

# A Japanese Perspective

Session II: NG/LNG Markets and Price Behaviour

Status of Post-Pandemic Natural Gas and LNG Markets

EIA 2021 Virtual Workshop on Financial and Physical Energy Market Linkages

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# Talking Points

- A view from Japan on the global energy crisis
- Market shift (LNG production, consumption)
- The role of LNG from the United States to Japan
- Updates on Japan's retail competition
- Strategic Energy Plan and its implication on LNG
- Methane emission management
- Future considerations

# World Gas Price Shocks - Causes and Implications

- Spot LNG price assessment
  - ✓ Growing demand in Northeast Asia, notably China
  - ✓ Outages of LNG production (although trades increase)
- European spot gas prices
  - ✓ Growing demand (Recovery, decreasing coal-fired power and below expectation performance of renewables)
  - ✓ Low inventories (Supply growth does not catch up with demand growth)
- Greater interaction between global regions and different energy sources
- Expected impacts on future LNG and gas procurement
- Transition pathways will be impacted
- Lessons from the past winter
  - ✓ Close consultation between the government agencies and electric power and gas companies
  - ✓ Initiatives of closer regional cooperation between companies

# What Have Been Observed

Russia maintains higher level of pipeline gas export with evolving destinations and supply routes. Reduction of crude oil production in 2020 has some impacts on associated gas production.

EU/ United Kingdom: Economic recovery, decreasing domestic gas production, below expectation renewable production, decreasing coal-fired power mean more demand for gas from outside.

India suffers from higher coal prices and consequentially shortage of thermal power production, as well as reduced LNG import due to higher prices.

Southeast Asia: Due to higher spot prices, LNG imports have not grown quickly.

China: Strong economic performance, coal-to-gas shift leading to surge in LNG import and increasing domestic gas production

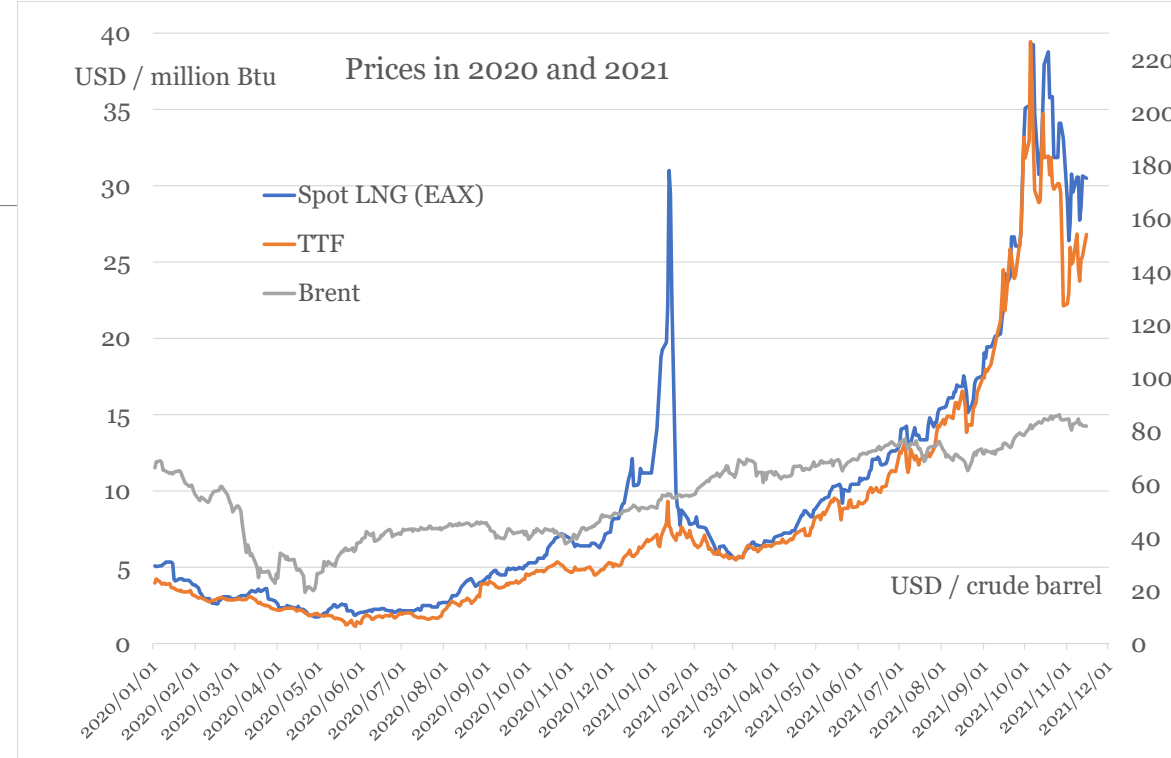
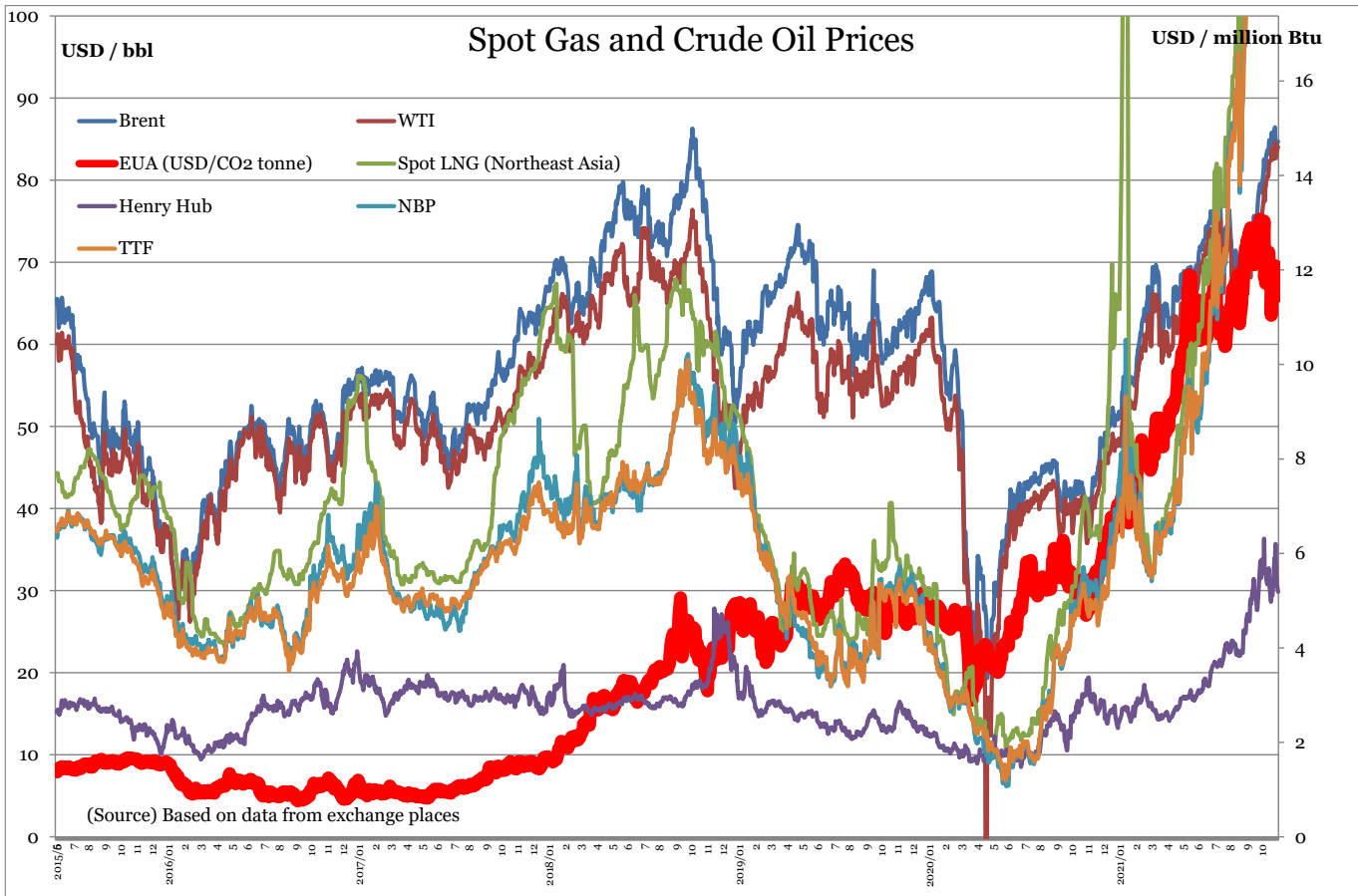
Northeast Asia: Increasing LNG demand encourages surge in assessed spot LNG prices

USA dominates growth of LNG export globally. Domestic gas prices rise.

