October, 2016



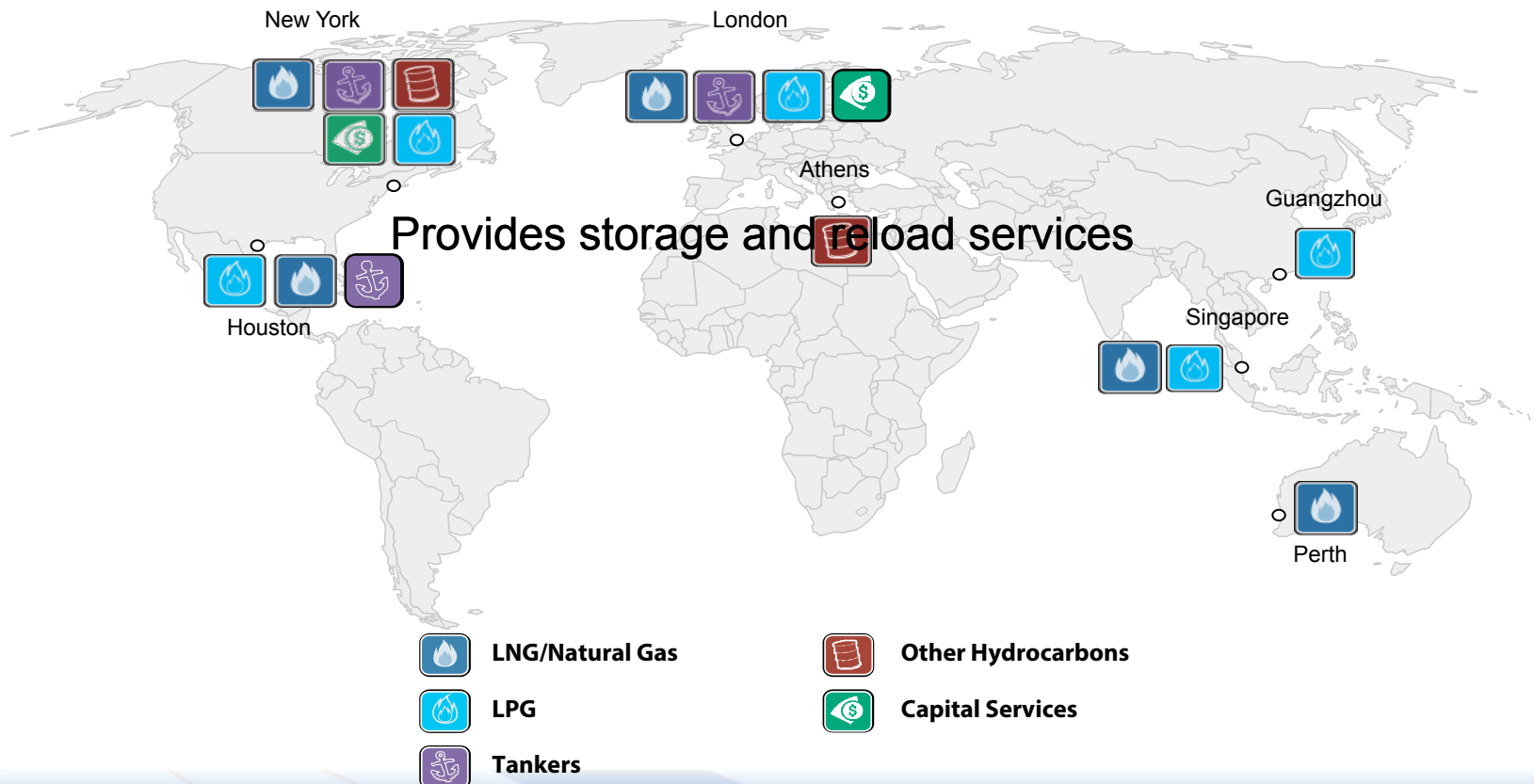
POTEN & PARTNERS



Sophie Tan
Business Intelligence
Poten & Partners

Poten & Partners: A global leader in LNG business services

- Poten & Partners is a leader in the energy business with 60+ years of experience.
- The largest LNG advisory team in the world covering the full natural gas & LNG value chain: upstream, LNG plants, technical, marine, markets and commercial issues
- Insightful market and industry business intelligence, forecasts and data



Poten Business Intelligence Services

LNG in World Markets

LNG in World Markets

POTEN & PARTNERS

Vol. 28 No. 1 Jan. 2016

INSIDE SECTIONS

Contracts 4

Markets 13

Projects 15

Transport 17

Corporate / Industry 19

Global Developments 20

In Brief 22

Market Data 25

Growing Supplies, Lagging Demand Bring Challenges To Contracts in 2015

Contract Sizes (MMbbl/y)

Sources: Poten & Partners

New supplies are coming online in Australia and the US with still more supply to follow in coming years. But global demand growth is lagging as China's economy slows and demand stays in Japan and South Korea.

As a result, buyers have gained power in negotiating new contracts and they want changes. They are asking for and getting shorter contracts, smaller volumes, lower steps against crude oil or indications other than oil. And when end users demand is filled, portfolio players are stepping forward to take the risk of signing contracts for excess volume.

In this issue, *LNG in World Markets* takes a comprehensive look at the changes that took place last year in new contracts signed with buyers exercising their new power.

Special Contract Issue

▶ READ MORE

Producers Pass Buck to Portfolio Players

As large volume, long-term contracts with end users have been increasingly difficult to find, producers have resorted to selling millions of tons of LNG to portfolio players, who now account for about three-quarters of the buyers in the most recent long-term deals. The vast majority contracted to portfolio players carries no destination restrictions. The portfolio players hold portfolios of LNG supply from different regions as well as various shipping, storage and regasification assets.

PAGE 6

Tanggul LNG Train 3 Financing Advances

Financing for Tanggul's third liquefaction train progressed when sponsors sent out the information memorandum to banks. Sponsors are preparing the financing to lay the ground for train 3's final investment decision, expected late this year or in early 2017. The commercial tranche is \$3.25 billion, while IBC is expected to provide \$1.25 billion and the Asian Development Bank will lend \$0.5 billion, according to the information memorandum.

PAGE 15

Chemiere Energy to Enter Global Market as New Supplier under New Leadership

Chemiere Energy will be starting 2016 as the newest LNG supplier in the global market and under new leadership. While the company's former leader, Chafiq Souki, said he would start paying dividends when he ran out of ideas for growth, the new leadership will most likely follow the wishes of Carl Koch, now the company's largest shareholder, whose big investments in the company last year led to Souki's departure.

PAGE 19

Global LNG Outlook

Comparison of Poten LNG Demand Forecasts - Japan

Sources: Poten & Partners

We have reduced our Japanese LNG demand projection by 5 MMbbl/y in 2015 due to higher nuclear power generation, higher renewable power generation and lower industrial and commercial gas demand. We are projecting flat demand to 2025.

- In September 2015 at its annual LNG Consumer/Producer Conference, METI announced that Japan's target LNG demand would be lowered to 62 MMbbl/y by 2030 from 88 MMbbl/y in 2014. Poten considers that demand that low is unrealistic. But we see enough evidence to envision lower LNG demand than previously forecast and we lowered our LNG demand forecast by 5.9 MMbbl/y to a flat 85 MMbbl/y from 2014 to 2025.
- **Japan's Electricity Mix**

Sources: Poten & Partners

- No new built nuclear reactors were assumed in our previous forecast.
- In addition to Sendai No.1-2 that have restarted this year, we continue to assume that reactors advanced in the Nuclear Regulation Authority review process would resume operating in 2016. These reactors include Katsa No.3, Genki No.3-4, Takahama No.3-4 and Ohi No.3-4.
- However, nuclear power is anticipated to have slightly higher utilization rates than projected in the last issue - on average 80% utilization between 2017 and 2025.
- Poten projects slightly stronger growth in renewable energy from 2020 onward as we see stricter regulation of new coal plant emissions (e.g., opposition from the Ministry of Environment to apply additional pressure before heading into COP21 at the end of November). But where METI projects Japan's non-hydro renewable energy to make up 15% of Japan's electricity mix in 2030, we forecast it to be around 12%. (See page 7 for the comparison of electricity mix in 2030 and note that 2025 forecasts were unavailable from METI).
- We also project lower industrial and commercial gas demand despite Japan's denigration of power and city gas sectors. Despite denigration, Poten expects newcomers to face strong barriers to entry and to face difficulties capturing substantial market share. Nonetheless we see incumbents becoming more reluctant to invest in infrastructure and aggressively cultivate demand in an uncertain liberalization environment. Although Tokyo Gas is bullish on its industrial demand growth in greater the Tokyo-Kanto area (Tokyo Gas projects CAGR 4.6% growth from 2014 to 2019, mainly driven by fuel switching to gas from fuel oil, we estimate lower industrial demand than previously projected for all Japan.

