# Bolstering APEC oil and gas security now and during the energy transition

**Session IV: Best Practices or Policy Efforts to Enhance Energy Security**

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# Outline

- Energy security: definition and current context
- Outlook for APEC oil and gas demand
- What is APEC doing to enhance energy security?
- The impact of extreme weather
- How to bolster energy security?

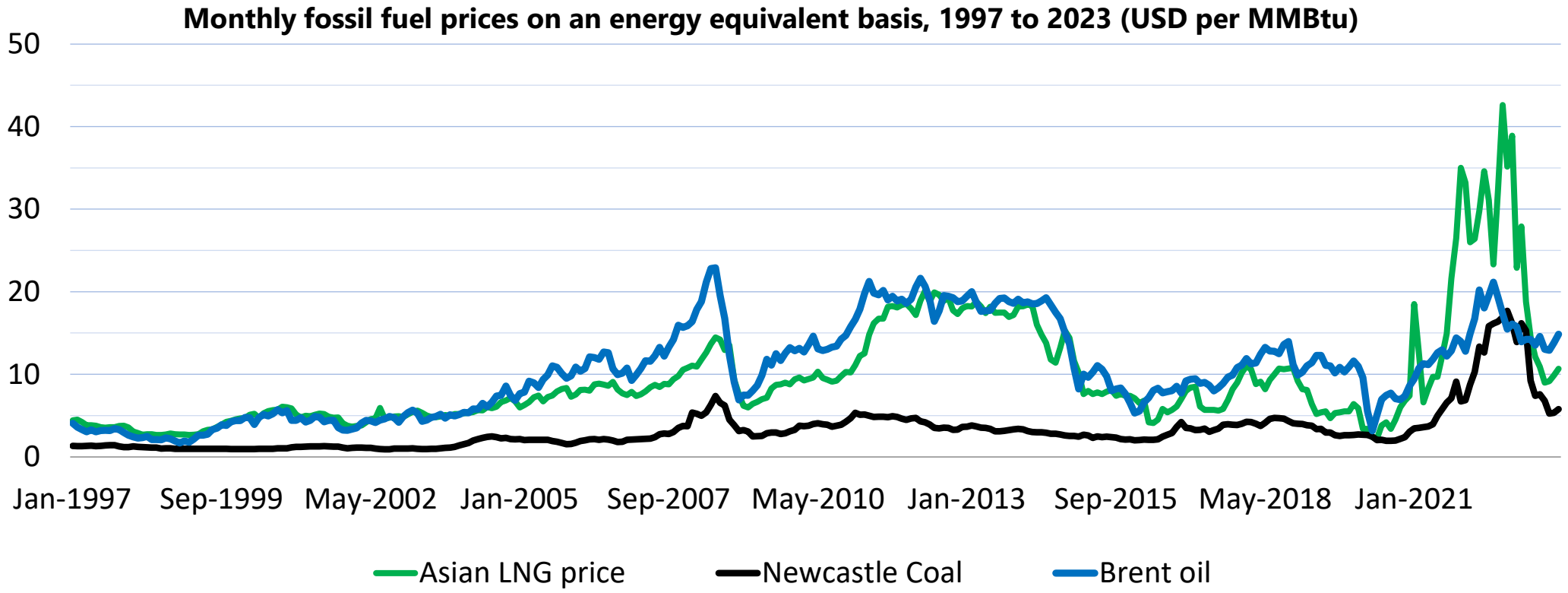
# Energy security

## Definition and the current context

# What is energy security?

- APERC currently defines energy security as “providing reliable energy at reasonable cost”

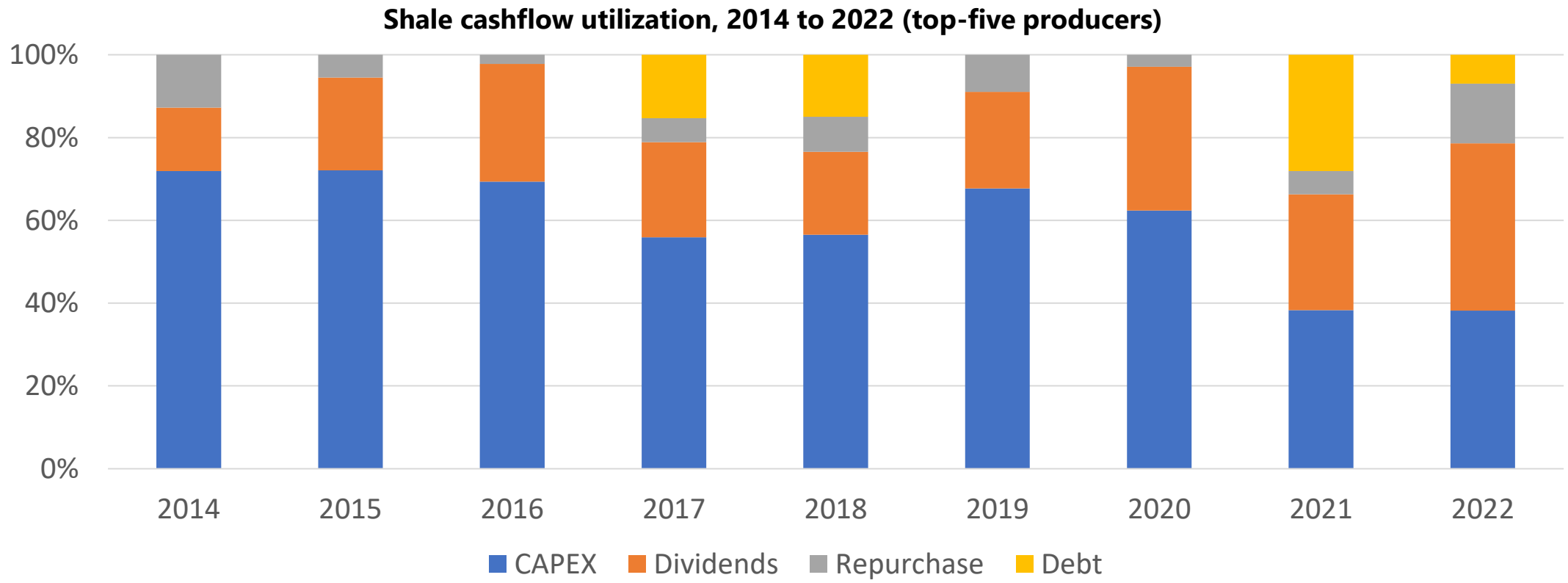
# Energy security is now at the center of energy policy discussions




Source: IMF, JOGMEC, EIA, APERC analysis

- Pandemic recovery is prompting a rebound in energy demand
- The Russian-Ukrainian war is reorganizing energy supply chains
- Lower inventories and tight balances for oil, some products and LNG are challenging energy security

# Several combining factors are constraining energy supply growth




Source: Financial statements

- Shifting investor preferences, capital discipline, labor shortages, and input constraints
- Higher LNG capacity is coming, but constrained until the mid-2020s
- For LNG, oil products and oil, we are unlikely to see a repeat of the last supply response