Brazil: Less hydro-electric power production increase need for LNG to fill the gap.

# Volatility Has Been Excessive

Global Spot Gas and Crude Oil Prices (near month)

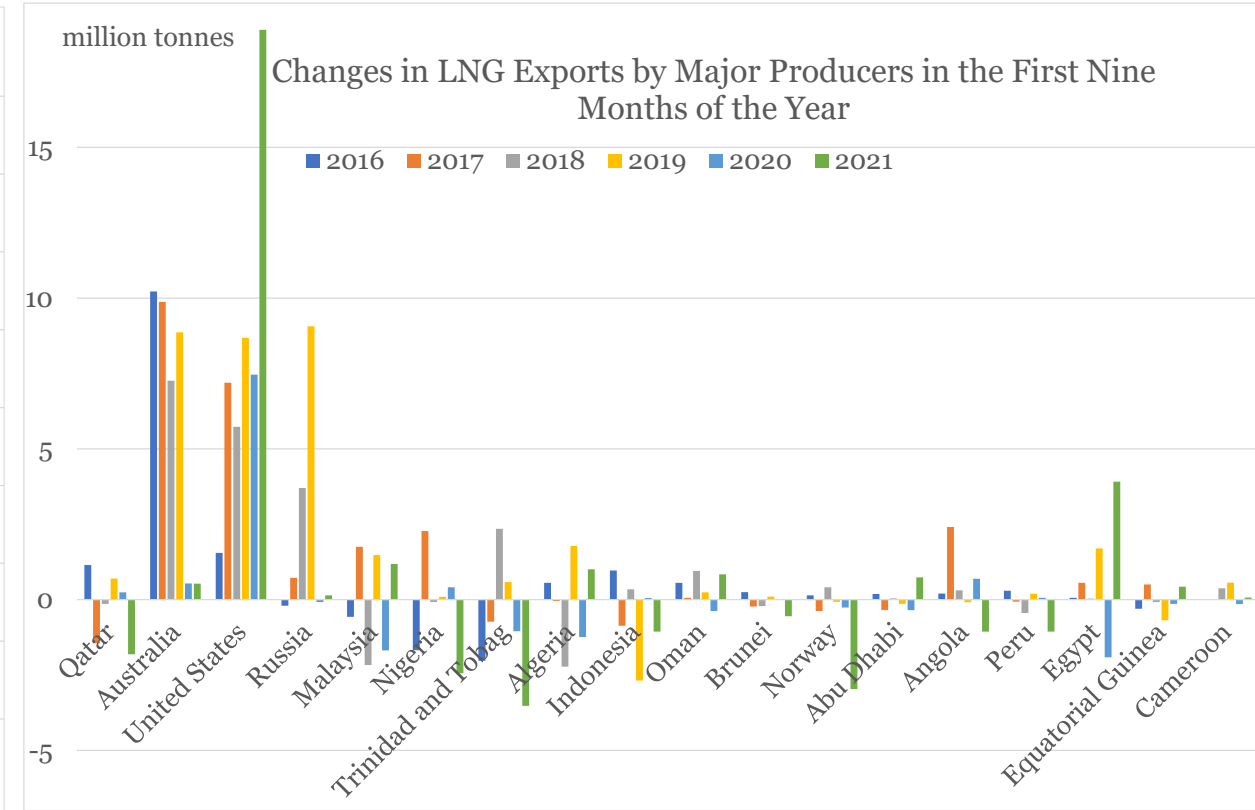
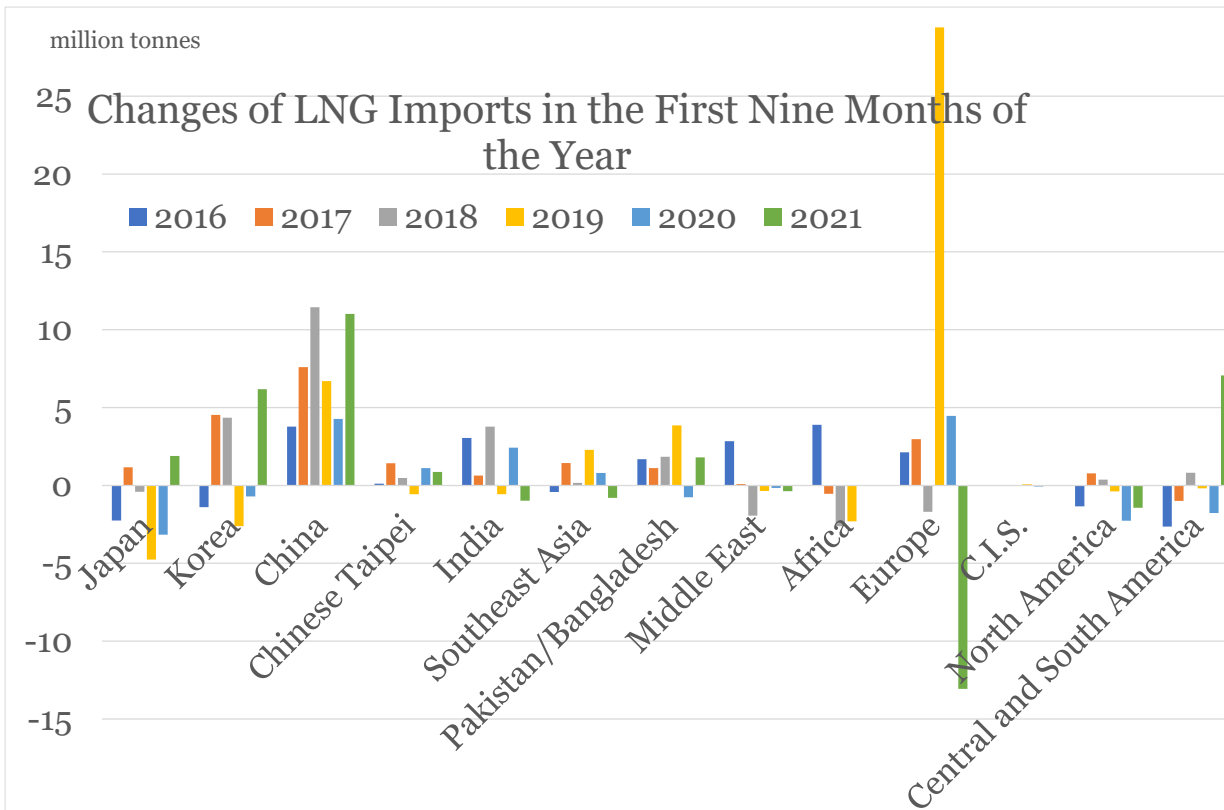


Spot gas (assessment in Asia) and crude prices at certain points

	Northeast Asia	Europe	USA	Brent Crude
September 2021	33.10	33.18	5.87	13.64
August 2021	17.55	17.46	4.38	12.44
September 2020	5.10	4.56	2.53	7.35