LNG Finance in World Markets

PROJECT FINANCE JANUARY 2016 www.poten.com

PROJECT FINANCE

Poten 2016 Ranking - Top LNG Project Finance Lenders

Japanese banks took first and second place in Poten's 2016 LNG project finance lenders ranking providing more than \$1 billion apiece to the sector. Sumitomo Mitsui Banking Corp. was in first position and Bank of Tokyo-Mitsubishi UJF was second. Japanese lenders had occupied five of the top 10 slots last year but only three this year. In addition to SMBC and BTOU, Japan's Mizuho was number six this year.

France's Societe Generale climbed to third from fifth place last year and was joined by four more European banks. In the top 10, comprising the Netherlands ING at four, UK's HSBC at seven, Italy's Intesa Sanpaolo at eight, and UK's Lloyds Bank at nine. Canadian banks rounded out the top 10 with Bank of Nova Scotia moving up the table to fifth place from 20 last year and Royal Bank of Canada sharing ninth place, up from 26. A total of 61 lenders from 15 countries provided most of the LNG project finance funds in 2015 (see Poten Top LNG Lenders table). Total lending by commercial banks to LNG projects via project finance structures climbed to about \$18 billion in 2015 from about \$12 billion in 2014.

Nineteen European banks provided almost \$4 billion or around 44% of these funds, followed by US and Canadian banks, which provided \$4.4 billion or 24%. Japanese banks contributed \$3.3 billion or almost 18% and other Asian banks \$2.7 billion or nearly 15%. This ranking does not include funds provided by export credit agencies (ECA) or multilateral agencies, although a couple do appear on this list when they are alongside commercial banks in the deal, other than contributing funds in their own separate tranches. In the 2016 ranking, some non-bank lenders were present and included CIT Group and Raymond James Financial, both from the US, and Singapore's Clifford Capital.

For the 2016 ranking, there were 30 banks that had not appeared in 2015, although 17 of them were Indian and came in to support two LNG import projects, both in Gujarat state. Of the 13 others that had not appeared in 2015, five were from the US, with another four apiece from Europe and Asia. Sixteen of the banks in the 2015 ranking did not make it to the 2016 ranking. The average LNG contribution per institution climbed in the 2016 ranking to \$300 million, from \$256 million in the 2015 ranking. This was primarily as result of large contributions to Cheniere's Corpus Christi project in Texas. Banks had agreed in November 2014 to fund the project, but it did not reach financial close on the contributions for train 1 and 2 until 2015. If it had closed on train 1 as well, the average contribution per institution would have been even larger in the 2016 ranking.

US transactions determine bank listing

Funds were supplied by banks to three US liquefaction projects, two Indian LNG import terminals and a handful of LNG shipping transactions, which were structured as project financings. As in the year before, participation in US LNG project financings largely determined the 2016 rankings because the bulk of funds supplied by banks in 2015 primarily supported US liquefaction projects. In 2014 two of these projects were financed, and in 2015, three of them reached financial close, bringing in around \$16 billion from banks. The US liquefaction transactions, all completed in 2015, comprise almost \$8.4 billion for train 1 and 2 of Corpus Christi, producing 4.8 MMbbl/y per train; just over \$4 billion for train 3 of Cheniere's Sabine Pass Liquefaction project in Louisiana, which will produce 4.5 MMbbl/y; and almost \$3.6 billion for Freport LNG's train 3 in Texas, which will produce 4.6 MMbbl/y. Between them, these projects attracted 39 commercial banks, with 16 of them appearing on all three transactions.

9 LNG Finance in World Markets JANUARY 2016

- The most trusted and reliable sources on the global LNG industry and markets.
- Exclusive information and insightful analysis of developments affecting major projects, markets and contracts.
- Innovative point of view on industry and market evolution.

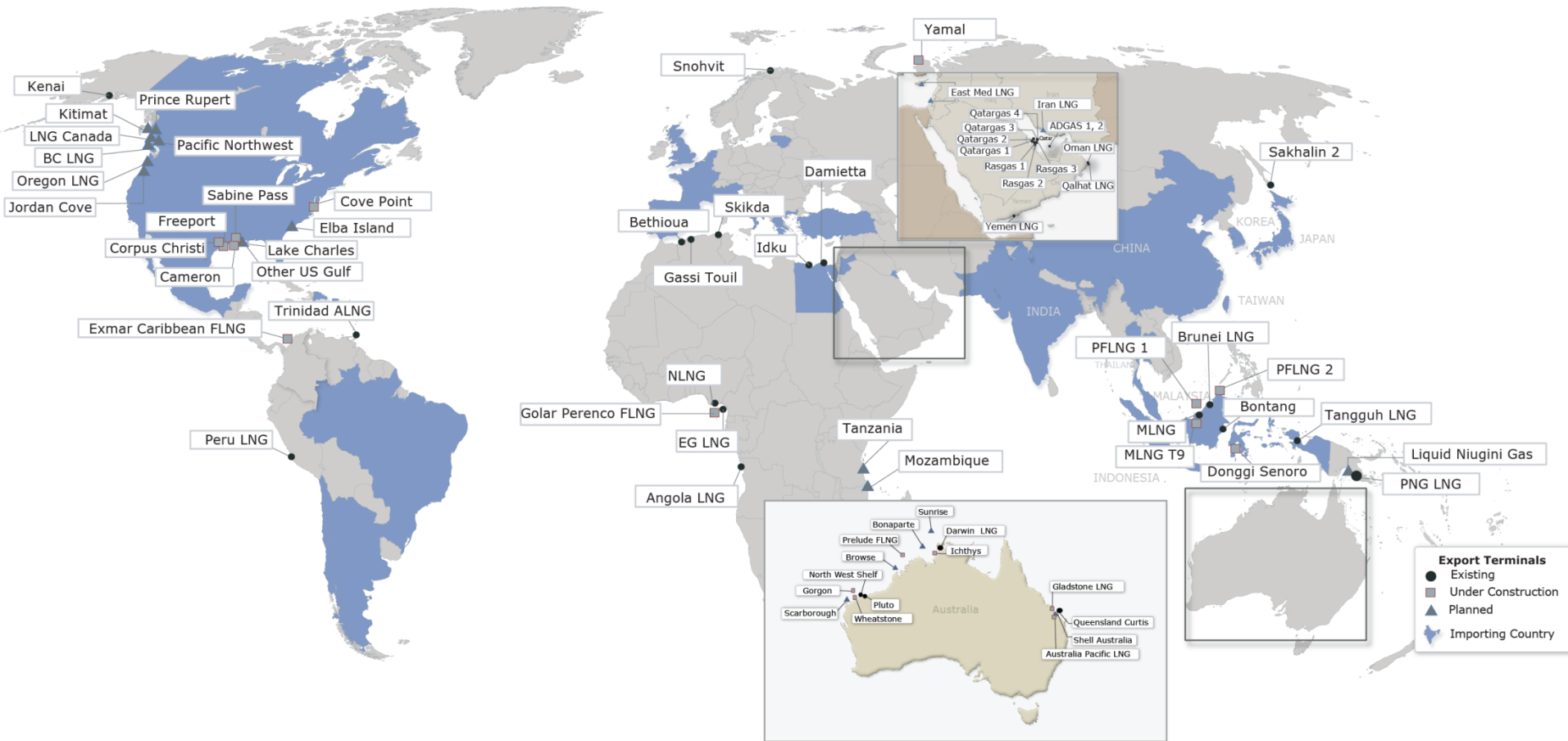
- Detailed global supply and demand forecasts going out 10 years.
- Specialized sections on shipping, project developments and EPC.