# Outlook for APEC oil and gas demand

## Several key findings from the 8th edition of the APEC Energy Demand and Supply Outlook

# Scenarios in the 8th Edition of the APEC Demand and Supply Outlook

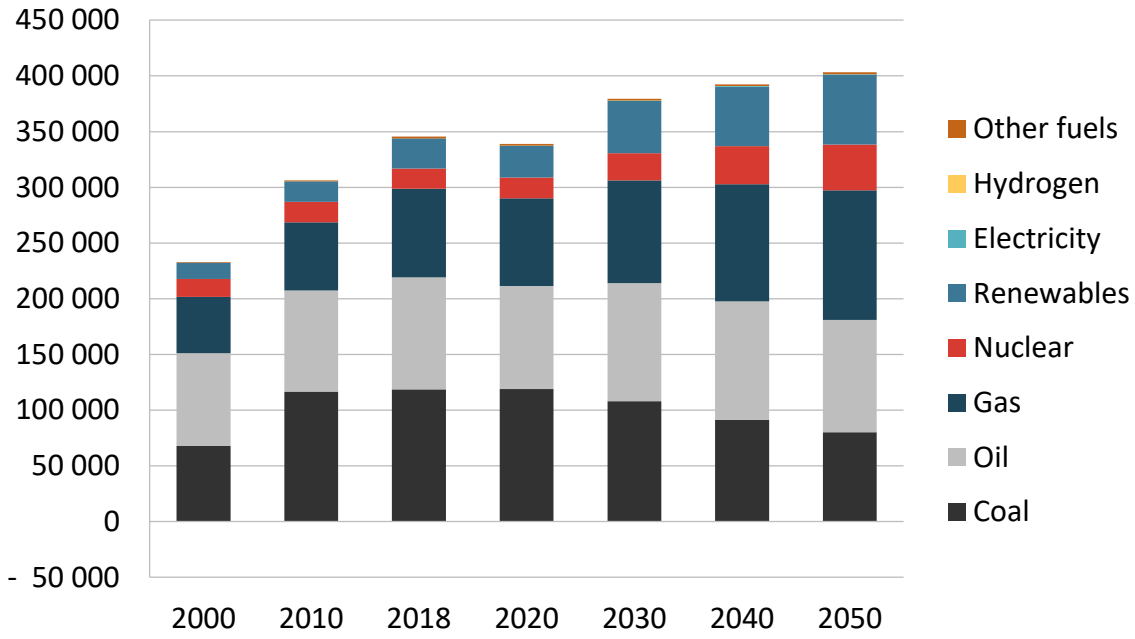
| | Reference (REF) | Carbon Neutrality (CN) |
|---|---|---|
| **Definition** | Recent trends and current policies. | Hypothetical decarbonisation pathways for each APEC economy. |
| **Purpose** | Provides a baseline for comparison with the Carbon Neutrality scenario. | Additional energy sector transformations that support decarbonisation objectives. |
| **Key assumptions** | Current polices and trends continue. | Increased levels of energy efficiency, electrification, behavioral changes, fuel switching, and CCS deployment. |
| **Limitations** | Assumes that recent trends, including relevant decarbonisation measures continue. | Does not consider non-energy impacts on $CO_2$ or removal. |

*Note: does not represent APERC's recommendation or advocacy for a pathway or set of policies.*

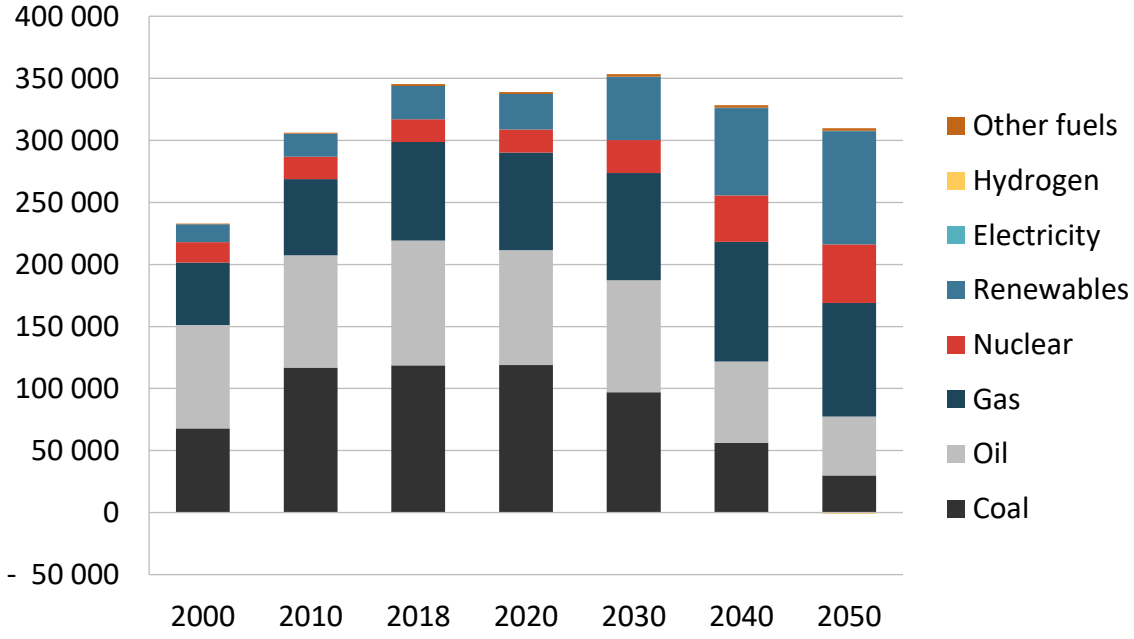
*The analysis was performed prior to March 2022 and does not include current disruptions to international energy markets.*

