LIVE WEBINAR

HOW COVID-19 CHANGES THE DYNAMICS OF GAS MARKET AND WHAT IS THE IMPLICATION TO MALAYSIA?

APRIL
28

10.30 AM - 12.00 PM
(GMT +8 KL)

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IEPRe Institute of Energy Policy and Research
Universiti Tenaga Nasional
TENAGA NASIONAL
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Energy Talk Webinar

April 28th, 2021

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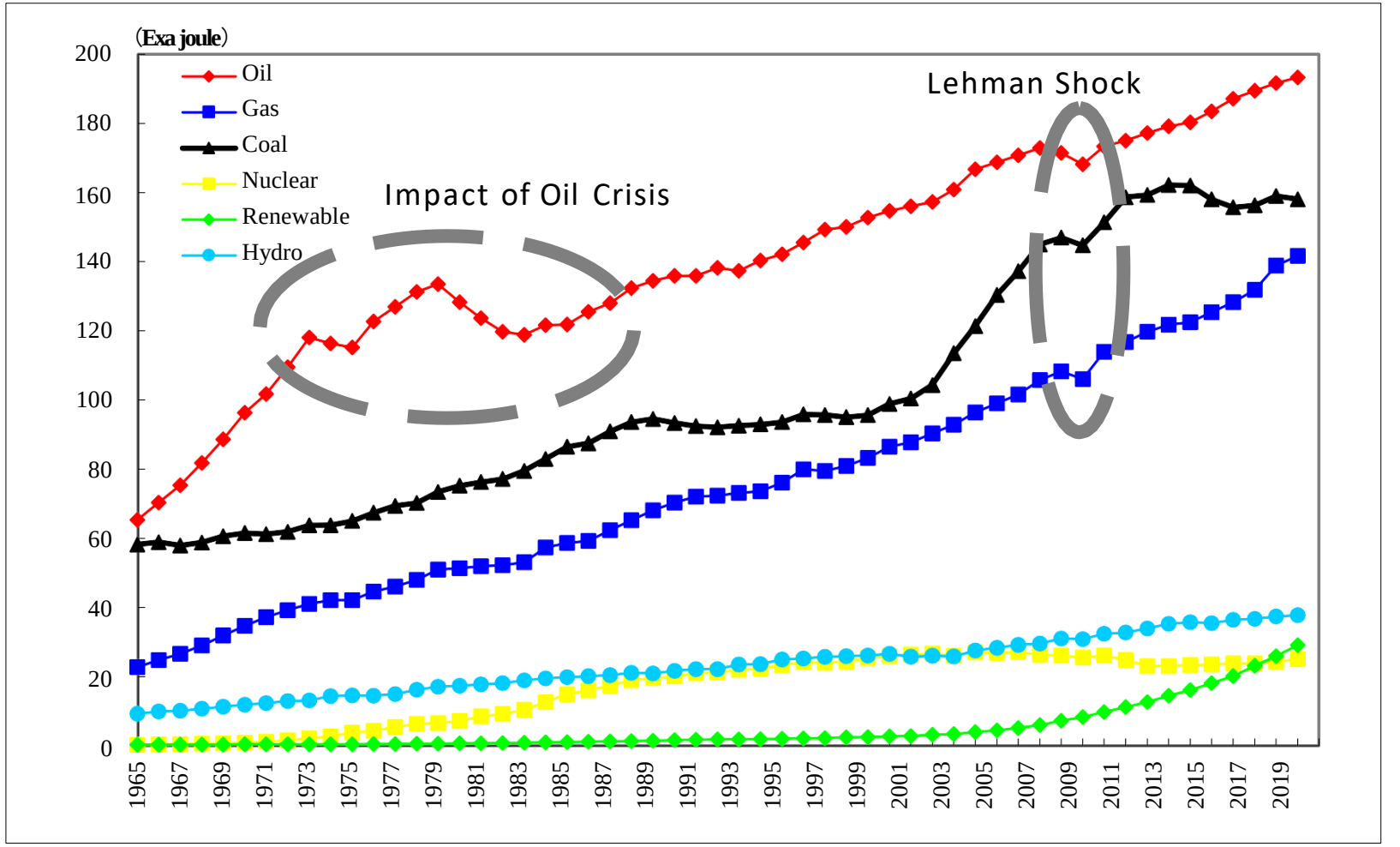
Chief Economist & Senior Managing Director, Institute of Energy Economics, Japan

Global energy demand trajectories by source

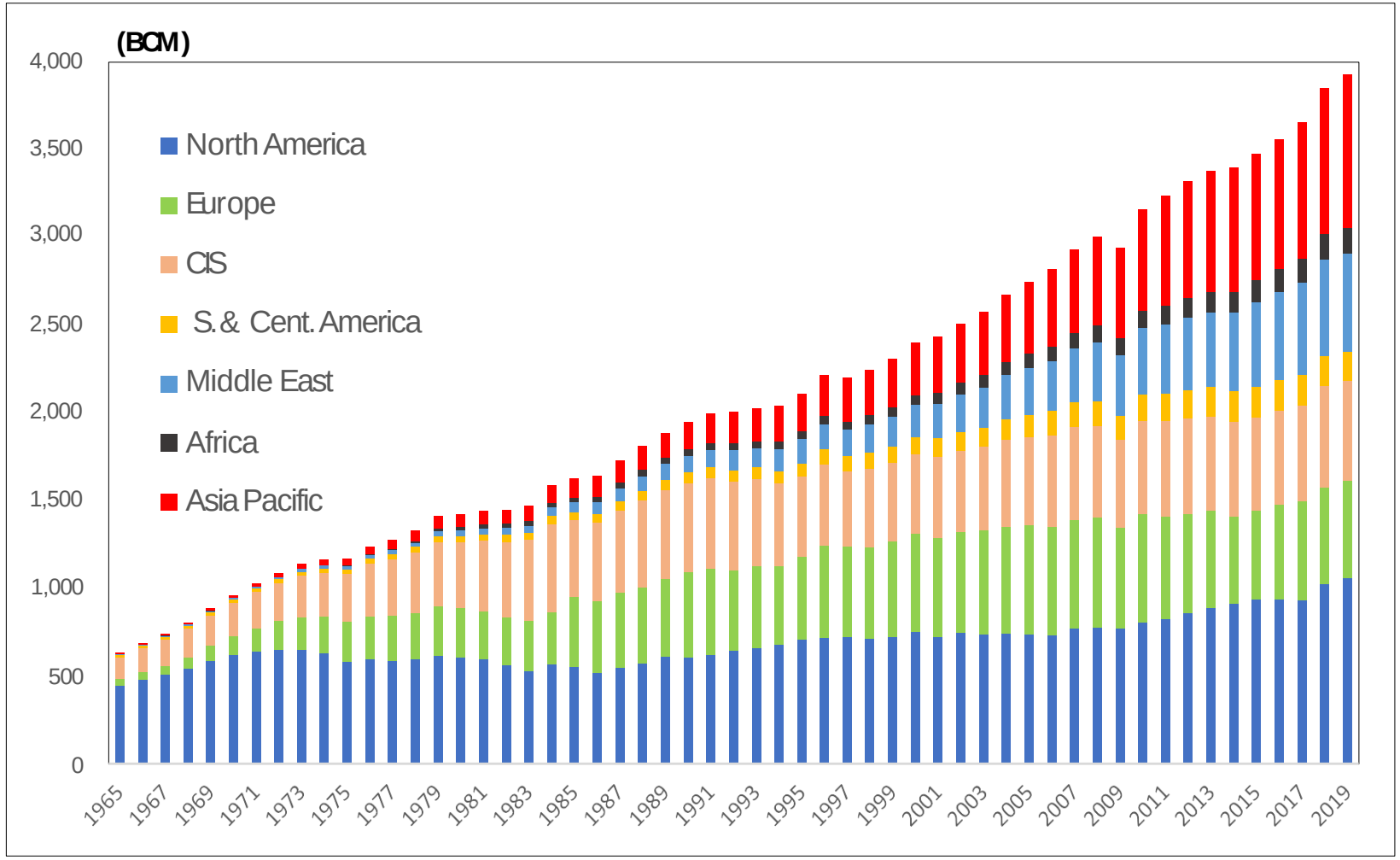
(Natural gas demand continued to grow very strongly)



Source: Prepared by author based on BP Statistical Review of World Energy 2020

Global natural gas demand by region

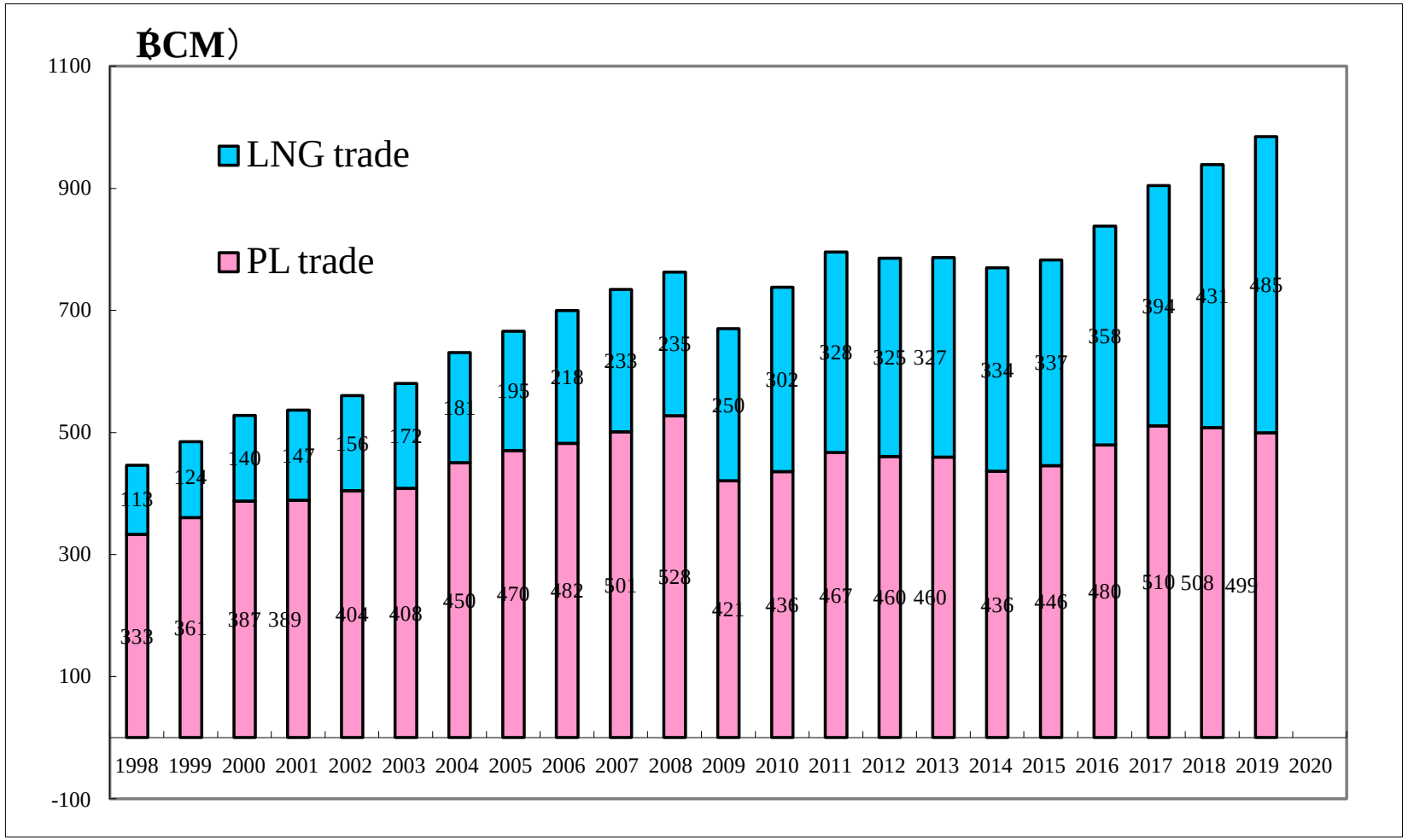
（N. America/Europe/CIS dominates market, but Asia demand grows very strongly）



