



Session 4

GLOBAL LNG TRADE

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- ▶ Brief history of global LNG trade,
- ▶ key suppliers and consumers in global trade
- ▶ LNG Trade
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 - ▶ Capacity utilization of Liquefaction and Regasification terminals
- ▶ Market Liquidity
 - ▶ Supply side and Demand-side factors affecting liquidity
 - ▶ Breakeven costs of global LNG export projects,
- ▶ Cross-border NG Pipelines and their impact on LNG trade

HISTORY OF LNG TRADE

LNG – evolution

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- ▶ 1940 : LNG Facility at Cleveland, Ohio
- ▶ 1958 : First Trans-Atlantic Shipment by Methane Pioneer: Lake Charles, Louisiana to Canvey Island, UK
- ▶ 1964 : First Commercial LNG facility at Algeria -ships the first consignment by Methane Princess; the CAMEL project to deliver Algerian gas to the UK and France
- ▶ 1969- three more trades had started – an additional delivery from Algeria to France, one from Libya to Italy and Spain, and one from the Cook Inlet of Alaska to Japan, the first Pacific project.
- ▶ 1972-USA entered the market first when deliveries started for a small Distrigas (Cabot) project at Everett, MA.
- ▶ 1978 - USA large contracts by El Paso Natural Gas to Columbia Gas for Cove Point, MD and Southern Natural at Elba Island, GA.
- ▶ 1982 onwards -Growth of LNG exporting and importing countries
- ▶ 2010-11: Shale gas boom in US and its entry as LNG Exporter ;The first tanker shipment of LNG took place from Lake Charles

History

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- ▶ The **development of the early US projects 1972** onwards took place during a period of unprecedented change in international energy markets. This included **the two oil price shocks**, the widespread **nationalisation of the international oil companies'** concession areas within OPEC, and the restructuring of the North American gas industry.
- ▶ While **LNG imports into Europe continued to increase**, the North American trade nearly collapsed, thereby blunting what was expected to be a substantial growth in Atlantic Basin trade. With the substantial slowdown in interest in LNG in the Atlantic, the balance of **interest shifted to the Pacific as Korea and Taiwan joined Japan as importers**.
- ▶ **Between 1975 and 1996, the Asia Pacific demand increased** by an average of 3.31 BCM per year (about 2.4 MMT). In contrast, Europe and the United States increased only 0.76 BCM per year.
- ▶ Since **1996 Atlantic Basin markets had begun to take off**, average Atlantic growth was 3.97 BCM per year compared to Asia's 4.22 BCM (equivalent to the capacity of a more modern 3 MMT train).
- ▶ With the **continuing growth of Asian markets**, the principal suppliers were from the Asia Pacific region – Indonesia, Malaysia, Australia and Brunei.
- ▶ The **first Middle East project from Abu Dhabi** dates back to 1977, but there was no significant expansion until the major **new projects from Qatar and Oman** in the late 1990s. Similarly, the slow growth of European and US markets until recently limited the Atlantic market
- ▶ The **Asia- Pacific Basin Suppliers Dominated Growth until 1996**, Accounting for 72% of Supply at that Time;
- ▶ With the startup of **new liquefaction plants in Trinidad and Nigeria in 1999** the Atlantic Basin suppliers started growing . By Late **1990s Indonesia has become the world's largest supplier**, but Qatar in the Middle East and both Trinidad and Nigeria in the Atlantic Basin started increasing their exports substantially.
- ▶ By **2002-03 Egypt had two LNG facilities** under construction and was destined to become a major LNG supplier.

Recent Past

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- ▶ LNG industry has grown by leaps and bounds since the beginning of the 21st century.
- ▶ The largest LNG train in operation is in Qatar, with a total production capacity of 7.8 million tonnes per annum (MTPA).
- ▶ These facilities reached a safety milestone in 2014, completing 12 years of operations on its offshore facilities without a Lost Time Incident.
- ▶ The Qatar operation overtook the Train 4 of Atlantic LNG, Trinidad Tobago with a production capacity of 5.2 MTPA, followed by the LNG plant in Egypt with a capacity of 5 MTPA.
- ▶ The recent boom in U.S. natural gas production 2011 onwards, enabled by hydraulic fracking, has many of US LNG import facilities being considered as export facilities.
- ▶ The first U.S. LNG export was completed in early 2016.