# APEC fossil fuel use remains robust, even on a path to carbon neutrality

**Energy supply in REF (PJ)**



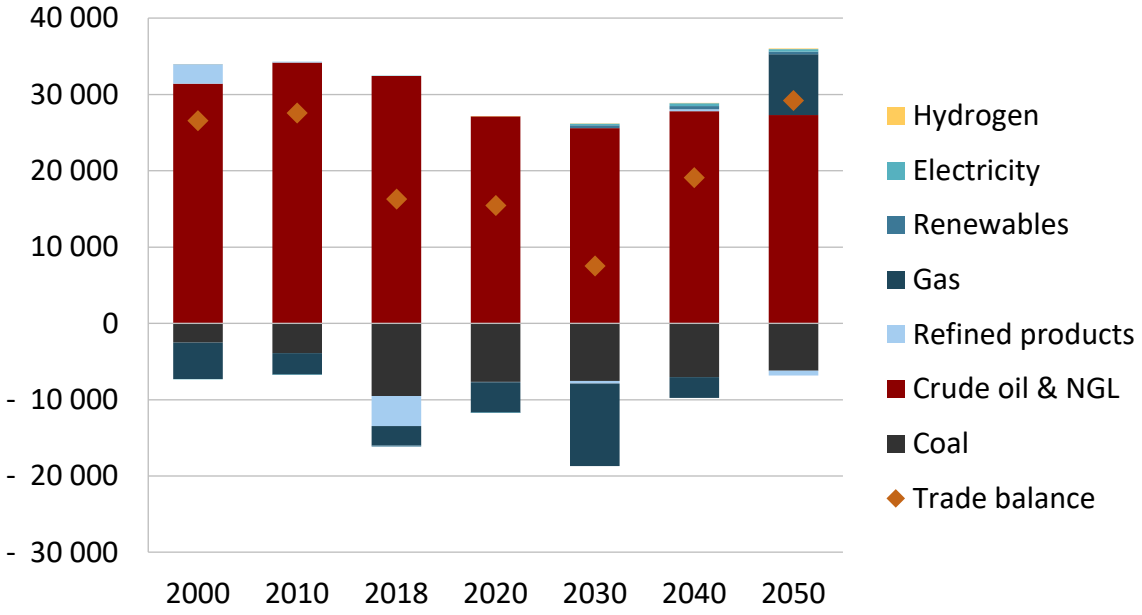

**Energy supply in CN (PJ)**



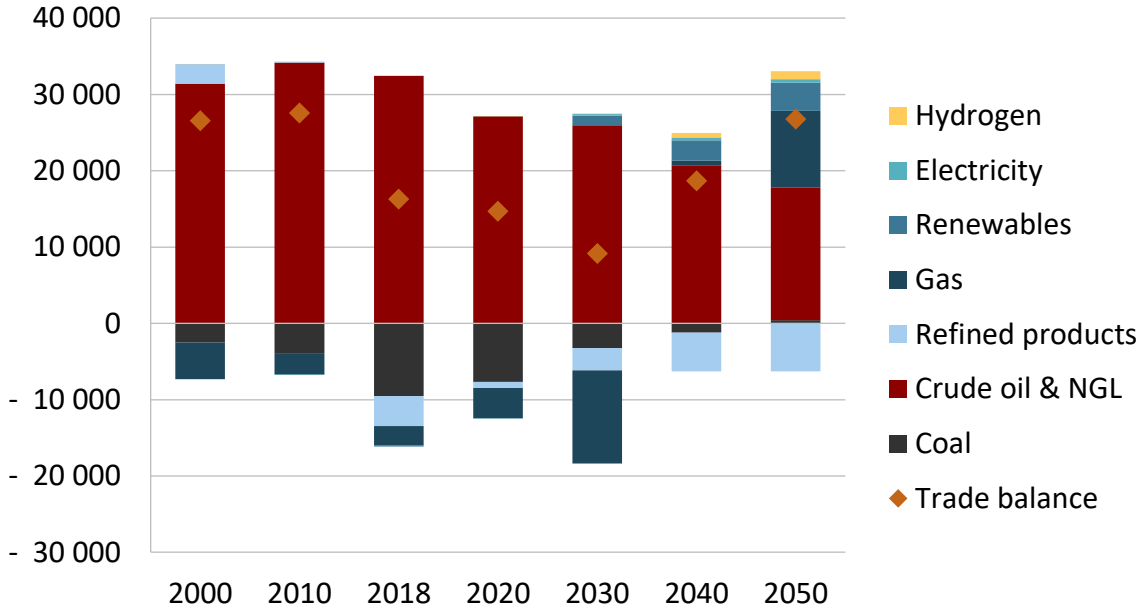

- Renewables and nuclear reduce the role of fossil fuels, but fossil fuels remain integral
- Emissions fall 14% in REF, two-thirds in CN
- Coal declines the most due to phasing down (or out) in the power sector
- Oil supply peaks in REF, falls significantly in CN due to large fuel switching

# Natural gas and oil import growth driven by China and southeast Asia

**Net energy trade in REF (PJ)**




**Net energy trade in CN (PJ)**




- Net imports typically represent less than 10% of APEC energy supply and fall to 2030 before increasing out to 2050
- Natural gas production declines at a faster rate than consumption in the 2040s.
- Refined products net exports increase out to 2050

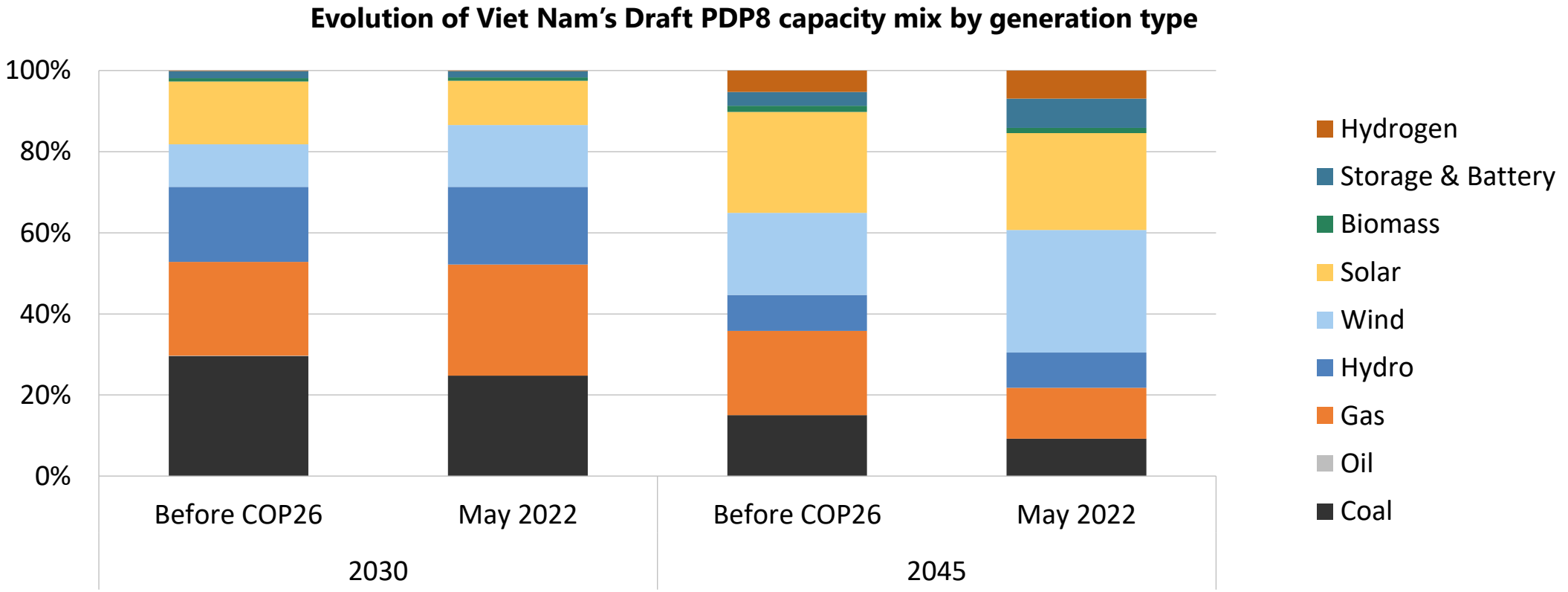
# What is APEC doing to enhance energy security?

## Several key findings from the 19th Oil and Gas Security Studies (OGSS) report

# Mitigating strategies to improve energy security

- Robust demand during tight markets will challenge APEC's ability to "provide reliable energy at reasonable cost"
- Threats to energy security can be mitigated by:
  - Diversifying fuel sources and reducing import dependence
  - Securing energy supply through domestic prioritisation and foreign investment
  - Demand flexibility (fuel switching; demand response)
  - Supply flexibility (releasing strategic stockpiles; redundancy in import capacity)
  - Finding lower-cost sources of supply (at the expense of contract flexibility)
  - Government intervention to reduce the burden on energy users