Source: Prepared by author based on BP Statistical Review of World Energy 2020

Global gas/LNG trade

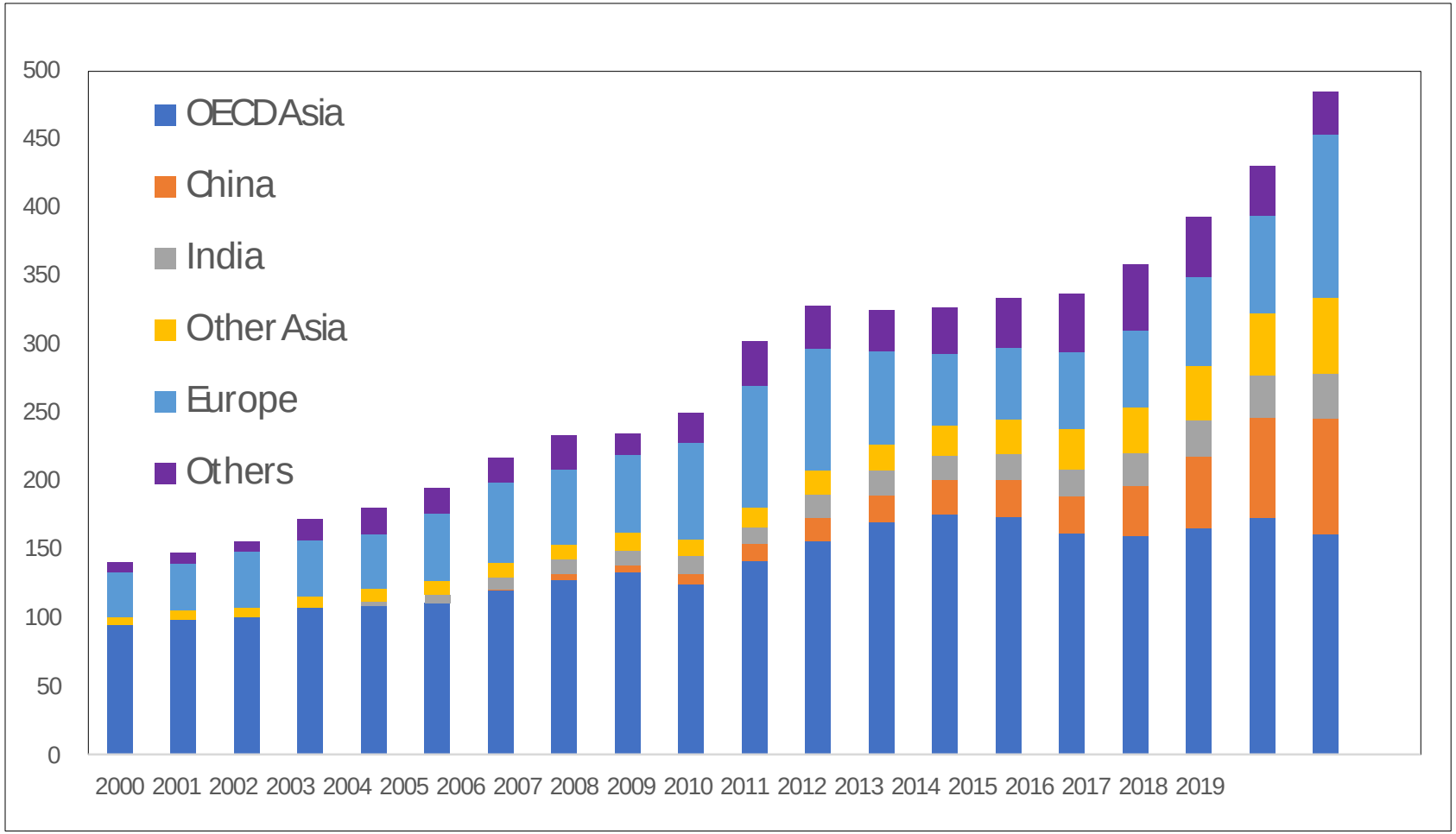
（PL/LNG trade continued to grow but LNG trade firster）



Source: Prepared by author based on BP Statistical Review of World Energy 2020

Global LNG import by region

(Asia dominates world LNG import)

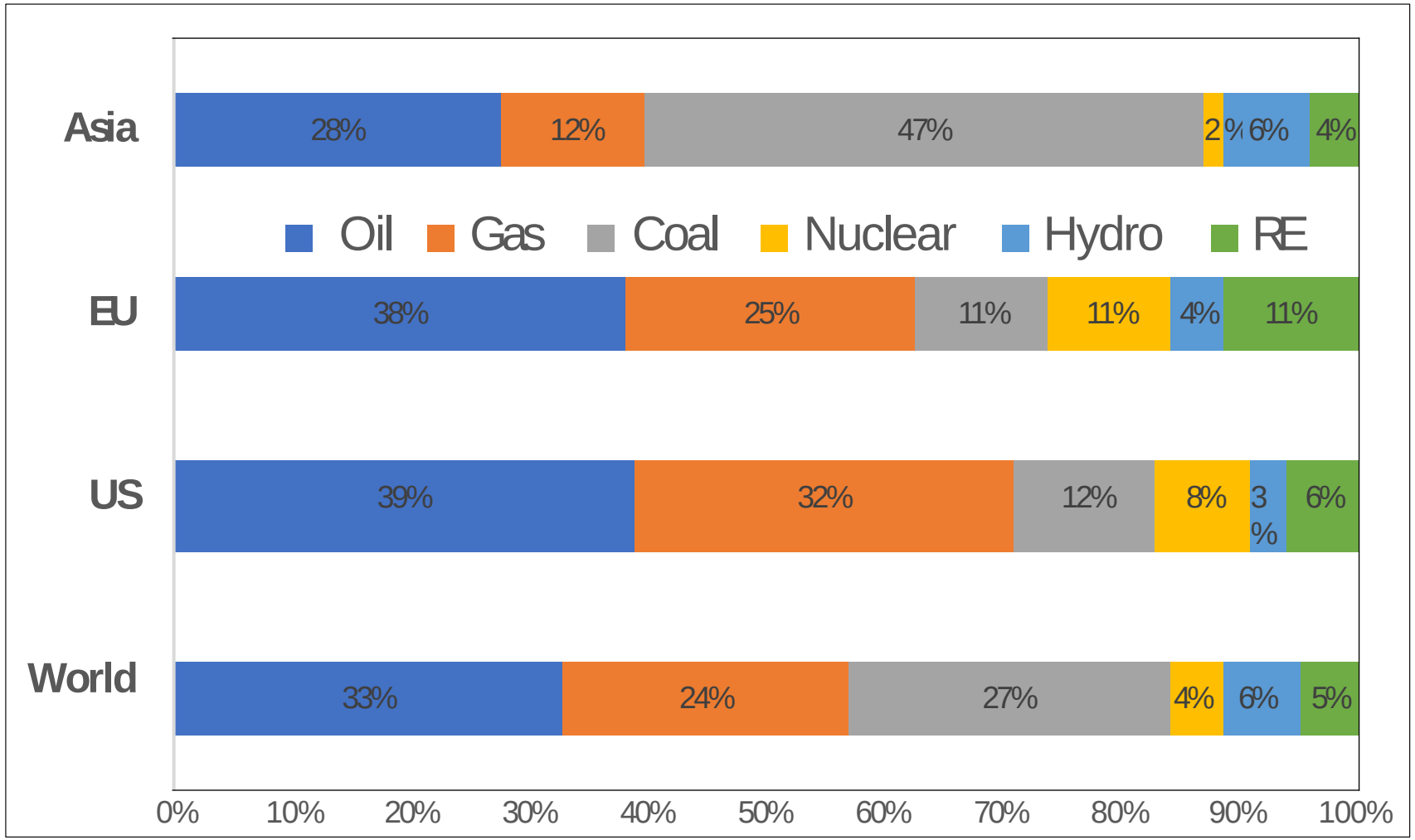


Source: Prepared by author based on BP Statistical Review of World Energy 2020

Factors to affect Gas/LNG Demand in Asia

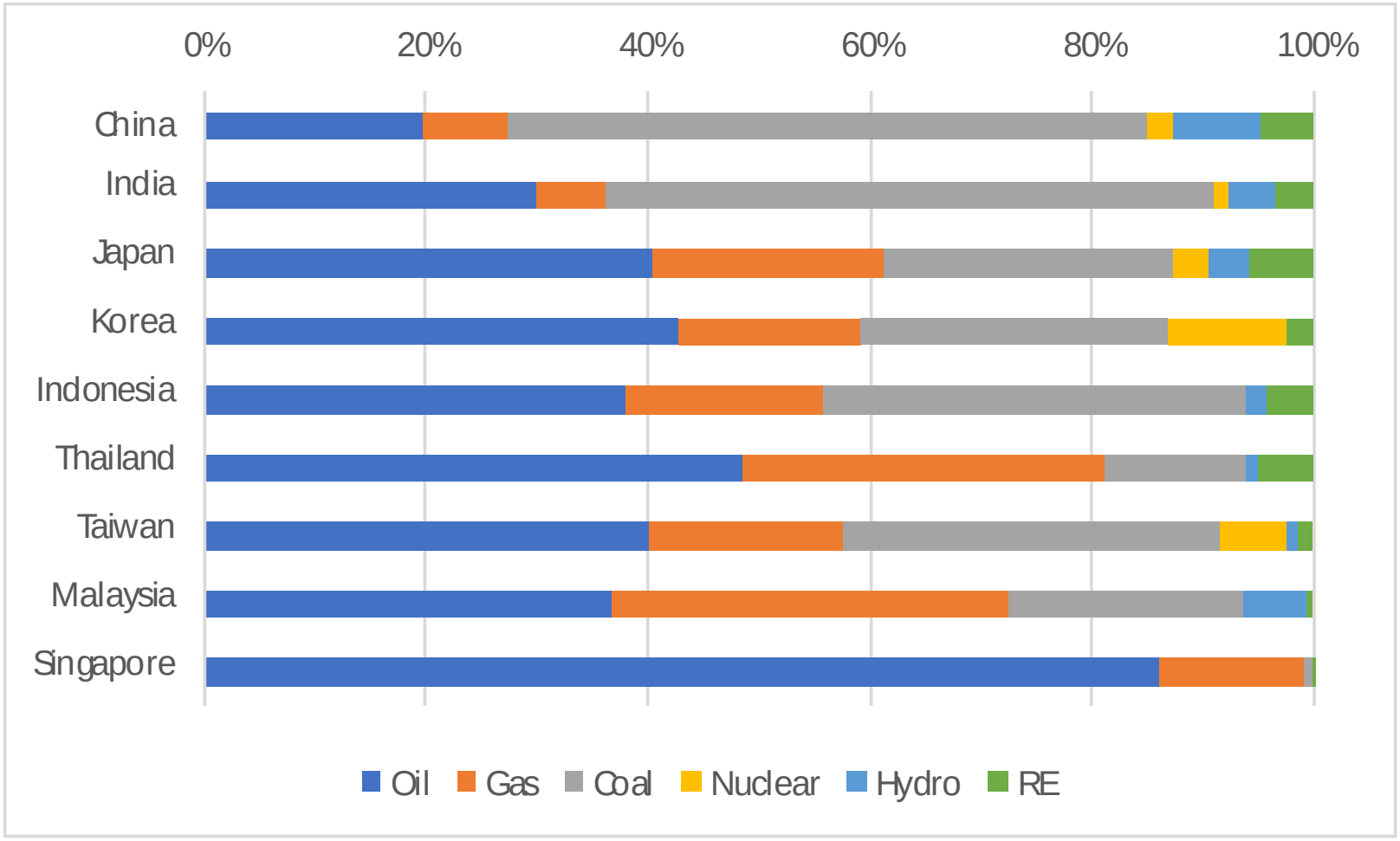
- **Economic growth**
- **Need to protect environment**
- **Lower price**
- **Competition against coal**
- **Future of nuclear power**
- **Competition against renewable energy**
- **Competition with LPG**
- **Impact of power/gas market reform**
- **Pipeline vs. LNG**