LNGas Database

- Proprietary database with exclusive information on trade, import and export projects and contracts.
- Exclusive cost-of-service tool allows detailed comparisons of competitiveness of different LNG projects

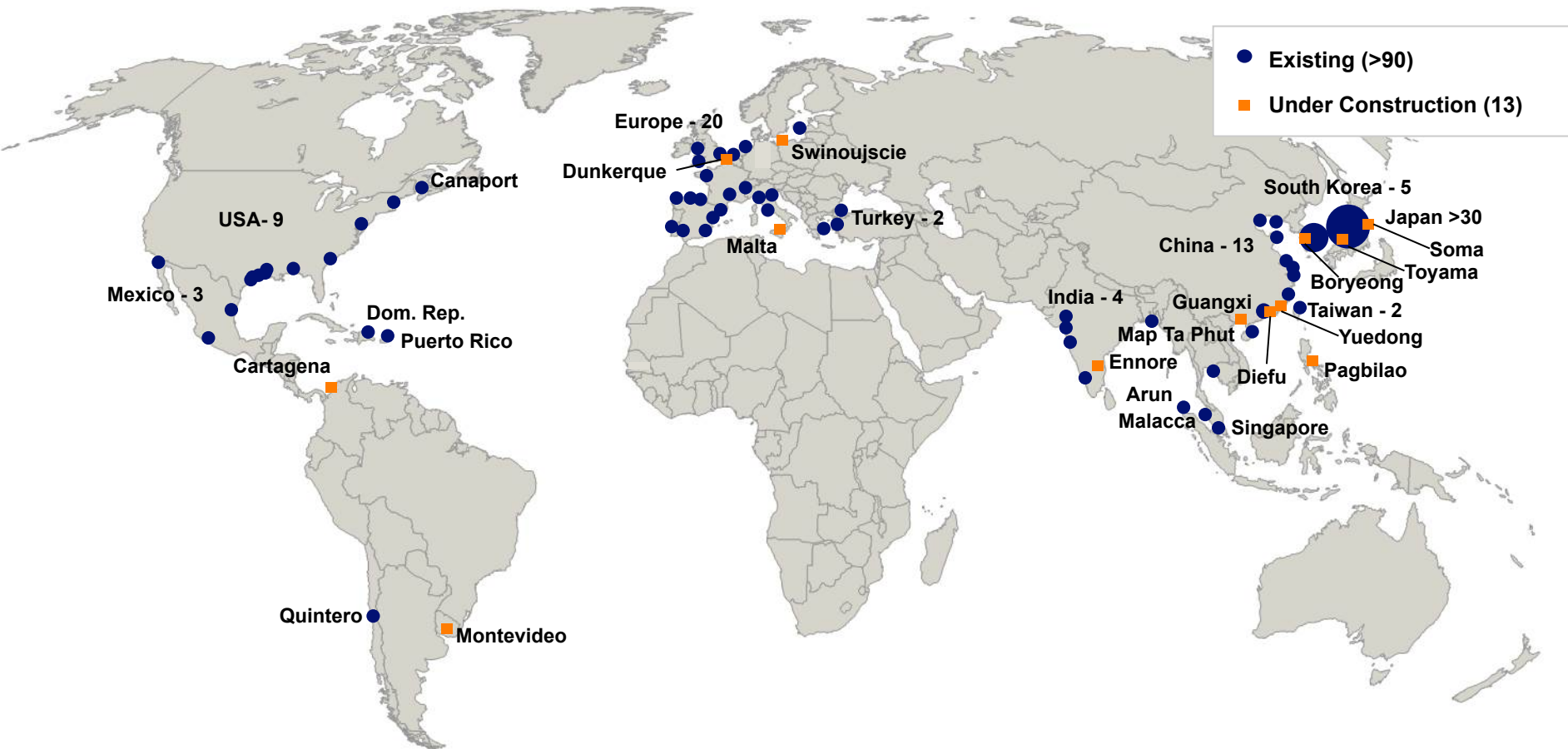
- The only source of focused, reliable information on LNG finance.
- Unique information on project finance, multilateral and bank lending and LNG shipping finance.
- Annual rankings of project finance lender, export credit agencies and shipping finance.

LNG market is expected to grow 9 MMT to 254 MMT/y in 2016, with 26 exporting and 34 importing countries



Source: Poten & Partners

More than 90 conventional LNG terminals in operation worldwide, with 13 under construction