# Diversifying fuel sources and reducing import dependence

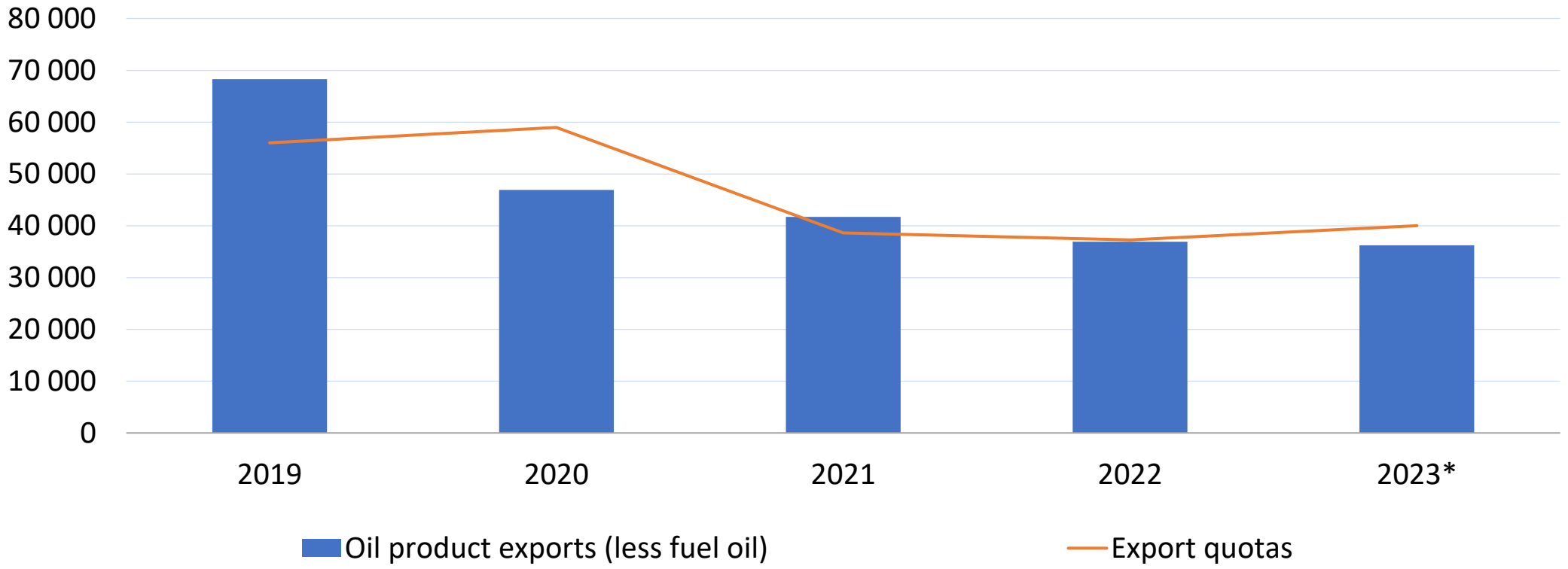



Note: not based on the official PDP8, but reflective of the general trend

Source: Nang Luong Vietnam, APERC analysis

- Difficult to diversify in the short term
- Embracing electrification of end-use demand
- Reconsideration of long-term energy plans to reduce vulnerability to fossil fuel imports

# Securing energy supply through domestic prioritisation and foreign investment

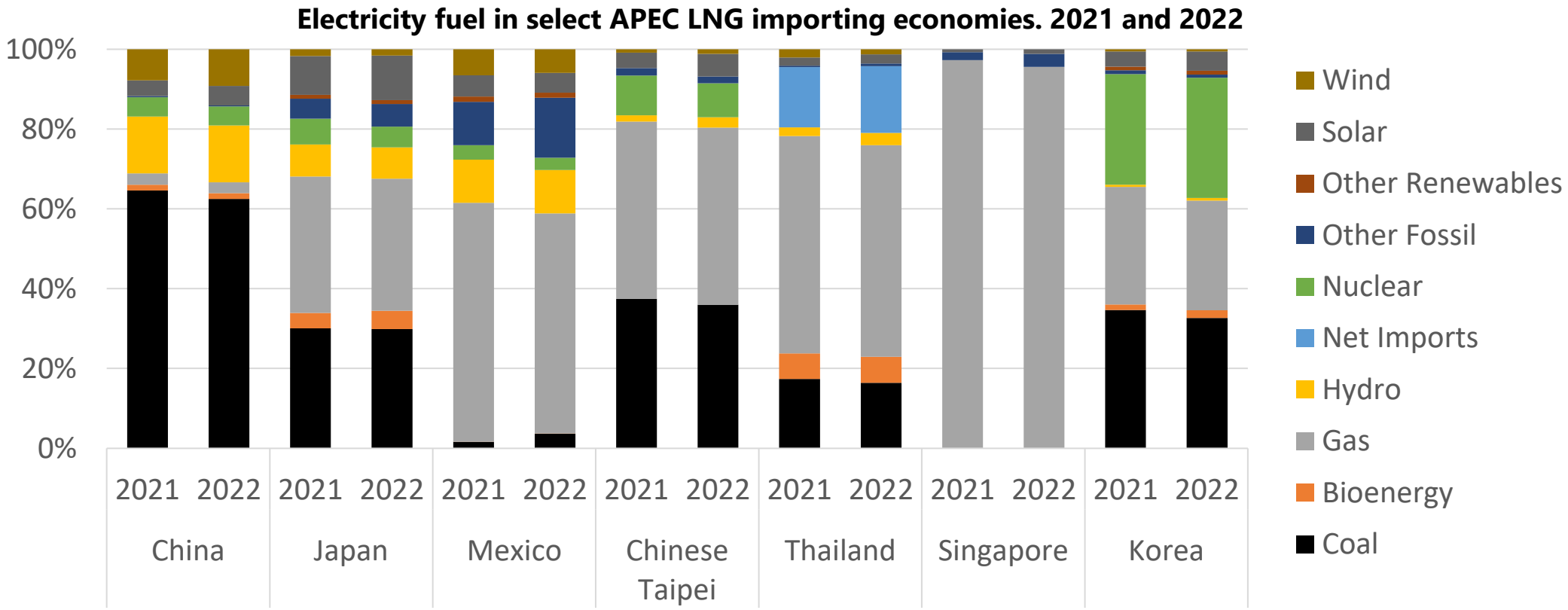



*Estimated

Source: Platts, Reuters, EGEDA, APERC Analysis

- Export limitations and moratoriums: Indonesian coal, Australian gas, Russian & Chinese oil products
- China turning to domestic coal supply as its cornerstone of energy security and electrical reliability
- Japan investing in LNG projects and upstream US natural gas supply