Key Suppliers and Consumers

Key Suppliers –LNG

TOTAL: 20

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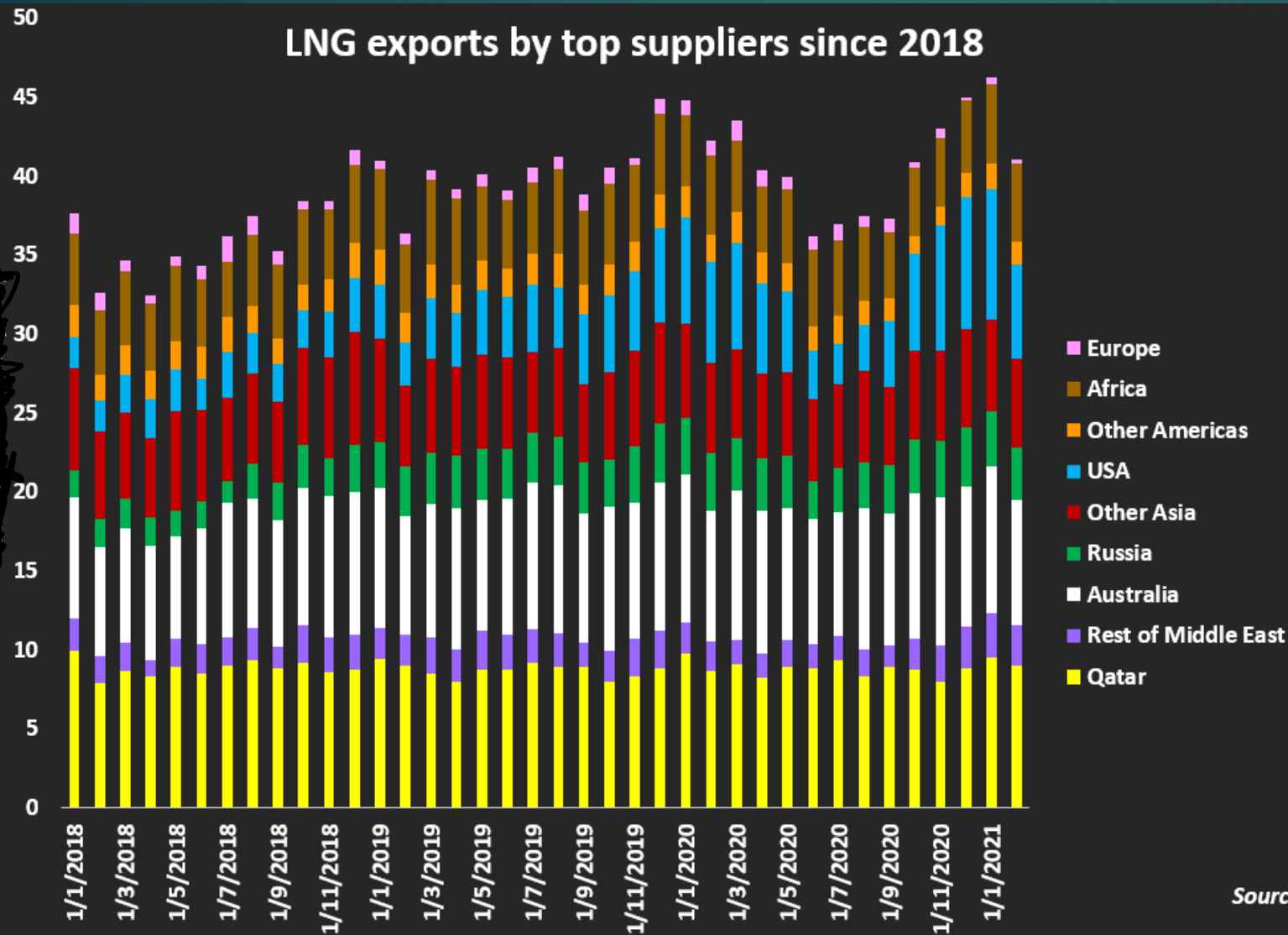
- ▶ Qatar
- ▶ Australia
- ▶ USA
- ▶ Algeria
- ▶ Russia
- ▶ Nigeria
- ▶ Indonesia
- ▶ Malaysia
- ▶ Trinidad & Tobago
- ▶ Oman
- ▶ UAE
- ▶ Papua New Guinea

LNG Exports – Top Suppliers

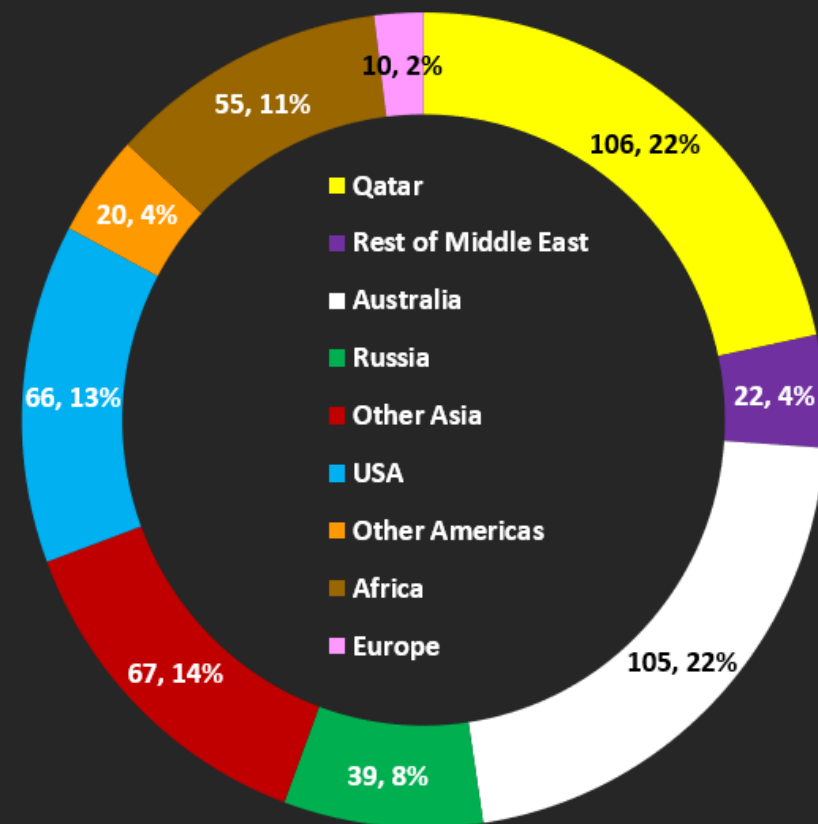
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10BCM

LNG exports by top suppliers since 2018



2020 LNG exports by origin (BCM), and share of total (%)



Source: Refinitiv

Note: 1BCM = 0.74 MTPA

Key Consumers –LNG

TOTAL- 39

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- ▶ Japan
- ▶ China
- ▶ South Korea
- ▶ India
- ▶ Taipei
- ▶ Spain
- ▶ France
- ▶ UK
- ▶ Italy
- ▶ Turkey
- ▶ Pakistan
- ▶ Bangladesh