(Unit) USD / million Btu (Source) Data from ICIS, ICE, CME, IMF

# LNG Import Growth Is Driven By China



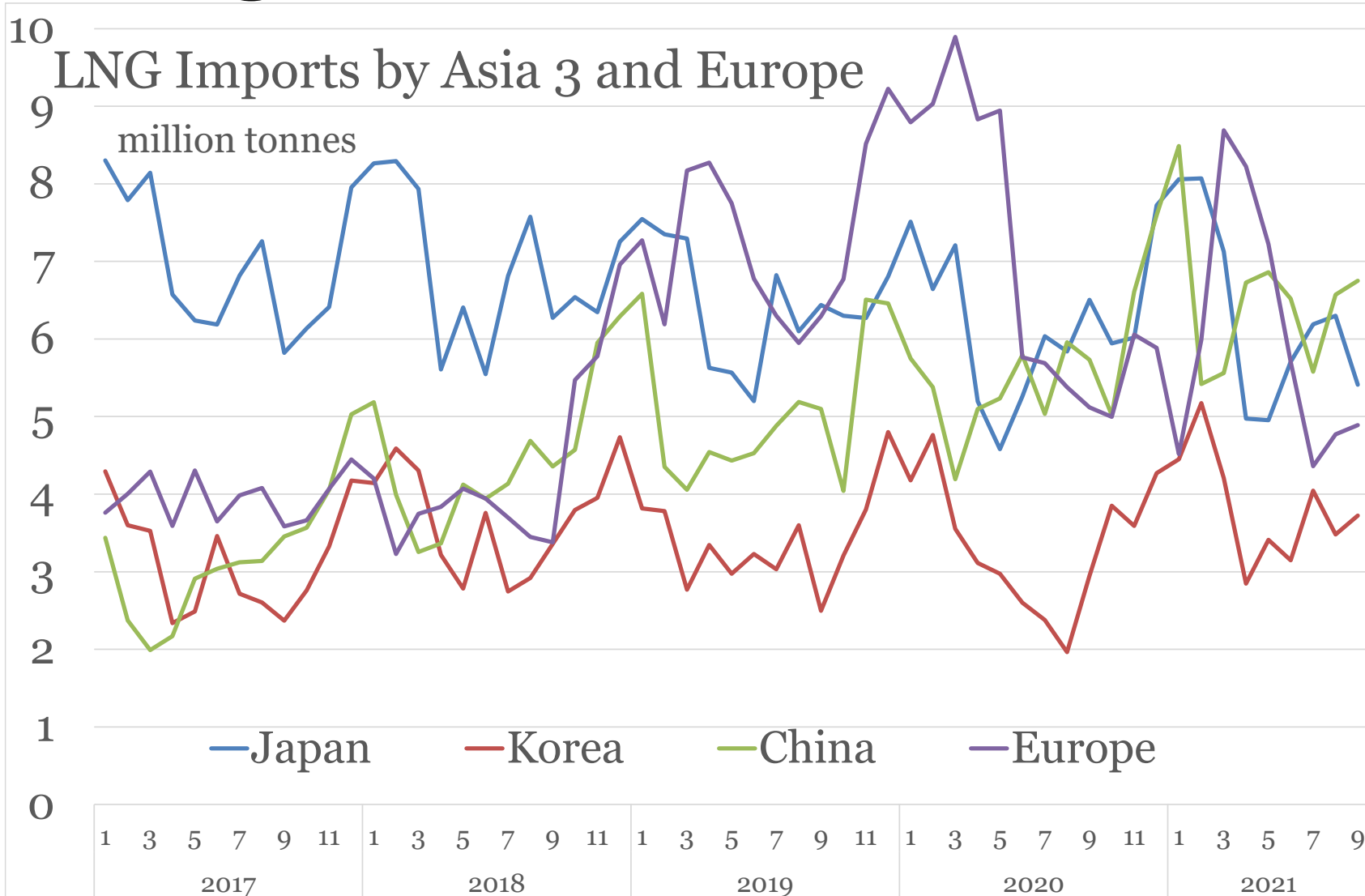
(Source) Compiled by the author based on data of Cedigaz LNG Services

- LNG imports grow in China, Korea, South America and Japan in 2021, decrease in Europe
- LNG exports increase in USA and Egypt, do not change much in Australia and Qatar, and decrease in some producers

# A Mixed LNG Market in 2020-21 - Growth Slowed but More Resilient than Other Energy

- The combined LNG imports into the four big markets in Northeast Asia during the first nine months of 2021 amounted to 165 million tonnes, a 14% increase year-on-year.
- The total LNG trade in the world increased by 4.6% from one year earlier to 277 million tonnes during the first three quarters in 2021. The share of the Northeast Asia big four was 55% in the period, almost the same as in the twelve months of 2020.
- The European region, including Turkey, imported 54 million tonnes of LNG during the nine-month period in 2021, declining nearly 20% year-on-year.
- Assessed spot LNG prices shot up to the highest levels in the history.
- The single largest final investment decision on LNG production facilities was made in Qatar.

# Higher Peaks Have Been Observed

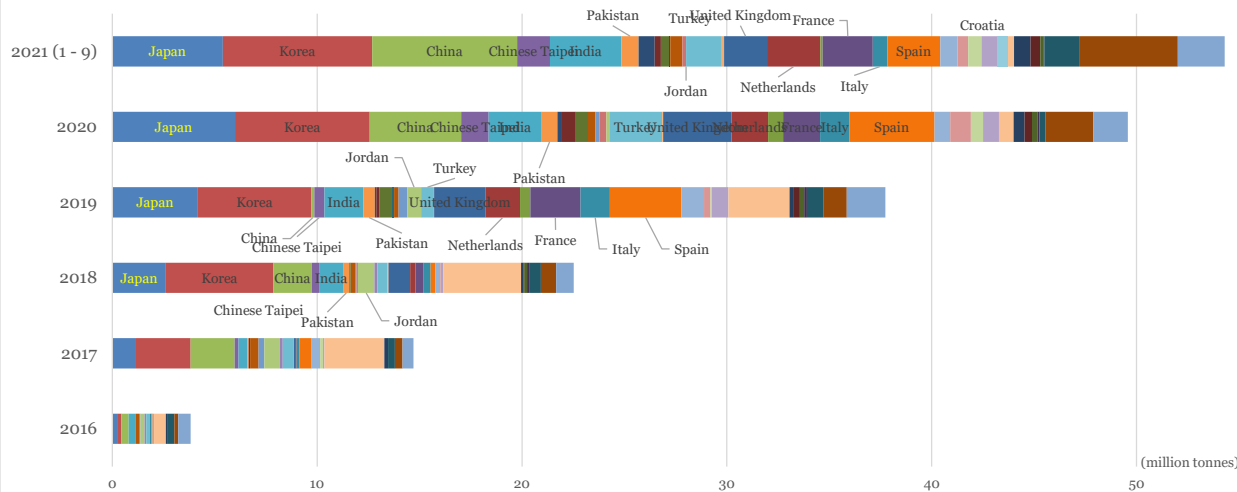


- The current four major LNG importers (Japan, China, Korea and Europe including the United Kingdom and Turkey) have seasonal import peaks in the Northern Hemisphere winter. The peaks have been higher in recent years.
- If they find any market with different seasonal peaks and bottoms of demand, it will be less difficult for them to balance demand and supply throughout the year.
- Some players have already embarked on international alliances.