Asia, heavily dependent on coal



Source: Prepared from "BP Statistical Review of World Energy 2020"

Asian countries, diversified energy position



Source: Prepared from "BP Statistical Review of World Energy 2020"

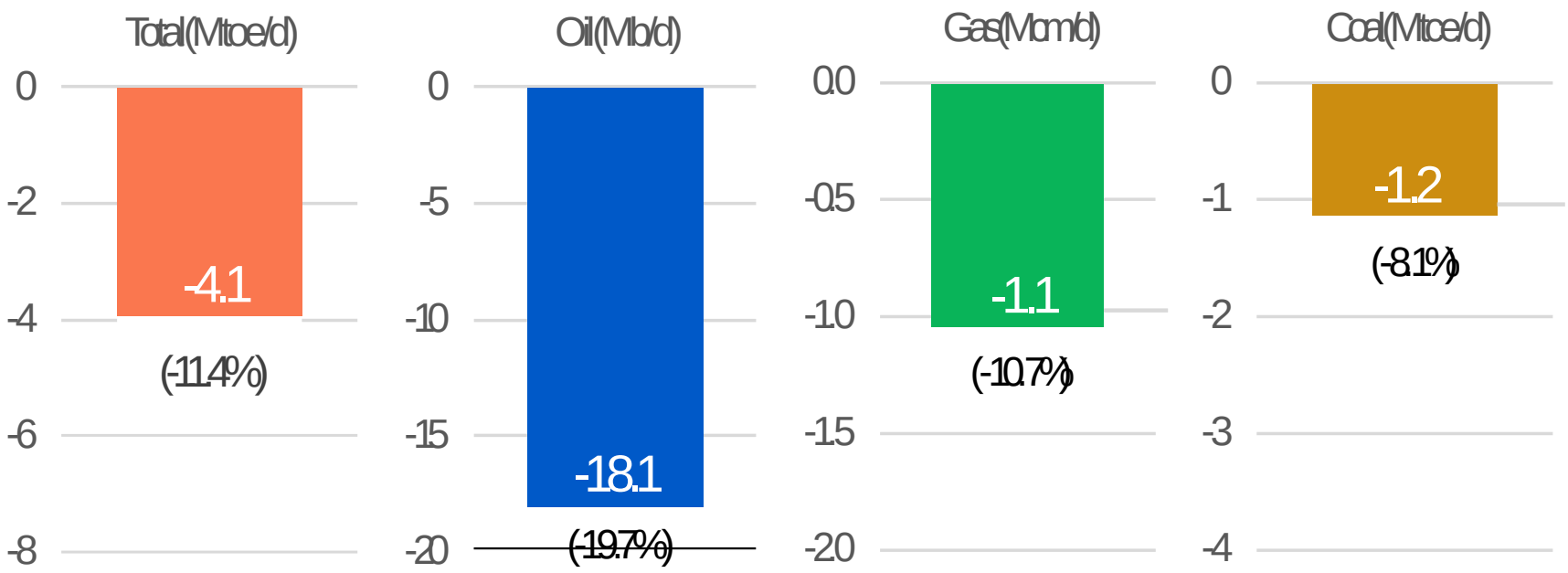
Emerging global energy landscape

- **Unprecedented impact of COVID-19 pandemic**
- **2020 market with over-supply and lower energy prices**
- **Impact of Biden Administration's policy**
- **Asia as a gravity center of world energy demand**
- **Energy Geopolitics revisited**
- **Waves of carbon neutral target**
- **Expectation for advanced and innovative technology**
- **Power market "crisis" in Japan and Texas early this year**

Viewpoint of world energy market under pandemic

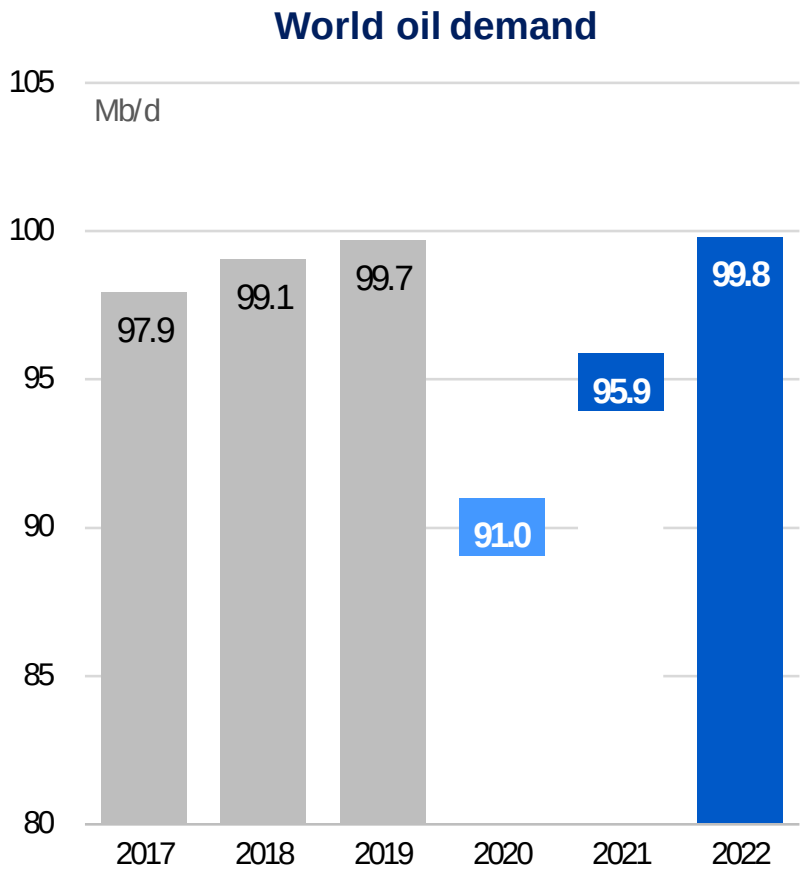
- **Pandemic peak out? Second/third/fourth waves?**
- **World economy: can we see "V shape recovery"?**
- **Supply responses to low prices/over supply?**
- **Demand responses to low prices?**
- **Impacts of low price on investment, industry and producing countries?**
- **Structural changes caused by the pandemic?**

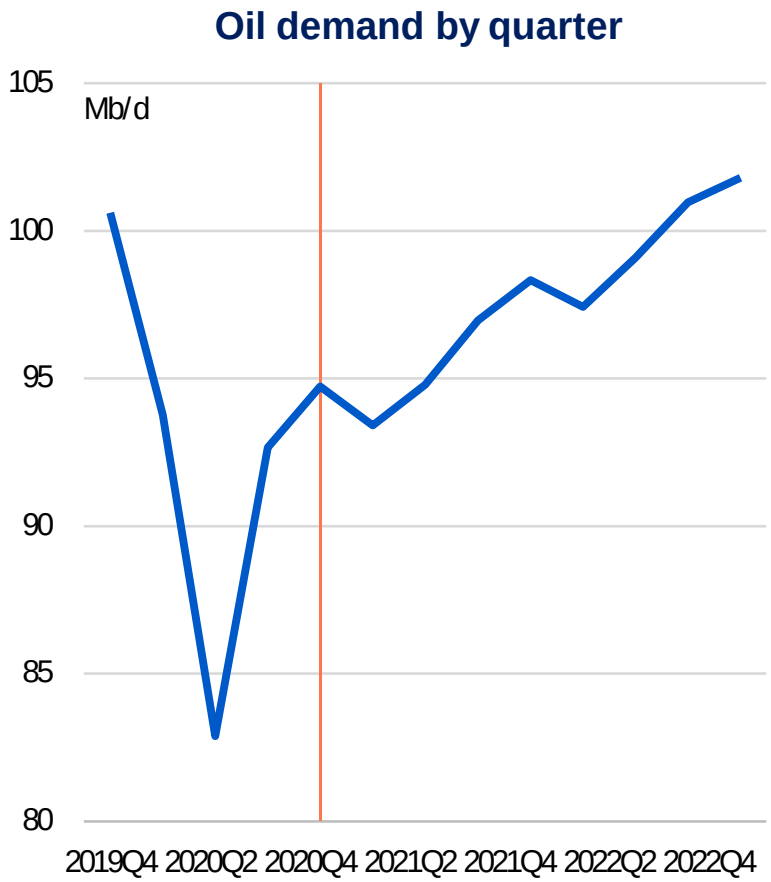
Impact of City-lockdown on energy demand



