Regional snapshot: Natural gas in Asia and the Pacific

8th Expert Working Group on Universal Access to Modern Energy Services, Renewable Energy, Energy Efficiency and Cleaner Use of Fossil Fuels

30 March 2023, Bangkok, Thailand

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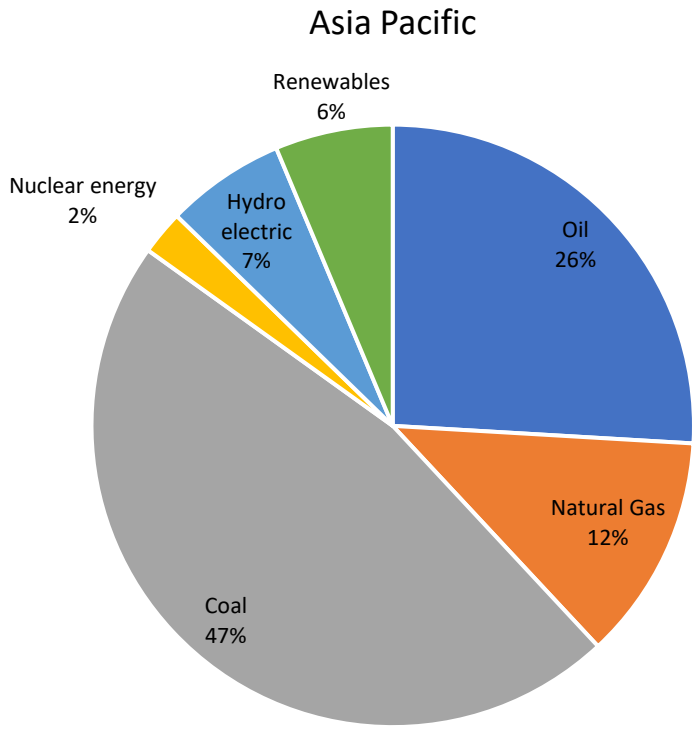
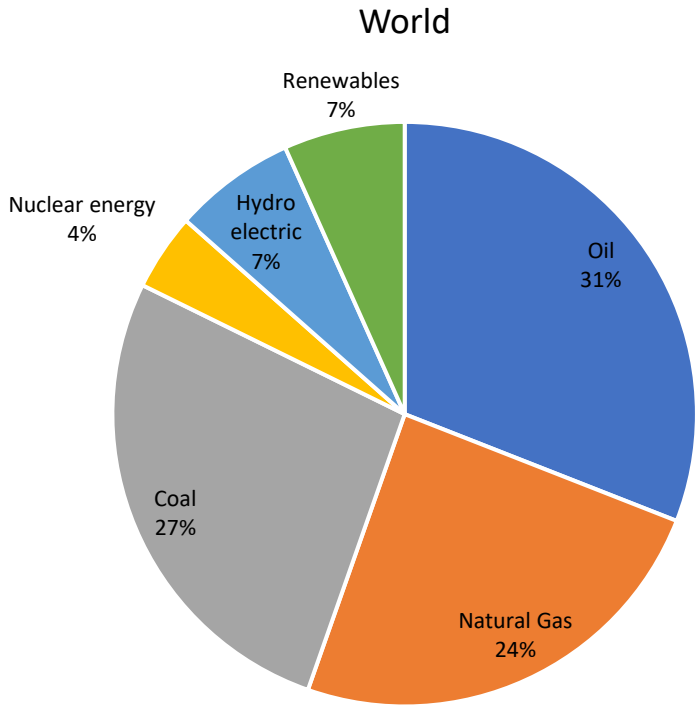
Coal dominates the energy mix in Asia-Pacific, natural gas comes after oil with a 12% share