# LNG From USA Is The Key

## LNG Exports in Bulk from the United States

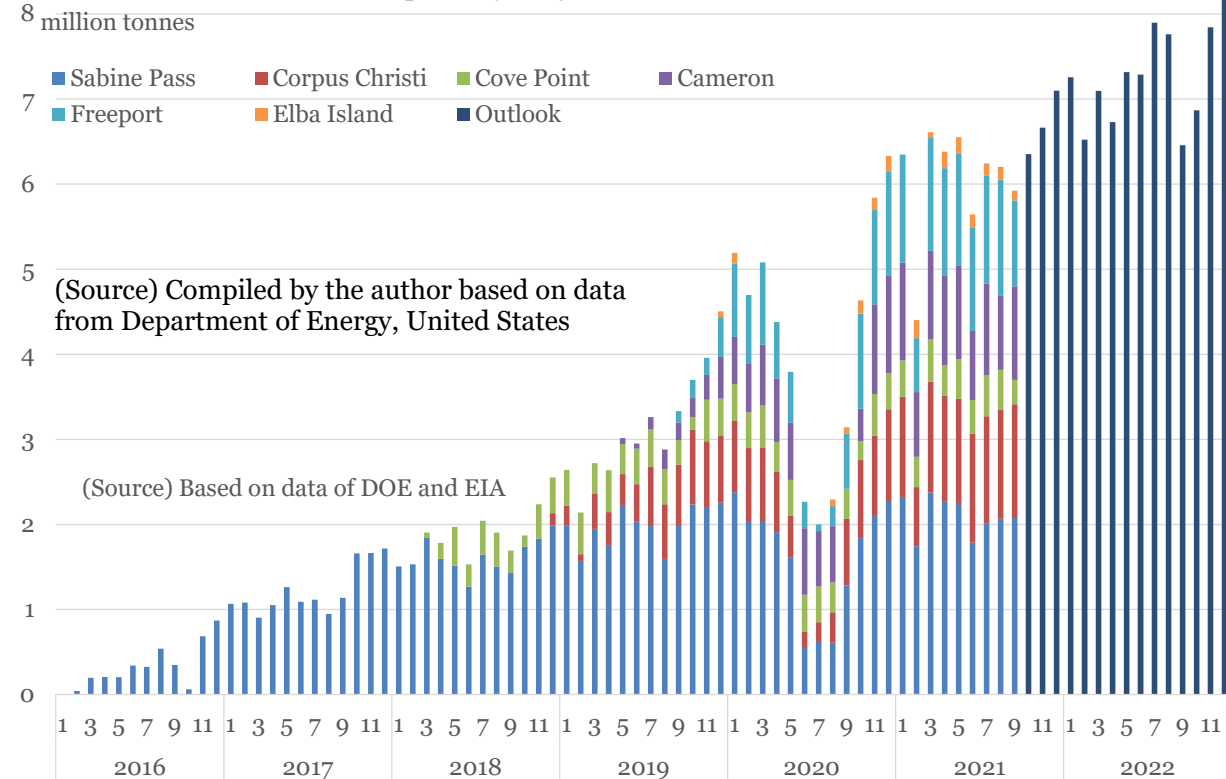


(Source) Compiled by the author based on data from Department of Energy, United States



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## LNG Exports by Project and Short-term Outlook

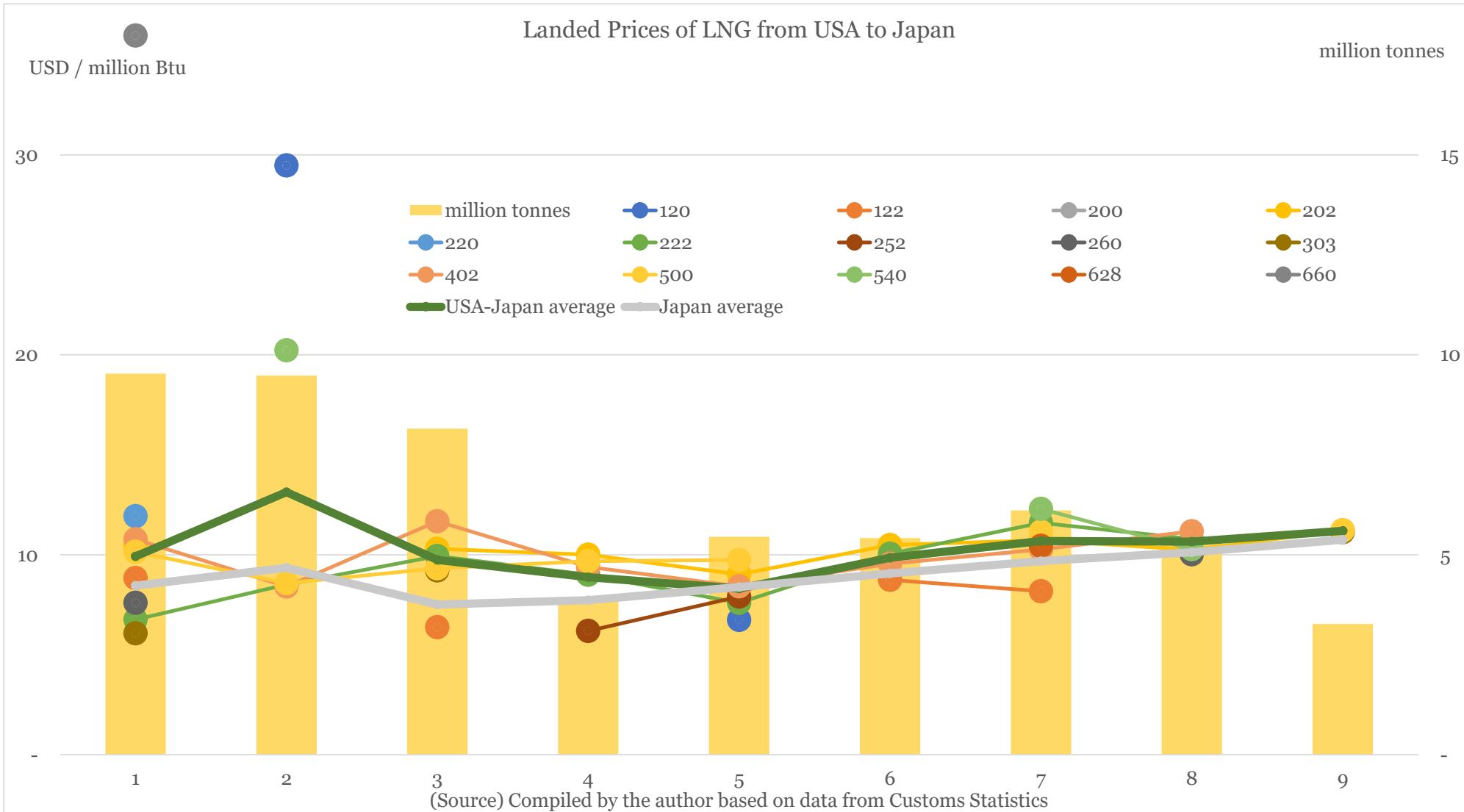


(Source) Compiled by the author based on data from Department of Energy, United States

