APEC Energy Demand and Supply Outlook 9th Edition: Summary of Results and Key Takeaways

Official Launch

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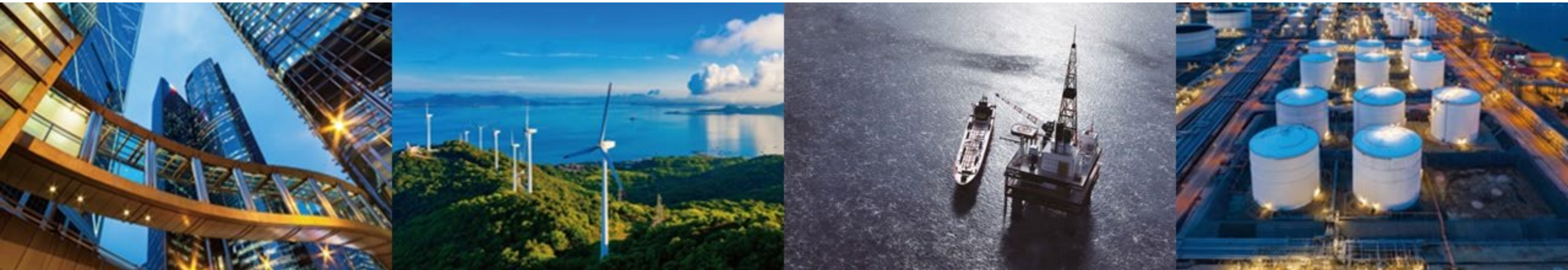


Outline

- **The *APEC Energy Demand and Supply Outlook, 9th Edition***
- Results for the APEC region
- Key takeaways
- Summary

APEC Energy Demand and Supply Outlook 9th Edition

- A priority task under the APEC Energy Action Programme (1995).
- Provides analysis and policy insights on future energy demand and supply in APEC economies.
- In the 9th edition, **projections** extend to **2060**.

The Reference Scenario (REF)

Economy-specific pathways based on **historical trends**, recent developments, and APERC's assumptions about the evolution of the energy system within each APEC economy. REF offers a **baseline to compare with TGT projections**.

The Target Scenario (TGT)