Source: IEEJ

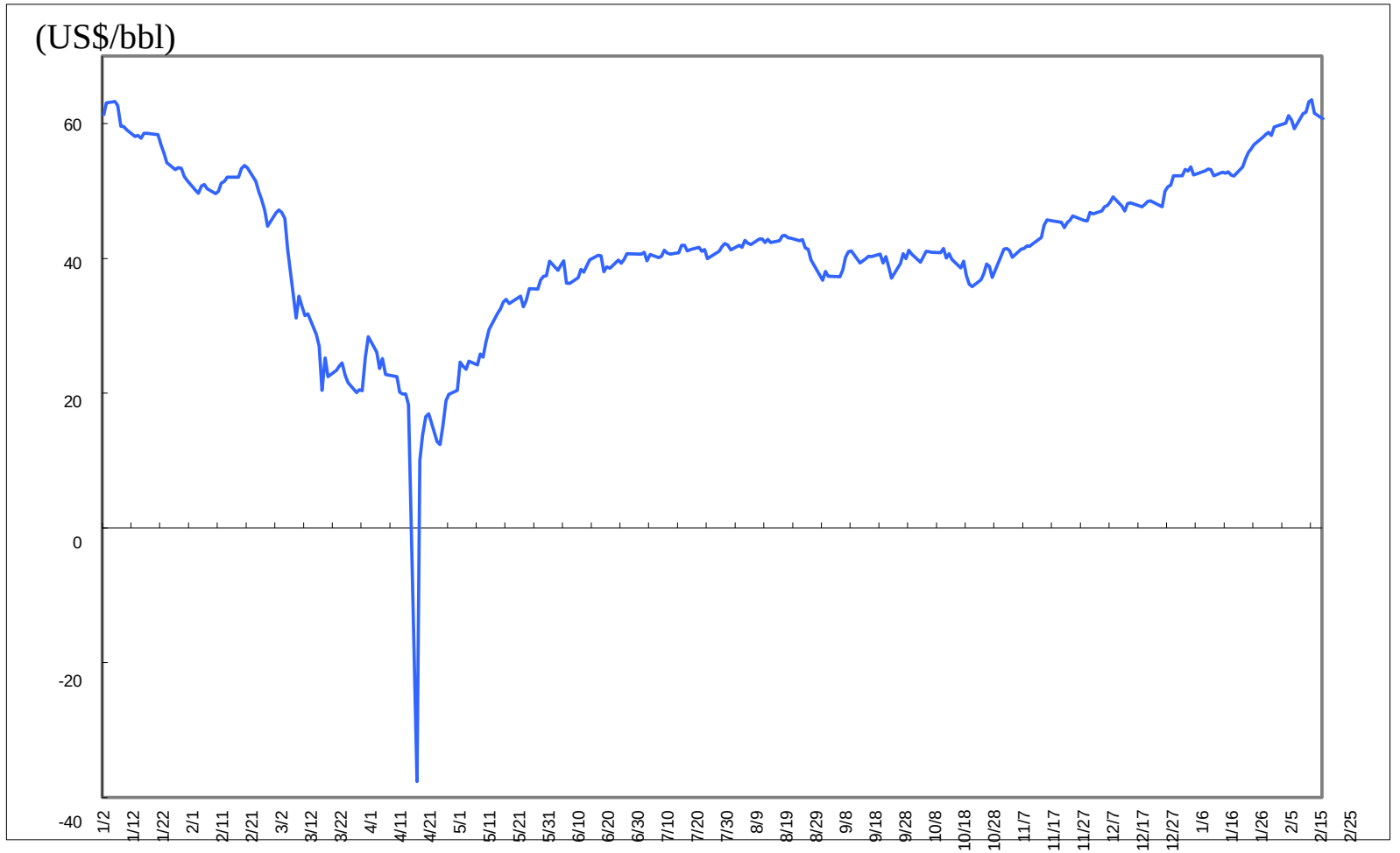
Oil demand up to 2022





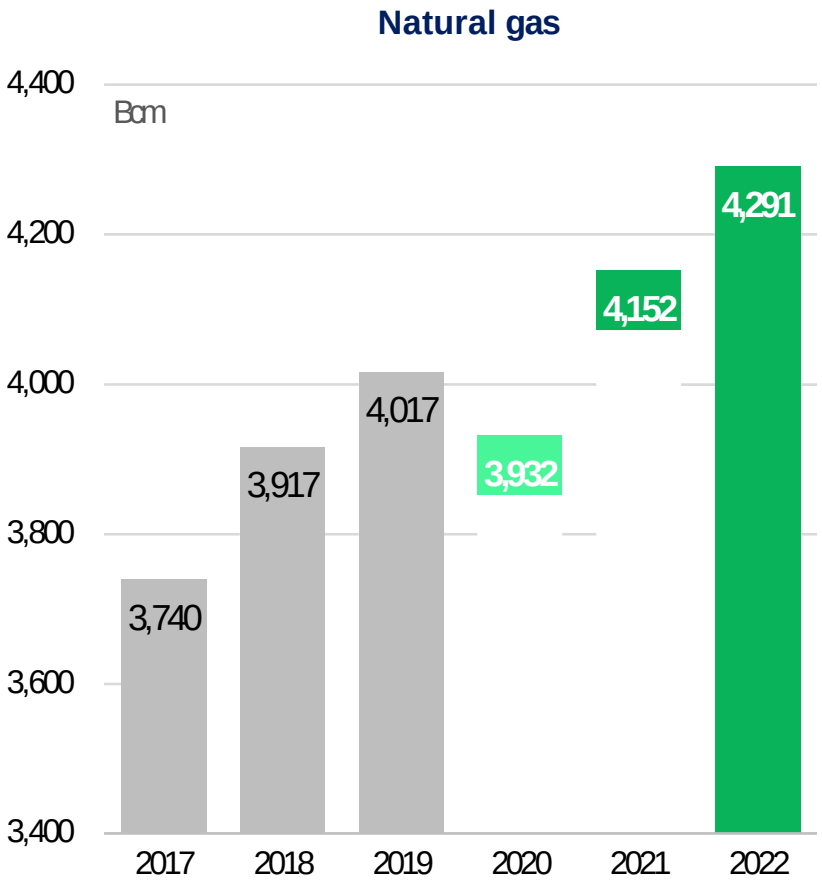
Source: Koyama and Suehiro (IEEJ, March 2021)

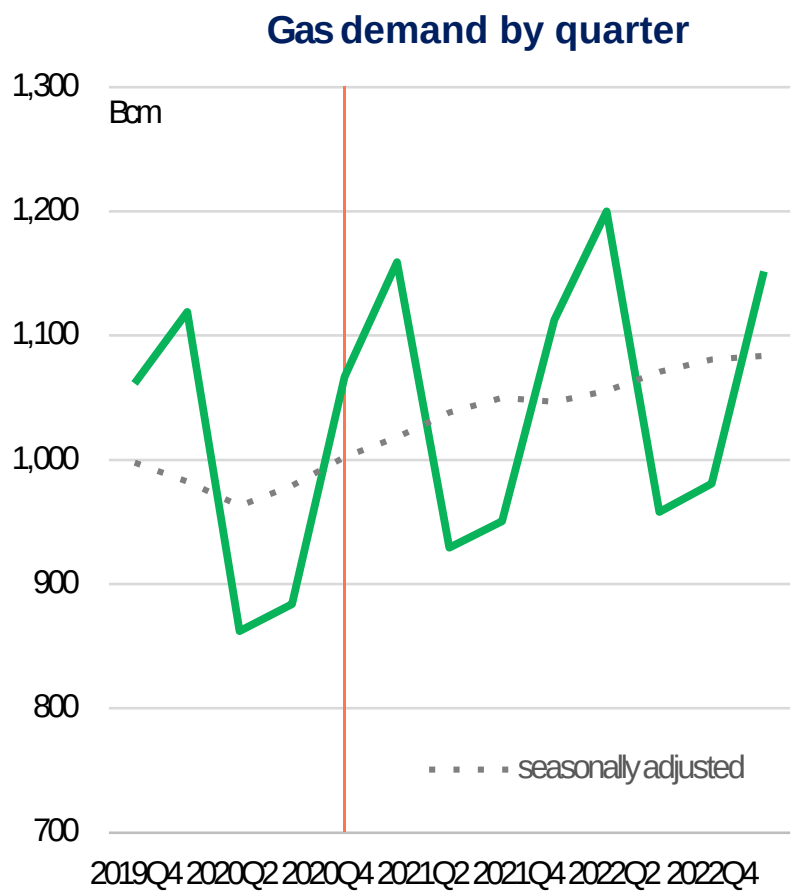
Crude Oil Price Volatility (Negative price!)



Source: NYMEX data, etc.

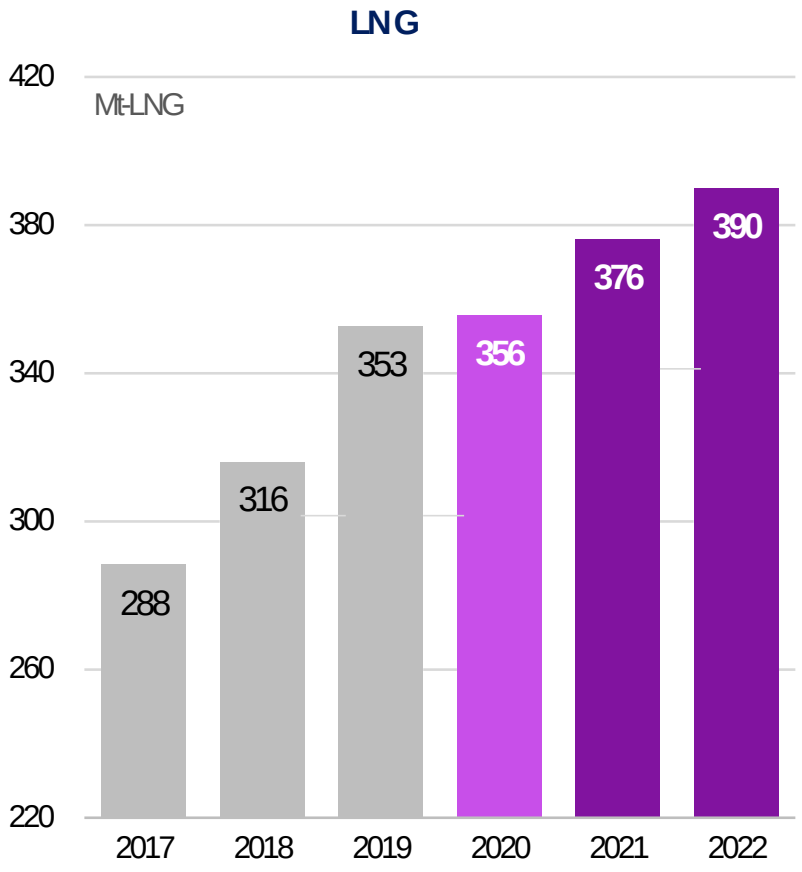
Natural Gas demand up to 2022

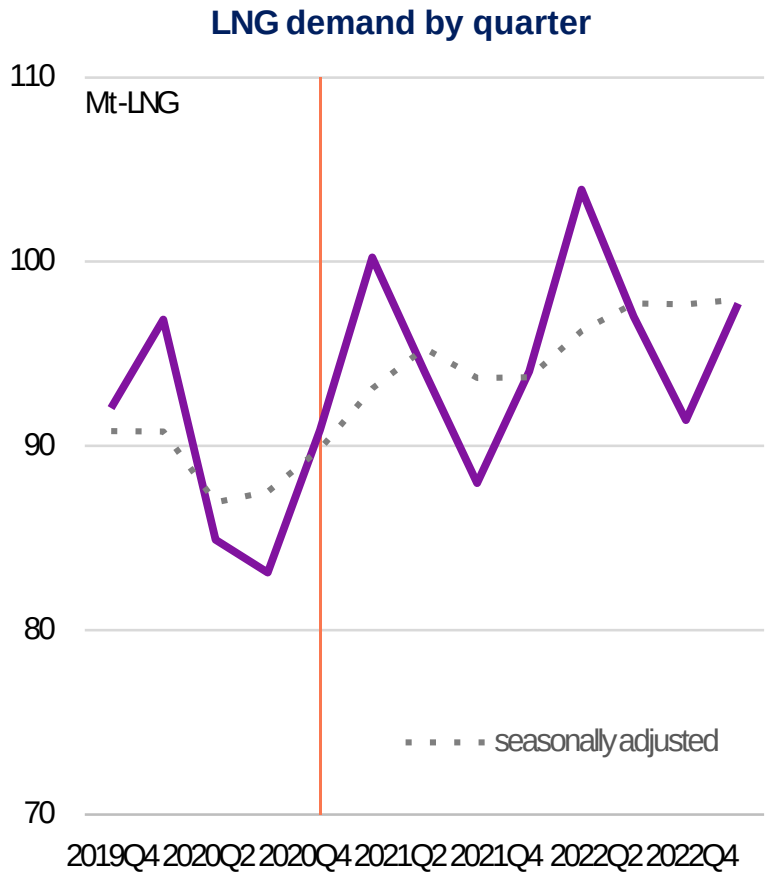




Source: Koyama and Suehiro (IEEJ, March 2021)