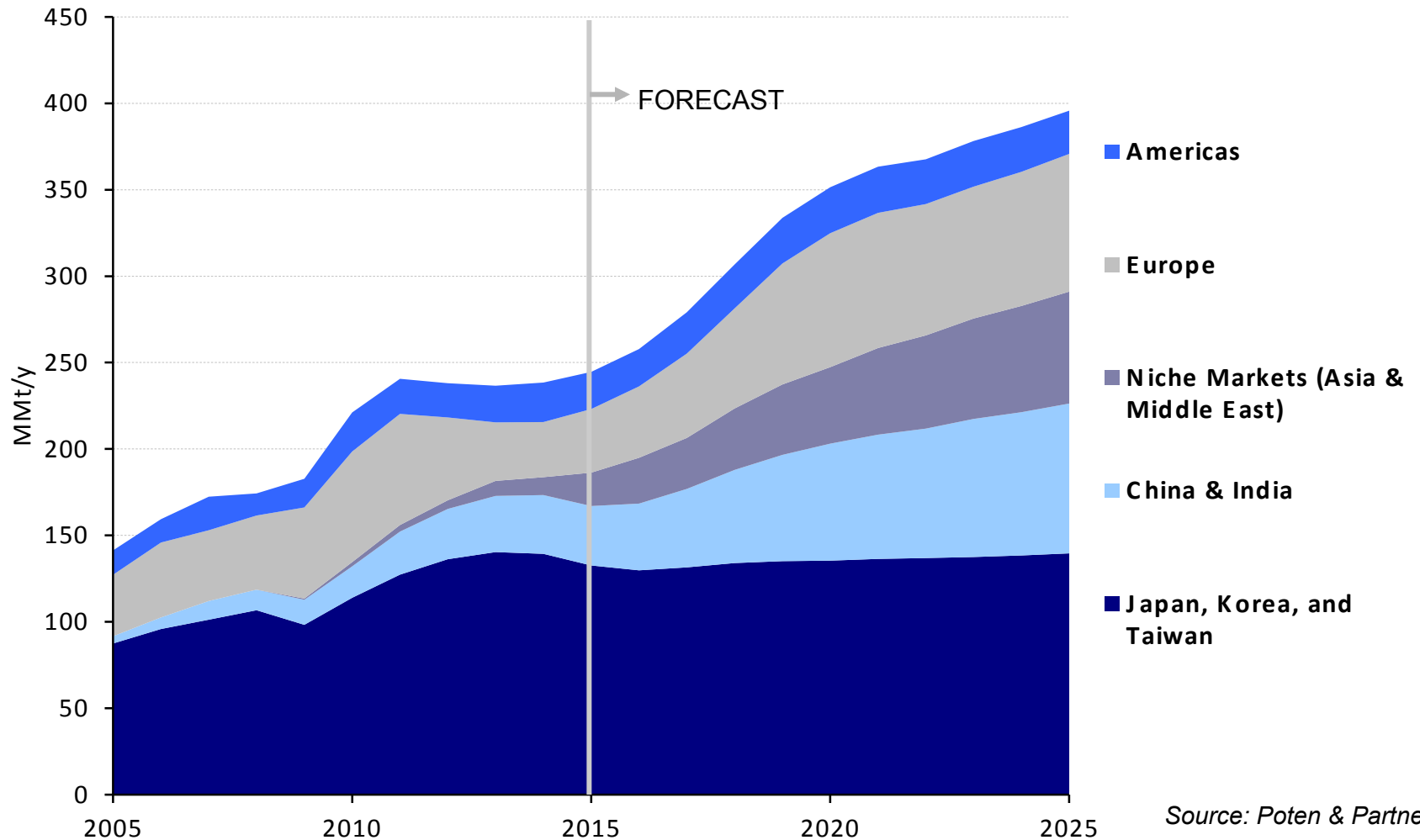


Does not include: terminals <0.5 MMt/y capacity

Source: Poten & Partners

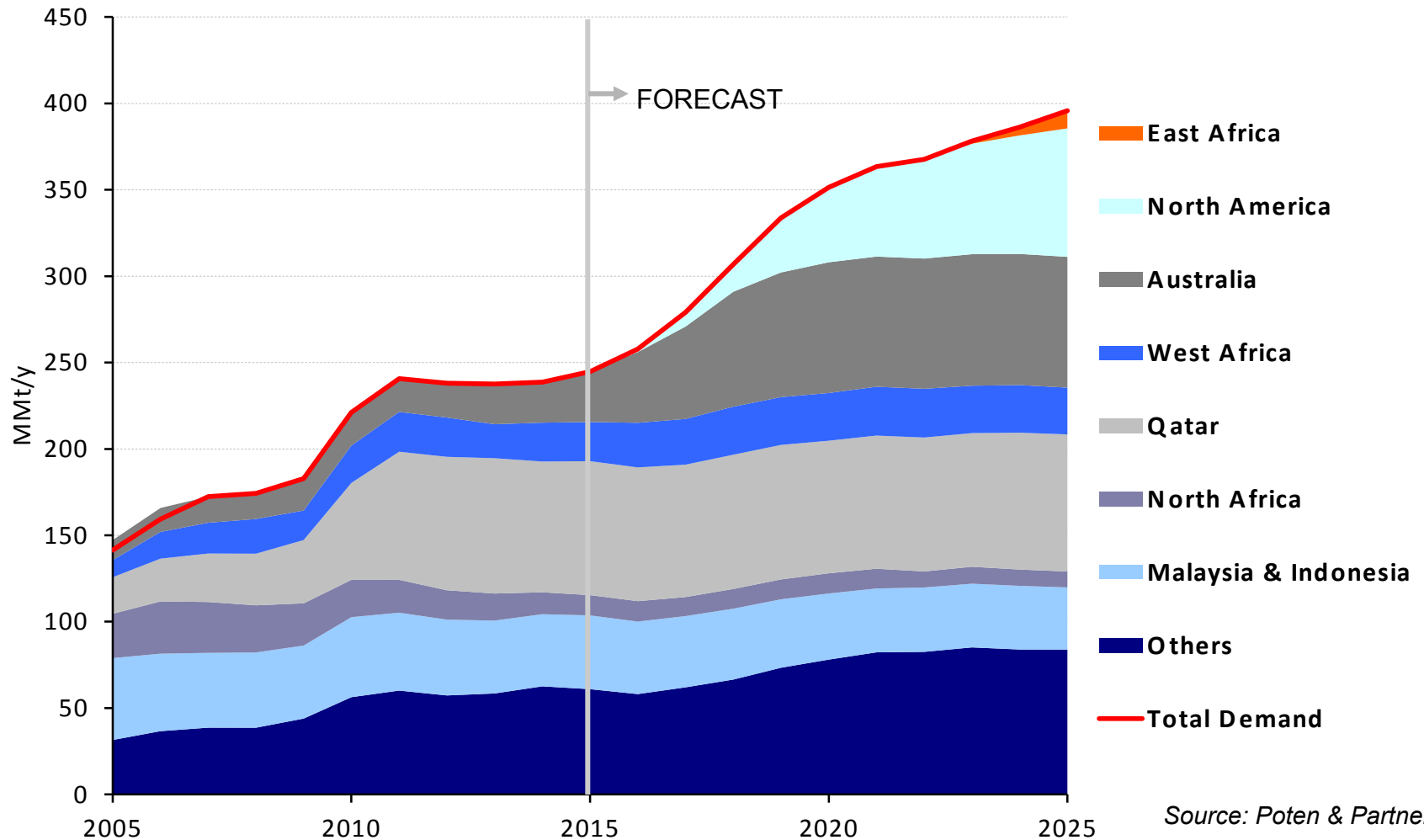
LNG demand projected to reach 400 MMt/y by 2026

Global LNG Demand Forecast (2005-2026)

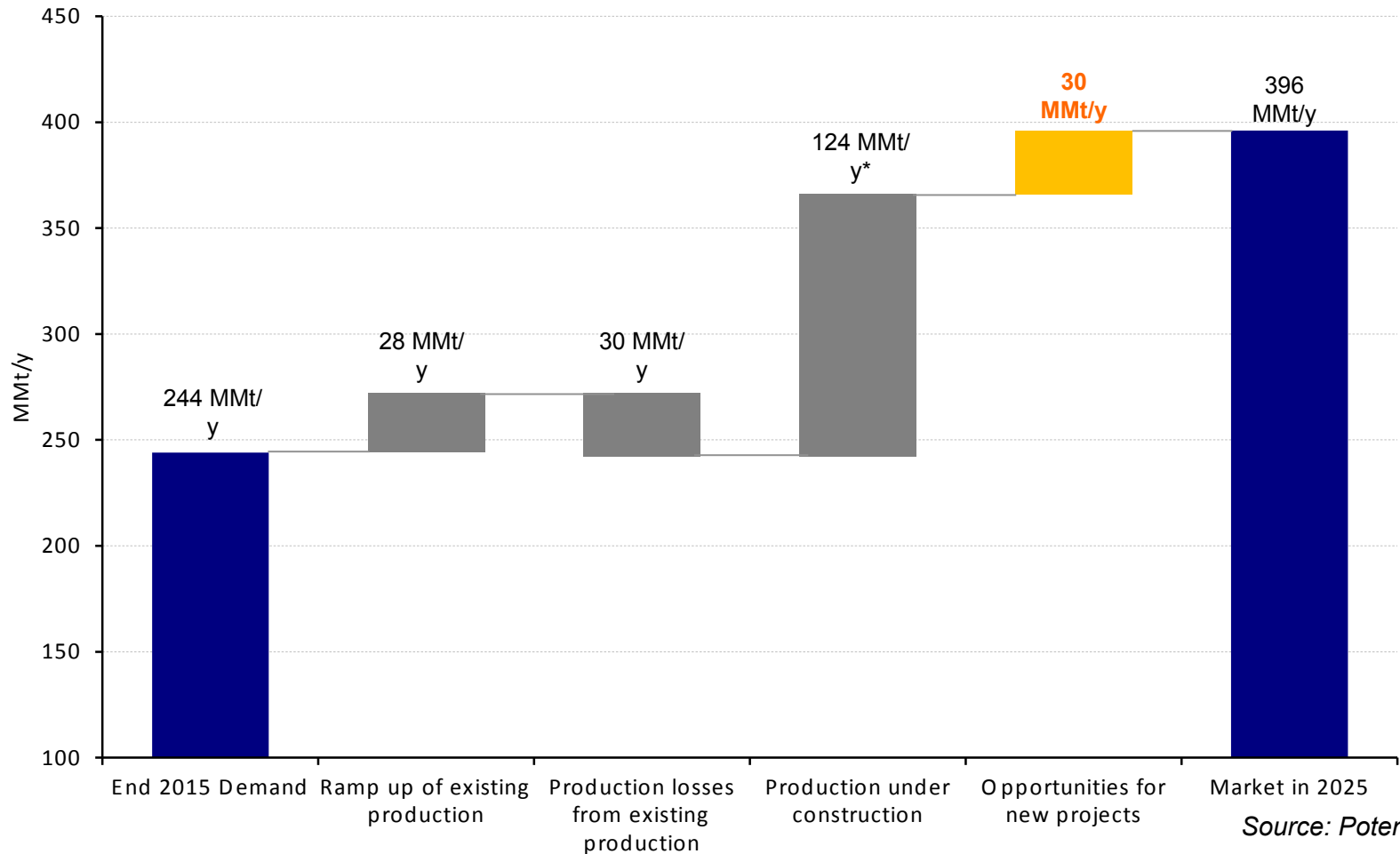


Source: Poten & Partners

Australia, then North America to be the main source of LNG supply growth to 2026



Around 30 MMt/y of demand available globally to potential projects by 2026

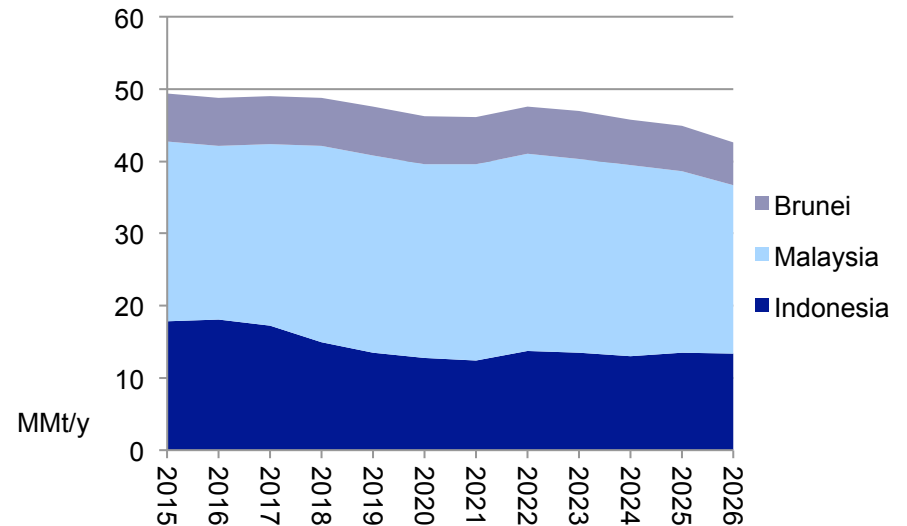


* 130 MMt/y nameplate capacity, adjusted for planned maintenance, estimate of unplanned shutdowns, BOG during shipping, and de-rating factor

- Additional North American projects and East Africa to fiercely compete for this demand