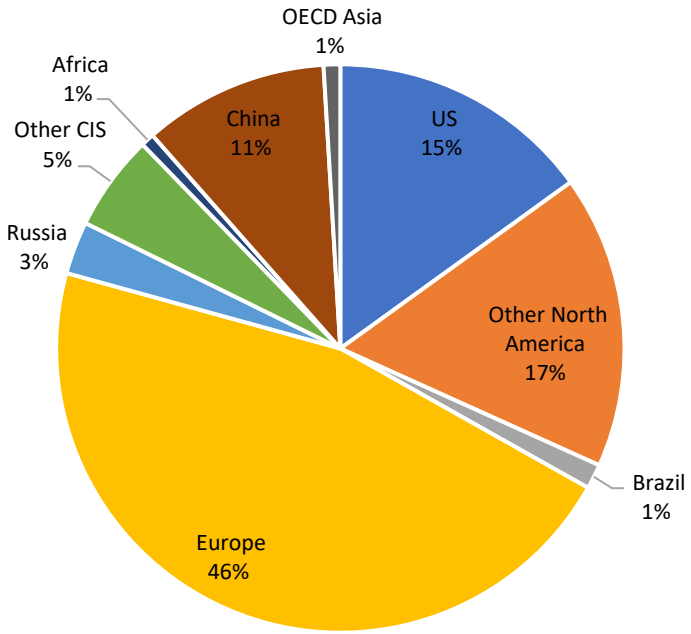




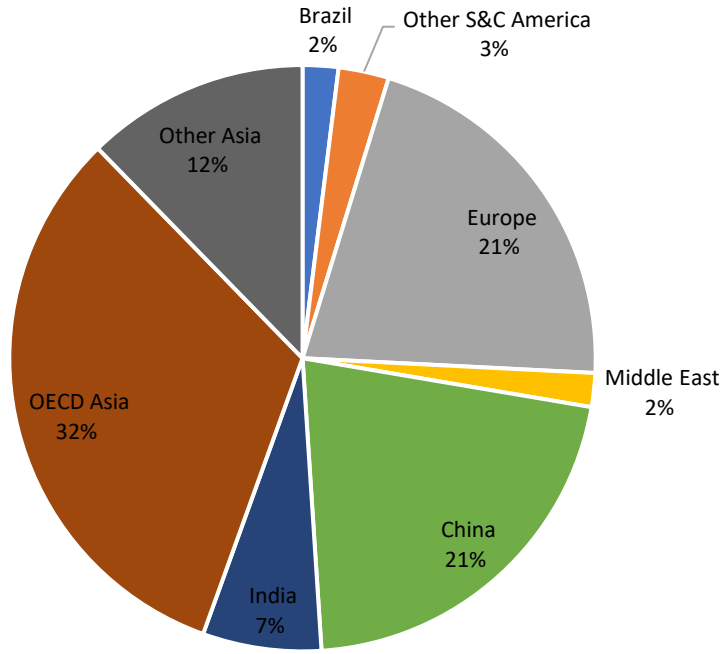
**- USA, Russia and Central Asia are not included into these stats*
Source: BP Statistical Review of World Energy 2022

With relatively low natural gas penetration rate, Asia represents over 40% of global natural gas imports as of 2021

Pipeline gas imports as of 2021



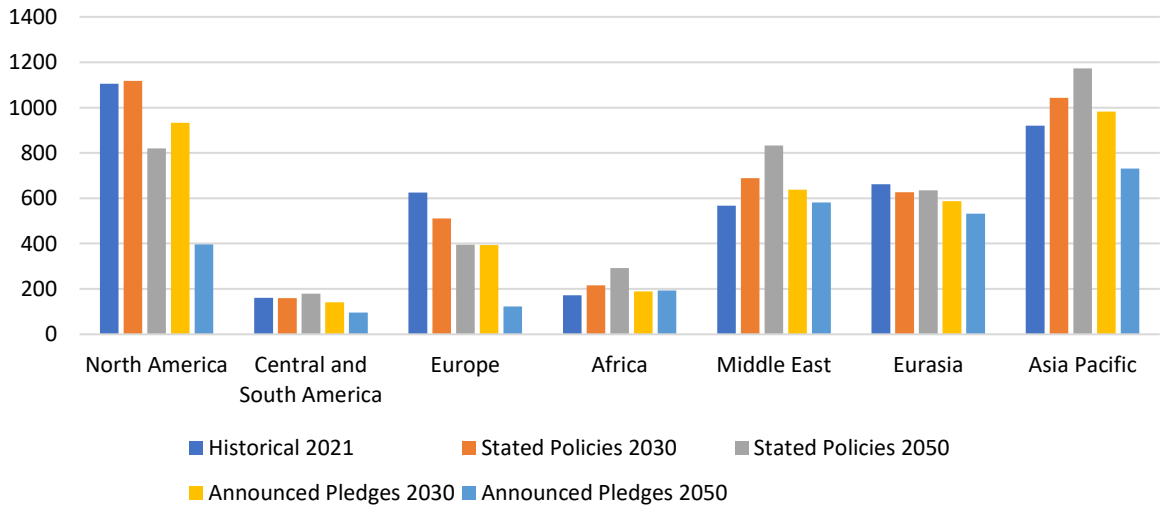
LNG imports as of 2021



Source: BP Statistical Review of World Energy 2022

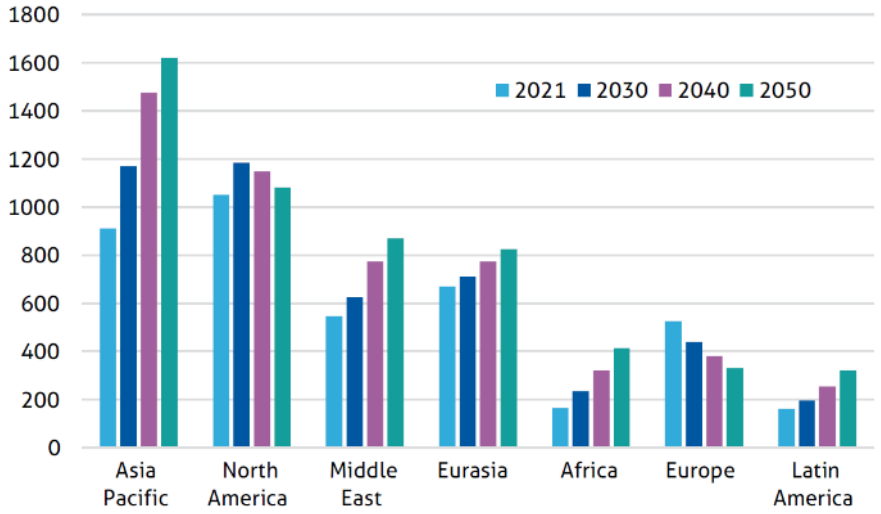
There are uncertainties while forecasting the future of natural gas in Asia-Pacific, but the region will remain the top one in terms of demand