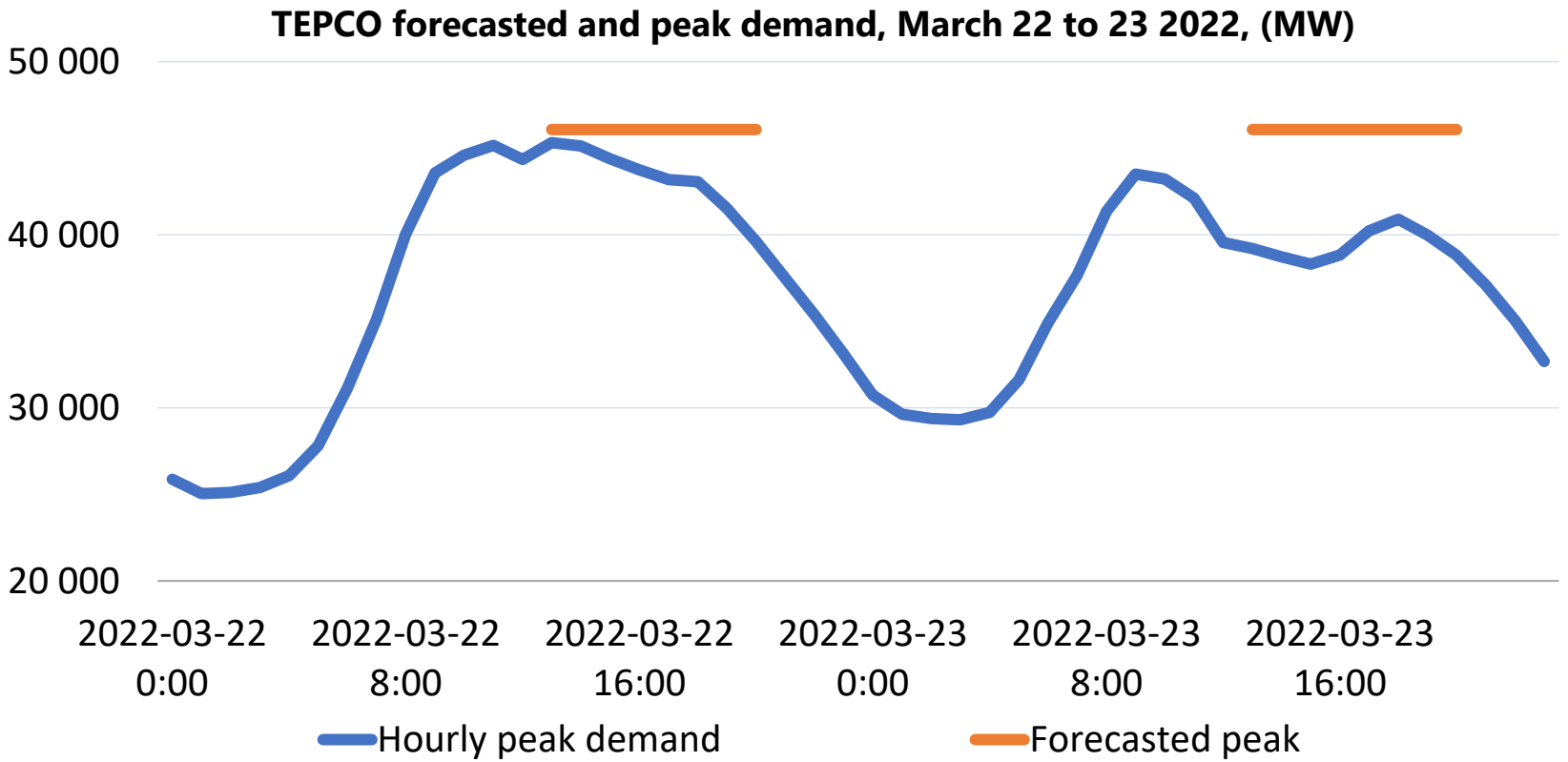
# Demand flexibility: fuel switching




Source: EMBER

- Technological capacity limits current fuel switching
- Gas demand flexibility is not present in APEC LNG importers like it is in other areas, like Europe
- Sophistication, redundancy, and replacement increase fuel switching ability but do not emerge overnight
- Government policy can also play a role in limiting fuel switching (for example, coal-to-gas switching targets)

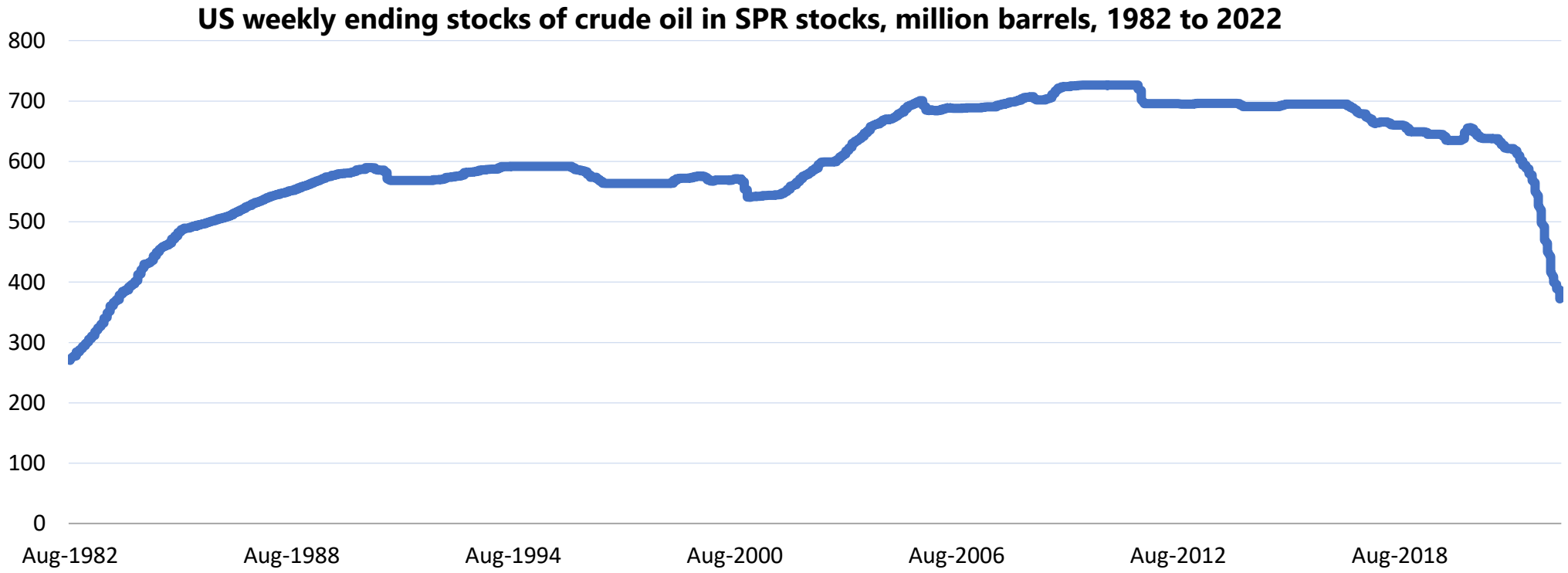
# Demand flexibility: demand response




Source: TEPCO, Grid Monitor, APERC analysis

- Emergency response measures are effective at ensuring energy security, including grid reliability
- Useful during extreme temperatures and unexpected outages
- Japan's emergency response could be a blueprint to imitate at the gas and electric retail level