Southeast Asia Focus: An overview – Supply

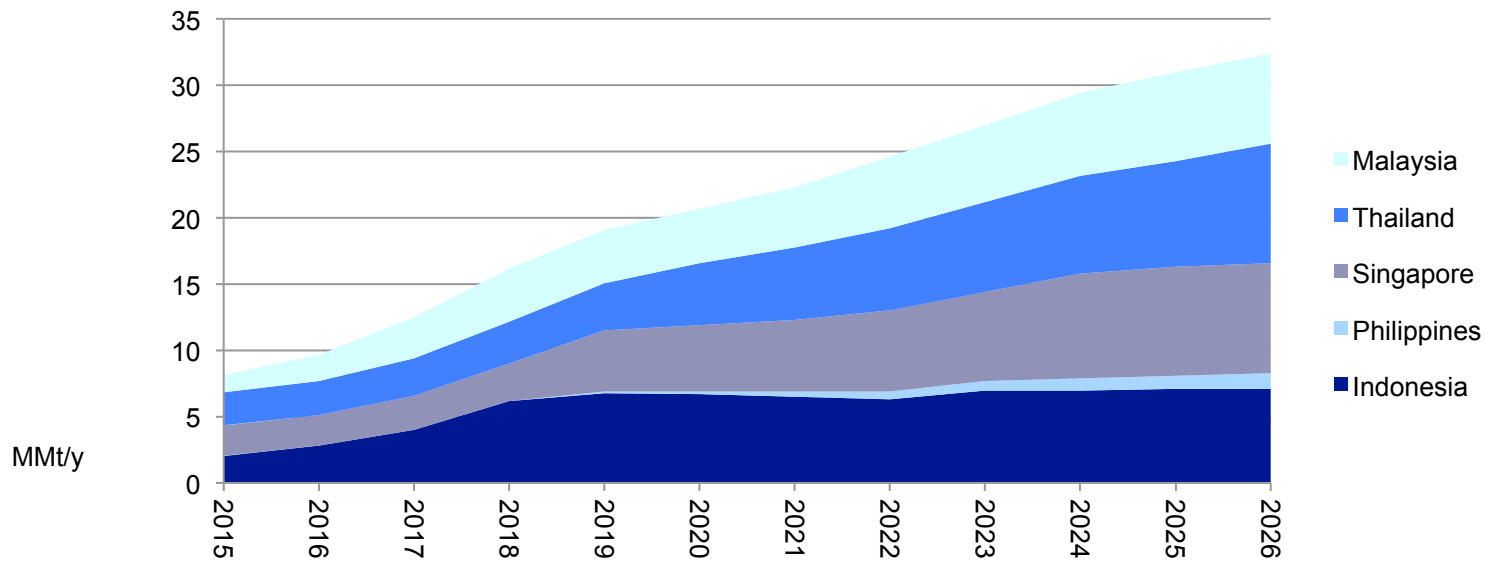
- LNG supply from the region is expected to decline to 42 MMt/y by 2026 from 49 MMt/y in 2015, taking into account existing projects, under construction and those taken FID
- Gas production is being diverted to meet growing domestic demand
- End-of-life projects face falling reserves
- Long-term LNG prices making some projects uneconomical
- Less buyers are willing to commit to long-term contracts necessary to secure project finance
- Upstream licensing issues and disagreements between the government and project owners on development concepts in Indonesia



Source: Poten & Partners

Southeast Asia Focus: An overview - Demand

- Southeast Asia may become a 32 MMt/y market by 2026, with demand quadrupling from 8 MMt/y in 2015, based on latest forecasts.
- Indonesia, Singapore, Thailand, and Malaysia have existing terminals and plans for additional capacity in the next decade.
- The Philippines, Vietnam and Myanmar may start importing LNG as they plan to build their first terminals from the next decade

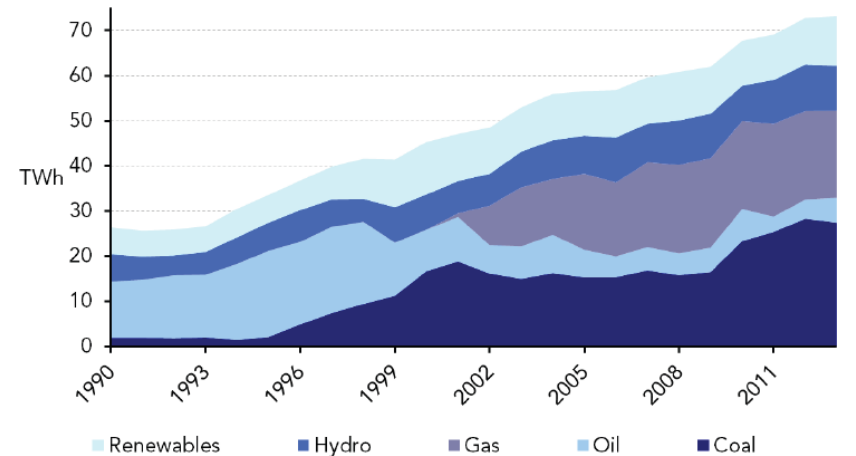


Source: Poten & Partners

Southeast Asia Focus: The Philippines

- Poten forecasts the Philippines could start importing LNG as early as the second half of 2019, assuming the timely start-up of regas terminals. Demand could reach 1 MMT/y by 2026
- Energy World Corp has the only sanctioned LNG-to-power project in Pagbilao; around 60% complete
- Shell is working on a possible floating terminal in Batangas. FEED study was launched in 2014, with FID said to be 2017
- First Gen Corp is also looking to find partners for its proposed terminal in Batangas city to supply LNG for its 1,500 MW power plants, with FID said to be end-2017
- Issue with fuel mix policy, economics based on PPA versus selling into WESM, possible carbon tax

PHILIPPINES HISTORICAL POWER GENERATION BY FUEL



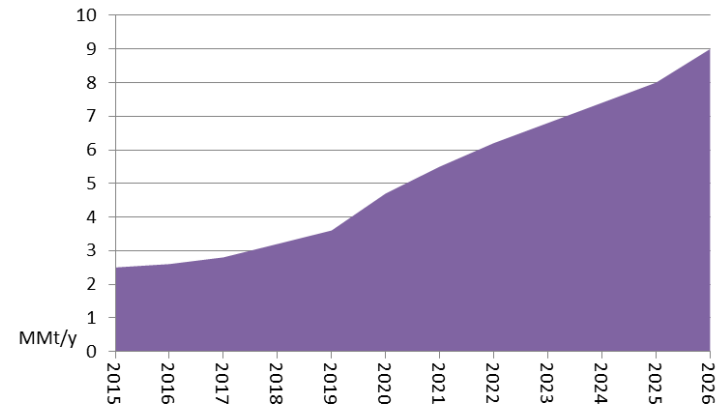
Source: Poten & Partners, IEA

Southeast Asia Focus: Thailand

- Domestic and Myanmar gas output declines predicated LNG import plans. Currently supplied by Qatargas and buys spot cargoes for peak shaving especially during April to June
- Thailand could be a fast-growing LNG importer if the domestic output declines are faster than expected, because it already has the terminal capacity
- Preference for hybrid pricing in recent contracts; reduced tenor to 15 years.

* Map Ta Phut would be 10 MMt/y mid-2017, increasing to 11.5 MMt/y eventually, and a second 5 MMt/y terminal is planned for 2019-20. EGAT has preliminary plans for LNG-to-power to offtake 5 MMt/y via a FSRU in 2020-21

* PTT is working on an import terminal in Myanmar to supply the south of Thailand in 2020-21



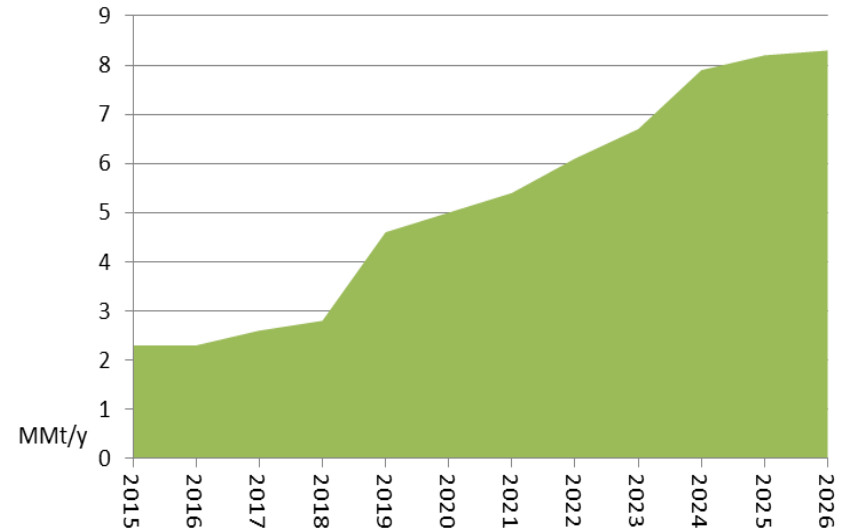
- Energy policy direction detrimental to gas demand by going to more coal-fired power; third-party access to existing terminal is taking time; weaker than expected GDP growth pushing back start date of LNG supply contracts