(Source) Based on data of DOE and EIA

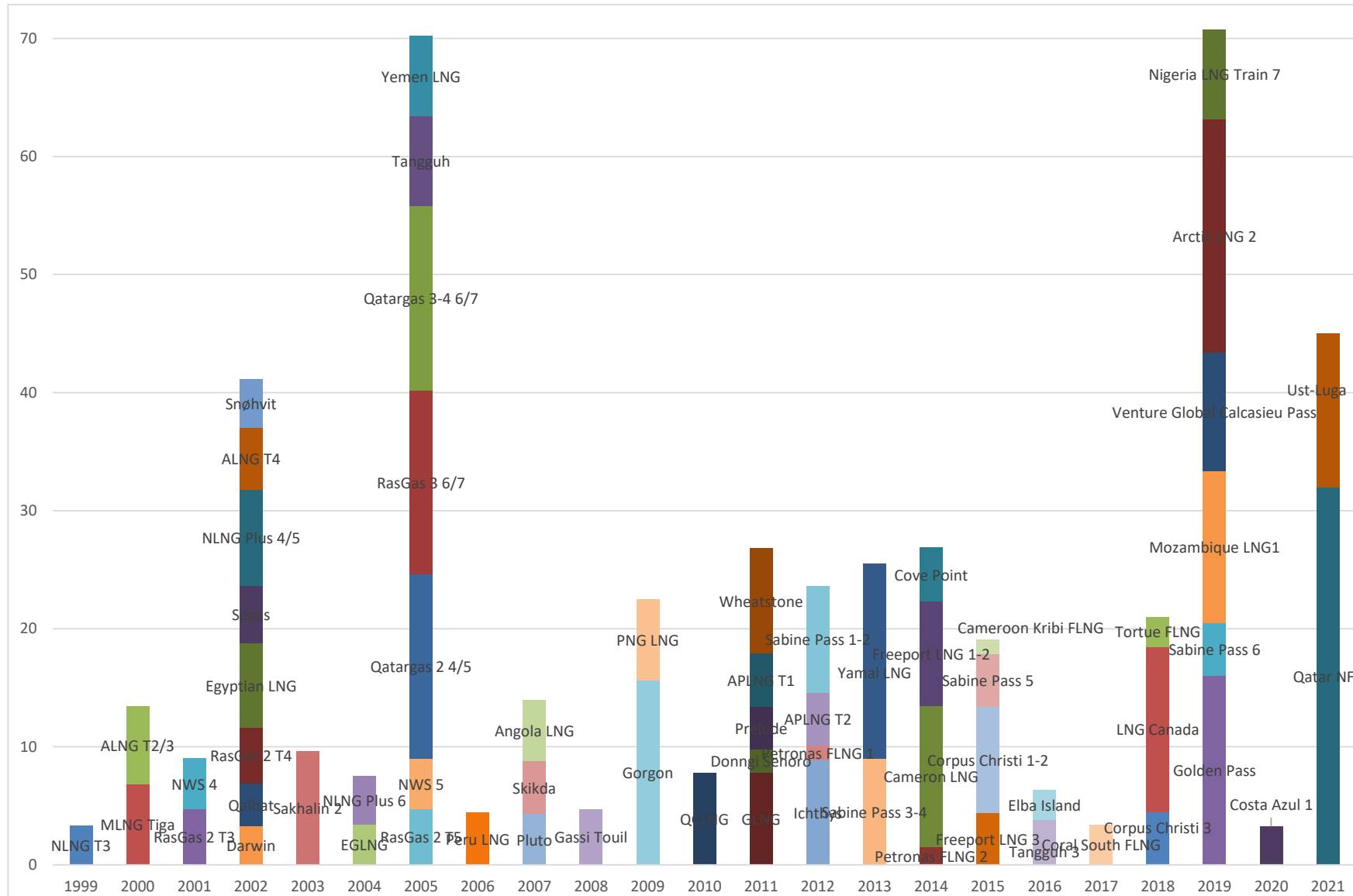
- 74 million tonnes in 2021 and 87 million tonnes in 2022 are expected to be exported to make the United States the largest exporter
- Export destinations have been diversified - Japan has been the best friend of USA in terms of LNG

# LNG From USA Helps Japan Meet Peaks



- Different ports receive spot cargoes at different prices
- Term contract cargoes are delivered at stable prices at stable rates
- Volumes increase and decrease to respond to the market requirements