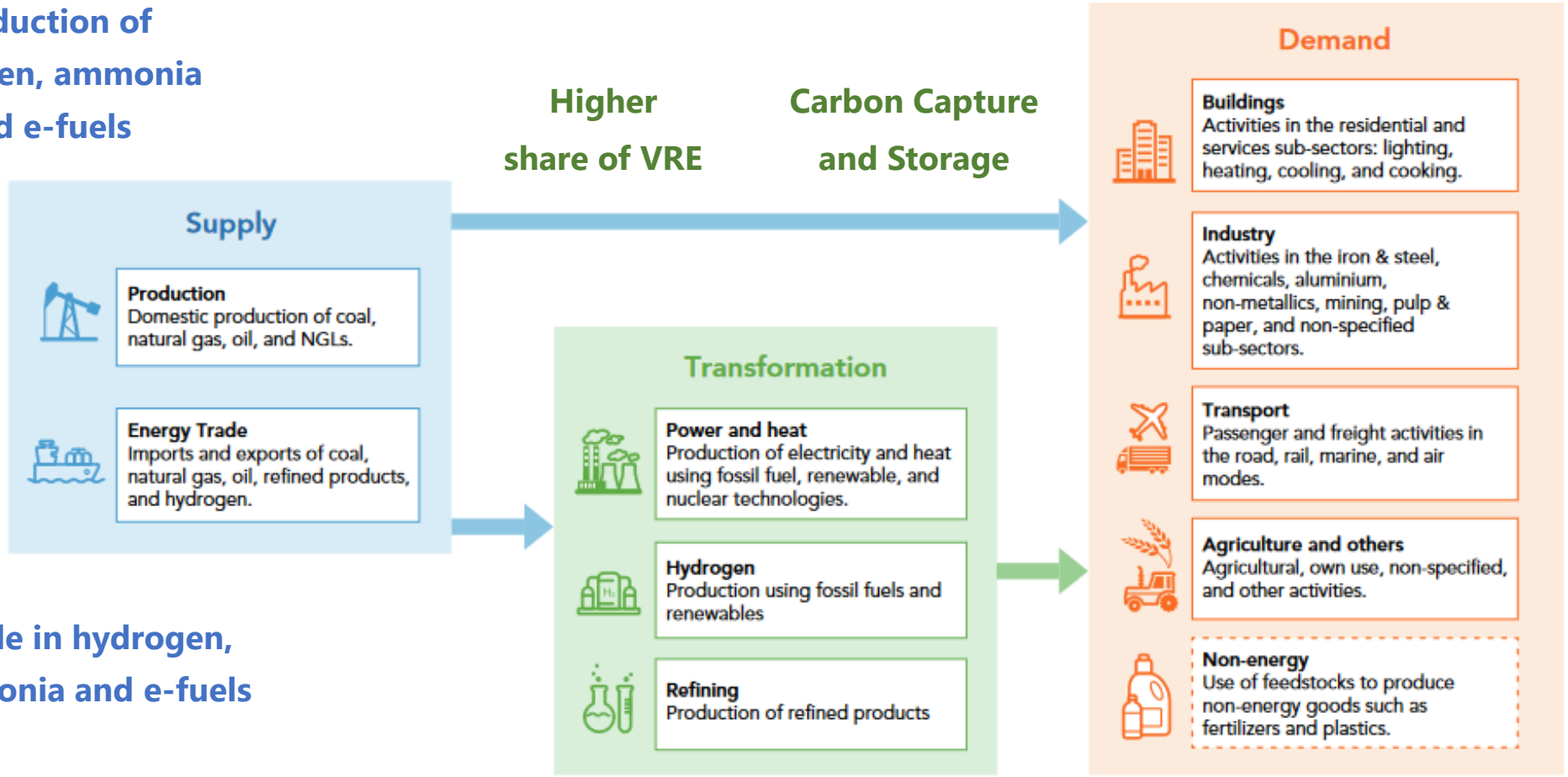
A **hypothetical pathway** where each economy **achieves its energy-related policy targets** regardless of cost-effectiveness. When implementation details are lacking, assumptions are inferred from the targets themselves or emissions-related goals.

New and renewable energy technologies have implications throughout the energy system