IEA outlook for gas in various regions



Source: IEA World Energy Outlook 2022

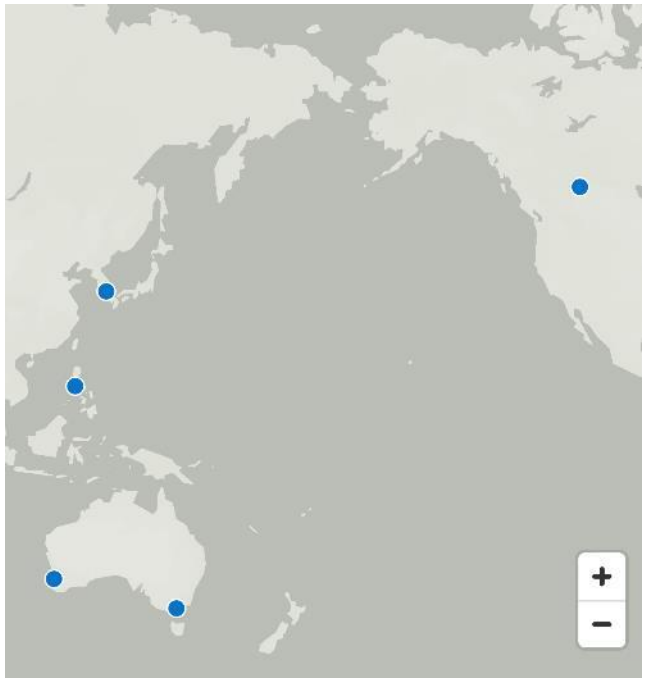
GECF outlook for gas in various regions



Source: GECF Secretariat based on data from the GECF GGM

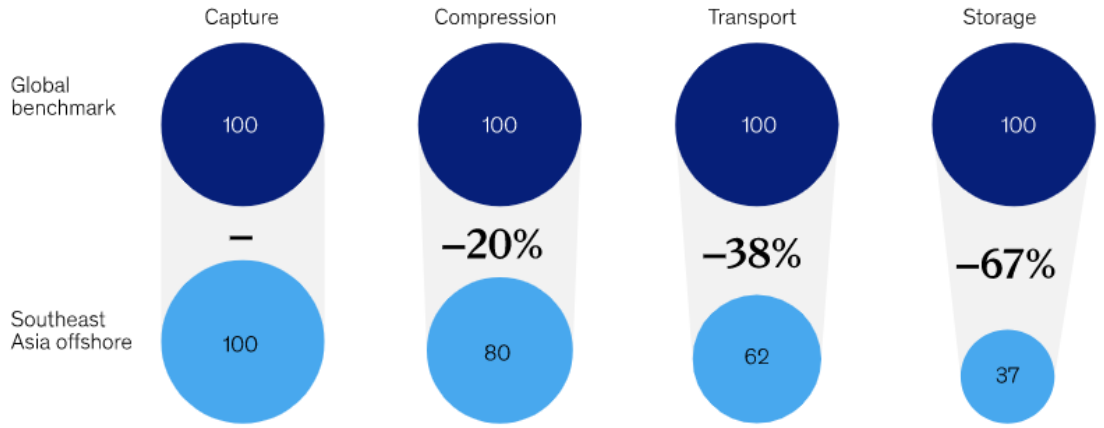
The Asia-Pacific region has the scope and potential to become a hydrogen superpower, has great options for CCUS use – it may lead to new applications for natural gas use

Asia-Pacific is home to several "blue" hydrogen (produced from NG) projects



Source: Pillsbury Law Hydrogen Map

Carbon capture, utilization, and storage costs in Southeast Asia measure well against global benchmarks.



Source: Global CCS Institute; National Petroleum Council; McKinsey CCS cost model (Westney Capital Analytics, Energy Insights)

McKinsey & Company

Asia and the Pacific region has all the competences for establishing a gas value chain, huge potential for cross-border cooperation. However, global and regional cooperation might still be needed to implement large-scale infrastructure projects