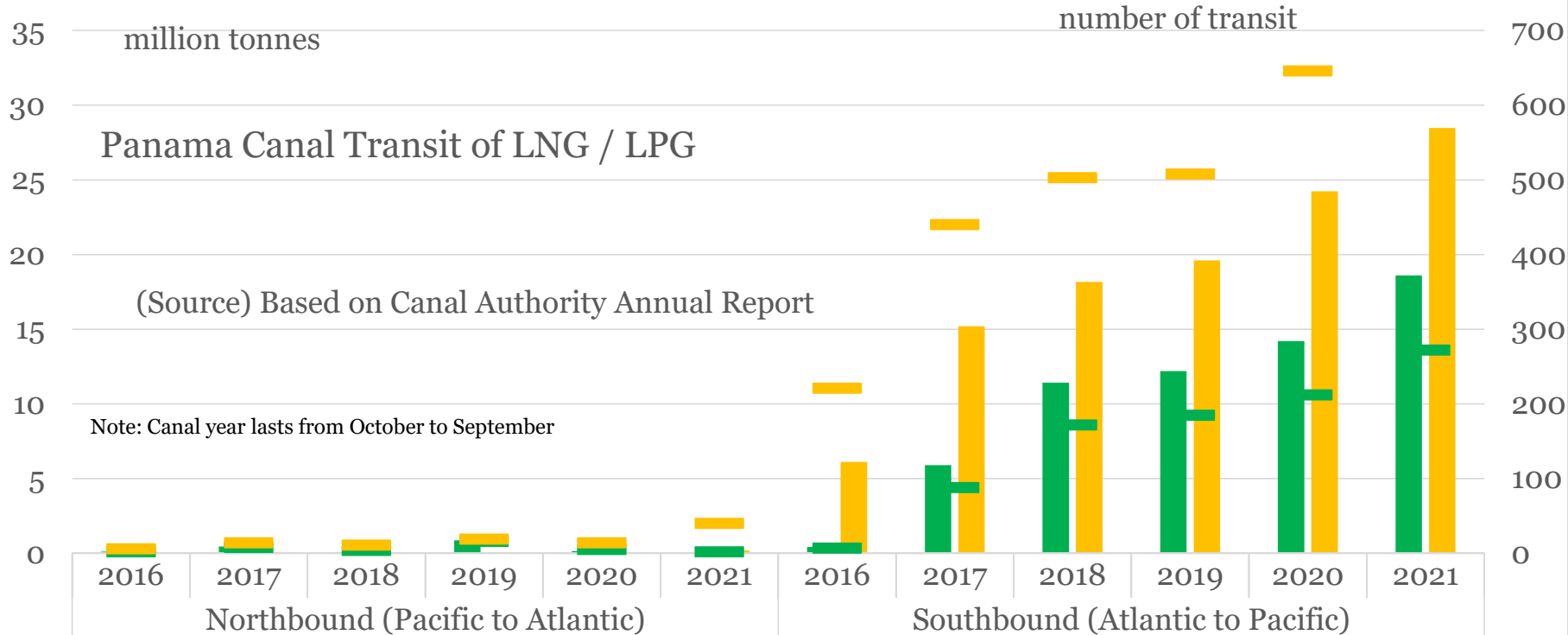
# Uncertainly Continues on Investment



Project	Participants	Capacity	Production	FID
<b>United States</b>				
Golden Pass	QatarEnergy, ExxonMobil	15.6	2024 ---> 2025	2019
Corpus Christi Stage 3	Cheniere Energy	10	2024	2020 ---> 2021
Plaquemines	Venture Global LNG	20	2023 ---> 2024	2020 ---> 2021
Freeport (T4)	Freeport LNG	5	2022 ---> 2024	2020 --->
Lake Charles	Energy Transfer	16.45	2025 --->	2020 --->
Port Arthur (T1-2)	Sempra Energy	13.5	2024 ---> 2025	2020 --->
Rio Grande	NextDecade	27	2023 ---> 2024	2020 --->
Magnolia LNG	LNG Limited	8	2022 --->	2020 --->
Driftwood LNG	Tellurian	27.6	2023 --->	2020 --->
Texas LNG Brownsville	Texas Brownsville LNG	2	2023 ---> 2025	2020 --->
Jordan Cove	Pembina Pipeline	7.8	2024 --->	2020 --->
Gulf LNG Pascagoula	Kinder Morgan	11.5	2024 --->	2020 --->
Port Arthur (T3-4)	Sempra Energy	13.5	-	2021 --->
<b>Mexico</b>				
Energia Costa Azul Phase 1	Sempra Energy	3.25	2024 ---> 2024	2020 1Q ---> 4Q
<b>Canada</b>				
LNG Canada	Shell, Mitsubishi, Petronas, etc.	14	Mid 2020s	2018
Kitimat	Chevron, Woodside	18		2022 ---> X 2020 --->
Woodfibre LNG	Woodfibre Natural Gas	2.1	---> 2025	2021
Goldboro	Pieridae Energy Canada	10	2025 ---> 2026	2020 ---> 2021
<b>Qatar</b>				
North Field East	QatarEnergy	32	2024 ---> 2025	2020 ---> 2021
<b>Australia</b>				
Pluto Train 2	Woodside	5	2025 ---> 2026	2020 ---> 2021
<b>Mozambique</b>				
Mozambique LNG 1	TotalEnergies, Mitsui, PTT, ONGC, etc.	32	2024 ---> 2026	2019
Rovuma LNG	ExxonMobil	15	2024 --->	2020 --->
<b>Mauritania / Senegal</b>				
Tortue FLNG	bp	2.5	2022 ---> 2023	2018
<b>Indonesia</b>				
Tangguh Train 3	bp, etc.	3.8	2021 ---> 2022	2016

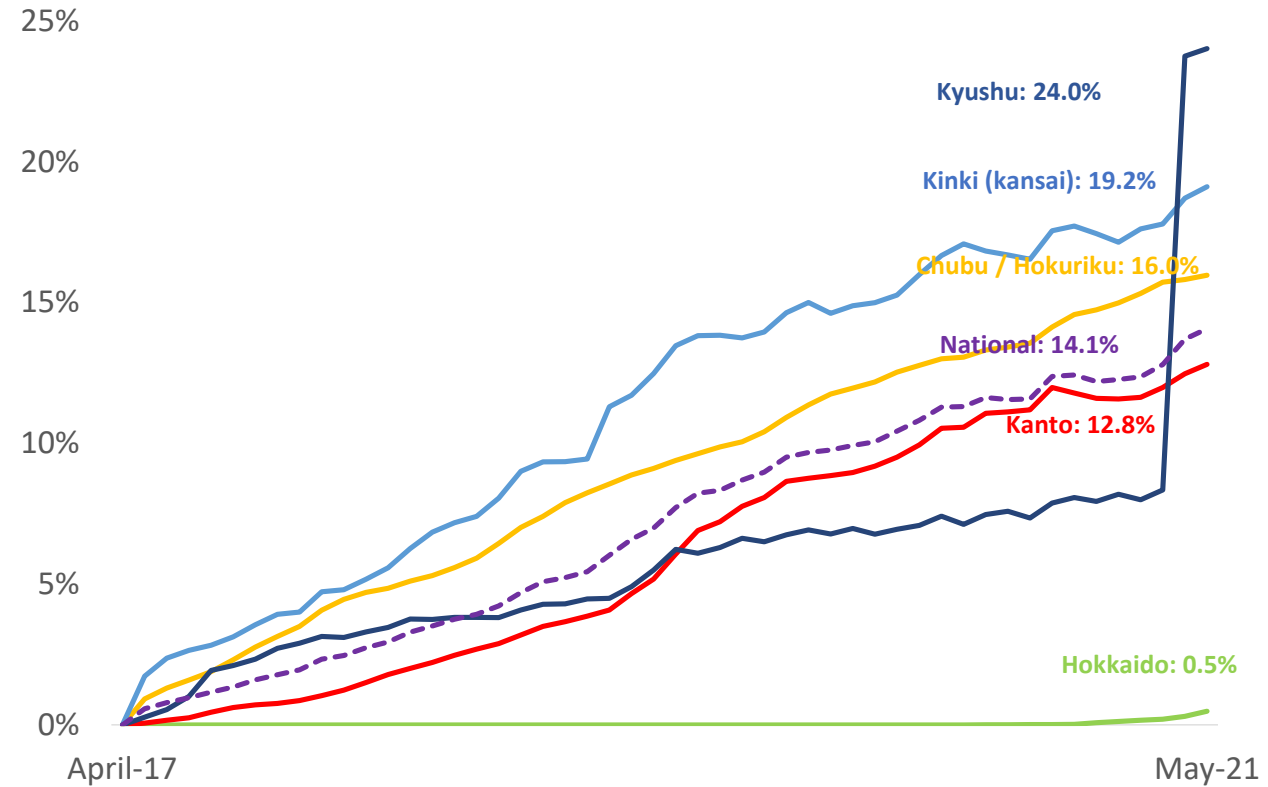
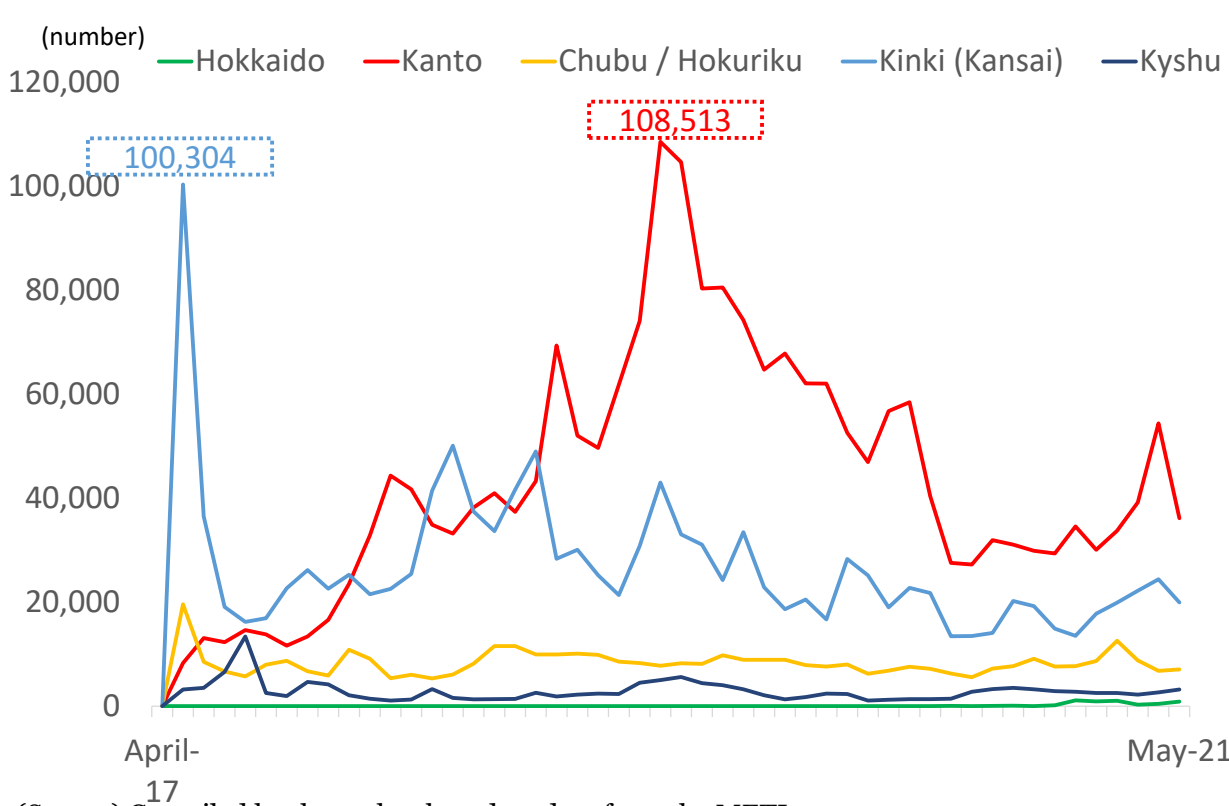
(Source) Based on company information

# Panama Transit Grows Steadily



- Panama transit is the preferred route from Gulf of Mexico to Asia
- LNG and LPG transits have expanded quickly after canal expansion
- Nearly one laden LNG transit per day lately
- The authority has expressed intension to expand LNG traffic

# Progress of Gas Retail Competition



(Source) Compiled by the author based on data from the METI

- Cumulative residential customer switchings had reached 4.02 million by May 2021 since the opening up for competition in April 2017. Recently more switching-backs to the incumbent retailers have been observed.
- Competition has been the fiercest in Kanto and Kinki (Kansai) where 13.68 million and 6.44 million retail customers subscribe to gas services, respectively.
- The share of new entrants is the largest in Kinki (Kansai).