# Supply flexibility: Releasing strategic stockpiles

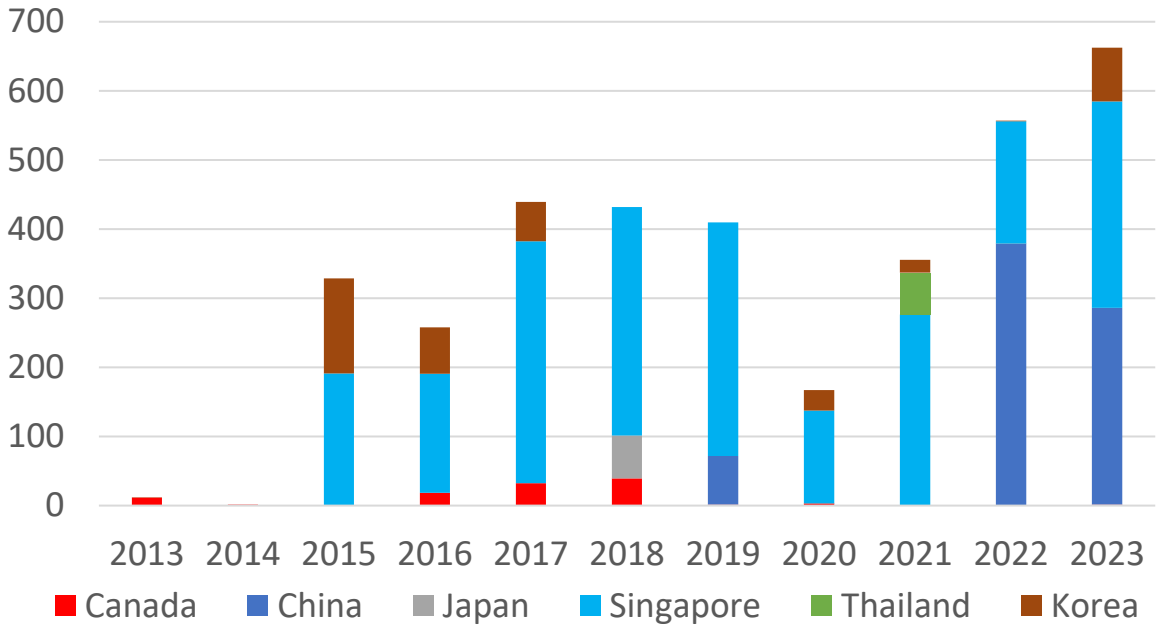



Source: EIA

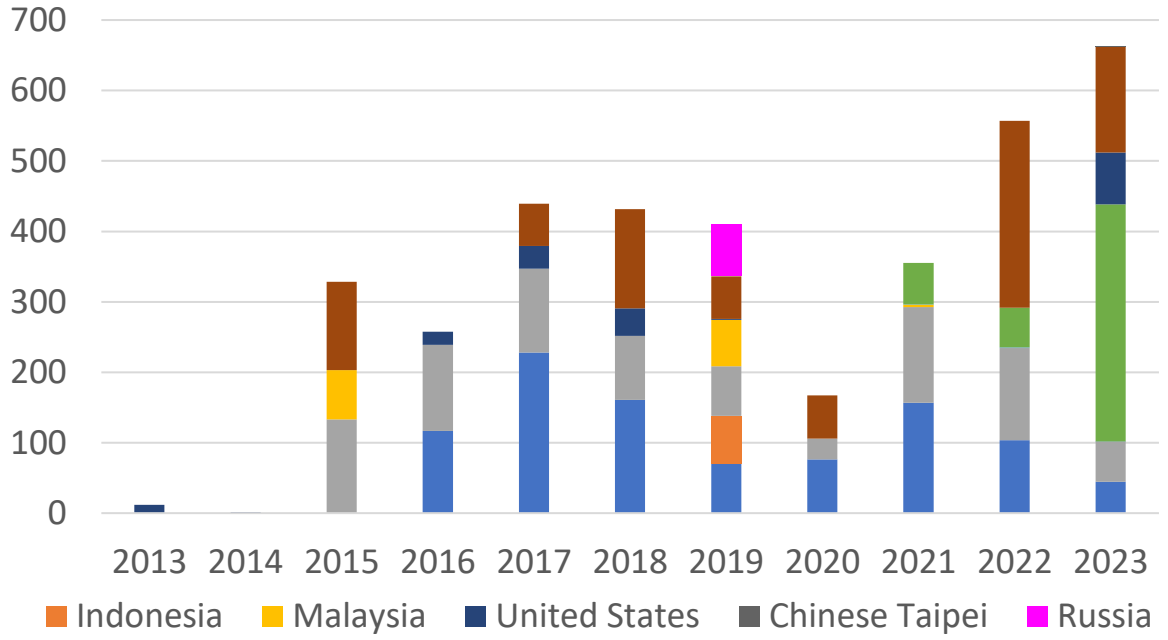
- We've seen significant, coordinated SPR releases to put a ceiling on crude prices
- Significant recent investment in increasing strategic stockpile capacity in China