Drilling rigs

China

USA

Russia

India

Iran

Large-diameter pipes

Japan

China

Russia

India

LNG plants EPC, equipment

Japan

China

USA

Gas turbines

Japan

Iran

China

Russia

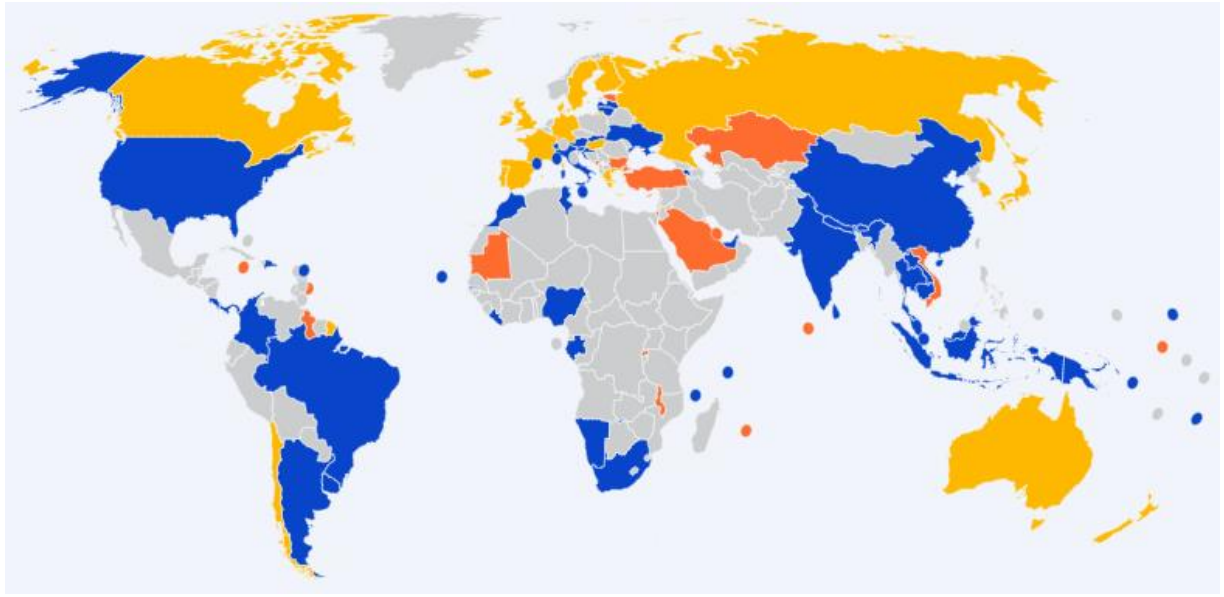
LNG vessels

China

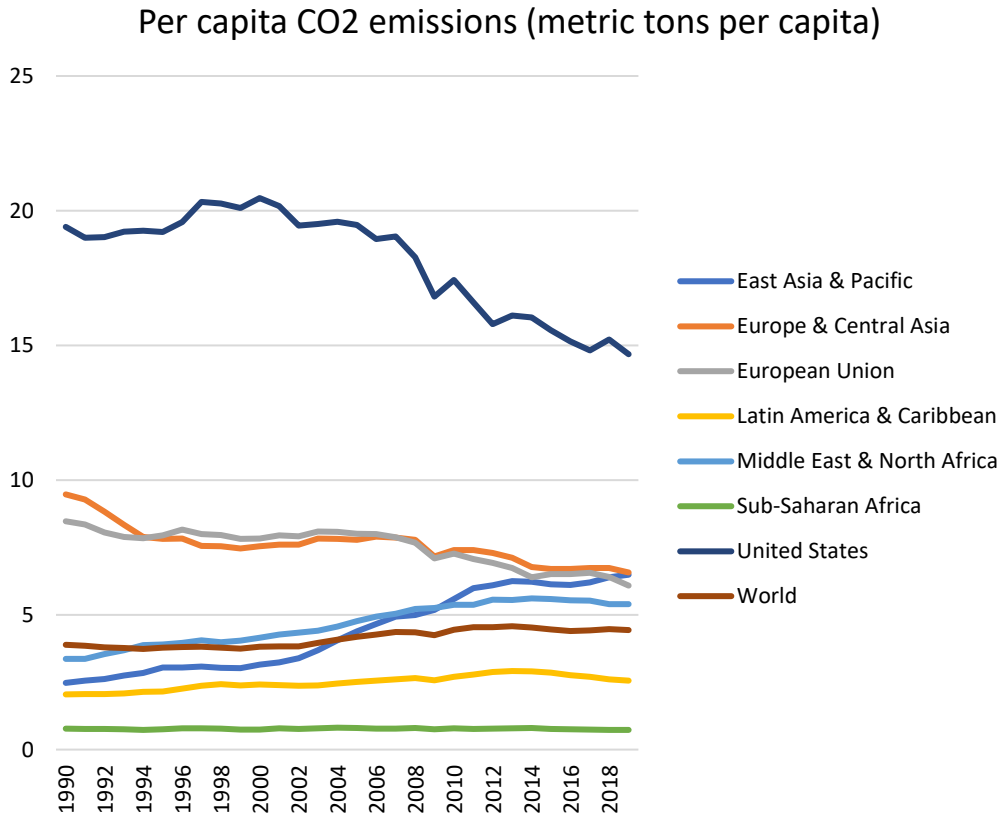
Korea

Japan

Most countries of Asia and the Pacific have communicated Net Zero targets. Being home to more than 50% of global GHG emissions, per capita CO2 emissions in Asia and the Pacific are near global average

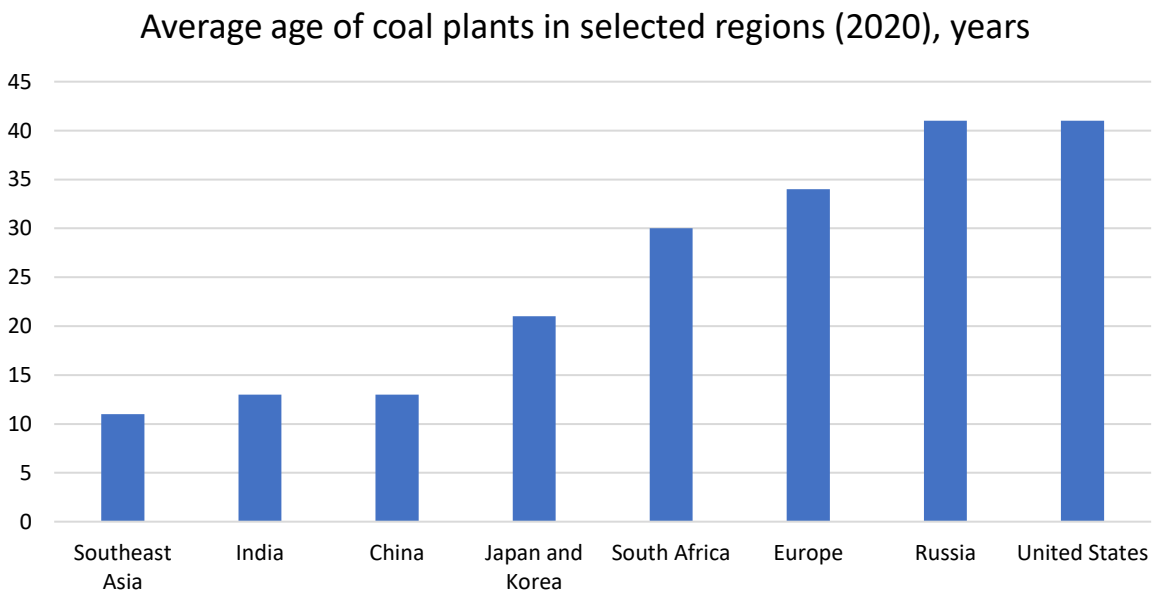


- Net-zero Target in Law — 20 Parties
- Net-zero Target in Policy Document — 49 Parties
- Net-zero Target in Political Pledge — 19 Parties
- No Document Submitted — 123 Parties



Source: World Bank

One of the barriers on the way to coal-to-gas switch and broader energy transition is a structure of national energy systems. I.e., China's coal plants are one the world youngest and most efficient