# 18 out of 32 LNG Receiving Terminals Offer TPA - A Case Was Reported in 2020

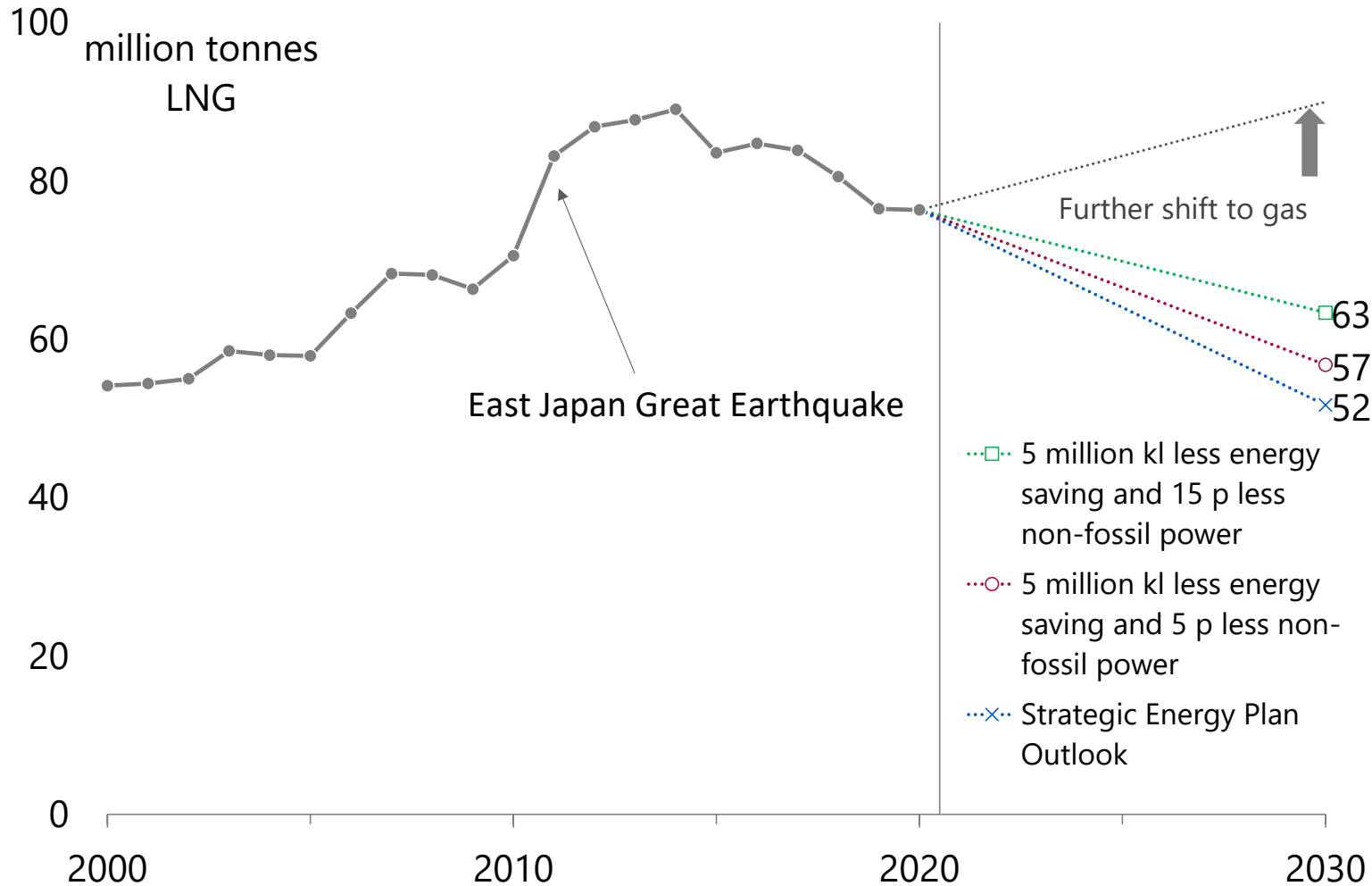
	Terminal operator	Terminal	Storage (kl)
1	Hokkaido Gas	Ishikari LNG Terminal	380,000
2	JXTG Energy	Hachinohe LNG Terminal	280,000
3	Japex	Soma LNG Terminal	230,000
4	Nihonkai LNG	Nihonkai LNG Niigata Terminal	720,000
5	Inpex	Naoetsu LNG Terminal	360,000
6	Tokyo Gas / Nijio	Negishi LNG Terminal	999,000
		Ohgishima LNG Terminal	850,000
		Sodegaura LNG Terminal	1,385,000
		Hitachi LNG Terminal	230,000
7	TEPCO Fuel & Power	Minami Yokohama Thermal Power Station LNG Terminal	181,000
		Sodegaura Thermal Power Station LNG Terminal	1,275,000
		Higashi Ohgishima Thermal Power Station LNG Terminal	540,000
		Futtsu Thermal Power Station LNG Terminal	1,110,000
8	Shizuoka Gas	Sodeshi Terminal	337,200
9	Toho Gas Chubu Electric Power Chita LNG	Chita LNG Joint Terminal	300,000
		Chita Midoriham a Terminal	620,000
		Chita LNG Terminal	640,000
10	Toho Gas Chubu Electric Power	Toho Gas Yokkaichi Terminal	160,000
		Chubu Electric Yokkaichi LNG Center	320,000
11	Chubu Electric Power	Kawagoe Thermal Power Station LNG Terminal	840,000
12	Osaka Gas	Senboku Terminal 1	320,000
		Senboku Terminal 2	1,585,000
		Himeji Terminal	740,000
13	Kansai Electric Power Sakai LNG	Himeji LNG Terminal	520,000
		Sakai LNG Center	560,000
14	Mizushima LNG	Mizushima LNG Terminal	320,000
15	Kyushu Electric Power	Tobata Terminal	480,000
16	Saibu Gas	Hibiki LNG Terminal	360,000
17	Kyushu Electric Power	Oita Terminal	460,000
18	Okinawa Electric Power	Yoshinoura Thermal Power Station LNG Terminal	280,000

	Terminal operator	Terminal	Storage (kl)	Note*
1	Hokkaido Gas	Hakodate Minato Terminal	7,100	A
2	Japex	Yufutsu Terminal	2,700	A
3	JXTG Energy	Kushiro LNG Terminal	10,000	A
4	Tobu Gas	Akita LNG Terminal	12,000	A
5	Sendai City Authority	Minato Terminal	80,000	B
6	Tohoku Electric Power	Shin Sendai Thermal Power Station	320,000	C
7	Chubu Electric Power	Joetsu Thermal Power Station	360,000	C
8	Shikoku Electric Power Cosmo Oil Shikoku Gas	Sakaide LNG Terminal	180,000	B
		Takamatsu Terminal	10,000	A
9	Shikoku Gas	Matsuyama Terminal	10,000	A
10	Hiroshima Gas	Hatsukaichi Terminal	170,000	B
11	Okayama Gas	Chikko Terminal	7,000	A
12	Shikoku Electric Power	Yanai Terminal	480,000	C
13	Saibu Gas	Nagasaki Terminal	35,000	B
14	Nihon Gas	Kagoshima Terminal	86,000	B

\*Reasons not to be covered by the third-party use regime  
A: Secondary receiving terminal; B: Smaller storage less than 200,000 kl; and C: Dedicated only to power generation

- It is difficult to find a lot of unused capacity at those purpose-built terminals.
- The main competitors against the incumbent city-gas utility companies are electric power companies in the same regions, who have already had their own LNG terminals and do not have to use facilities owned by the rivals.
- It is good to utilise unused capacity
- in practice this regulation may not contribute greatly to promote competition.
- The spirit of this regulation - maximum effective utilisation of facilities - is important.
- Voluntary arrangements and /or capacity terminal utilisation.