LNG demand up to 2022

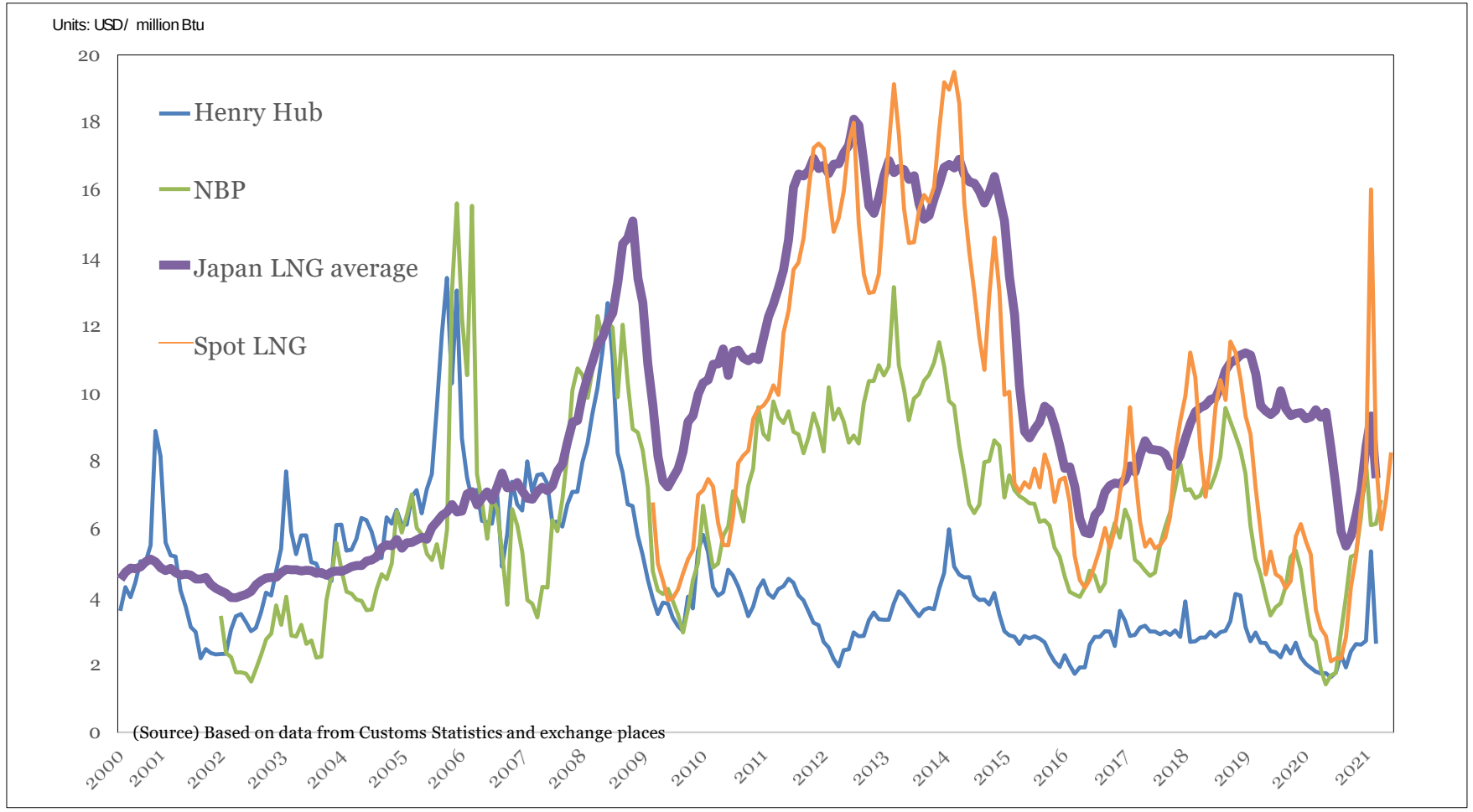




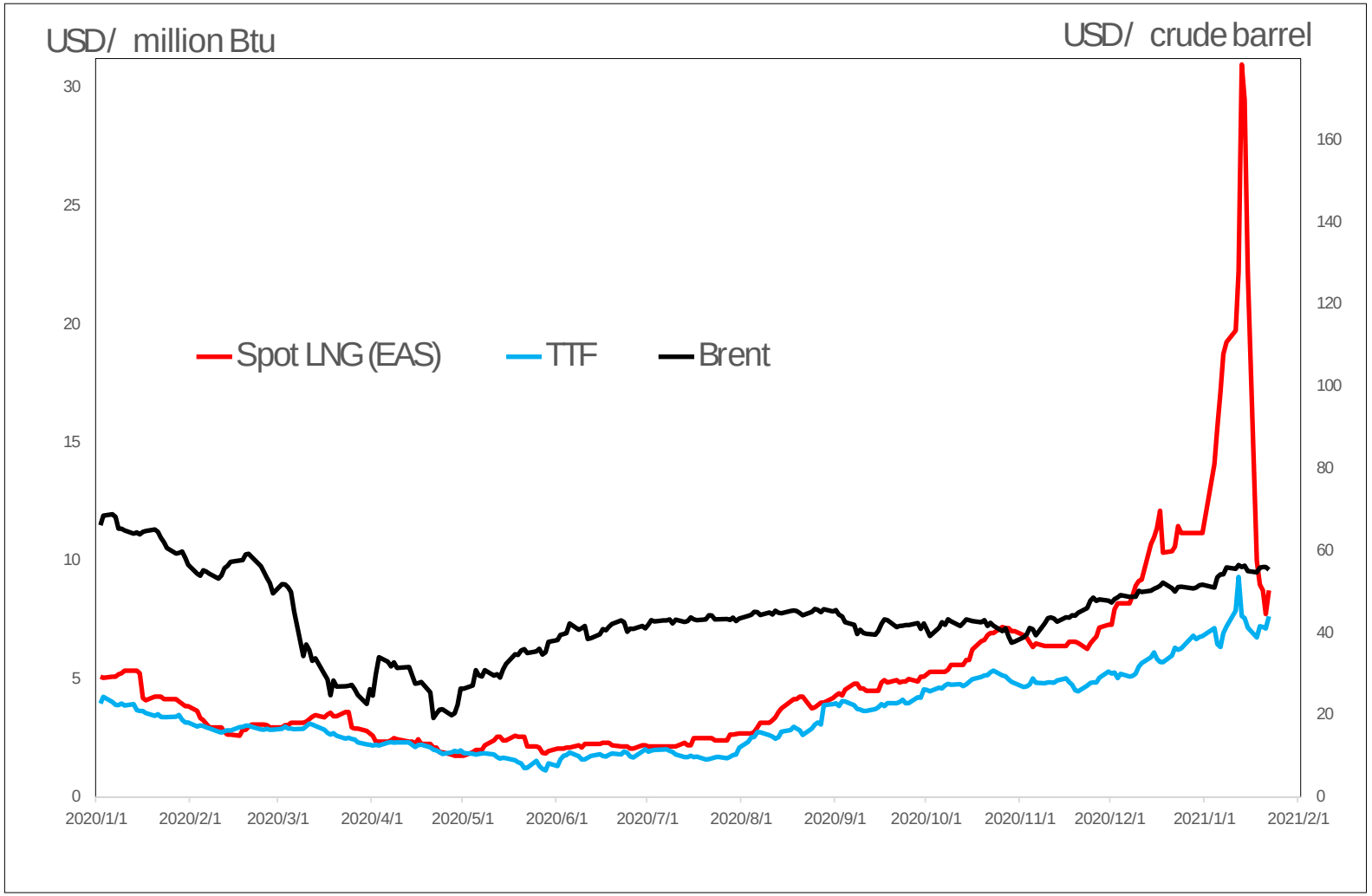
Source: Koyama and Suehiro (IEEJ, March 2021)

Regional gas/LNG price in the world

Asia spot price declined significantly, but later…JCC link price also declined



Extremely Volatile Asian spot LNG prices



（出所）TTF、ICISデータ他からエネ研作成

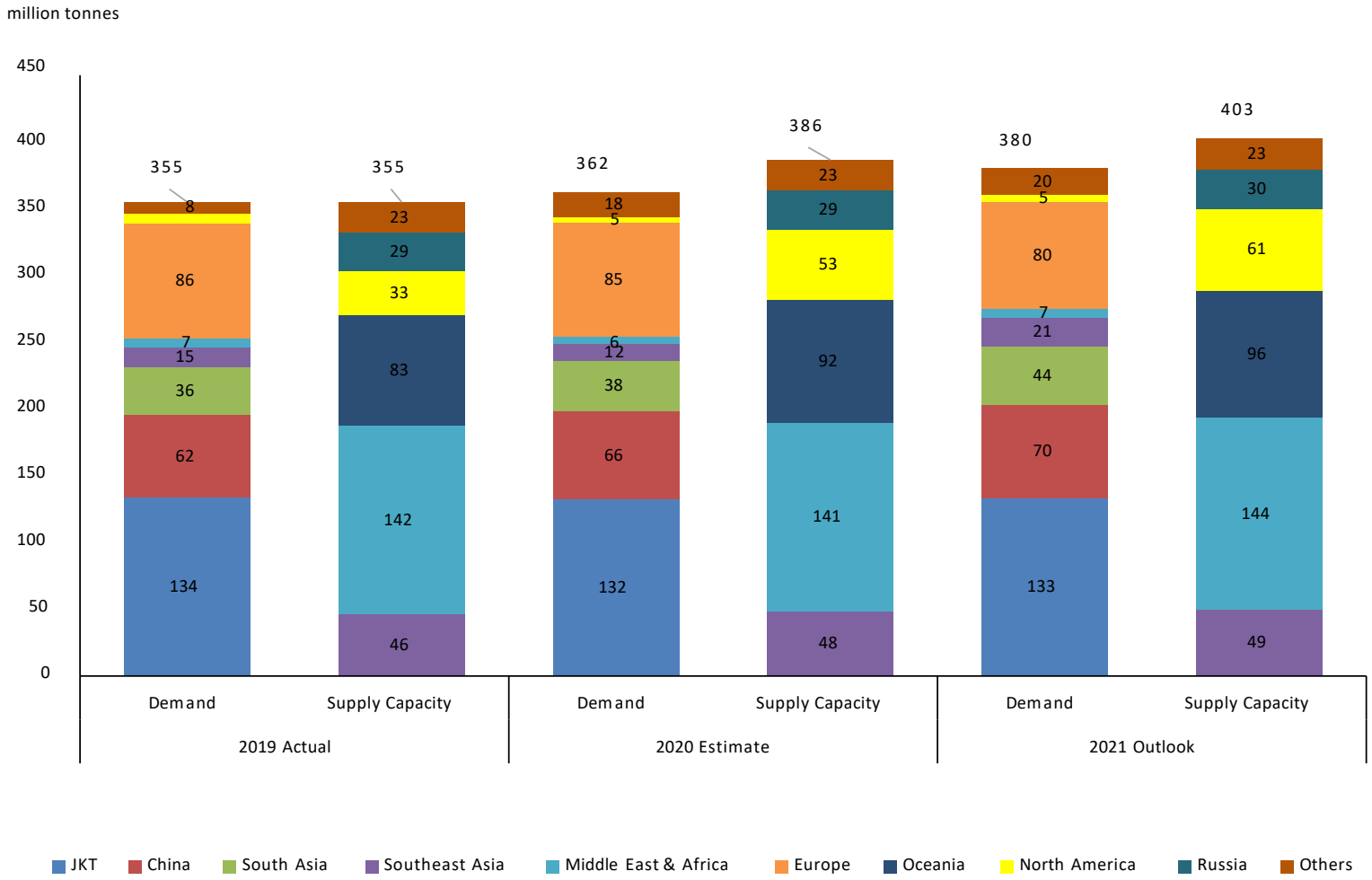
Power crisis in Japan (Jan) & Texas (Feb) in 2021

- **Extreme cold weather caused power demand hikes**
- **Solar PV in Japan and wind power in Texas did not function in bad weather**
- **Gas-fired power, main power source had fuel supply chain problems. LNG spot price soared in Japan's case**
- **27% customers had black out in Texas**
- **Extreme price spikes in wholesale power prices both in Japan and Texas**
- **End of cold weather saved the crisis, but…**

Common background factors in Japan and Texas

- **Extreme weather and natural disaster**
- **Increasingly important RE did not function**
- **Supply chain problems to gas/LNG worsened the situation**
- **Other base-load power (coal in Texas, nuclear in Japan) faced with supply problems or constraints**
- **Isolated power grid system**
- **Supply resilience need to be enhanced**

LNG supply/demand outlook up to 2021



Source: Hiroshi Hashimoto, IEEJ, 2020 December

COVID-19 pandemic impact on gas/LNG supply

- **Demand uncertainty caused by the pandemic and decarbonization make FID more difficult**
- **Suppliers/investors became cautious about the future of gas/LNG market**
- **Only those who have "deep pocket" and low cost reserves may be able to make FIDs**
- **Future supply-demand balances became more uncertain**
- **Market concentration with "big 4"?: Qatar, Russia, US and Australia**