World's Top LNG Importing Countries

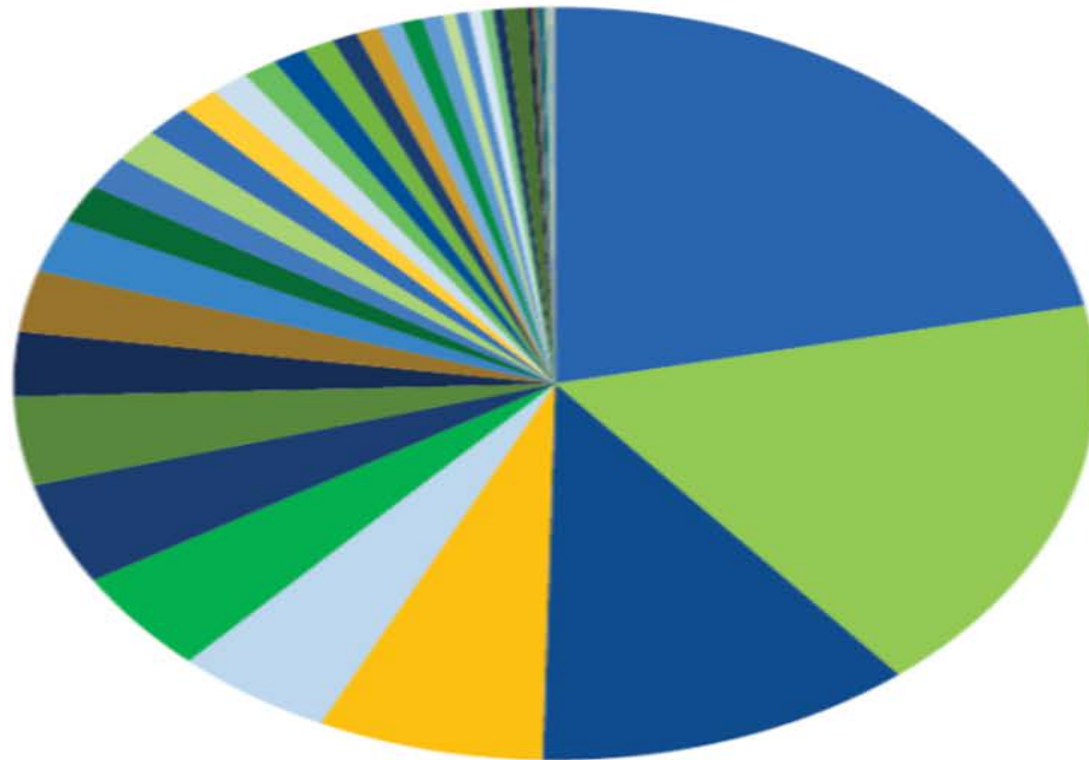
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Country	Million Ton 2019	Million Ton 2020	Market Share %
Japan	76.87	74.43	21
China	71.68	68.91	19
South Korea	40.14	40.81	11
India	23.98	26.63	7
Chinese Taipei	16.66	17.76	5
Spain	15.72	15.37	4
UK	13.55	13.43	4
France	15.57	13.06	4
Turkey	9.37	10.72	3
Italy	9.77	9.07	3
Pakistan	8.10	7.42	2
Thailand	5.00	5.61	2
Netherland	5.79	5.33	1
Bangladesh	4.07	4.18	1
Portugal	4.12	4.07	1

LNG importing Countries

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Figure 2.5: 2019 LNG Imports and Market Share by Market (in MT)



Japan , 76.9 , 22%	China , 61.7 , 17%
South Korea , 40.1 , 11%	India , 24.0 , 7%
Chinese Taipei , 16.7 , 5%	Spain , 15.7 , 4%
France , 15.6 , 4%	UK , 13.5 , 4%
Italy , 9.8 , 3%	Turkey , 9.4 , 3%
Pakistan , 8.1 , 2%	Netherlands , 5.8 , 2%
Belgium , 5.1 , 1%	Thailand , 5.0 , 1%
Mexico , 4.9 , 1%	Portugal , 4.1 , 1%
Bangladesh , 4.1 , 1%	Indonesia , 3.6 , 1%
Kuwait , 3.6 , 1%	Singapore , 3.3 , 1%
Malaysia , 2.7 , 1%	Poland , 2.5 , 1%
Chile , 2.4 , 1%	Brazil , 2.3 , 1%
Greece , 2.1 , 1%	Jordan , 1.4 , 0%
Lithuania , 1.4 , 0%	UAE , 1.4 , 0%
Argentina , 1.2 , 0%	Dominican Rep. , 1.2 , 0%
USA (incl. Puerto Rico) , 2.4 , 1%	Israel , 0.6 , 0%
Panama , 0.4 , 0%	Canada , 0.4 , 0%
Malta , 0.4 , 0%	Jamaica , 0.3 , 0%
Sweden , 0.3 , 0%	Colombia , 0.2 , 0%
Finland , 0.1 , 0%	Norway , 0.1 , 0%
Egypt , 0.1 , 0%	Gibraltar , 0.1 , 0%

