

2-2. Oil and Gas Security Studies (OGSS)

Final draft of OGSS 20: What are the energy security implications of recent declines in both APEC and global spare petroleum refining capacity?"

The APEC Expert Group on Clean Fossil Energy (EGCFE) Meeting 2024
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Timeline of OGSS No. 20

- March 2024: Presentation of first draft to the 7th OGSN Forum.
- May 2024: Presentation of draft final report to EGCFE 2024.
- August 2024: Presentation of final report to EWG 68.
- By End 2024: Publish on APEC Website.

Table of content of OGSS No.20

Section 1: Introduction

Section 2: Historical trends

Section 3: Future challenges for petroleum products supply security

Section 4: Assessment of petroleum products supply security in APEC sub-regions

Section 5: Assessment of petroleum refinery utilization in APEC sub-regions

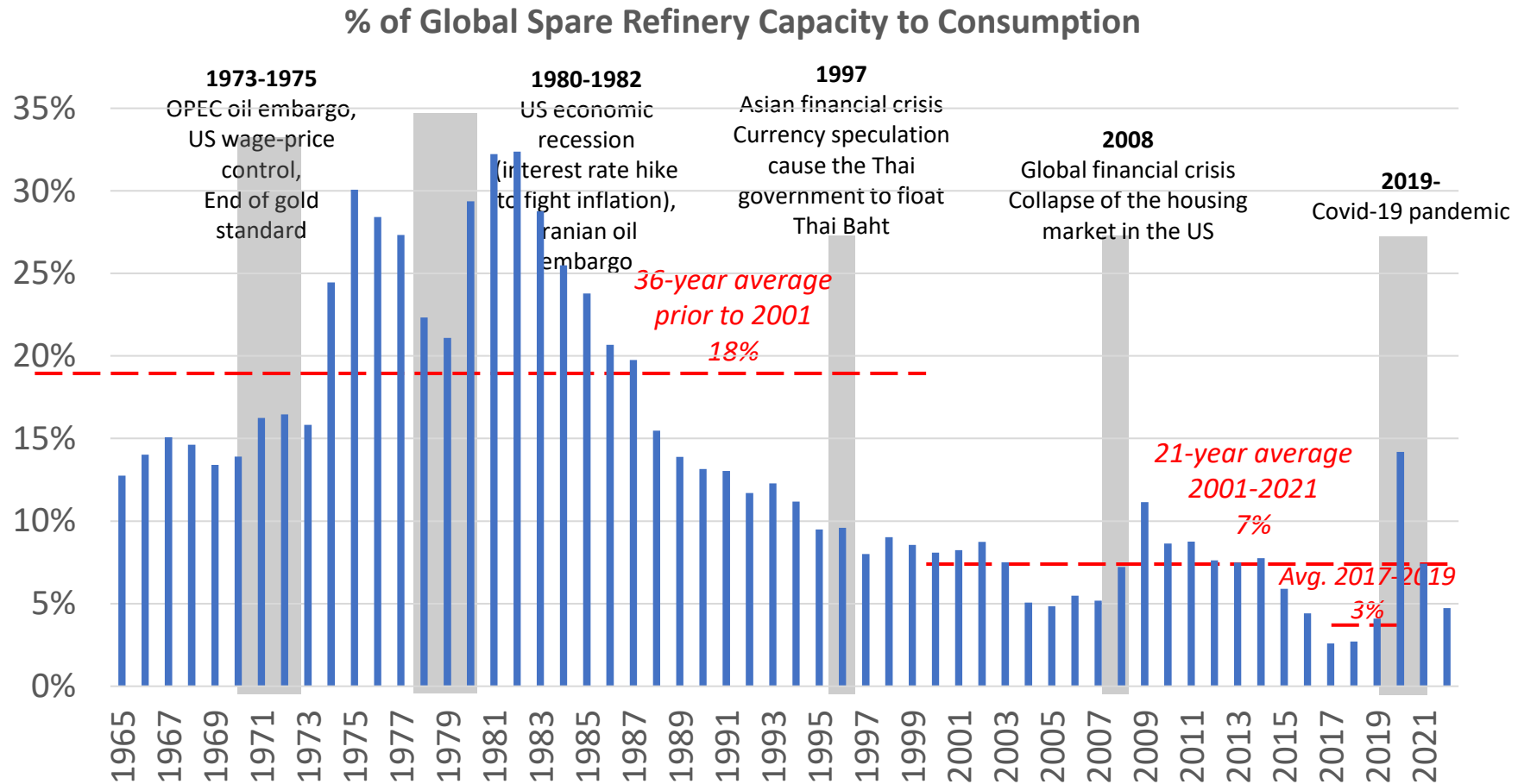
Section 6: Conclusions and Recommendations