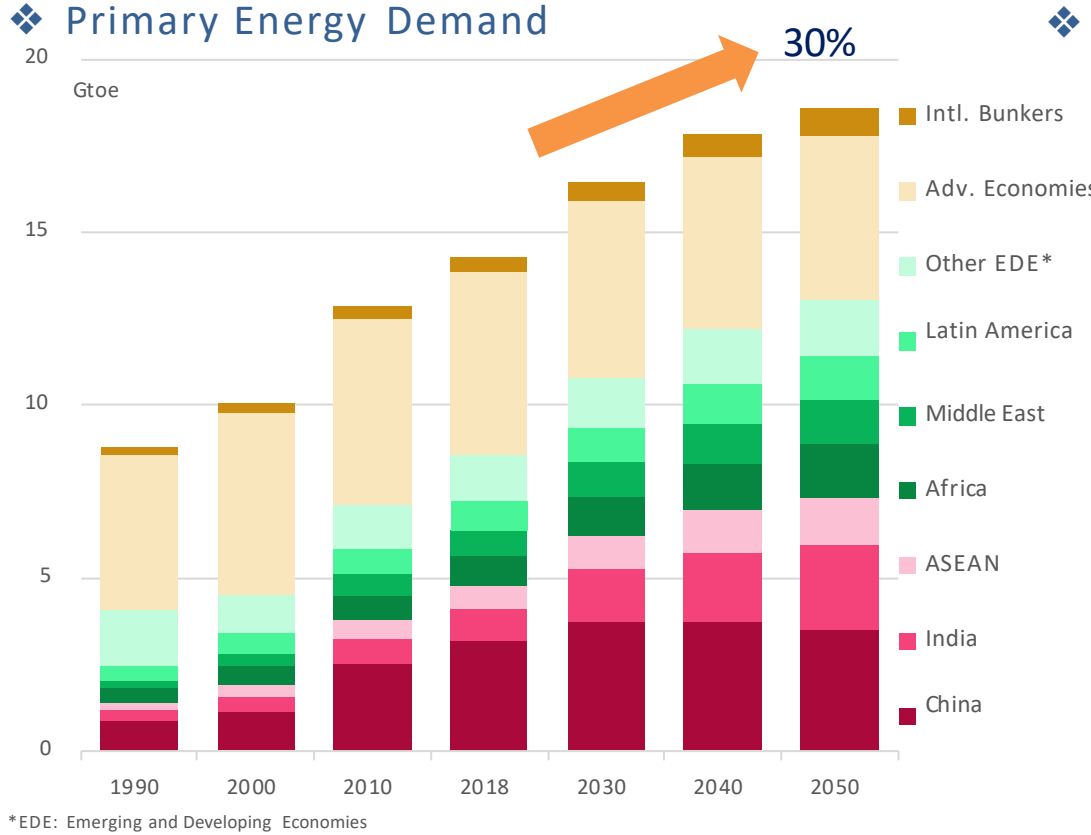
Overall LT implication of COVID-19 pandemic

- **Transportation demand may structurally restrained**
- **Digitalization may substitute transportation demand**
- **Oil demand restrained, acceleration of “electrification”**
- **Any shift in the priority of “3E”?**
- **Wave of carbon neutrality**
- **Pandemic sheds lights on the importance of “big government”**
- **Impact on US-China new cold war and global geopolitics**
- **The meaning of priority to national security**

Reference

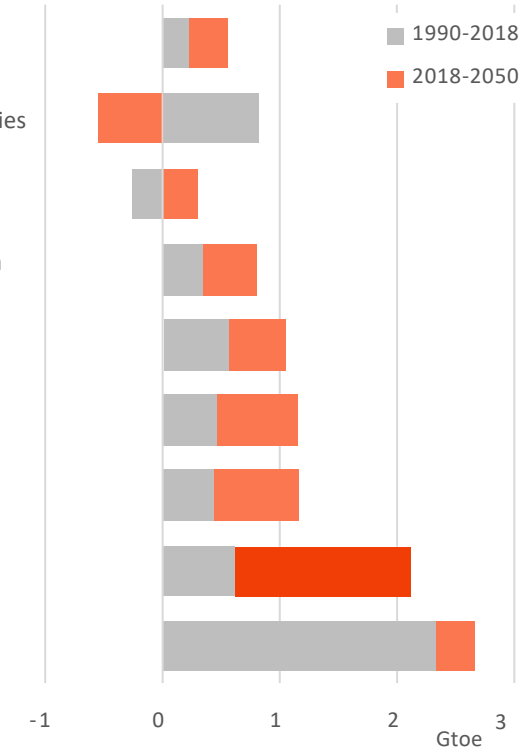
Demand growth shifts from China to India

❖ Primary Energy Demand



*EDE: Emerging and Developing Economies

❖ Growth (1990-2050)



Energy demand in emerging and developing countries increases by more than 50%, while that in advanced economies decreases by about 10%.

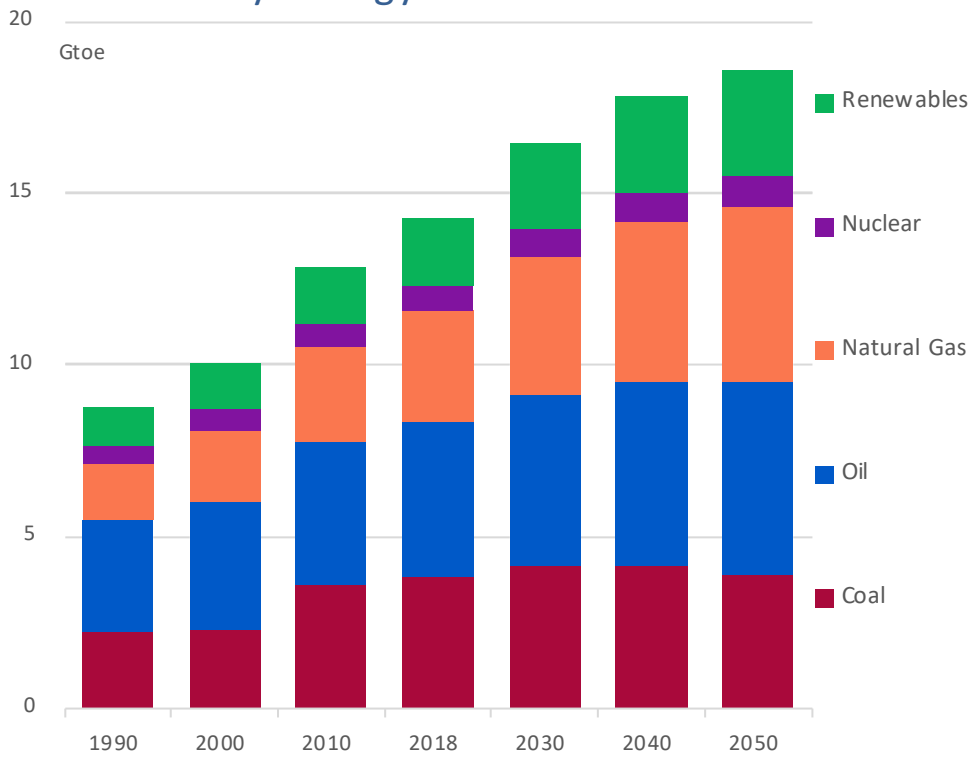
The global energy demand growth changes from China to India. More than one-third of the global demand growth comes from India, while China's demand peaks in the late 2030s.

Source: "IEEJ Outlook 2021" (IEEJ, October 2020)

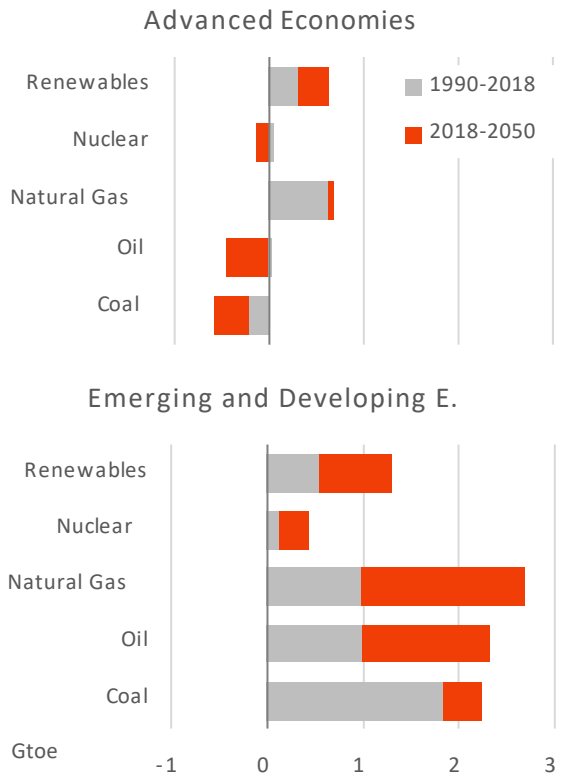
Reference

Coal peaks out, NG increases significantly, Oil continues to gradually increase

❖ Primary Energy Demand



❖ Growth (1990-2050)



Natural gas increases the most, especially in the power generation sector, making it the second largest energy source after oil. The growth in oil consumption in emerging and developing countries by far counter-balances the decrease in advanced economies. Coal demand peaks in the mid-2030s due to a decline in advanced economies and China.

Source: "IEEJ Outlook 2021" (IEEJ, October 2020)

Global Environmental Challenges

- **Climate change, as a long term strategic challenges**
- **Air pollution, as an immediate crisis**

NDC under Paris Agreement

Party	Submission date (2015)	Target type	Reduction target	Base year	Target year	Coverage
EU	Mar 6	Absolute emissions	40%	1990	2030	GHG
United States	Mar 31	Absolute emissions	26～28%	2005	2025	GHG including LULUCF
Russia	Apr 1	Absolute emissions	25～30%	1990	2030	GHG
China	Jun 30	GDP intensity	60～65% Total emission peak out before 2030	2005	2030	CO_2
Japan	Jul 17	Absolute emissions	26%	2013	2030	GHG
Indonesia	Sep 24	Reduction from BAU	29%	BAU	2030	GHG
Brazil	Sep 30	Absolute emissions	37% (43% for 2030)	2005	2025	GHG
India	Oct 1	GDP intensity	33～35%	2005	2030	GHG