Source: International Energy Agency

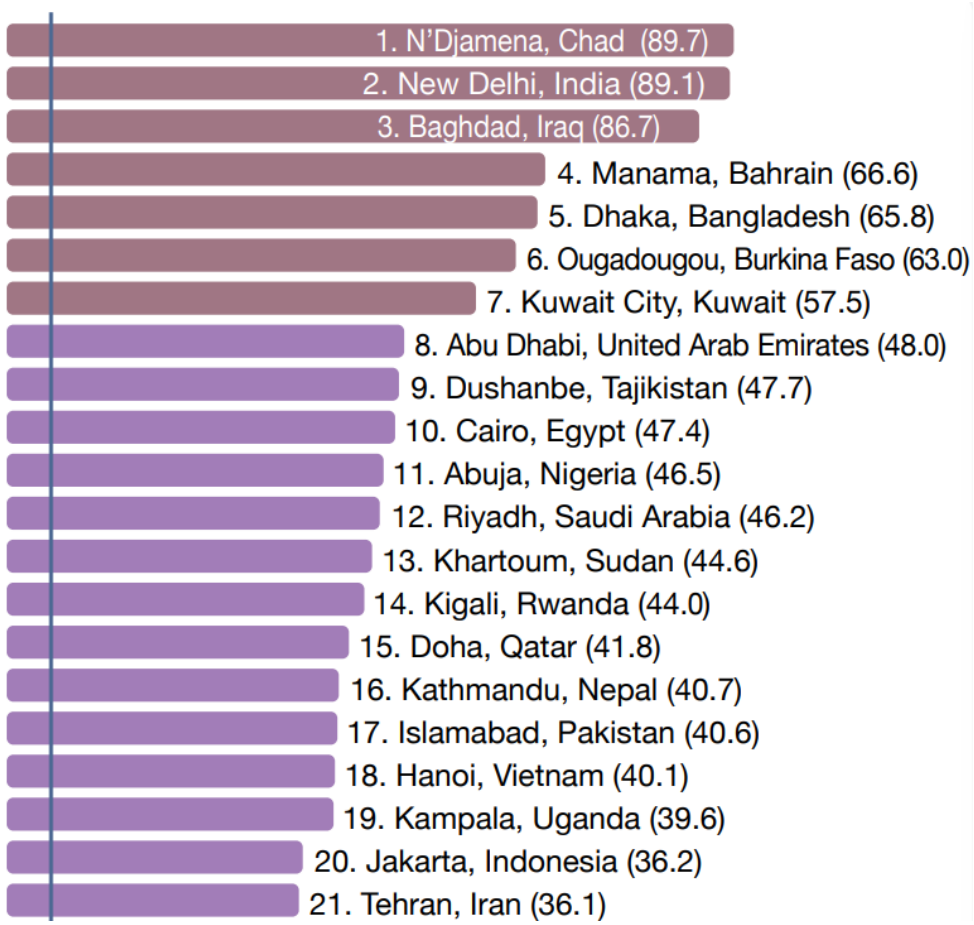
Haimen Power Plant 6x1000MW Ultra-supercritical Coal-fired Power Units (China)

Source: CGGC

Air quality is an issue of prime importance for many countries in Asia; is a target of environmental policy in addition to climate commitments

Population weighted, 2022 average PM2.5 concentration (µg/m³) for countries and cities in descending order

1	Chad	89.7
2	Iraq	80.1
3	Pakistan	70.9
4	Bahrain	66.6
5	Bangladesh	65.8
6	Burkina Faso	63.0
7	Kuwait	55.8
8	India	53.3
9	Egypt	46.5
10	Tajikistan	46.0
11	United Arab Emirates	45.9
12	Sudan	44.6
13	Rwanda	44.0
14	Qatar	42.5
15	Saudi Arabia	41.5
16	Nepal	40.1
17	Uganda	39.6
18	Nigeria	36.9
19	Bosnia Herzegovina	33.6
20	Uzbekistan	33.5
21	Iran	32.5



Source: IQAir's 2022 World Air Quality Report

According to latest studies, natural gas can use can contribute to increasing life expectancy in regions with poor air quality

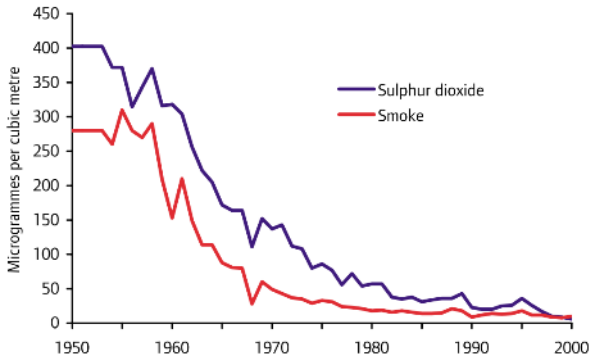
- According to *R. Zhang et al., 2021**, expanding natural gas consumption can significantly reduce the mortality rate;
- According to China's experience, an **increase in 1 cubic meter** in national per capita gas consumption can **reduce mortality by 0.0011**, which is equivalent to 1540 fewer deaths in 2019;
- The relationship between natural gas consumption and mortality is verified as **linear**.

Source: UNICEF/Habibul Haque Air pollution in Dhaka, Bangladesh, is leading to a series of health problems for the city's inhabitants.

*- Ruining Zhang, Hui Li, Tianqi Chen, Bingdong Hou, How does natural gas consumption affect human health? Empirical evidence from China, Journal of Cleaner Production, Volume 320, 2021, https://doi.org/10.1016/j.jclepro.2021.128795.