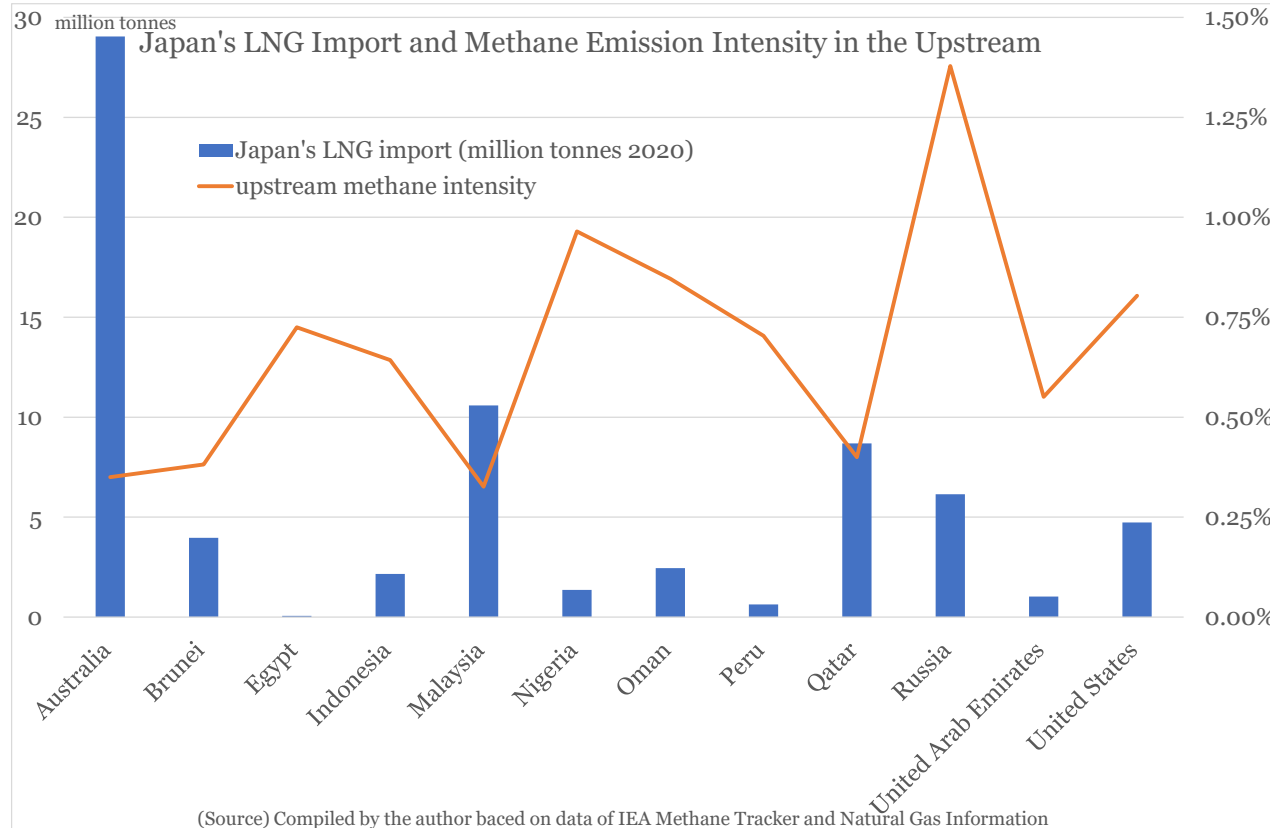
# Strategic Energy Plan - Implication on LNG



- Ambitious GHG reduction goal - 62 million kl crude oil equivalent energy savings and 59% share of non-fossil power generation accompanied with significant reduction of LNG requirement.
- But if the energy saving performance falls short by 5 million kl and non-fossil power falls short by 5 p - 15 p percentage points, LNG import demand should go up to 57 - 63 million tonnes from the base case of 52 million tonnes. Further shift to gas should add more LNG demand (up to nearly 90 million tonnes).
- In order to take care of fluctuation in LNG demand, especially in the power generation sector, substantial flexibility in LNG supply will be more important.
- Contractual flexibility, including destination flexibility and elimination of destination restriction may not be sufficient.
- In addition to securing more medium-term deals from flexible LNG supply sources, basic demand with certain prospects should be covered by term contract with relatively longer durations with more competitive conditions. Not only contractual commitment (from suppliers) but also effective physical control of LNG volume and logistic management, accompanies by third-party marketing ability should be more important.

# Methane Emission Management

- “Global Methane Pledge” is one step but has uncertainty over data and actual implementation.
- Japanese stakeholders have been aware of the importance and becoming willing to work with other regions.
- Japanese utility and engineering companies can contribute to the GHG management in gas and oil operations.



Methane Emissions Reported by Selected Japanese Companies Dealing with Gas

Segment	Company	tonnes - CH <sub>4</sub>					tonnes - CO <sub>2</sub> e				
		2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
City Gas	Tokyo Gas	560	200	425	354	323	14,000	5,000	11,000	9,000	8,000
	Osaka Gas	92	75	77	88	106	2,300	1,875	1,925	2,200	2,650
	Toho Gas	270	50	22	19	191	6,747	1,244	546	468	4,766
	Shizuoka Gas	7	7	7	7	7	165	164	170	170	176
	Hiroshima Gas	17	14	11	26	9	425	350	275	650	225
	Saibu Gas	9	10	10	10	9	225	250	250	250	225
Explorer	INPEX	750	633	577	9,361	13,160	18,760	15,813	14,417	234,021	329,000
	JAPEX		789	5,725	3,828	2,519		19,725	143,113	95,699	62,975
Petroleum	ENEOS			1,659	1,690	1,868			41,480	42,259	46,691
	Idemitsu					1,986					49,650
Trading House	Mitsubishi Corporation		60,000	37,680	36,800	34,800		1,500,000	942,000	920,000	870,000
	Mitsui & Company				71,840	36,320				1,796,000	908,000
Electric Power	Tepco		0	0	0	0		0	0	0	0
	Hokuriku					21					525
	Chubu					0					0
	Kyushu	108	0	8	0	0	2,700	0	200	0	0



# Focal Points - Japan and Internationally

- 2021/2022 Winter market balance is highly dependent on weather and LNG production performances
- Expected low inventories at the end of demand season in Europe is expected to maintain firm prices from first half 2022 around the world
- Players are expected to move earlier to procure LNG volumes
- Long-term contracts are expected to increase as players assess future demand in detail
- Players are expected to explore ways to secure upstream investment as the role of LNG will regain more importance
- Ways of finding more appropriate spot prices should be reviewed
- More mutual influences between regions and different energy sources should be observed
- Ways of energy transition should be carefully examined
- Changes of recognition and more understanding of natural gas by general public should be carefully analysed