# Supply flexibility: redundancy in LNG storage capacity

**APEC LNG re-exports by export economy source (ktpa)**




**APEC LNG re-exports by import economy destination (ktpa)**

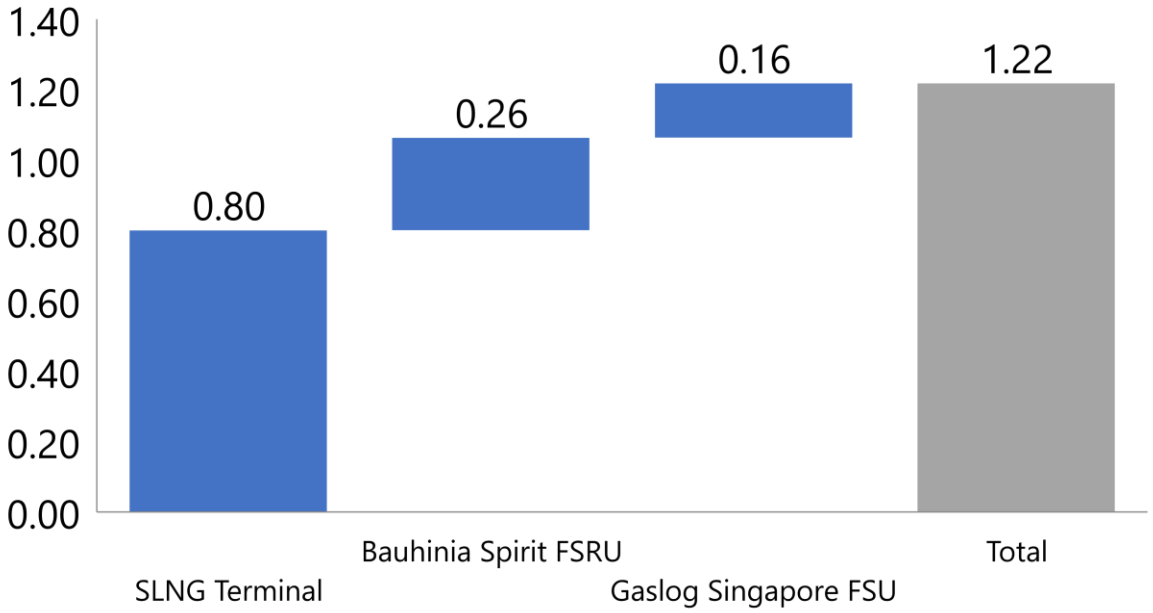



Source: Cedigaz

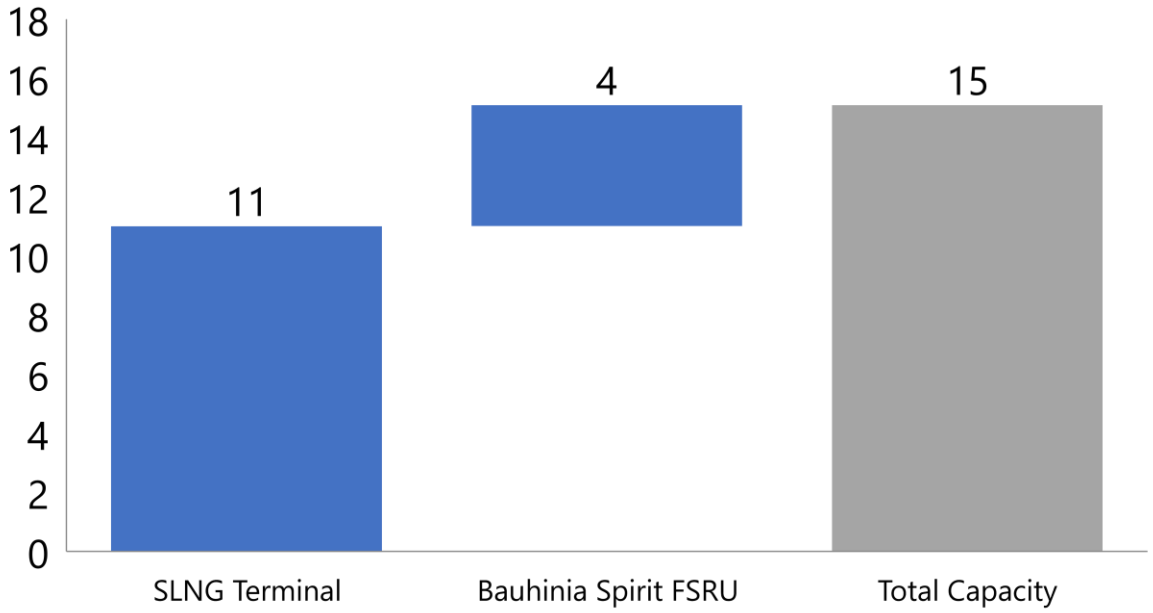
- Signs of increasing cooperation across APEC members via LNG re-exports
- Excess LNG storage, reloading capability is increasingly helping APEC during acute LNG shortages
- Enabling reloading capability to meet its maximum potential could encourage further re-export trade across the region
- Procurement of LNG carriers as FSRUs, FSUs to increase flexibility

# Government intervention to reduce the burden on energy users

**Singapore LNG storage capacity, early 2022 (million m³)**




**Singapore LNG regasification capacity, early 2022 (million tonne per annum)**




Source: GIIGNL, Platts, EMA, APERC Analysis

- Governments directly procuring strategic LNG stockpiles
- More regulation of wholesale and retail electricity markets
- Wholesale price caps on fuel prices
- Regulators mandating the weatherproofing of energy supply chains in the US (with questionable effectiveness)
- SPR releases to put a ceiling on crude prices
- Subsidies

# The impact of extreme weather

# Severe weather is exacerbating APEC's energy security challenges

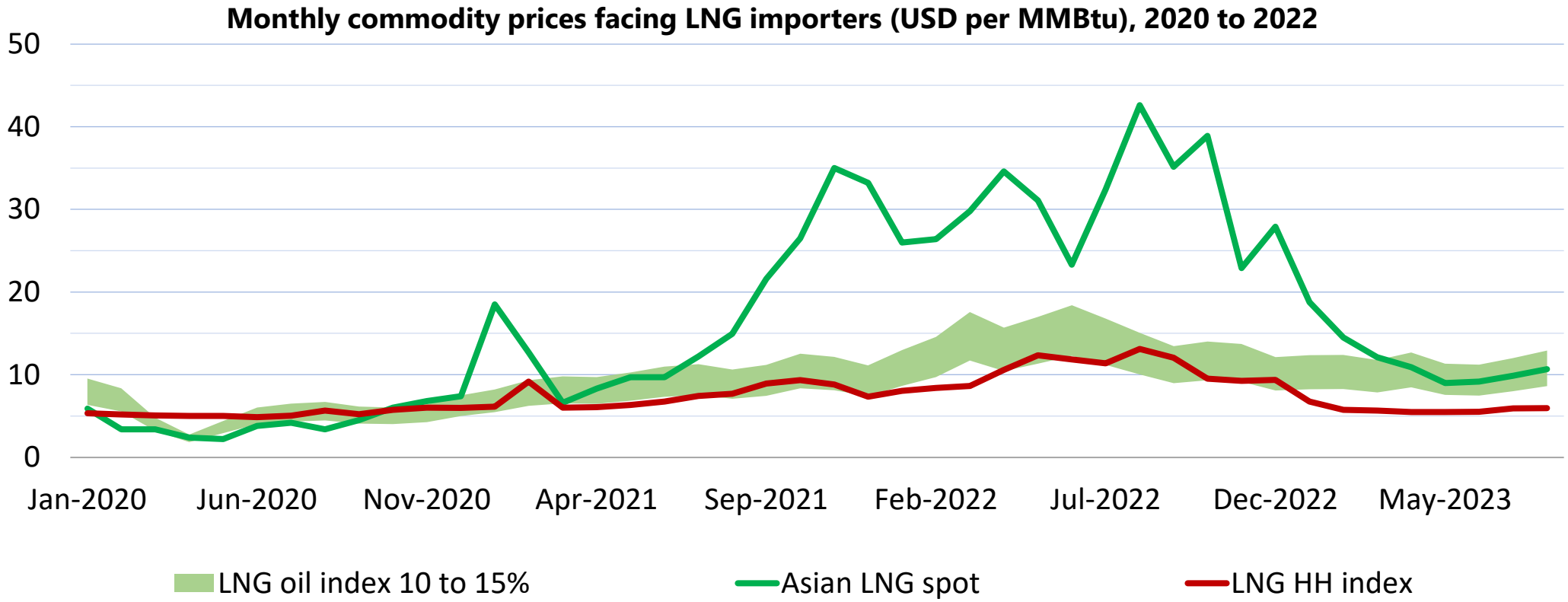
| | |
|---|---|
| Extreme heat | • Increase demand for cooling<br>• Reduce production capacity from refineries and thermal power generators |
| Extreme cold | • Increase demand for heating<br>• Freeze-offs of oil & gas wells, refineries and thermal power generators possible |
| Storm surges, hurricane winds, hail | • Reduce supply availability by damaging import equipment and delaying and disrupting just-in-time barge shipments |
| Floods | • Reduce supply availability of coal, gas and oil |
| Droughts | • Reduce water availability for hydroelectricity and oil and gas production<br>• Reduce coolant availability for thermal and nuclear power plants<br>• Reduce supply availability by delaying or limiting barge shipments |
| Wildfires | • Reduce solar availability<br>• Disrupt oil and gas supplies |

# How to bolster energy security?

# Summary

- APEC oil and gas requirements are likely to remain robust on a carbon-neutral pathway
- Accelerating renewables, efficiency will help reduce vulnerability but not eliminate it
- APEC actions illustrate that short-term action can mitigate the impact of the crisis
- Extreme weather is increasingly challenging fuel availability and grid reliability
- Enabling higher demand and supply flexibility is paramount to ensuring energy security
- APEC members must consider the impact that decarbonisation has on flexibility