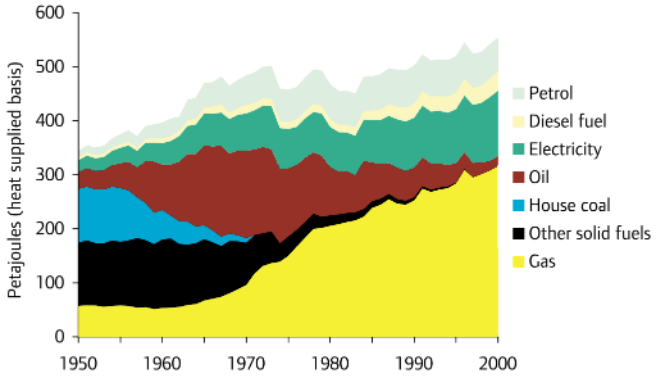
Coal-to-gas switching could be a fast-track solution of air pollution issues

Annual average smoke and SO2 concentrations in London (1950-2000)



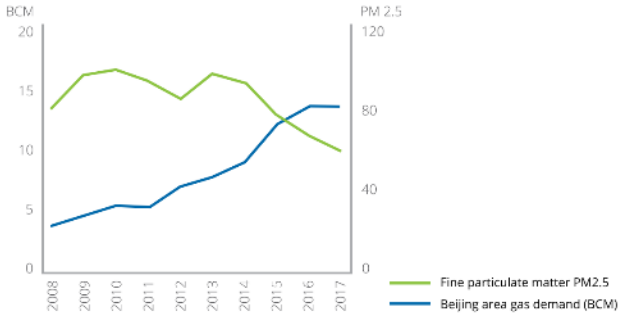
Source: AEA Technology Environment 2002

Energy use in London (1950-2000)



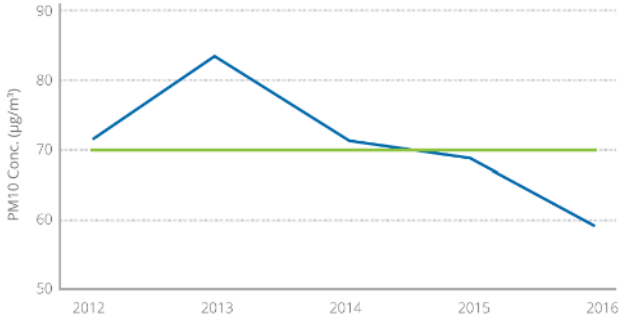
Source: Greater London Authority

Correlation b/w natural gas use and PM emissions in Beijing



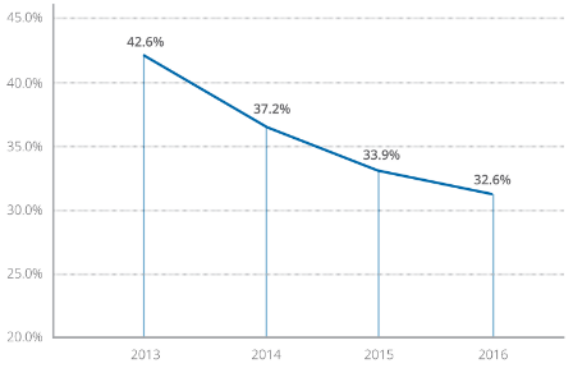
Source: International Gas Union on Shell data

Annual concentrations of PM10 in Shanghai and national standard



Source: International Gas Union
on data by Shanghai Environmental Protection Bureau