Export Country	Venture	Seller	Buyer	Terms	Start Year	End Year	Plateau Vol.(MMt/y)
Qatar	Qatargas	Qatargas 3	PTT	Xship	2015	2035	2.0
Unspecified	Unspecified	BP	PTT	Xship	2017	2032	1.0
Unspecified	Unspecified	Shell Eastern	PTT	Xship	2017	2032	1.0
Unspecified	Unspecified	Petronas	PTT	Xship	2017	2032	1.0

Source: Poten & Partners

Southeast Asia Focus: Singapore

- Supply to existing terminal operated by government terminal entity SLNG is underpinned by contract with Shell. Gas demand lower than expected with economic weakness. Provides storage and reload services
- Plans for a second, or even a third aggregator to be awarded before year-end for another 0.6 to 1 MMt/y initially
- Energy Market Authority is planning a FSRU to receive carriers of 60,000-cbm to 265,000-cbm, which is undergoing consultation. Operator may not be SLNG, could be selected via a tender

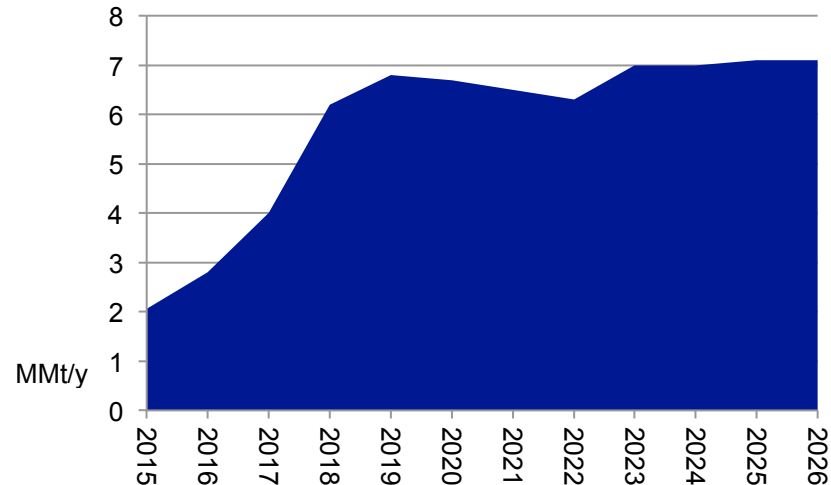


Export Country	Venture	Seller	Buyer	Terms	Start Year	End Year	Plateau Vol.(MMt/y)
Australia	BG Portfolio	BG	BG Marketing Singapore	Xship	2013	2033	3.0
Unspecified	Unspecified	Total	Pavilion Energy	Xship	2018	2028	0.7
Unspecified	BP Portfolio	BP	Pavilion Energy	Xship	2019	2039	0.4
Unspecified	Unspecified	Petronas	Keppel Corportation	Xship	2016	2026	1.0
USA	Cameron LNG	Unspecified	Pavilion Energy	Xship	2019	2039	0.4

Source: Poten & Partners

Southeast Asia Focus: Indonesia

- Demand is currently met by supply under the domestic market obligation program from existing liquefaction projects Bontang and Tangguh. Donggi Senoro is exempted
- Future LNG demand depends on the progress of new LNG-to-power and small-scale projects such as Jawa-1, Central 21
- New supply from Jangkrik, Tangguh expansion by 2020, and Abadi post
- Development of new liquefaction projects – LNG supply growth
- Tax issues for LNG imports

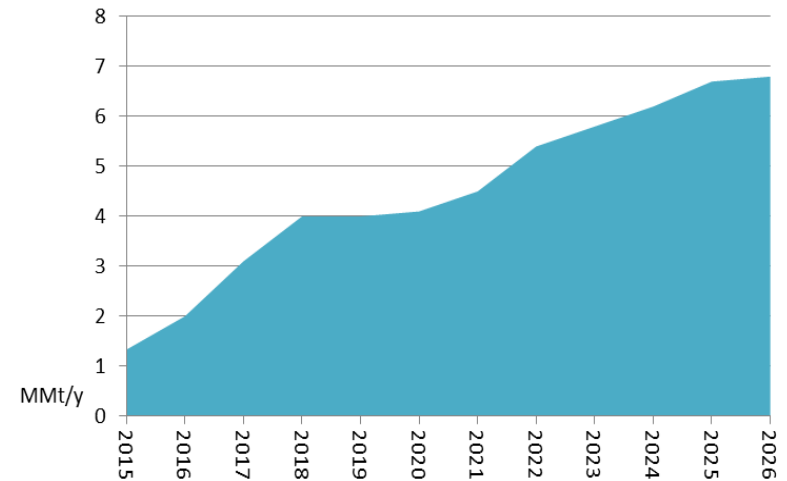


Export Country	Venture	Seller	Buyer	Terms	Start Year	End Year	Plateau Vol.(MMt/y)
Indonesia	Unspecified	ENI Gas & Power	Pertamina	Xship	2017	2024	1.4
Unspecified	Unspecified	Woodside	Pertamina	Xship	2019	2036	0.75
Unspecified	Total Portfolio	Total	Pertamina	Xship	2020	2035	0.70
USA	Corpus Christi LNG	Cheniere	Pertamina	FOB	2020	2040	0.76
USA	Corpus Christi LNG	Cheniere	Pertamina	FOB	2019	2039	0.80

Source: Poten & Partners

Southeast Asia Focus: Malaysia

- Melaka import terminal is operated by state owned Petronas. Imports are mainly from its contract with Gladstone LNG. Demand around 2 MMt this year.
- Domestic gas output are expected to be diverted from end-of-life liquefaction projects to meet growing demand, in the event that LNG export contracts are not being renewed.
- Upcoming terminal the 3.75 MMt/y Pengerang is expected to be completed end-2017 and bulk of the demand is expected to come from petrochemical project RAPID from 2019. Provides storage and reload services
- Possible policy changes – third-party access under discussion



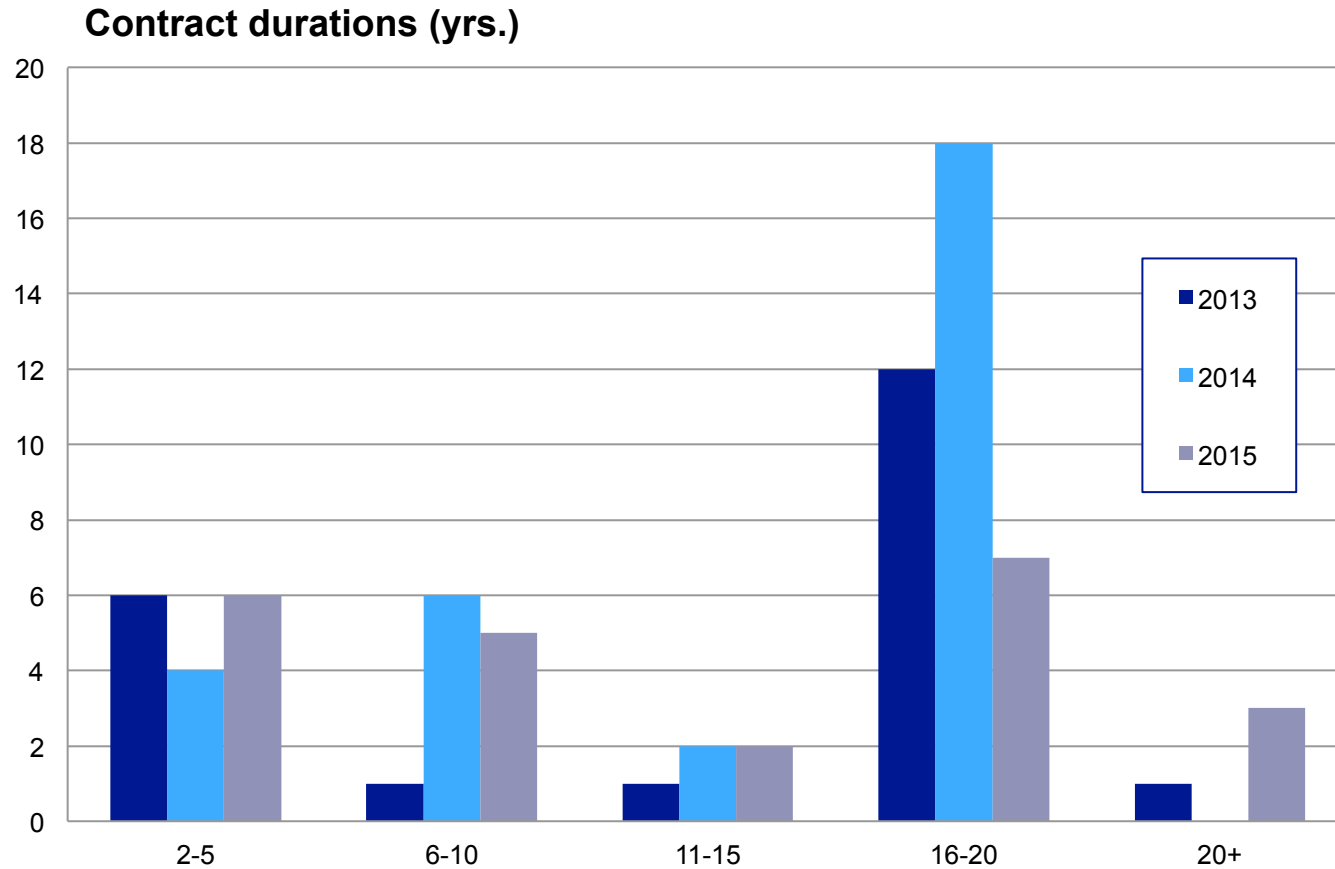
Export Country	Venture	Seller	Buyer	Terms	Start Year	End Year	Plateau Vol.(MMt/y)
Australia	Gladstone LNG	Gladstone LNG	Petronas	TBD	2014	2034	3.5

Source: Poten & Partners

How is market structure changing?