References

Historical trends:

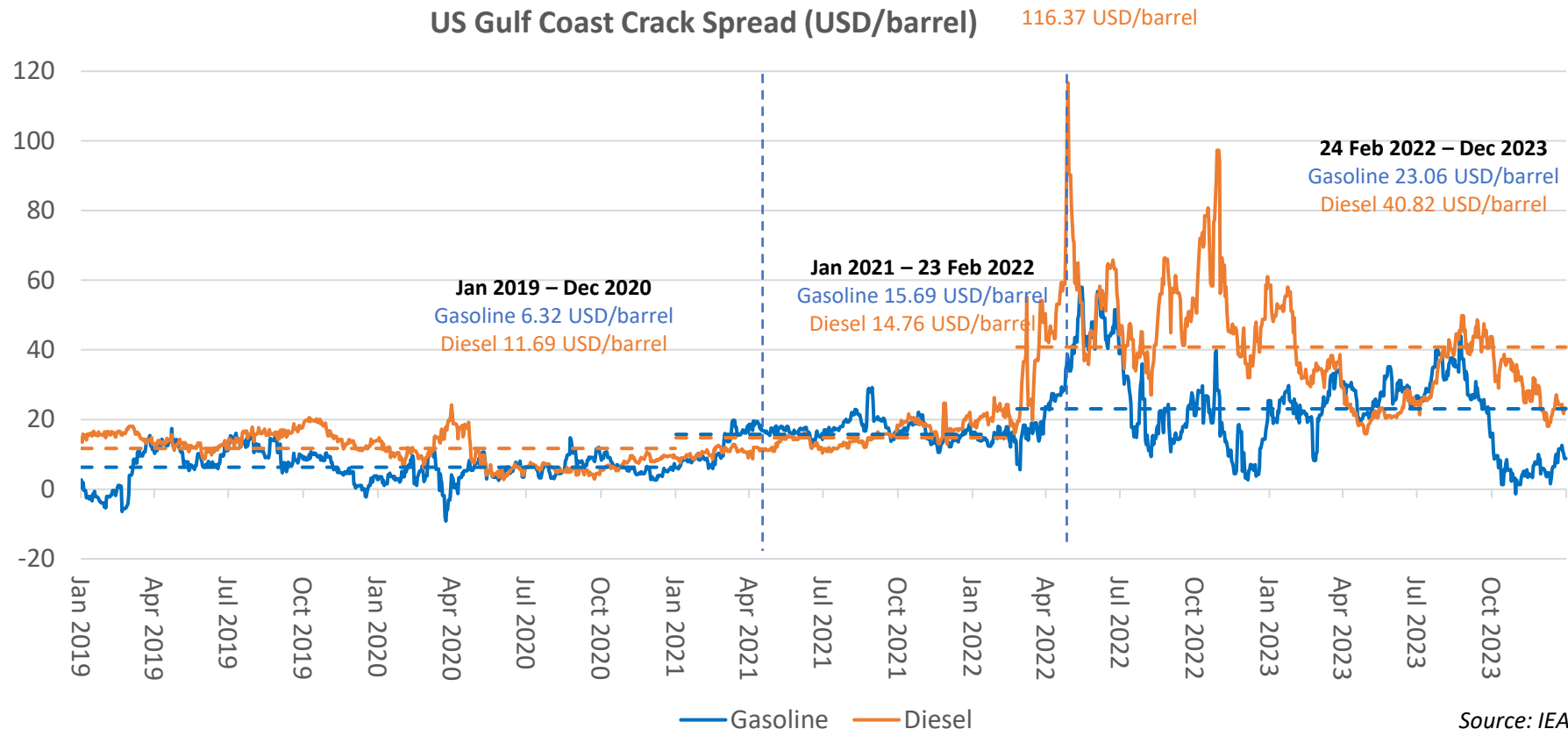
Globally, the ratio between spare refinery capacity to product consumption shows a declining trends, posing challenges for supply security of petroleum products.