Air pollution in China

Source: IEEJ "Asia/World Energy Outlook 2015" and others

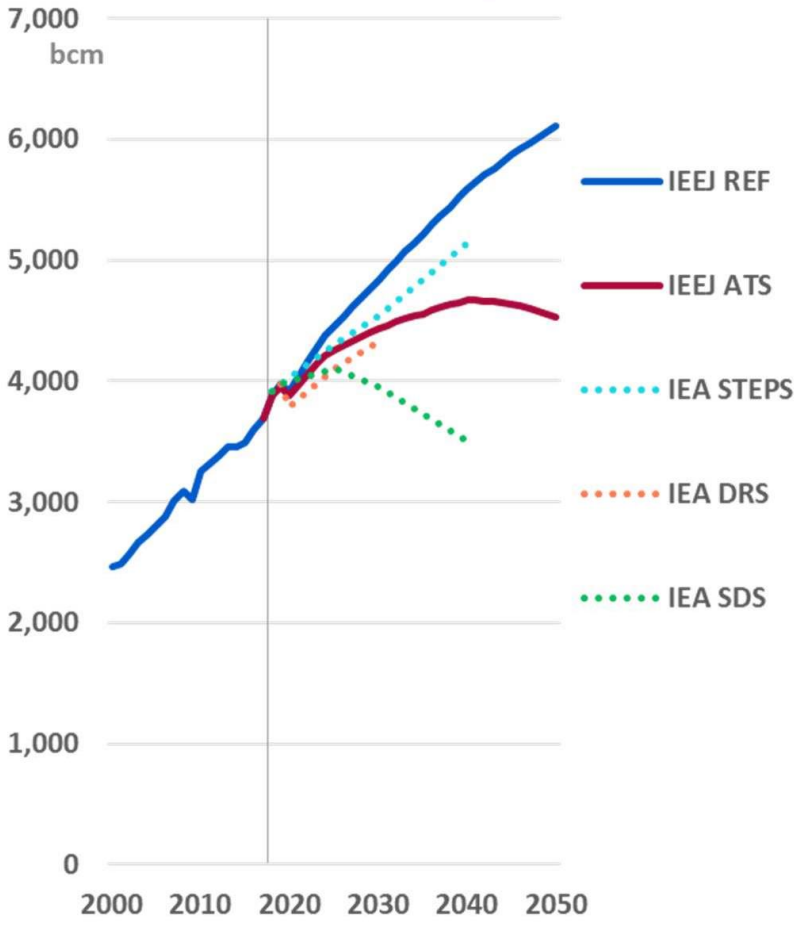
Waves of carbon neutrality target

- EU, as a front runner, targets Carbon Neutrality (CN) in 2050
- China announced CN target in 2060 (September 2020)
- Japan announced CN target in 2050 (October 2020) followed by Korea
- Biden administration has CN target in 2050
- Climate Summit further promotes global decarbonization
- But, CN achievement is extremely challenging
- Promotion of EE and non-fossil energy plus electrification with zero emission power is essential
- Innovative technology/approach such as hydrogen is needed
- Minimization of "transition costs" to CN is critically important

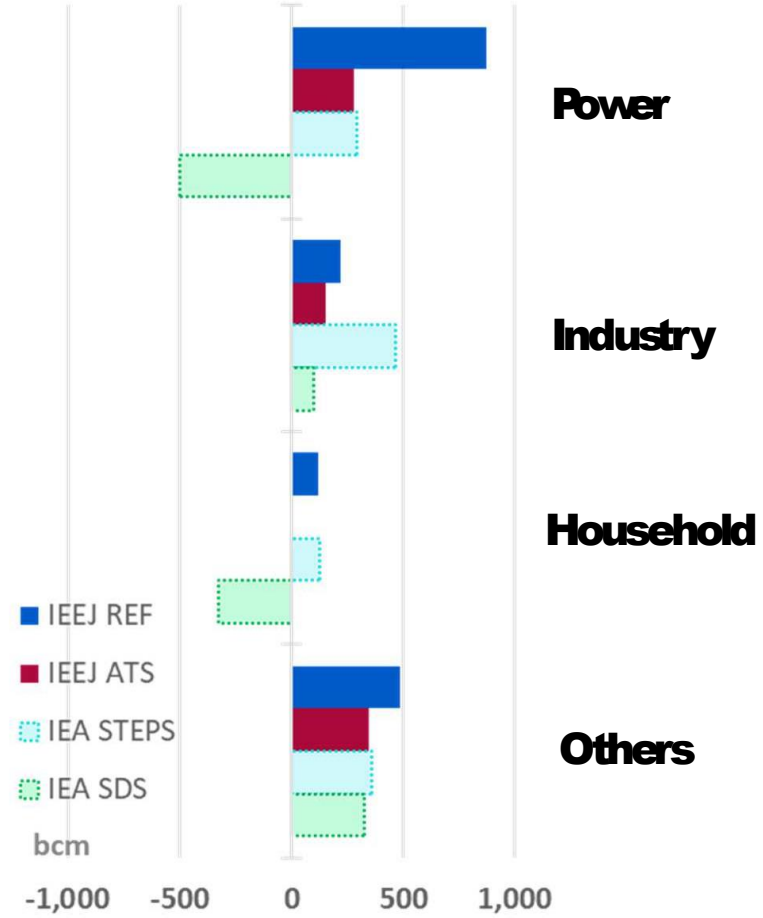
【IEEJ vs. IEA】

Gas demand affected by decarbonization

❖ Gas demand by scenario



❖ difference by sector (2018-2040)



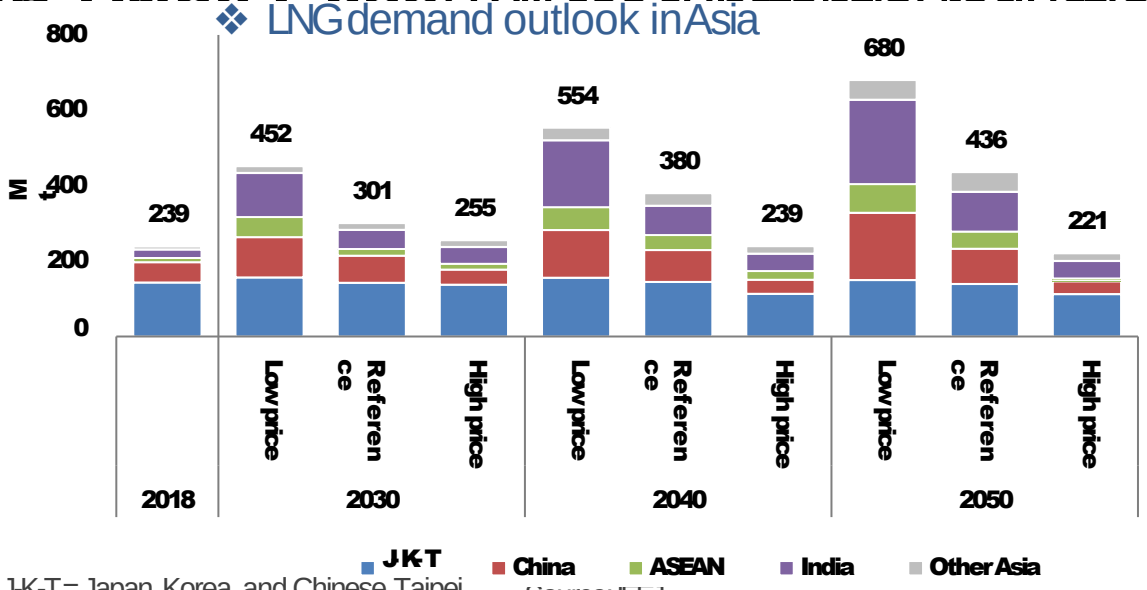
Source: Prepared by EDMC/IEEJ based on date from IEA WEO 2020 and IEEJ Outlook 2021

LNG demand outlook in Asia by case

■**Reference Scenario**: LNG demand in Japan, Korea and Chinese Taipei won't increase. Meanwhile, ASEAN and India will see high (CAGR= 4.4-6.2%) demand growth.

■**High Price Case**: will see substantial reduction of new deve d will stagnate (CAGR= -0.1%).

■**Low** n coal-fired to gas-fired powe se (CAGR= 3.3%).



J-K-T = Japan, Korea, and Chinese Taipei

Source: IEEJ

Source: "IEEJ Outlook 2020" (IEEJ, October 2019)

The role of LNG in Asian clean energy system

- **Expanded LNG share in Asian energy mix contributes to reduce air pollution and CO2 emission**
- **Abundant and affordable LNG will play an important role in Asian clean energy system**
- **But if Asian countries aim at "decarbonization" or "carbon neutral" as a long term strategy, what will be the impact on LNG**
- **Do we in Asia need "decarbonization of LNG" just as advocated in Europe?**

Towards the sound development of Asian gas/LNG market

■ To further enhance market function in Asia

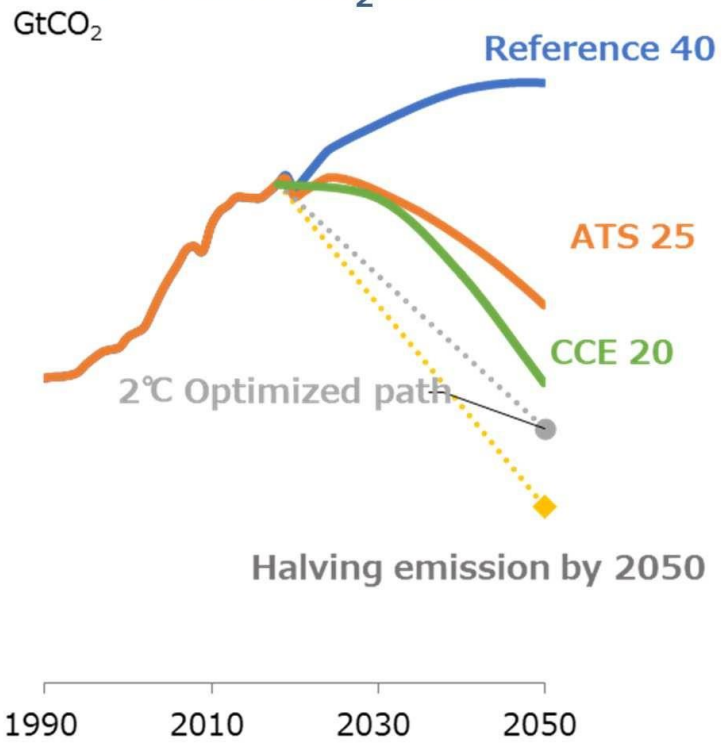
- ➢ Explore the best LNG pricing mechanism which reflects market reality in Asia
- ➢ Ensure free and flexible trading of LNG which helps to establish a well functioning market
- ➢ Realize stable and steady expansion of LNG market by securing necessary investment

■ To prepare for the long term path of "carbon neutrality"

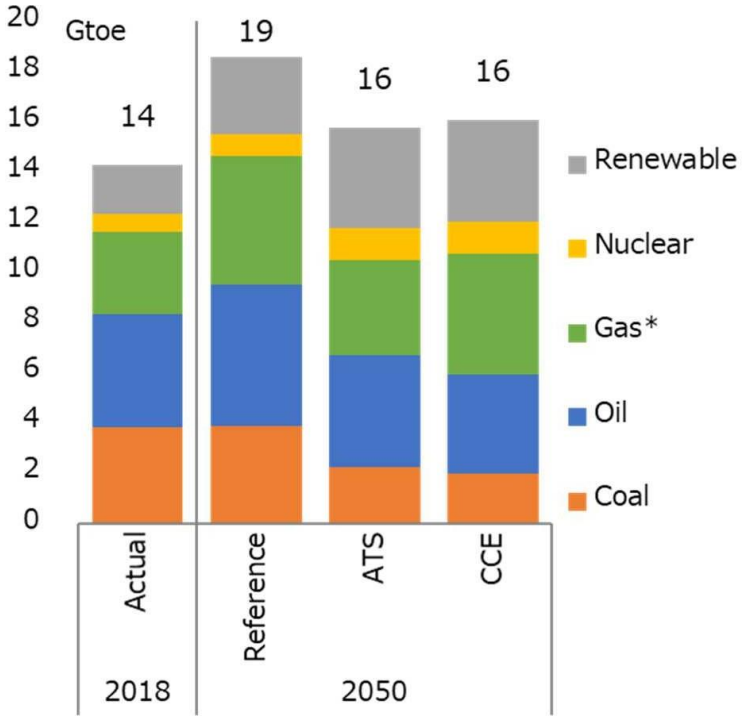
- ➢ The role of "carbon neutral LNG" ?
- ➢ The best utilization of LNG related infrastructure/facilities by:
  - ☐ Co-firing of "blue ammonia" or "blue hydrogen" with LNG (natural gas)?
  - ☐ Zero emission power generation
  - ☐ The best use of carbon neutral methane (methanation)

Emissions reduced while using fossil fuels

❖ World CO_2 Emissions



❖ World Primary Energy Demand



*Gas in CCE scenario includes synthetic methane

CO_2 emissions are reduced by 5Gt from ATS and approaches 2℃ optimized path.