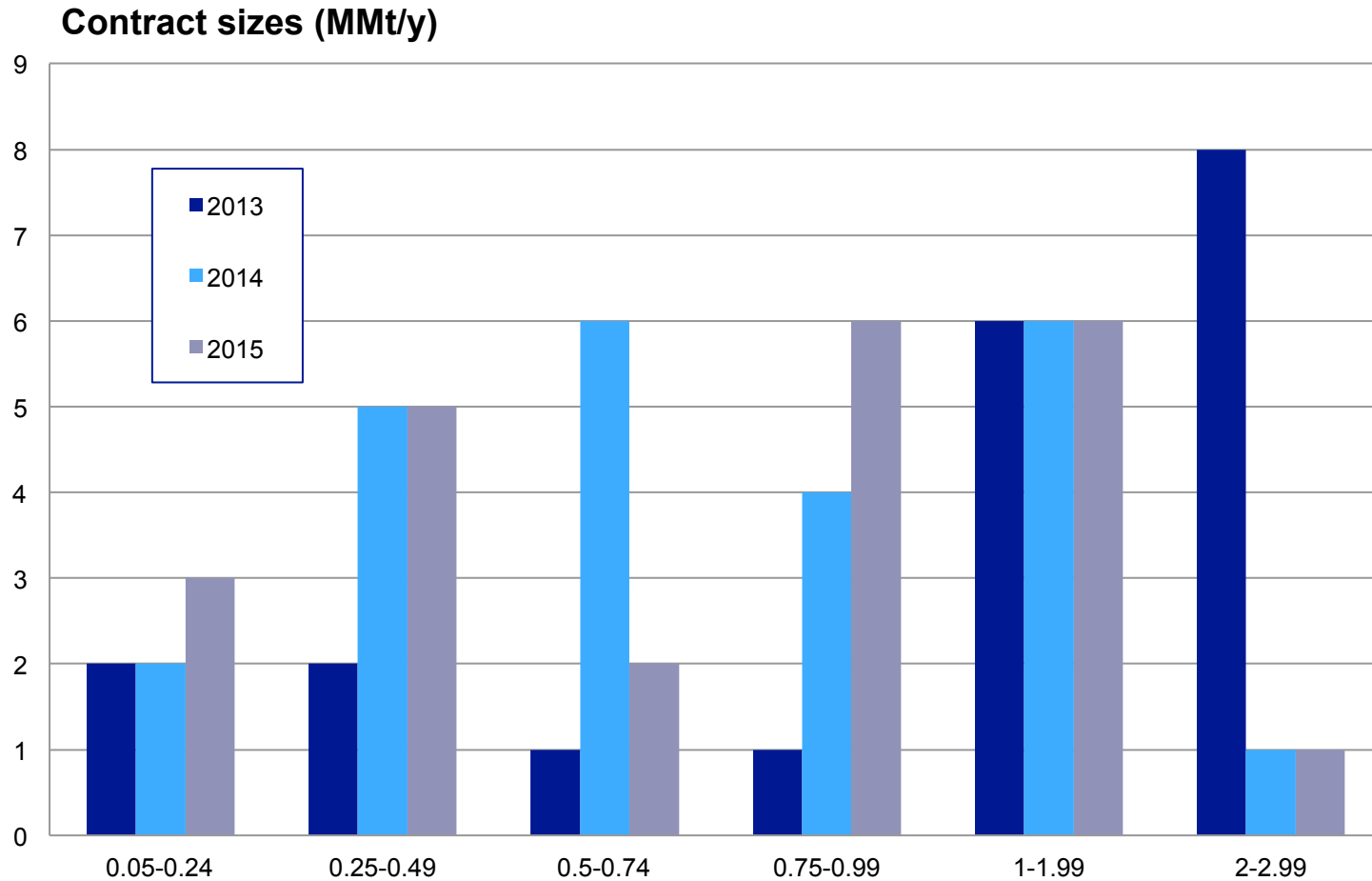
- **Contract volumes and durations are falling**
 - A transition between long-term contracts and a more fragmented market is taking place
 - There will be more contracts overall, but they will be smaller volumes and for shorter terms
 - Wave of contract expirations will accelerate this process
- **Aggregators and others are buying long-term but selling shorter term**
 - Adding to market liquidity (and fragmentation)
 - Using a wider variety of pricing mechanisms and more flexible terms
- **More LNG trading taking place, more to come**
 - Pure traders are taking a more active role
 - Some end users in Europe and Asia have overcommitted so they are reselling
 - Aggregators will also sell aggressively into spot markets
- **Buyers are acting differently**
 - Building supply portfolios that include spot, short-, medium- and long-term contracts
 - Seeking more flexibility in volumes, including seasonality
 - Many are looking at spot markets as a way to gain flexibility if suppliers won't offer it

Contracts durations are shrinking



Source: Poten & Partners' LNG in World Markets

Contracts volumes are shrinking

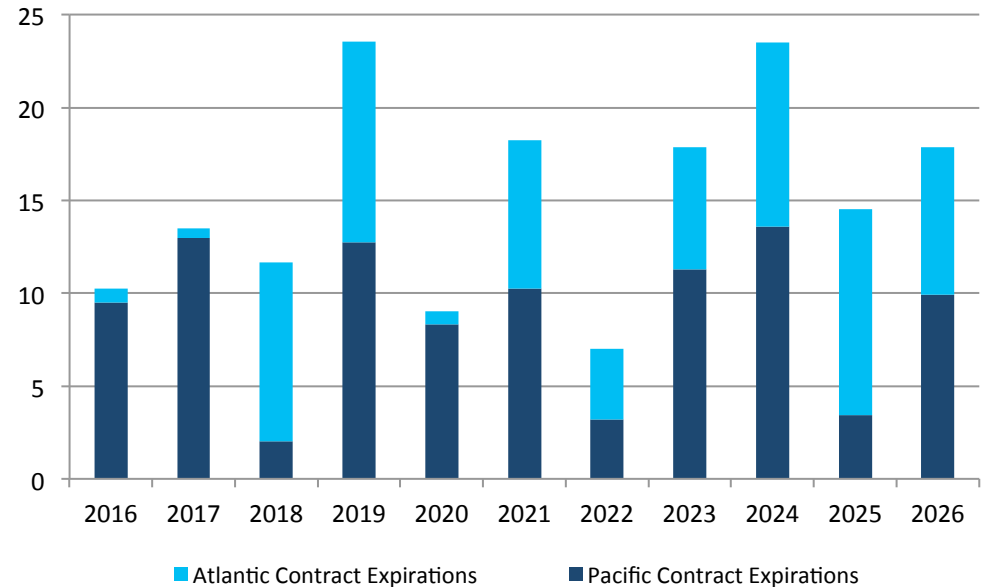


Source: Poten & Partners' LNG in World Markets

Contract expirations raise uncertainty

- 158 MMt of contract expirations through 2026
 - Mostly long-term supply
 - About 55% of expirations in Asia Pac and Middle East, rest in the Atlantic
- This is an opportunity for sellers
 - Some supplies coming from producers with declining availability
 - NWS, Indonesia, Malaysia, etc.
 - New suppliers offer geographical diversity and variety of pricing mechanisms
- But large number of expirations also pose challenges
 - Buyers are generally looking for smaller volumes and shorter tenures
 - Some new buyers are less credit worthy
 - Many players competing for same business

Global contract expirations (MMty)