- Global refinery capacity has not kept pace with growing petroleum product consumption.
- Average ratio of spare refinery capacity¹ over consumption reduced from 18% prior to year 2000 to 7% post-2000, and further to average 3% during 2017-2019 prior to the pandemic.



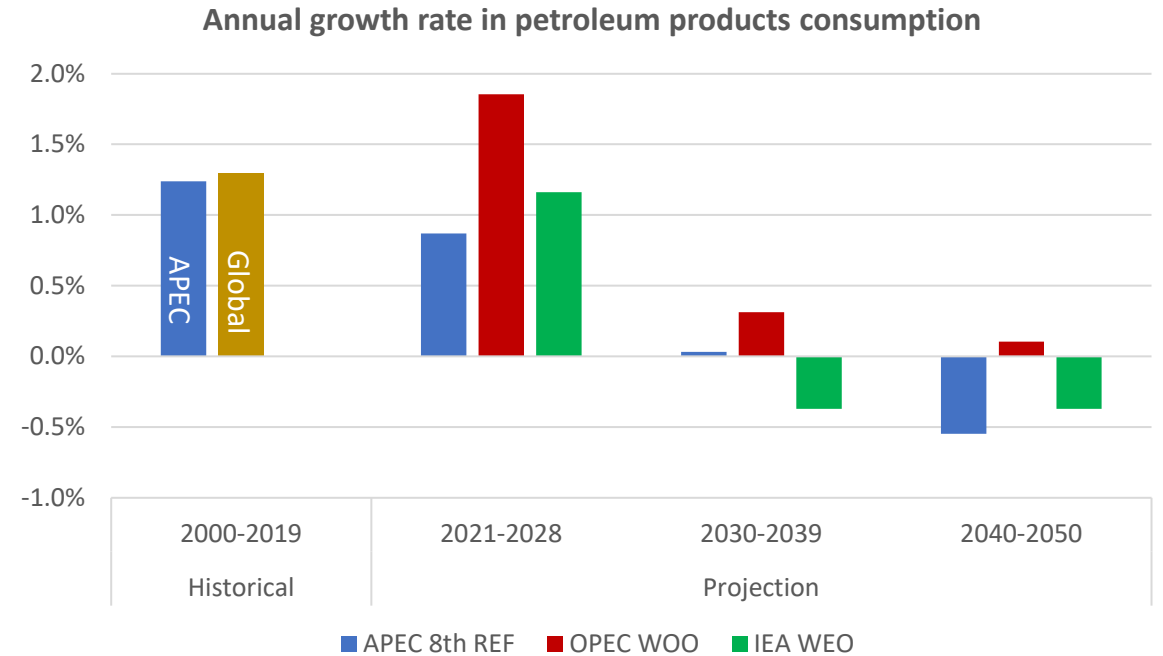
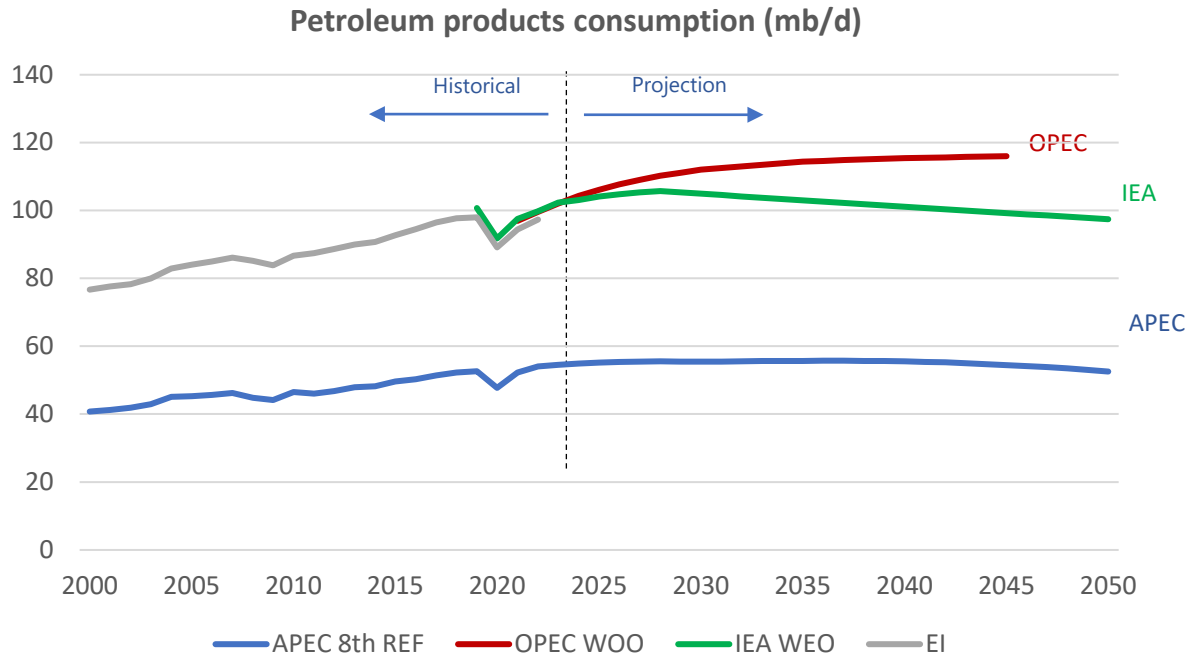
Low level of spare refinery capacity in APEC and the world likely contributed to increases in gasoline and diesel crack spreads.