Production of hydrogen, ammonia and e-fuels

Higher share of VRE

Carbon Capture and Storage



Separate electricity projections for data centres

Hydrogen based steel production

EVs, hydrogen powered trucks

Synthetic fuels

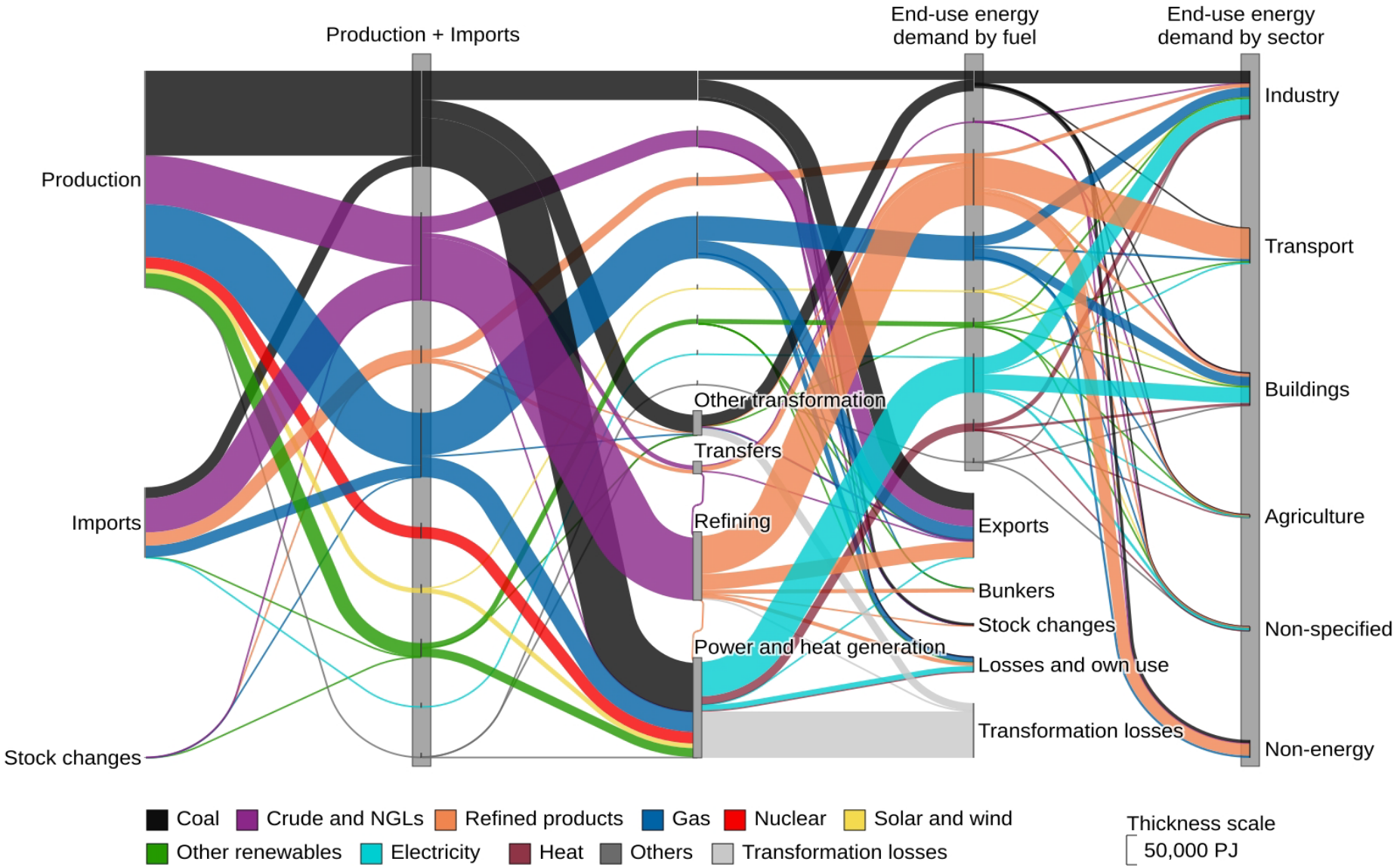
Trade in hydrogen, ammonia and e-fuels

Grid storage technologies

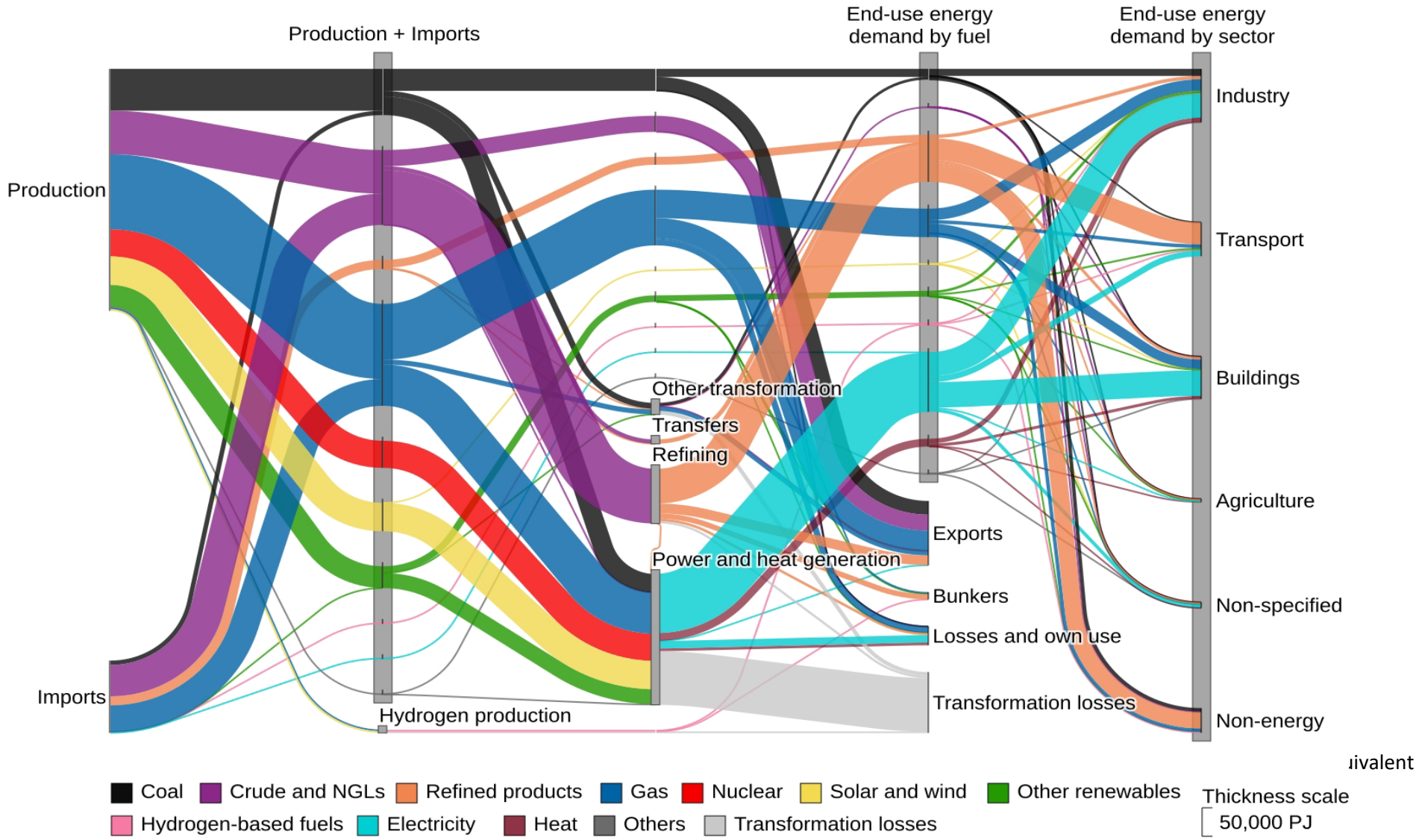