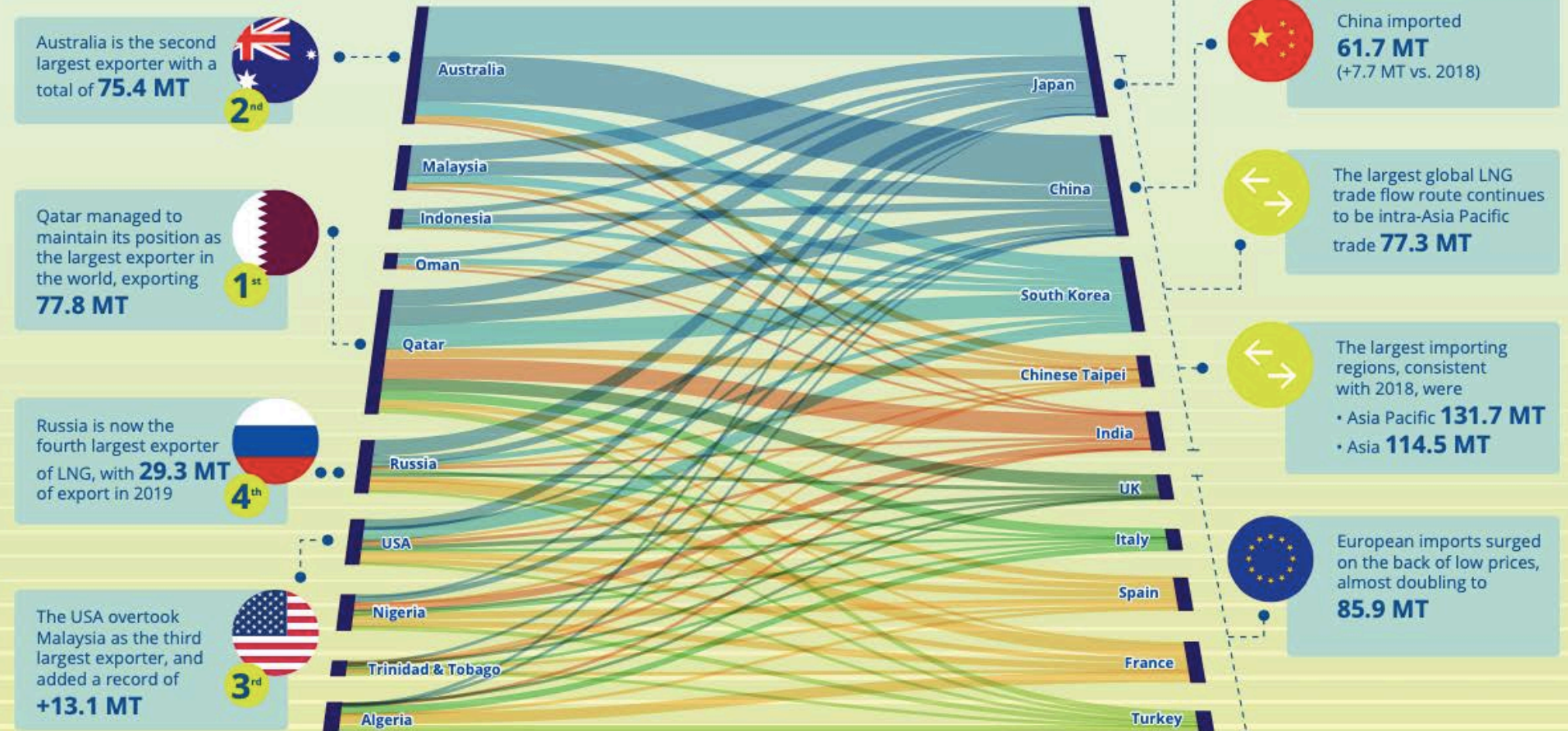
Source : GIIGNL

LNG TRADE

GLOBAL LNG TRADE

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Global LNG trade increased to **354.7 MT** in 2019, an increase of **40.9 MT** or 13% vs. 2018. This is the sixth year of consecutive growth in global LNG trade.



*The diagram only represents trade flows between the top 10 exporters and top 10 importers.

LNG TRADE

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Global LNG Trade	LNG Exporters & Importers	LNG Re-Exports
+40.9 MT Growth of global LNG trade	No new LNG importers in 2019 ¹	-2.2 MT Re-exported volumes decreased by 59% YOY in 2019
Global LNG trade reached an all-time high of 354.7 MT in 2019, setting a new annual record.	Bangladesh, Brazil, China, India, and Jamaica increased imports through new-built terminals.	Re-export activity dropped in 2019 to 1.6 MT (3.8 MT in 2018).
China provided 7.7 MT in new import demand, and Europe increased imports by 37 MT.	While most liquefaction capacity was added in markets already exporting LNG, a floating liquefaction project came online in Argentina, raising the number of exporters to 20.	Re-exports received dropped in all markets. Asia received the largest volume of re-exports (0.9 MT), while Europe re-exported the highest volumes (0.9 MT).
Contractions were largest in Japan (-5.6 MT), South Korea (-3.8 MT) and Egypt (-1.9 MT).		

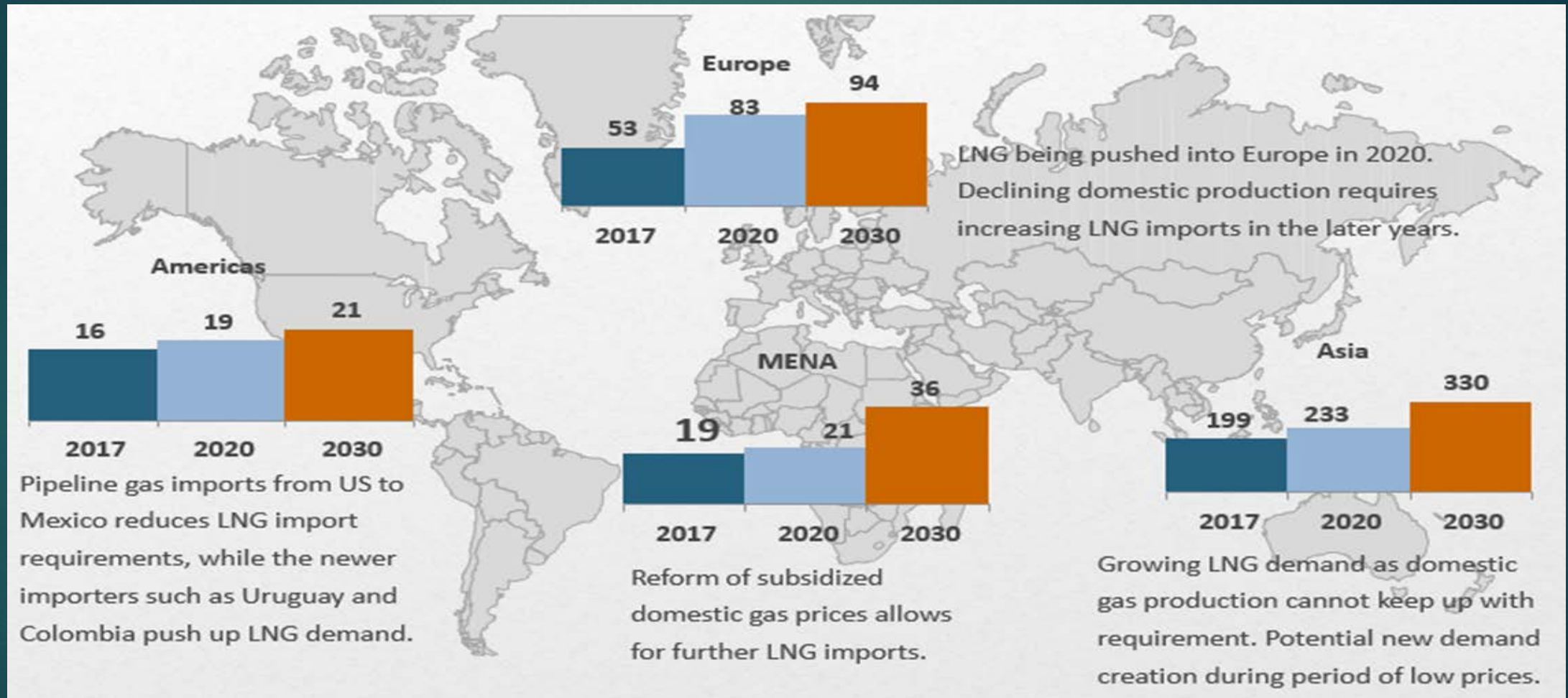
Table 2.1: LNG Trade Between Regions, 2019 (in MT)

Exporting Region	Asia-Pacific	Middle East	Africa	North America	Former Soviet Union	Latin America	Europe	Reexports Received	Reexports Loaded	Total
Importing Region										
Asia-Pacific	77.3	31.2	2.9	9.5	8.8	2.1	-	0.3	0.4	131.7
Asia	54.2	36.3	13.6	3.0	4.8	1.9	0.1	0.8	0.1	114.5
Europe	-	23.5	25.1	12.7	15.1	5.9	4.2	0.3	0.9	85.9
Latin America	-	-	0.8	4.2	-	2.6	0.4	0.1	-	8.1
North America	0.2	-	1.5	2.9	0.1	3.1	-	-	-	7.7
Middle East	0.1	3.0	1.0	1.4	0.6	0.8	-	0.1	-	6.9
Africa	-	-	0.1	-	-	-	-	-	-	0.1
Total	131.7	93.9	45.0	33.8	29.3	16.3	4.7	1.6	1.6	354.7

Source : GIIGNL

LNG – Demand Forecast

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Liquefaction Plants

Global liquefaction capacity reached **430.5 MTPA** in 2019.