- Average US Gulf Coast gasoline crack spread² increased to almost threefold to 15.65 USD/bbl prior to Russia-Ukraine war, and almost fourfold to 23.06 USD/bbl after the war started.
- Average diesel crack spread showed similar trends, with its peak at a historic 116.37 USD/bbl on 28 April 2022.
- Crack spreads in Singapore market experienced similar impacts, but at lesser degree.



Future challenges on petroleum product supply security:

OPEC, APEC, and IEA anticipate increasing petroleum product consumption in near term until 2028.

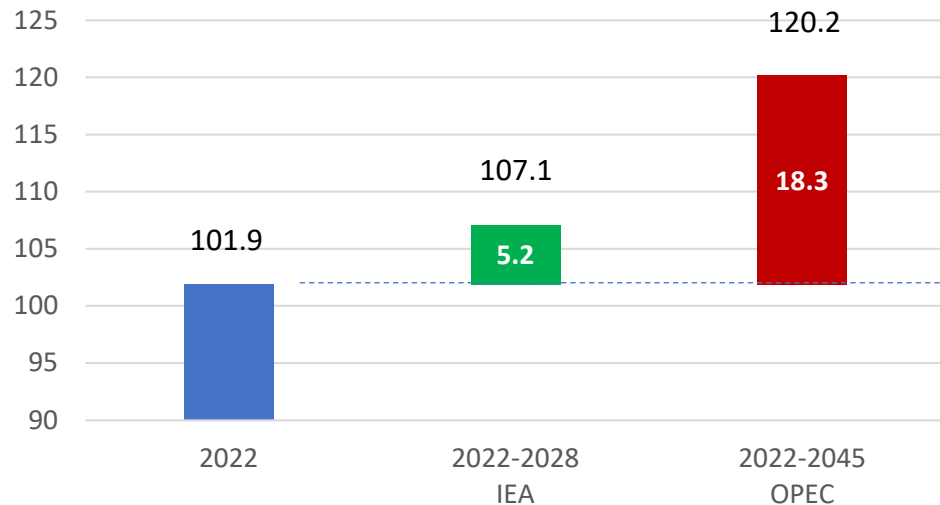


- APEC, OPEC, and IEA forecast petroleum product consumption to grow at 0.9%-1.9% per annum near-term.
- OPEC projected a growth trajectory to 116 mb/d in 2045. IEA projected peak at 105.7 mb/d in 2028.
- APEC region sees a slight decline in consumption in the long-term with negative growth after 2040.