Blending hydrogen with gas; ammonia with coal

APERC
Asia Pacific Energy Research Centre

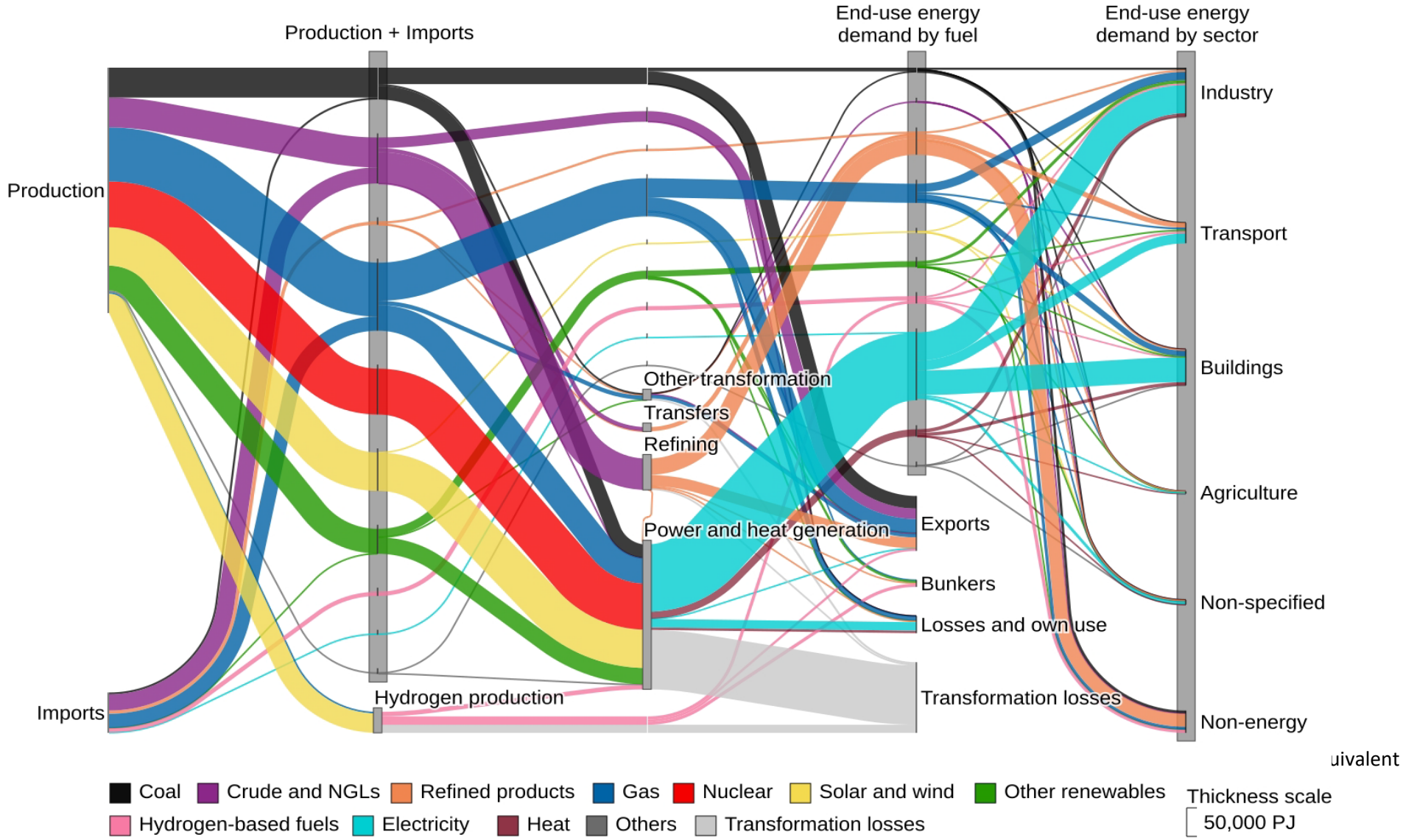
APEC Energy Flows (2022)