Coal to gas consumption rate in Shanghai

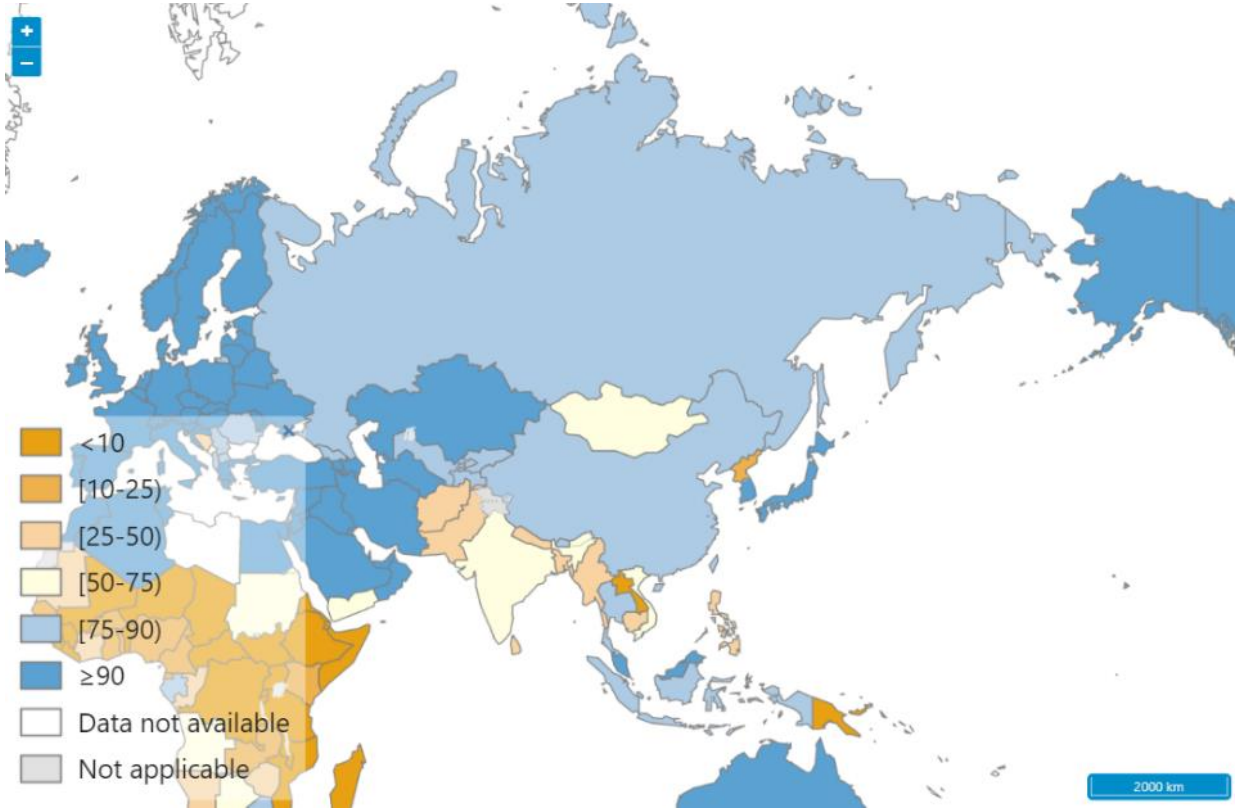


Source: International Gas Union on data by Beijing Gas

Asia-Pacific remains a region with high shares of population without access to clean cooking technologies

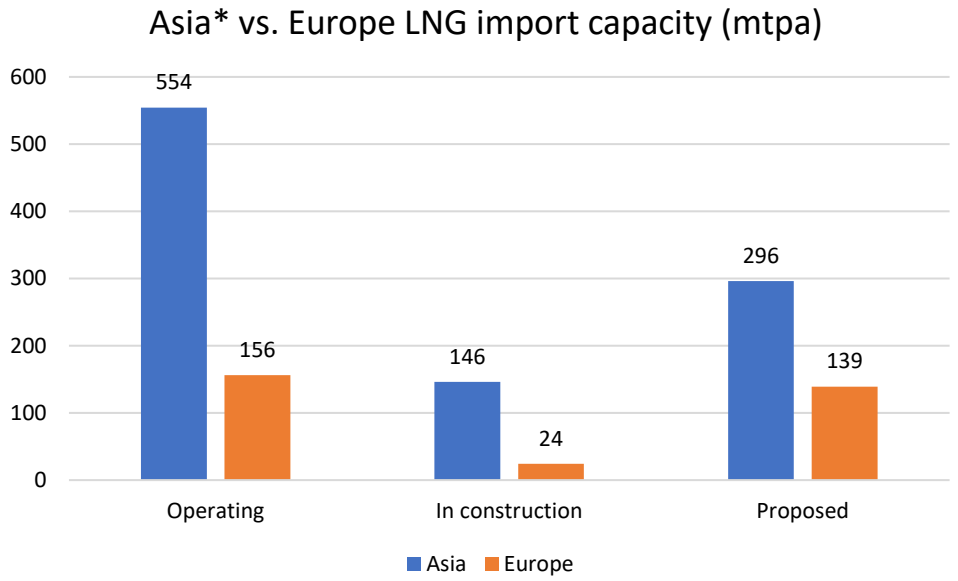
- According to WHO, 78% of population of Western Pacific have access to clean cooking, while this figure is just 65% for South-East Asia;
- Natural gas has been traditionally used in Europe, Americas, Eurasia for household stoves. However, it is a costly solution, not always applicable for rural areas;
- For rural areas, not connected to gas distribution grids, liquified petroleum gas (LPG) is a viable alternative to solid biomass and coal.

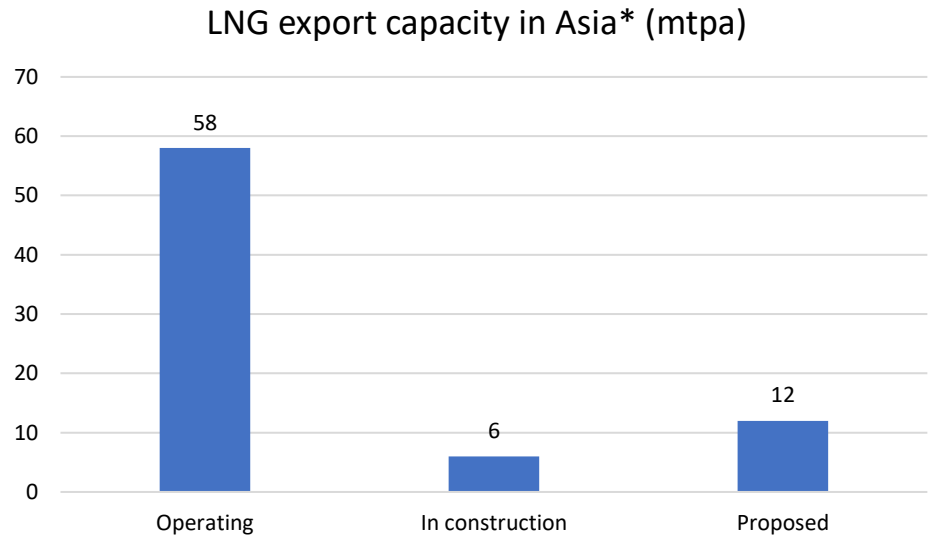
Percentage of population with access to clean cooking



Source: World Health Organization

Asia is the world leader in terms of LNG import capacity, with that export capacity in Asia is limited, the region has to source gas from global markets