While the share of fossil fuels of CCE scenario is almost same as ATS', the mix of fossil fuel shifts from coal and oil to natural gas as a primary feedstock of blue hydrogen.

CO_2 emissions significantly reduced while the consumption of fossil fuel unchanged.

Source: "IEEJ Outlook 2021" (IEEJ, October 2020)

Implication to Malaysia

- Malaysia, just as other countries, faces energy trilemma of its own
- Natural gas/LNG need to play an important role in Malaysia energy mix
- Competitive, flexible and affordable gas/LNG procurement will be key to Malaysia energy policy
- Malaysia can best utilize current gas/LNG market environment to prepare/implement energy policy
- Decarbonization will complicate the future of gas/LNG, but gas/LNG likely to continue to be important option
- Innovating options such as blue hydrogen/ammonia may become a key to Malaysia as well

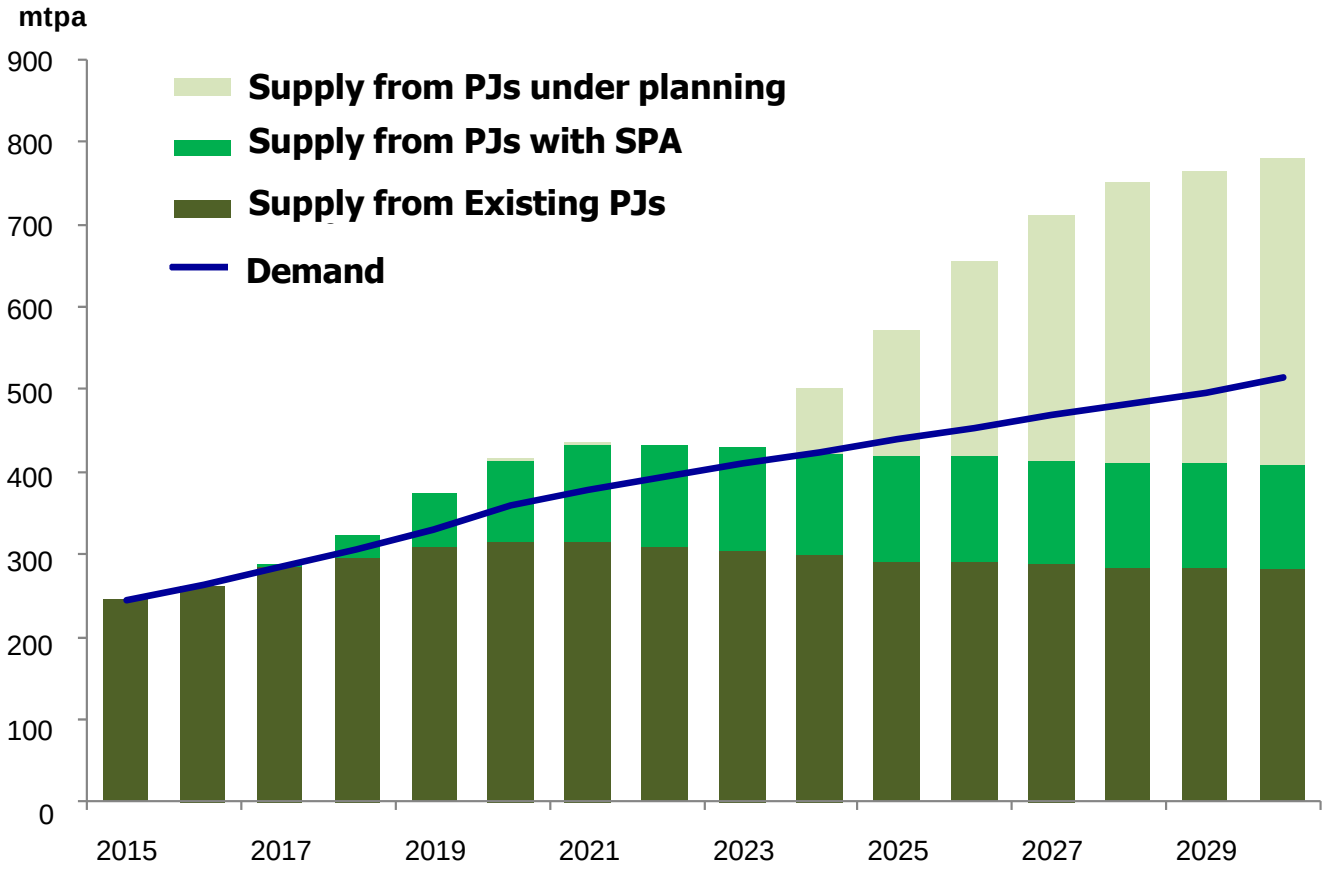
Thank you very much
for your kind attention.

History of Asian LNG Market

- Japan started LNG import in 1969 to combat air pollution.
- Need to address energy security and climate change further promote LNG in Japan.
- Korea (1986) and Taiwan (1991) followed Japan, and the 3 importers accounted for 70% of global LNG trade.
- India (2004) and China (2006) became LNG importers, and China became 2nd largest importer after Japan in 2017.
- New LNG importer from ASEAN and south Asia.
- Dominant LNG pricing in Asia is "JCC" or crude oil indexation.
- Long term contract still dominant, but spot/short term contract increased and supply flexibility improved.
- Traditional main supply sources are regional supplies, but growth in supply from ME, Russia, Australia, US, etc. contributed to diversification.

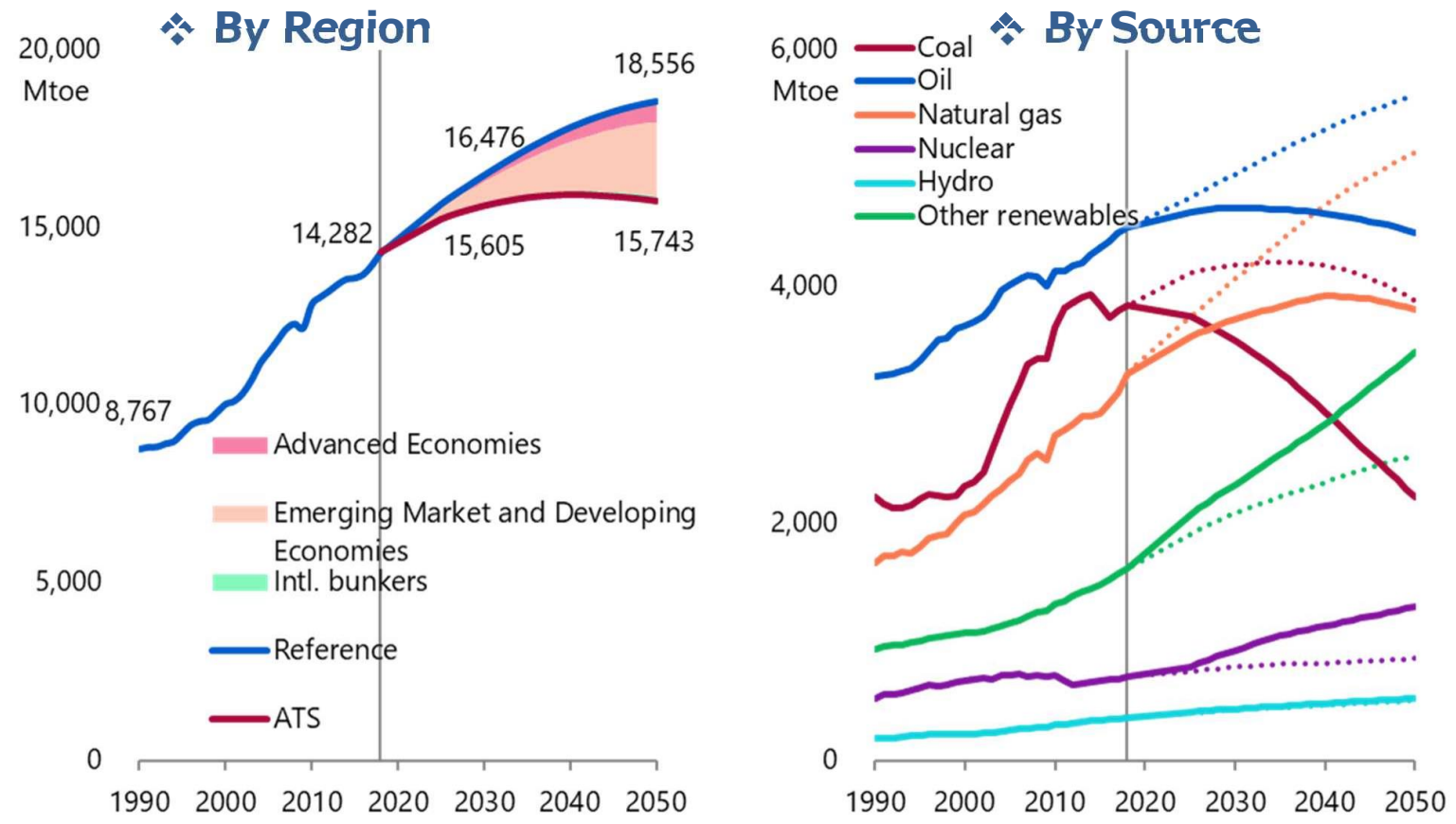
Global LNG Supply-Demand

Supply surplus continues until 2022～2023?



Source: Yoshikazu Kobayashi, "The Role of Natural Gas in Japan and Asia" (September 11, 2017)

Total Primary Energy demand (World)



The world's energy demand in ATS is lower by 15% compared to Reference largely because of the energy saving by emerging countries.

The world will remain dependent on fossil fuels for 67% of the total demand as of 2050.

Source: "IEEJ Outlook 2021" (IEEJ, October 2020)

Supply flexibility of LNG

- **Inflexible contract terms prevent liquidity improvement in Asia LNG market**
  - **Contract duration (20 years+)**
  - **Take or Pay**
  - **Destination clause → JFTC report on LNG trading and destination clauses (June 2017)**
- **Background of inflexibility**
  - **Remote greenfield projects need traditional rigid contract to manage the investment risk.**
  - **Flexible LNG can cause additional cost in logistics.**
- **Changing realities in the world LNG market:**
  - **Increasing supply of US LNG without destination restriction**
  - **Operational flexibility in tolling business model in the US**
  - **Lowering the hurdle to introduce LNG thanks to adoption of FSRU**
  - **Market liberalization of the uncertain demand for each buyer**
  - **Uncertainty in nuclear power generation due to policy and PA factors**
- **Flexibility is essential and useful for both importers and exporters because right price signal will adjust demand/supply efficiently.**

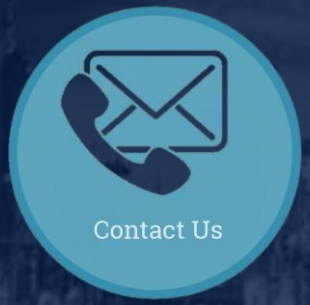
Source: Yoshikazu Kobayashi, "The Role of Natural Gas in Japan and Asia" (September 11, 2017)

Issues for LNG Pricing in Asia

- Given the dominance of the existing contracts, JCC pricing likely to remain dominant mechanism in Asia at least up to early 2020s
- But tide is changing:
  - ✓ Over-suppled market continues
  - ✓ Inflow of US LNG with HH pricing will increase in Asia
  - ✓ Spot/short-term trading continue to grow
  - ✓ Significant gas between spot and contracted LNG prices
  - ✓ JKM increasingly influential
  - ✓ Initiatives to create hubs and new price discovery in Asia
  - ✓ Power and gas market reforms in Japan and Asia
- Major Japanese/Asian buyers embarked on strategy to diversify pricing
- Buyers continue to search for possible alternatives to JCC and the share of JCC pricing will be reduced
- So far there is no clear answer as to what is the best alternative
- Uncertainties over both prices linked to JCC and spot LNG prices

SESSION

THANK YOU



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