APEC Energy Flows (2060, Reference Scenario)



APEC Energy Flows (2060, Target Scenario)



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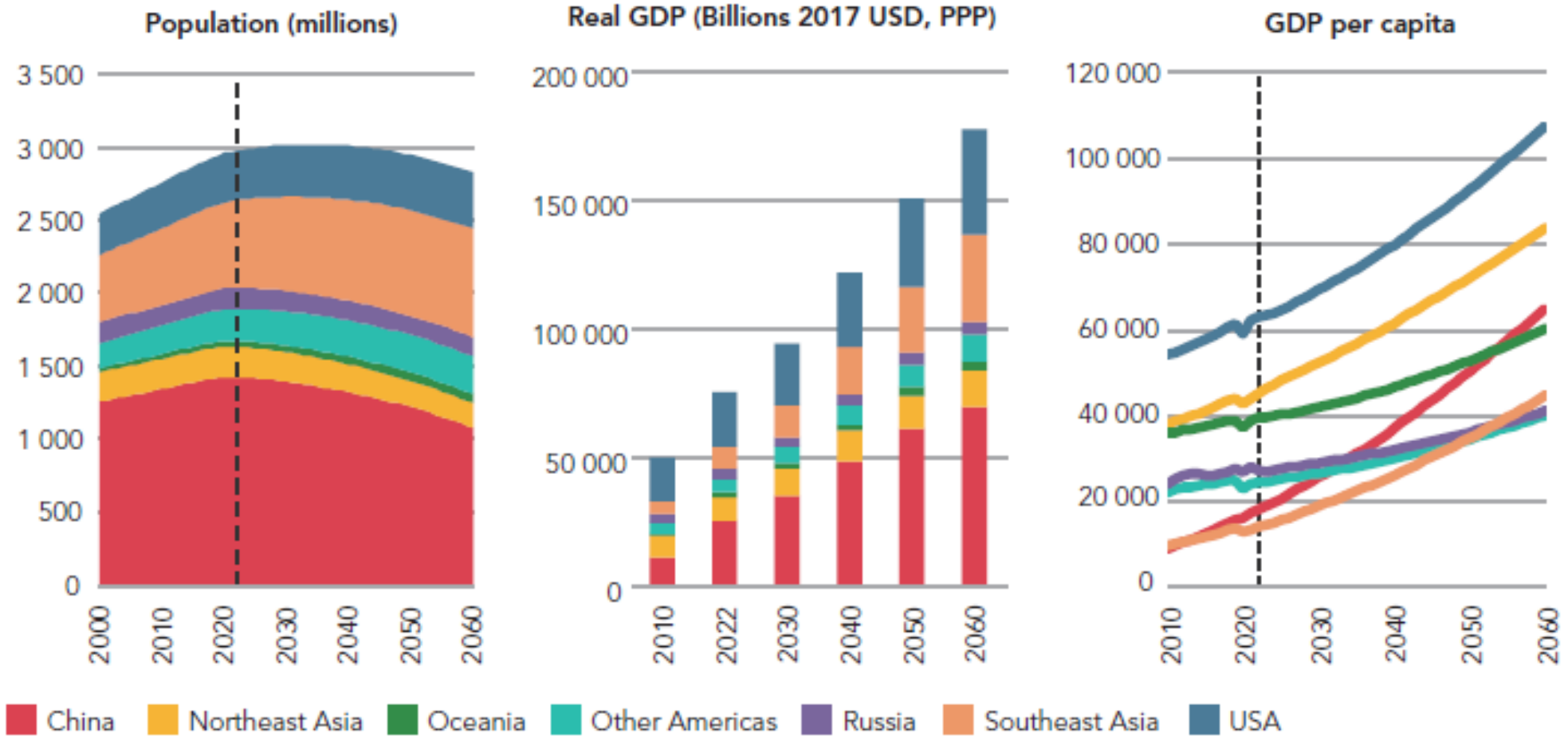
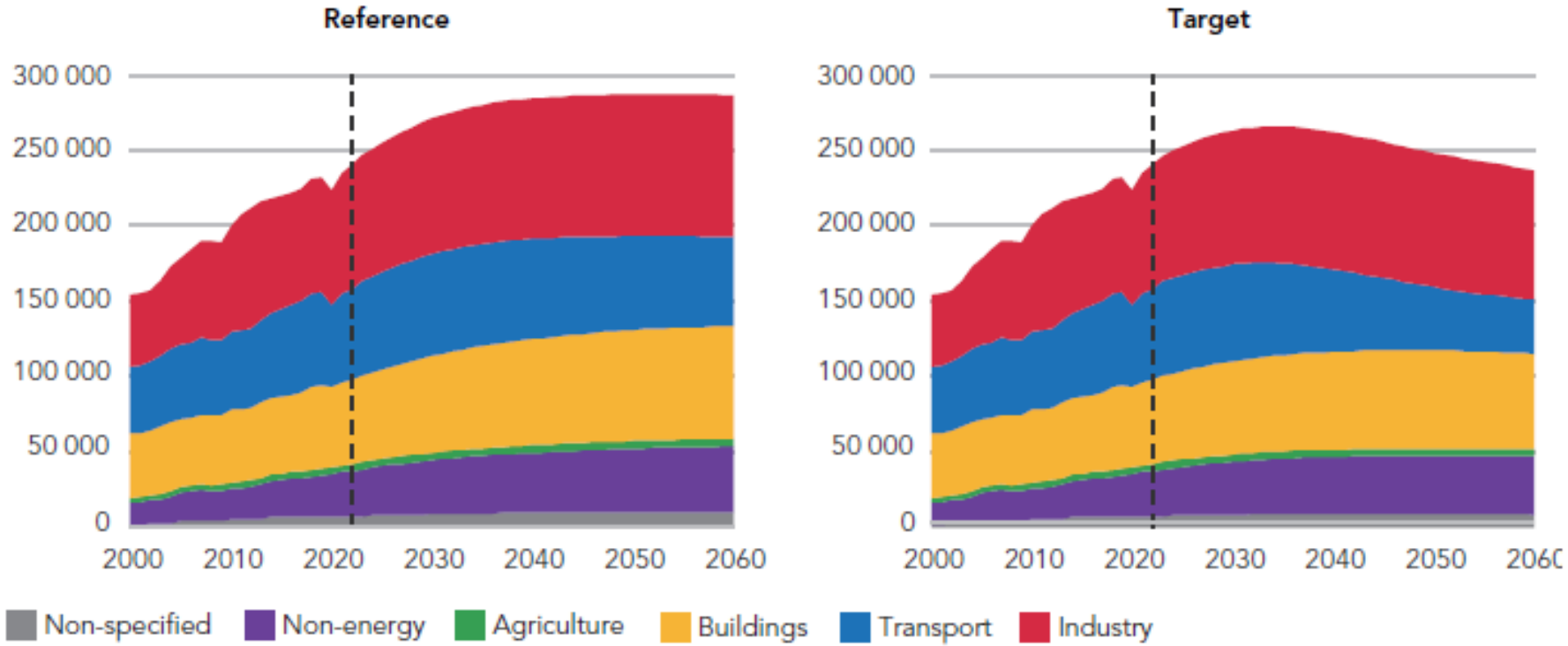
Population and GDP by APEC Subregion