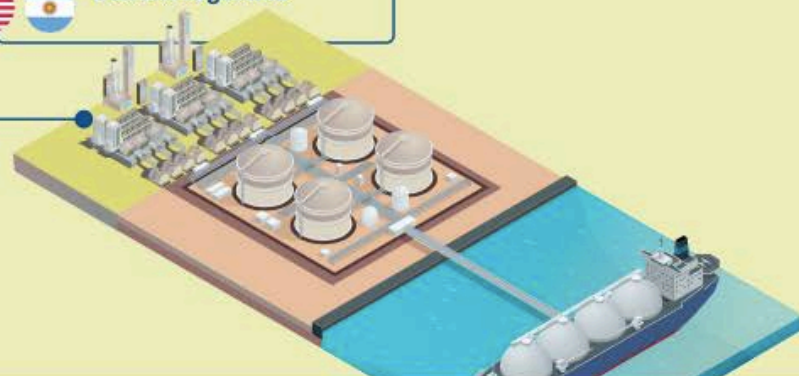
Capacity Additions for 2019

42.5 MTPA
of liquefaction capacity brought online

11%
year-on-year growth vs 2018

Australia 87.6 MTPA **overtook** **Qatar 77.1 MTPA**
as the market with the highest liquefaction capacity

Capacity added in **Australia, Russia, USA and Argentina**



FIDs and Under Construction

Record FIDs of liquefaction projects, totalling **70.8 MTPA**

FIDs were taken in **USA, Mozambique, Russia and Nigeria**

Global liquefaction capacity forecasted to reach **454.8 MTPA** by end 2020

Liquefaction capacity forecasted to be added in 2020 in **USA, Indonesia, Malaysia and Russia**



Pre-FID

907.4 MTPA
of liquefaction capacity currently in pre-FID stage

350.5 MTPA from USA	50.0 MTPA from Australia	42.2 MTPA from Russia
221.8 MTPA from Canada	49.0 MTPA from Qatar	



LNG- LIQUEFACTION CAPACITIES

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Global liquefaction capacity reached
452.9 MTPA in 2020.

Capacity Additions for 2020

 **20 MTPA**
of liquefaction capacity
brought online

 **5%**
year-on-year
growth vs 2019

 **Australia**
87.6 MTPA
Market with the
highest liquefaction
capacity

 **Qatar**
77.1 MTPA
Market with the
second highest
liquefaction capacity

 **USA**
Capacity added
in the USA
+20 MT

Pre-FID



892.4 MTPA
of liquefaction capacity
currently in pre-FID stage
as of Feb 2021

351.6 MTPA
from USA

227.8 MTPA
from Canada



50.0 MTPA
from Australia

44.0 MTPA
from Russia

37.2 MTPA
from
Mozambique

FIDs and Under Construction



Energia Costa Azul T1
Only 1 project took FID
in 2020
3.3 MTPA



Qatar Petroleum took
FID on North Field East
in Feb 2021
32 MTPA



139.1 MTPA

of liquefaction capacity under construction or
sanctioned for development as of Feb 2021



LNG LIQUEFACTION PLANTS

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World's Top LNG Producing Countries

Country	Million Ton	Market Share %
Australia	77.8	22
Qatar	77.1	22
USA	44.8	13
Russia	29.6	8
Malaysia	23.9	7
Nigeria	20.6	6
Indonesia	15.0	4
Algeria	10.6	3
Trinidad & Tobago	10.1	3
Oman	9.8	3
Papua New Guinea	8.3	2
Angola	4.6	1
Peru	3.8	1
Norway	3.2	1
Equatorial Guinea	2.6	1

Liquefaction Capacities Utilization Levels

- ▶ Global liquefaction capacity – 430.5 MTPA at the end of 2019
- ▶ In 2020 - 20.0 million tonnes per annum (MTPA) of liquefaction capacity was brought online
- ▶ Global liquefaction capacity - 452.9 MTPA at the end of 2020
- ▶ Average global utilization rate in 2019 - 81.4%
- ▶ Average global utilisation rate in 2020 - 74.6%

Halt in Investments due to CoVid-19

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LNG Receiving Terminals

23.4 MTPA of receiving capacity was added in 2019

+6

new terminals between 2019 – February 2020

+3

expansions at existing terminals between 2019 – February 2020

821 MTPA

of global regasification capacity as of February 2020

India and Thailand expanded existing LNG plants



Growth in

2019

was driven primarily by new-built terminals in existing LNG import markets: Bangladesh, Brazil, China, India, and Jamaica