Significant investment in global refinery capacity additions is required to meet near-term and medium-term demand.

- Assuming a constant capacity at the 2022 level (refer to EI) and no refinery closure after 2022, a capacity of 18.3 and 5.2 mb/d is required to meet the anticipated demand from OPEC and IEA, respectively (taking into consideration the highest projections from each source).
- These capacity additions translate to an investment ranging from 90 to 490 billion USD.
- Most investment is expected to be timely driven by high consumption growth in the near term before 2028 but with high uncertainty in longer term.

Required additional refinery capacity (mb/d)



Estimated investment (cumulative)	Net refinery capacity additions (mb/d)	Low-cost estimate (billion USD)	High-cost estimate (billion USD)
2022-2028 IEA	5.2	90	140
2022-2045 OPEC	18.3	320	490

Assumptions:

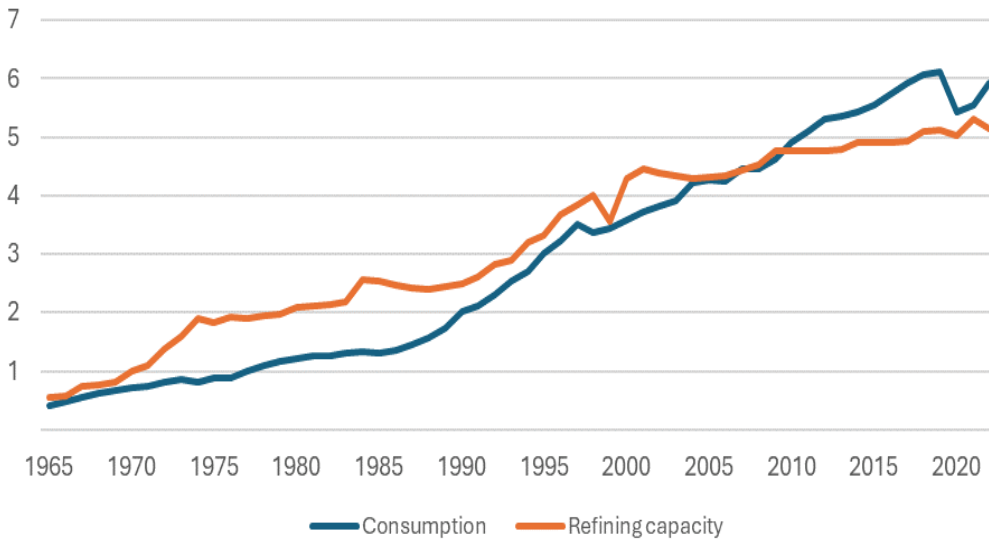
- 1) Low-cost estimate >> 7 billion USD per 400 kb/d capacity (Jizan, Saudi Arabia)
- 2) High-cost estimate >> 16.5 billion USD per 615 kb/d capacity (Al Zour, Kuwait)

[Refinery - ief-sp-global-downstream-investment-outlook---vf.pdf - All Documents \(sharepoint.com\)](#)

Assessment of petroleum products supply security in APEC sub-regions:

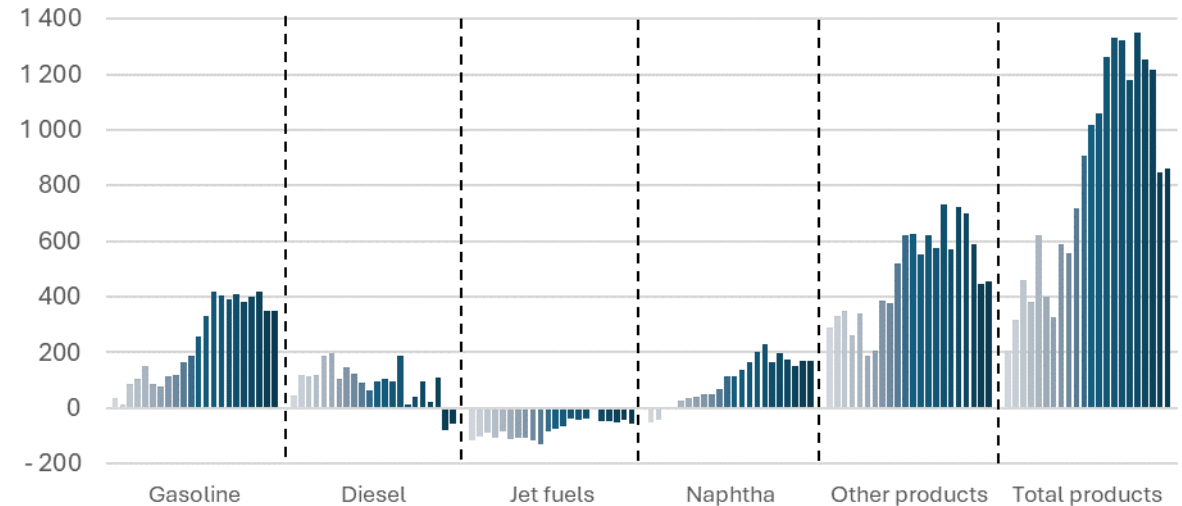
APEC Southeast Asia (SEA) dependence on imports is increasing.

APEC Southeast Asia petroleum products consumption and refinery capacity, 1965-2022 (mb/d)



Source: EI

APEC Southeast Asia net imports of petroleum products, 2000-2021 (kb/d)



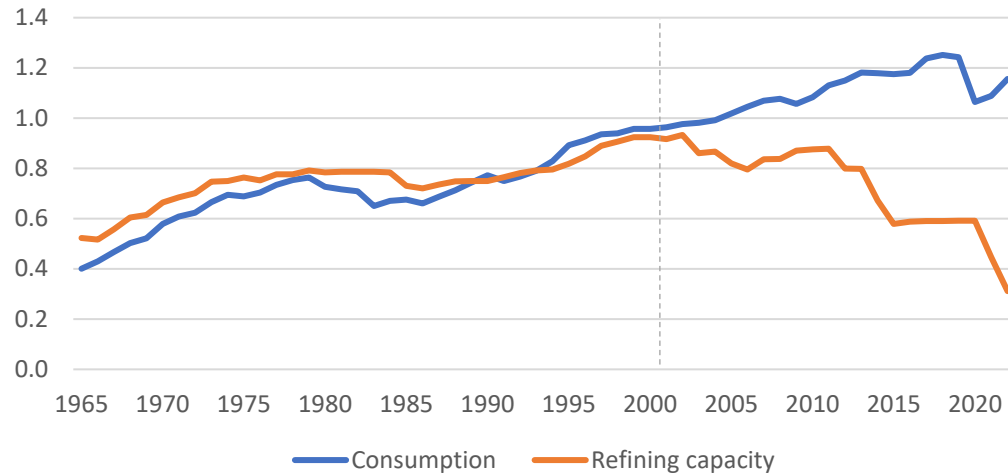
Source: EGEDA

Note: Other products includes fuel oil, petroleum coke, bitumen etc. (excluding LPG)

- APEC SEA oil consumption grew faster than the refining capacity (2.5% vs. 0.8% p.a. from 2010-2019), leading to higher reliance on net imports of all petroleum products except for jet fuel.
- The under-supply situation for refineries in APEC SEA poses challenges to rapid increases in regional demands, with Thailand being the only economy that announced net capacity additions of 125 kb/d.