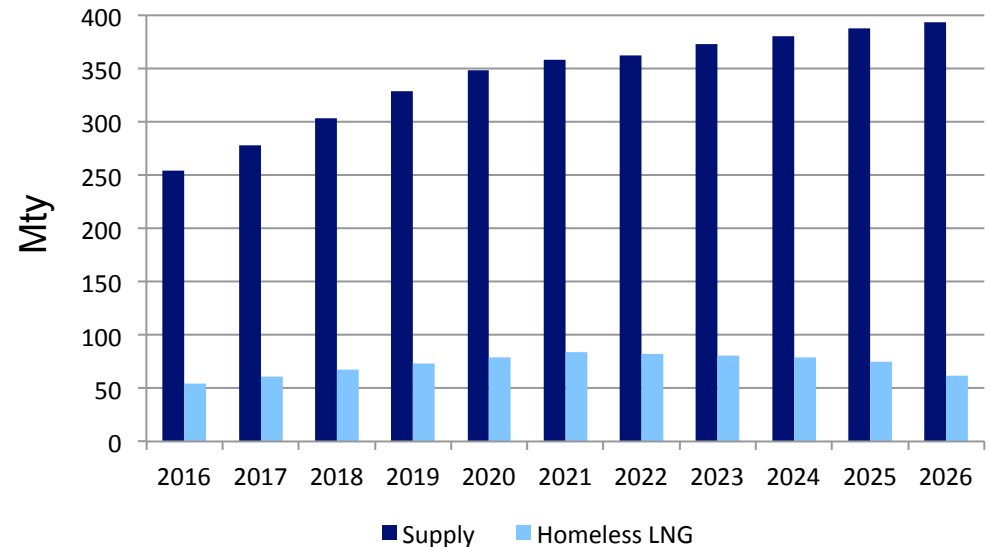


Source: Poten & Partners

Homeless LNG remains substantial

- Homeless LNG is LNG not committed to an end user
 - Aggregator supplies not under contract
 - Surplus supplies under contract to end users that most likely will be resold
 - Uncontracted tons held by producers
- There are a few things that can happen with homeless LNG
 - It can be sold under contract
 - Recent deals include Pakistan, Kuwait and other transactions
 - There are many contracts expiring over the next decade
 - It can flow into the spot market
 - It can stay in the ground
 - This is most likely for US supplies
 - Will only happen if global prices are extremely low or markets are saturated

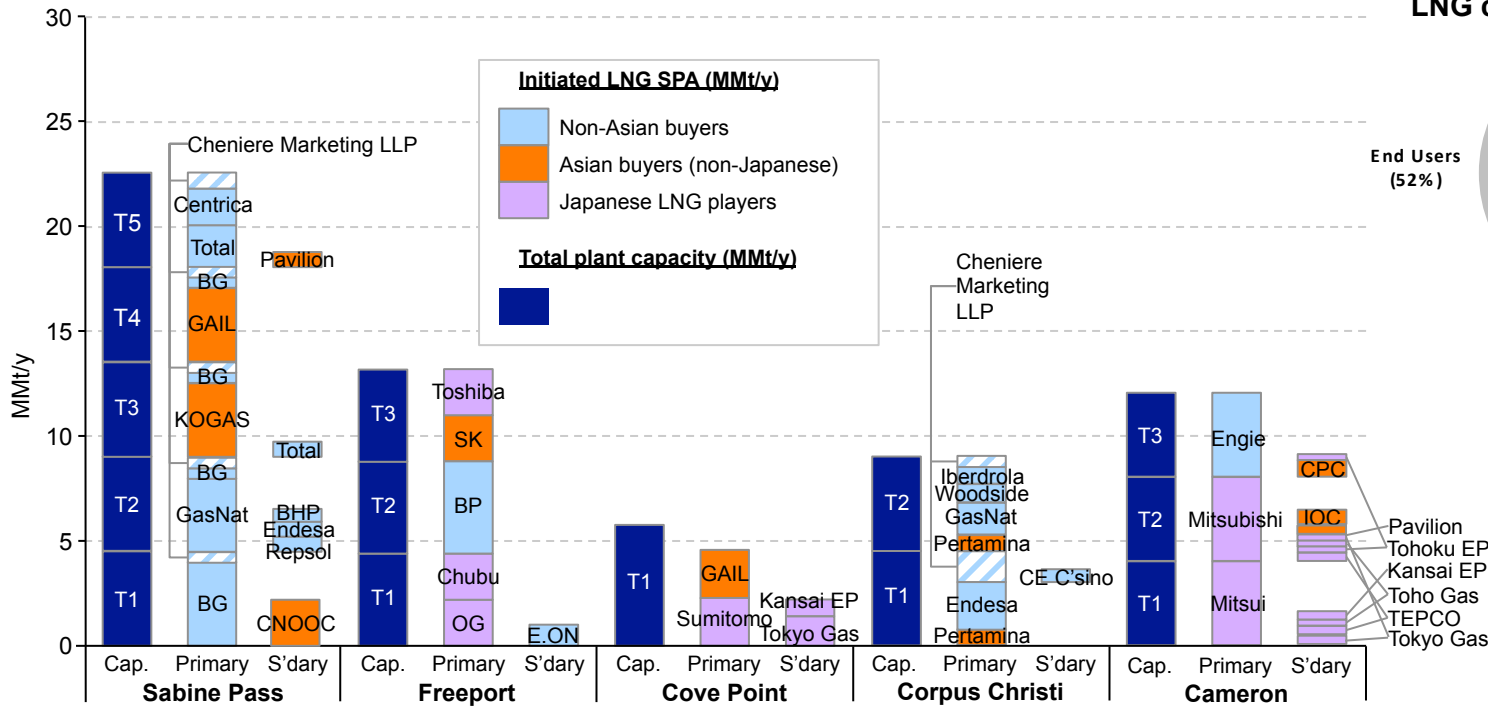
LNG supplies in search of final end users



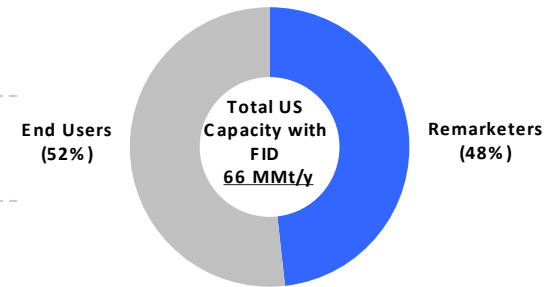
Source: Poten & Partners

Off-takers still need to re-market 48% of US projects under construction

US Liquefaction Capacity (most advanced projects) vs. LNG Sales/Offtake



Re-marketers* hold 48% of US LNG capacity with FID**



Note*: Re-marketers are BG, BP, GDF Suez, Total, Gas Natural, Mitsubishi, Mitsui, Sumitomo, Toshiba, Woodside

Note**: US LNG projects with FID as of October 2015, Sabine Pass T1-5, Freeport T1-3, Cameron T1-3, Cove Point, and Corpus Christi T1-2

Source: Poten & Partners

- Global portfolio suppliers and others are still looking to remarket substantial volumes from US export projects
 - This is turning out to be challenging in buyers' market – slow Asian LNG demand growth and supply long situation with new Australian projects entering the market.

Conclusion: Change is coming to the market

- The decisions buyers and sellers make over the next 5+ years as they work through abundant supply is going to fundamentally change the LNG market
 - Short- and medium-term business now commits the market to that model in the future
 - The long-term market is fragmenting
- Aggregators and majors with their own production will dominate the market
 - This is not to say they will make money
 - And there will be opportunities for pure traders
- Changes in the market require a new toolkit
 - Better pricing and risk management tools are needed
- The market changes may force a rethink of how we finance new projects
 - Aggregators allowed US projects to be financed. Will they sign more 20-year SPAs if they take a bath over the next few years?
 - Better risk management tools may allow projects to be financed without the same emphasis on long-term SPAs
 - It looks increasingly likely that over investment is leading to underinvestment in the future

CONSULTING | REPORTS & PUBLICATIONS | ONLINE SERVICES

SHIP BROKERAGE | COMMODITY BROKERAGE | PROJECT DEVELOPMENT | CAPITAL SERVICES



Thank You

HOUSTON | NEW YORK | LONDON | ATHENS | SINGAPORE | GUANGZHOU | PERTH



POTEN & PARTNERS

Business Intelligence and Consulting Contacts

Business Intelligence
Contact: Jason Feer
Email: jfeer@poten.com
Tel: +1 713 344 2367

US Sales
Contact: Dana Greer
Email: dgreer@poten.com
Tel: +713 263-3408

Europe & Asia Sales
Contact: Steve Park
Email: spark@poten.com
Tel: +44 20 3747 4849

Consulting
Contact: Graham Hartnell
Email: ghartnell@poten.com
Tel: +44 20 3747 4820