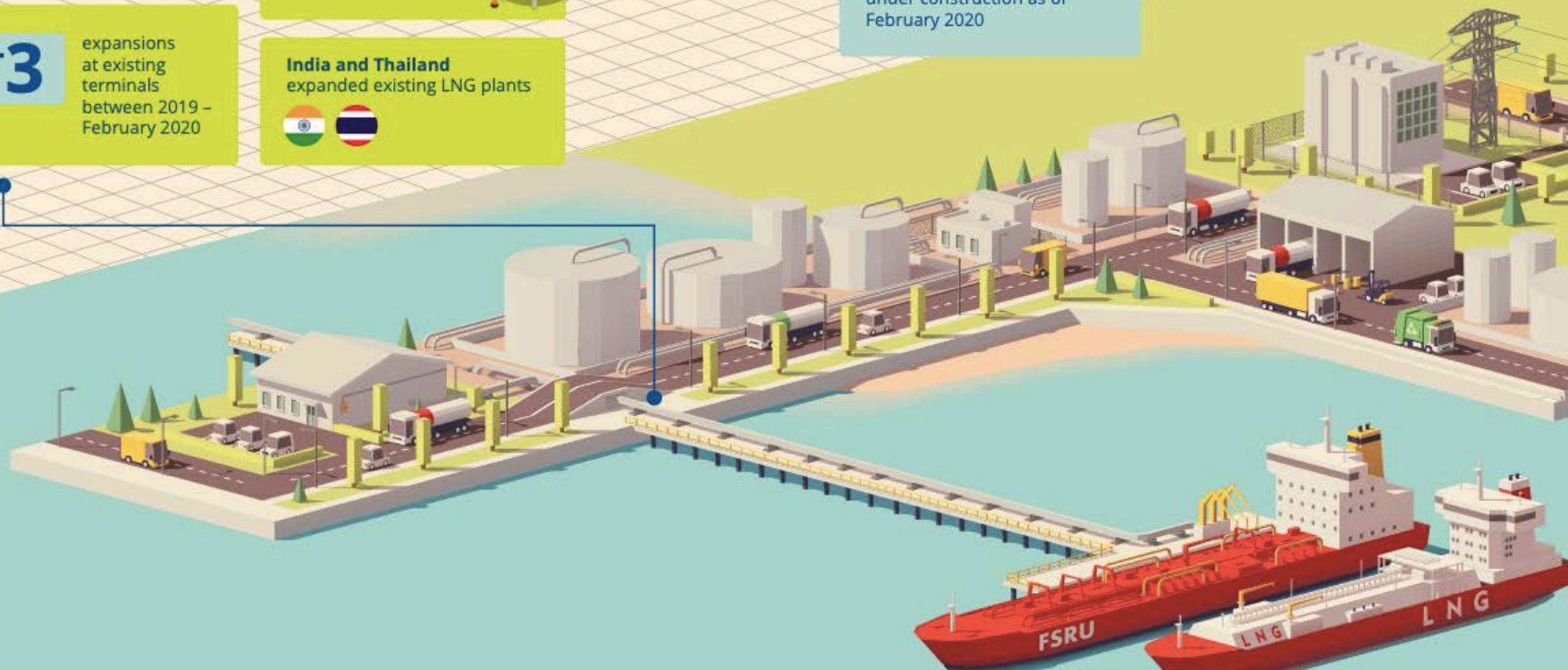
3 new FSRUs

Bangladesh, Brazil, and Jamaica



120.4 MTPA

of new regasification capacity under construction as of February 2020



Regasification Terminals Utilisation Levels

- ▶ LNG Receiving Terminals Capacity beginning of 2021 – 840 MMTPA
- ▶ Existing Terminals – 133, Under Construction - 30
- ▶ Japan has highest – 210 MMTPA i.e 25% of global regas capacity
- ▶ Increase in Regas Terminals in 2020– 4
- ▶ Increase in Capacity in 2020 – 19 MMTPA
- ▶ New countries joining – Myanmar
- ▶ New Capacities coming up 2021 – Brazil, Croatia
- ▶ New Markets Developing 2021 onwards – Ghana, El Salvador, Morocco, Coat De' Ivory, Cyprus, Nicaragua, Germany etc.
- ▶ Average Regas Terminals Utilisation level in 2020- 43 %
- ▶ Additional Regas Capacity – allows peak requirements to be met, seasonal winter demand requirements, Security of supply

Market Liquidity

LNG Market Liquidity

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▶ Supply Side

- ▶ Large Liquefaction capacities coming up (450MTPA) – Qatar, Australia, USA etc.
- ▶ Shipping fleet growing – 572 active vessels, 35 new delivered in 2020
- ▶ Import markets - developing LNG Hubs
- ▶ Re exports – Singapore, South Korea, India etc.
- ▶ Ship reloading and Transhipment

▶ Demand Side

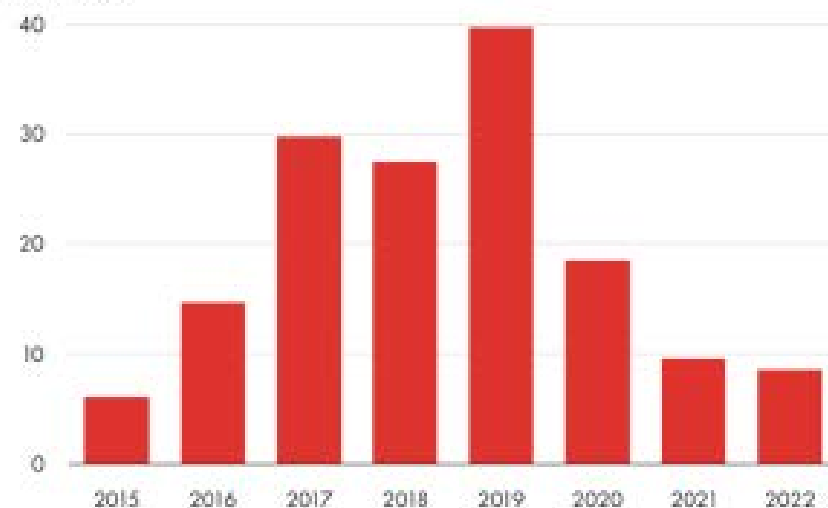
- ▶ Term of contracts – getting over, period getting smaller, short term in vogue
- ▶ Growing LNG capacity access- capacity holders growing, access to third party, traders
- ▶ FSRU- catering to quick, localized and smaller demands
- ▶ New Applications eg. Bunkering, Truck loading
- ▶ Price – arbitrage with alternate fuels, markets
- ▶ Weather – seasonality, temperature and climate impact

LNG Demand and Supply : face to face in 2021

LNG GROWTH

LNG trade volume growth

MTPA (DES)