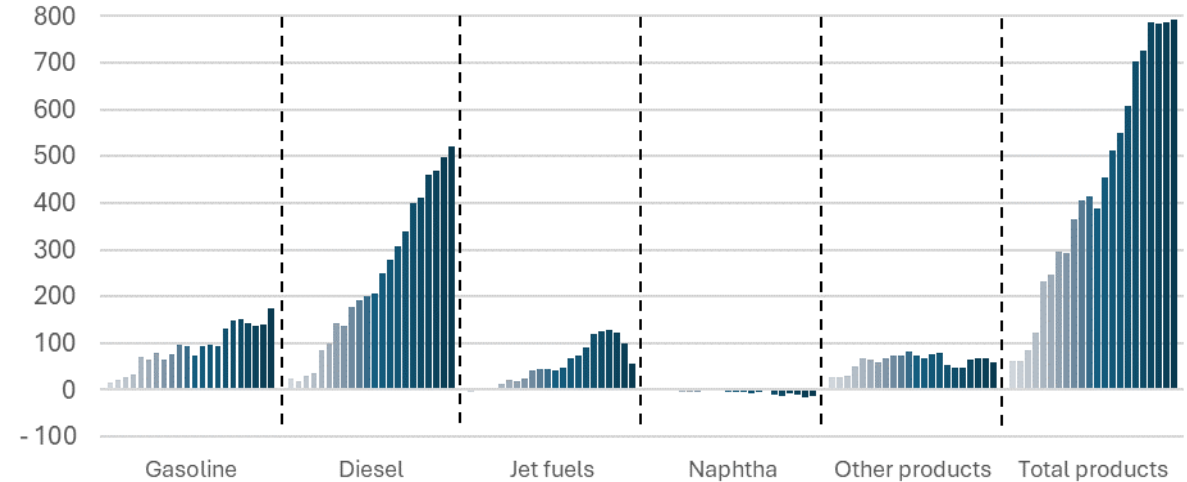
APEC Oceania is also becoming more reliant on imports.

APEC Oceania petroleum products consumption and refinery capacity (mb/d)



Source: EI

APEC Oceania net imports of petroleum products, 2000-2021 (kb/d)



Source: EGEDA

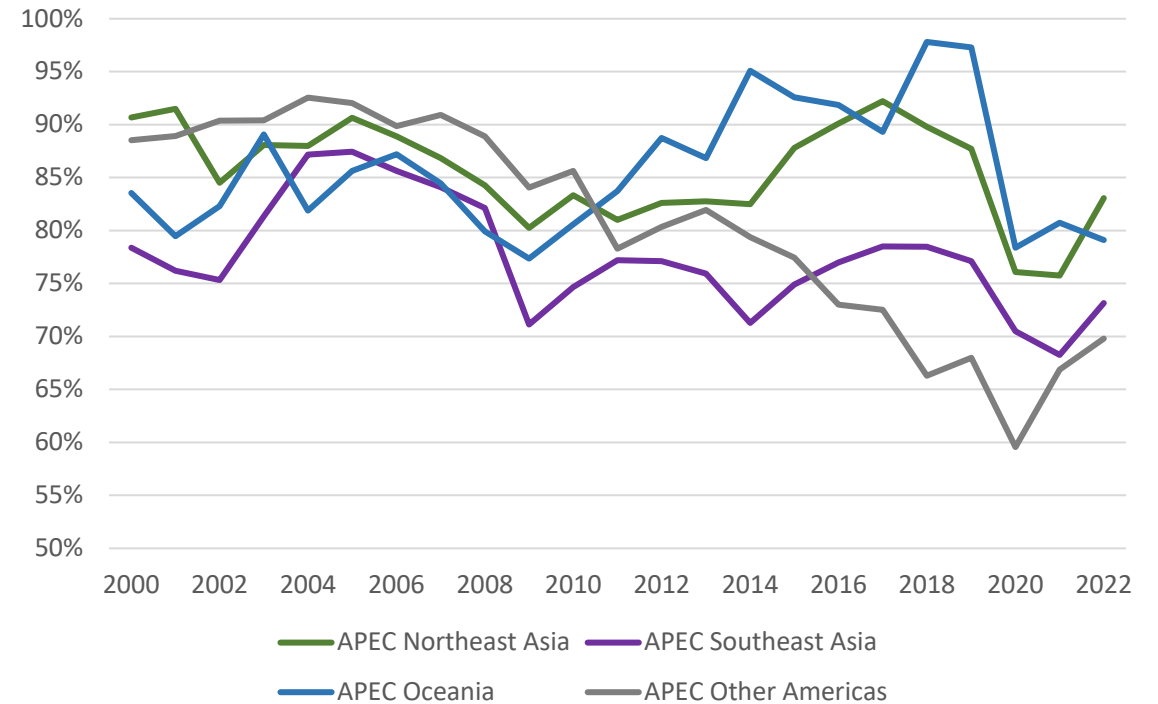
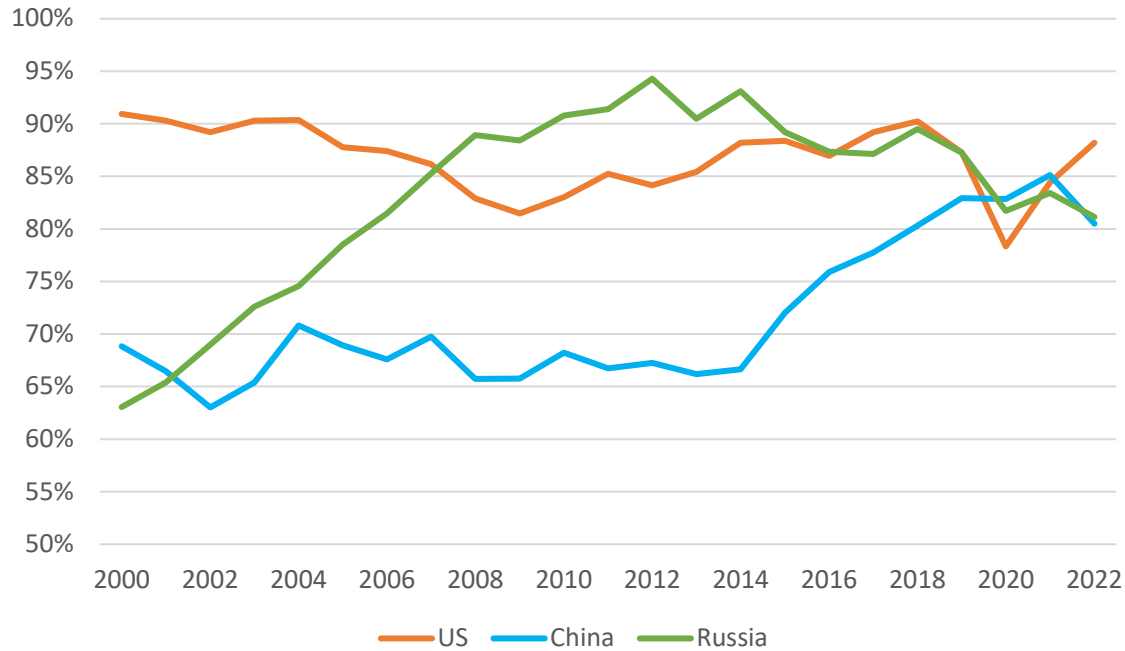
Note: Other products includes fuel oil, petroleum coke, bitumen etc. (excluding LPG)