# Lower cost supply or contract flexibility?

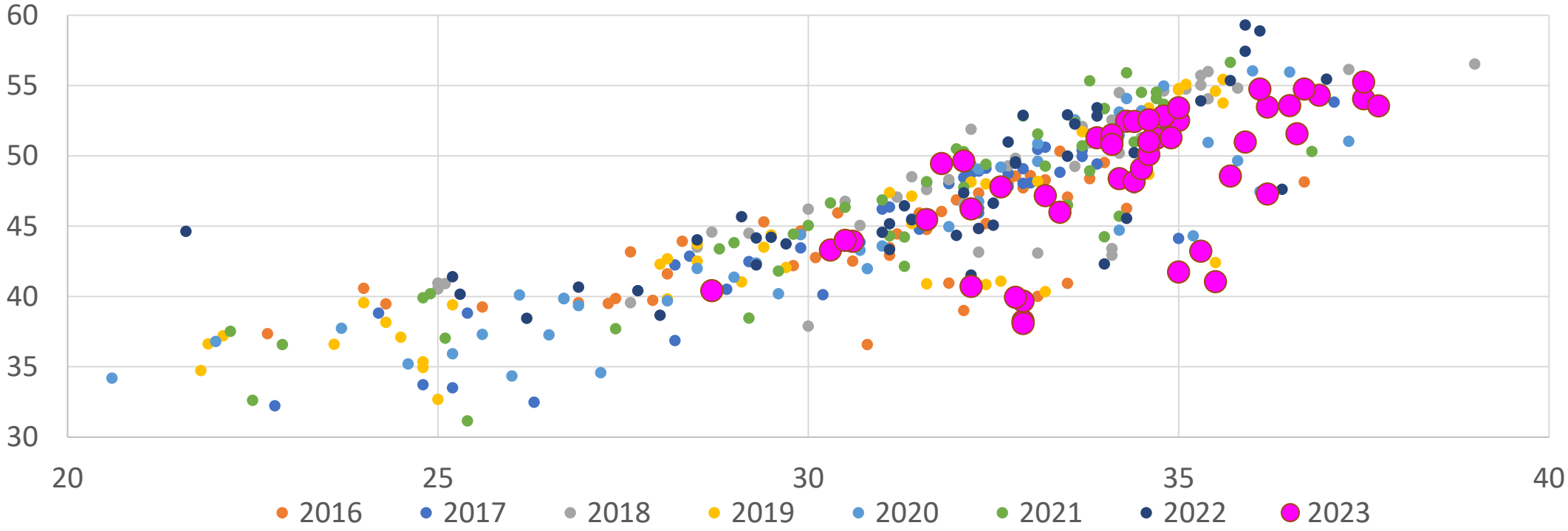



Source: JOGMEC, IMF, EIA, APERC analysis

- Long-term contracts insulate importers from high, volatile spot prices
- However, contract flexibility and lower demand allowed China to balance global LNG markets in 2022
- As Asia becomes the LNG market balancer, demand will require demand flexibility to mitigate future disruptions
- In the absence of demand flexibility, members should minimize the exposure to volatile spot LNG prices
- Smaller LNG importers should turn to collective bidding to increase bargaining power for long-term contracts

# Even with lower import dependence, demand flexibility will be important

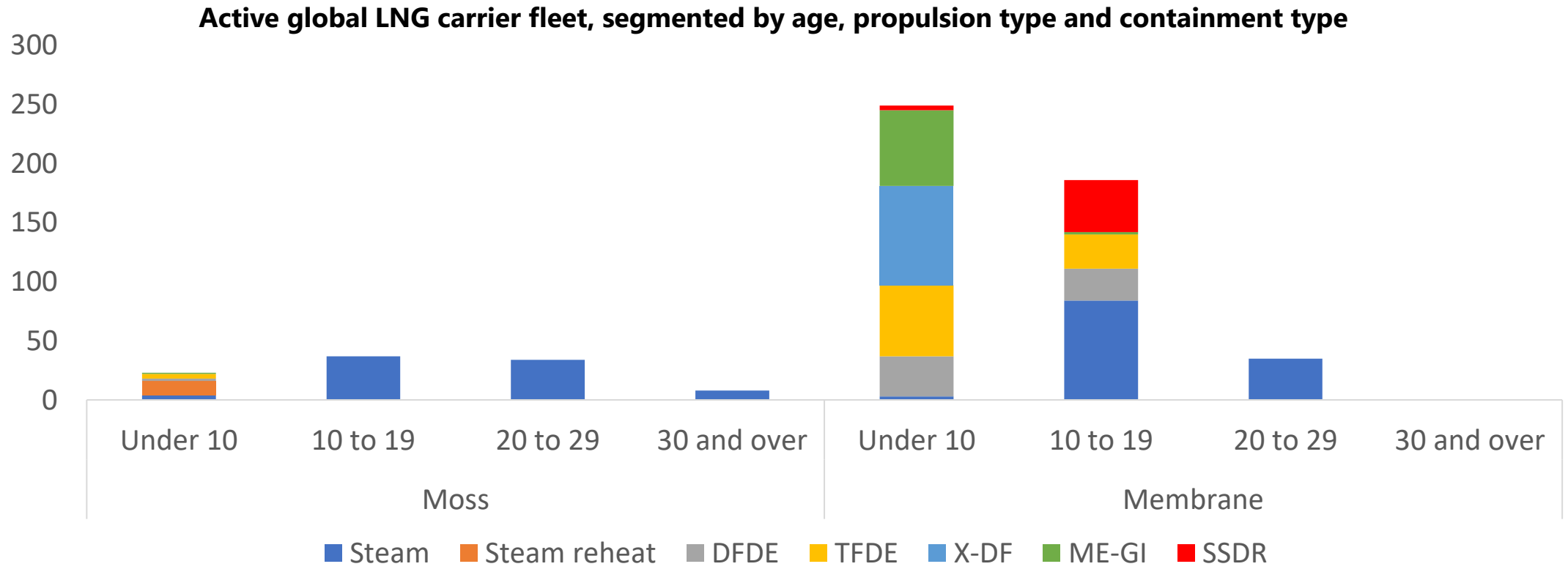
**Tokyo daily maximum demand (LHS, GW) versus daily maximum temperature (x-axis, °C) in July and August, 2016 to 2023**




Source: TEPCO, JMA, APERC Analysis

- Invest in electrification and efficiency to reduce import dependence
- Diversify long-term energy and power plans
- Consider investments in redundancy, sophistication, and replacement
- Develop short-term demand response programs at the retail level

# Increasing LNG supply flexibility with storage, LNG carriers




Source: IGU, GIIGNL, APERC analysis

- Underground storage is valuable, but unlikely to occur outside of China
- Enable LNG reloading at all import terminals
- Expand LNG storage tanks
- Invest in the expansion and conversion of LNG carriers

# Increasing mitigation capacity for crude oil, oil products

**Stockpiling days, Stockpiling Index and Import Dependency Index for APEC southeast Asia**

| Southeast Asia Economy | Oil Stockpiling Days | Oil Stockpiling Index | | Oil Import Dependency Index | |
|---|---|---|---|---|---|
| | | 2015 | 2020 | 2015 | 2020 |
| Brunei Darussalam | 31 days for refineries | 0.82 | 0.81 | 0.00 | 0.00 |
| Indonesia | 14 days (crude oil) and 23 days (oil products) by the NOC | 0.92 | 0.74 | 0.42 | 0.31 |
| Malaysia | 30 days by the NOC | No information | 0.82 | 0.00 | 0.00 |
| The Philippines | 30 days (crude oil) for refineries and 15 days (oil products) for importing companies | 0.87 | 0.65 | 0.63 | 0.64 |
| Singapore | 90 days (oil products) for power companies | 0.51 | 0.12 | 0.52 | 0.47 |
| Thailand | 22 days (oil crude) and 3.5 days (oil products) for refineries and traders | 0.59 | 0.59 | 0.25 | 0.25 |
| Viet Nam | 10 days (oil crude) and 40 days (oil products) for oil companies | 0.62 | 0.59 | 0.28 | 0.41 |

Notes: Information as of May 2022; the Oil Stockpiling Index was calculated based on domestic oil demand. However, economies with 15 days and below will have an index of 1.00 (most vulnerable). Source: APERC, IEA

- Develop an operationalization roadmap for joint-stockpiling of oil and oil products in APEC subregions
- Invest in stockpiling, SPRs to mitigate just-in-time disruptions to oil and oil product supply
- Replenish stockpiles at low price levels

# Discussion

Asia-Pacific
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# Thank you.

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