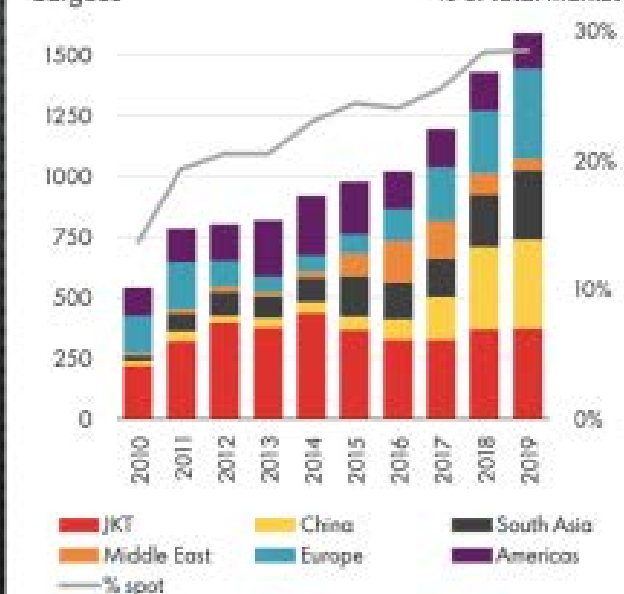


2019 LNG trade volume: 359 MTPA

Spot LNG deliveries

Cargoes

% of total market



Continued increase in Spot Deliveries

LNG Market

GLOBAL LNG TRADE: Emerging Gap in Demand and Supply

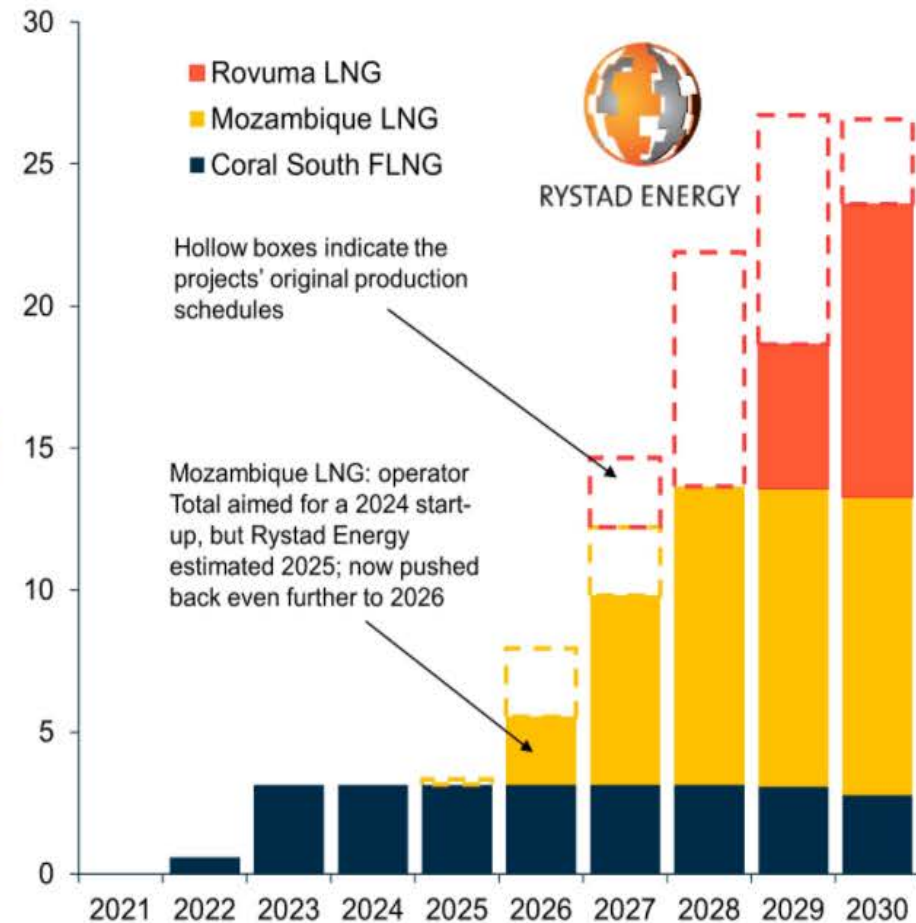
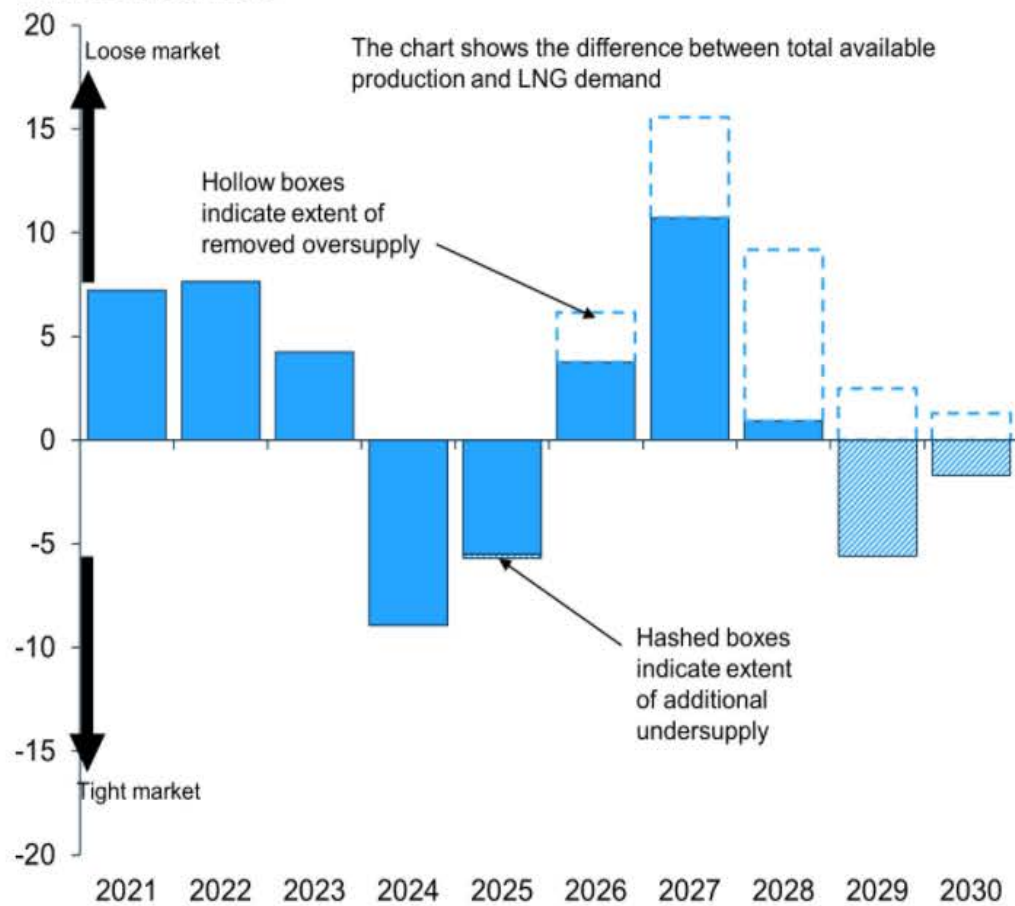
Global LNG demand continued to grow
despite a global pandemic

LONG TERM LNG MARKET TRENDS

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Global LNG balances – impact of delays in Mozambique's LNG projects