- Refinery capacity in Oceania dropped by over half since 2000, standing at above 300 kb/d in 2022. Meanwhile, consumption was on the rise.
- Oceania is growing more reliant on imports of all products, particularly diesel. The closures of refineries in Australia and New Zealand in recent years exacerbate the challenge. Prior to COVID-19, the utilization rate was above 95%.

Assessment of petroleum refinery utilization in APEC sub-regions:

Refineries in all APEC sub-regions are running at high utilization rates, indicating current tight refinery situations.

Refinery utilization rates, 2000-2022



Source: APERC analysis based on data from EI

Key summary:

- Spare refining capacity has been declining in APEC and the rest of the world for 40 years.
- Low spare refining capacity increases petroleum product price volatility and degrades energy security.
- Uncertainty about long term petroleum product demand increases the riskiness of additional refinery investments.
- If petroleum product demand increases in the near term, creating spare refining capacity will require substantial capital investments.
- These issues are especially important for petroleum product importing economies.

What measures can APEC economies take to improve security of petroleum products supply?

- APEC economies should evaluate how low spare refining capacity affects their energy security.
- This evaluation is especially important for import dependent economies.
- Strategic petroleum product reserves can help with localized and/or short-term supply emergencies but are expensive to maintain.
- Spare refining capacity is better for longer term disruptions and/or market changes.
- APEC governments should explore ways to reduce the financial risks of new refinery investments.
- National oil companies could be in a better position to create spare refining capacity.

Thank you.

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