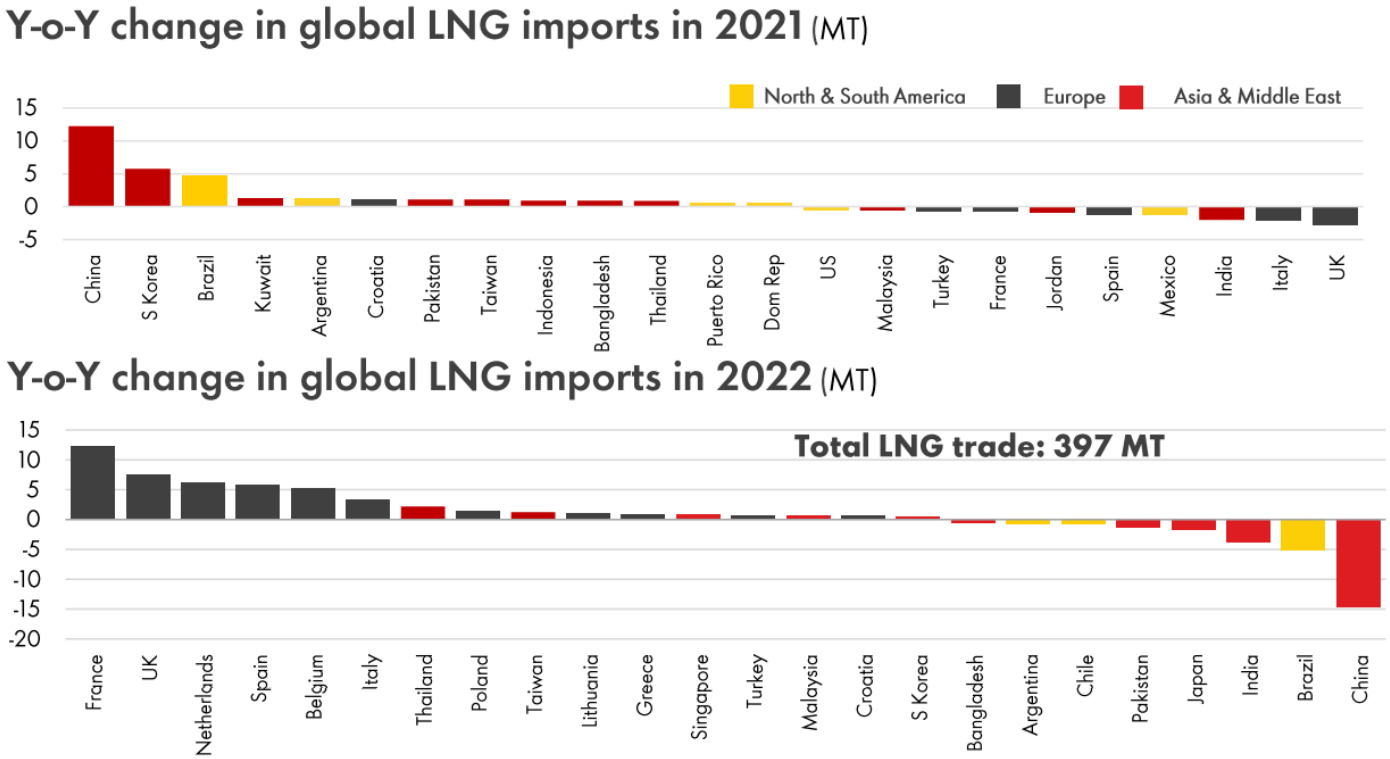




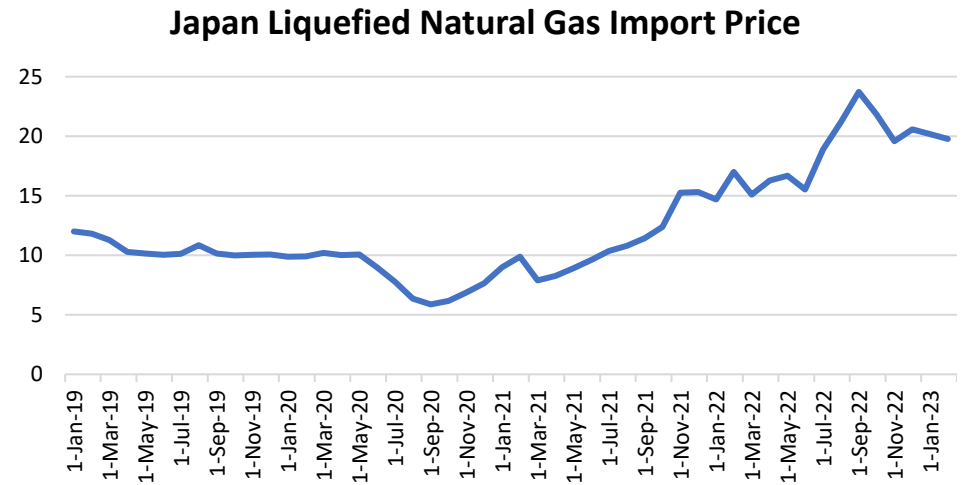
*- Asia here includes Bangladesh, Brunei, Cambodia, China (inc. Hong Kong + Taiwan), India, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam

Source: Europe Gas Tracker and Asia Gas Tracker, Global Energy Monitor, March 2023 release

Though having vast LNG import infrastructure, Asia is vulnerable to price fluctuations. LNG affordability remains a challenge in the region



Source: Shell Interpretation of Kpler and Wood Mackenzie 2022 data, Shell LNG Outlook 2023



Source: World Bank

United Nations

A/RES/75/221

General Assembly

Seventy-fifth session
Agenda item 19 (h)
Sustainable development: ensuring access to affordable, reliable, sustainable and modern energy for all

Resolution adopted by the General Assembly on 21 December 2020

[*on the report of the Second Committee (A/75/457/Add.8, para. 7)*]

75/221. Ensuring access to affordable, reliable, sustainable and modern energy for all

8. *Recognizes* the key role that natural gas currently plays in many countries and its potential to expand significantly over the coming decades to meet demand in some countries as well as in new sectors, such as the transportation sector, supporting transitions towards lower-emission energy systems, and calls upon Governments to enhance energy security through the sharing of best practices and knowledge for the security of gas supply and demand;

ESCAP

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