Million tonnes



Source: Rystad Energy GasMarketCube, research and analysis

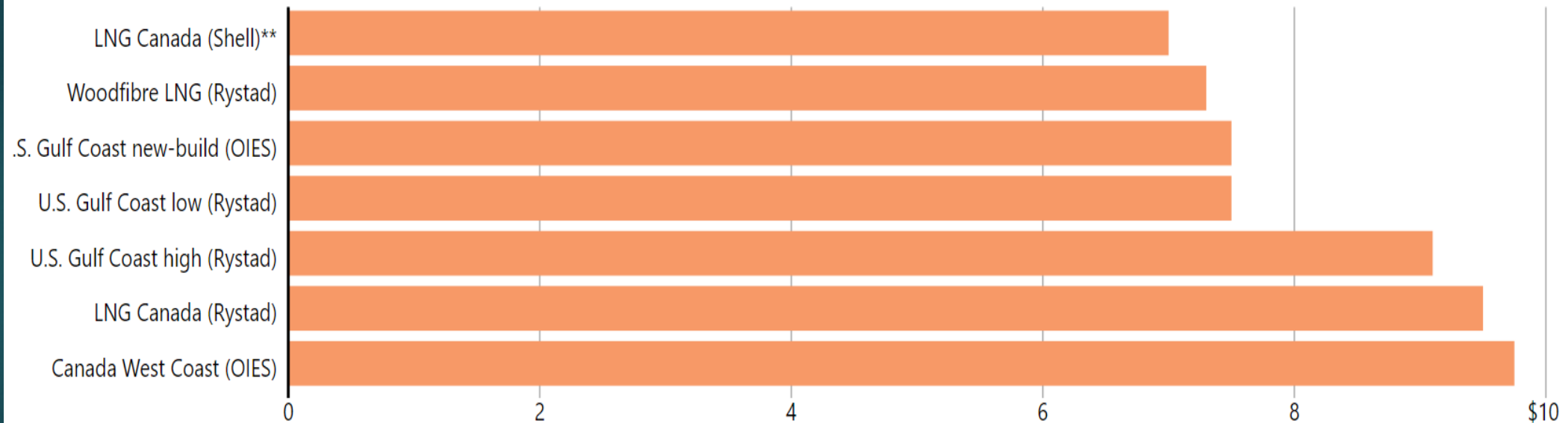
Breakeven costs of global LNG export projects

LNG Export Market Projects

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Estimated break even costs of new LNG projects

Liquefied natural gas export projects on North America's West Coast have high capital costs, but may be able to deliver for cheaper than expected.



*Based on delivery to Asia **Based on \$2 feed gas price

Royal Dutch Shell, Oxford Institute for Energy Studies, Rystad Energy

Julie Gordon | REUTERS GRAPHICS

Cross-border Natural Gas Pipelines

Trans National Pipelines

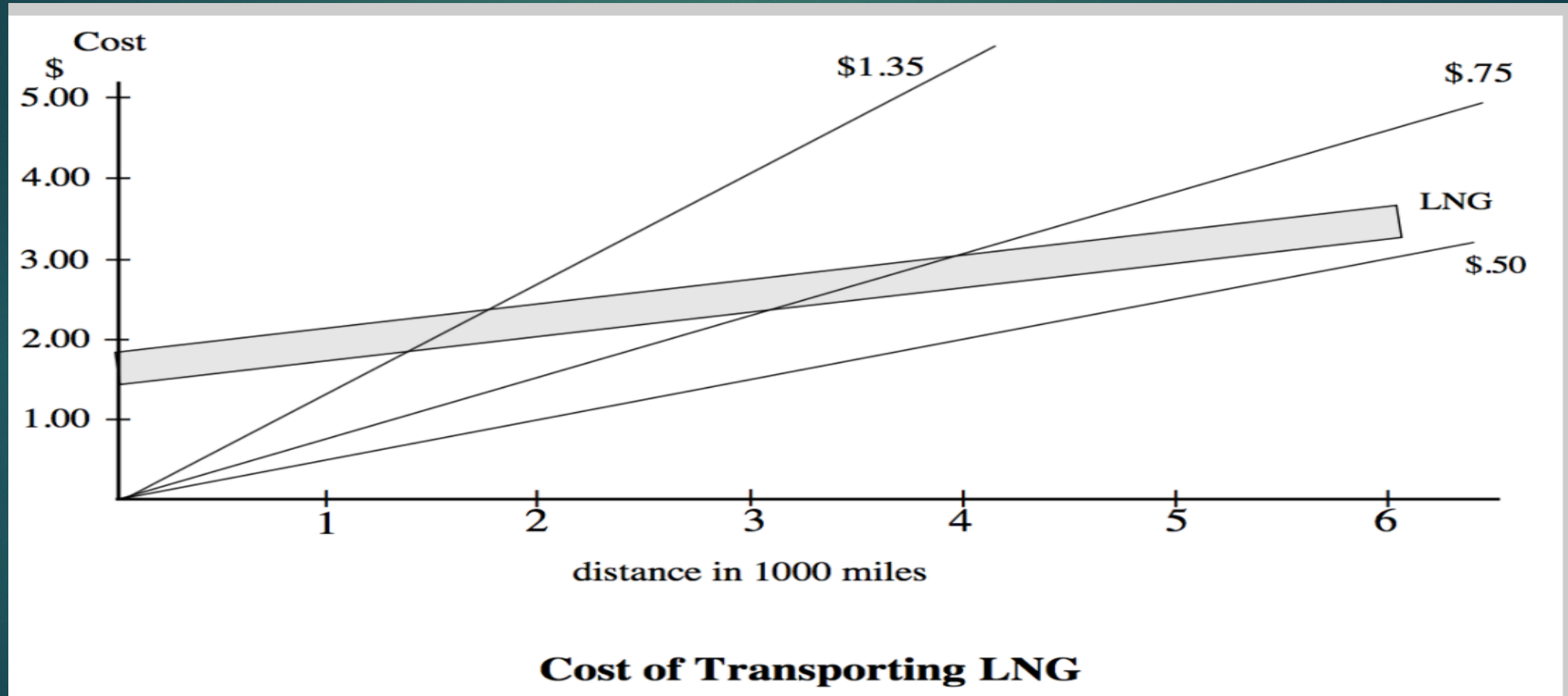
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- ▶ Transnational pipelines create long term economic relations between nations for meeting energy needs
- ▶ Transnational pipelines are point to point and have limited flexibility in terms of capacity, supply volumes and destination
- ▶ Transnational pipeline projects and LNG Import Projects are complimentary with each other in order to meet the energy needs of the nations

Trans National Pipelines V/S LNG

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Break even point for LNG at different pipeline transportation costs



Regional Accessibility: Pipeline projects

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Q & A

Thanks