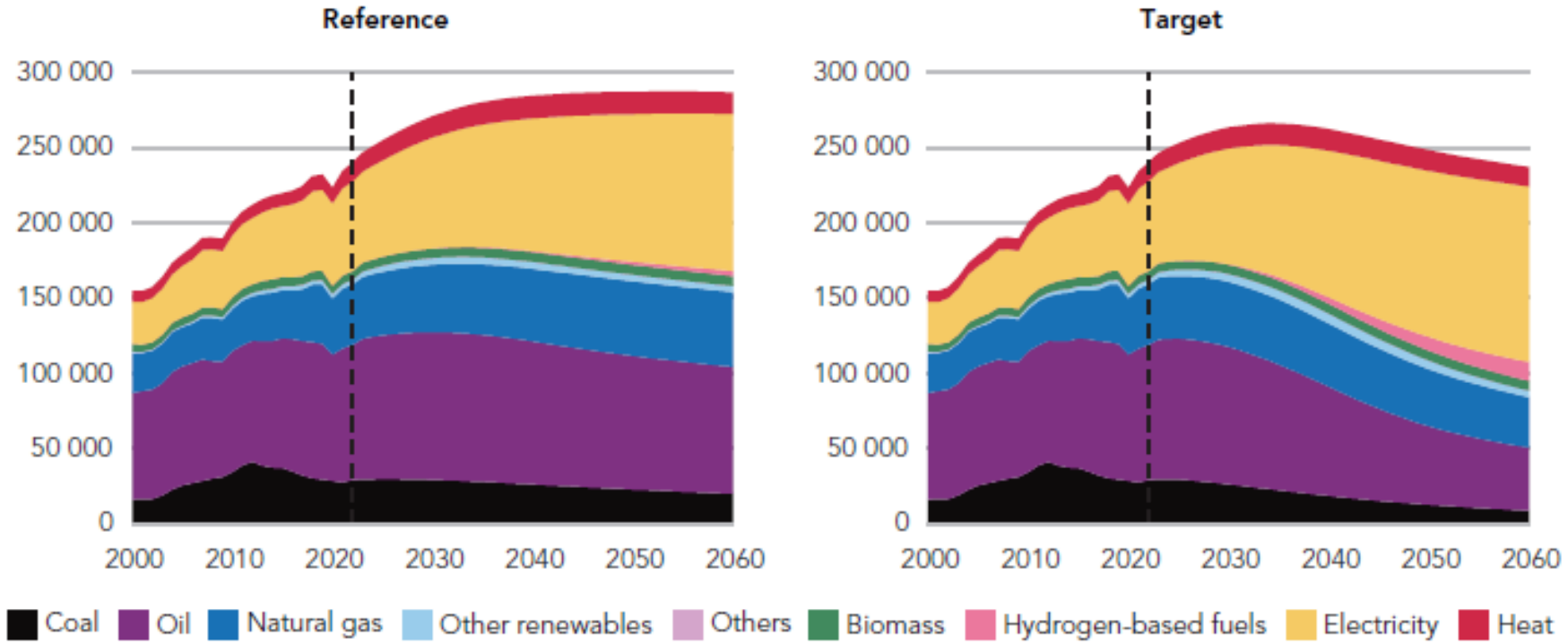


Total Final Consumption by Sector (PJ)



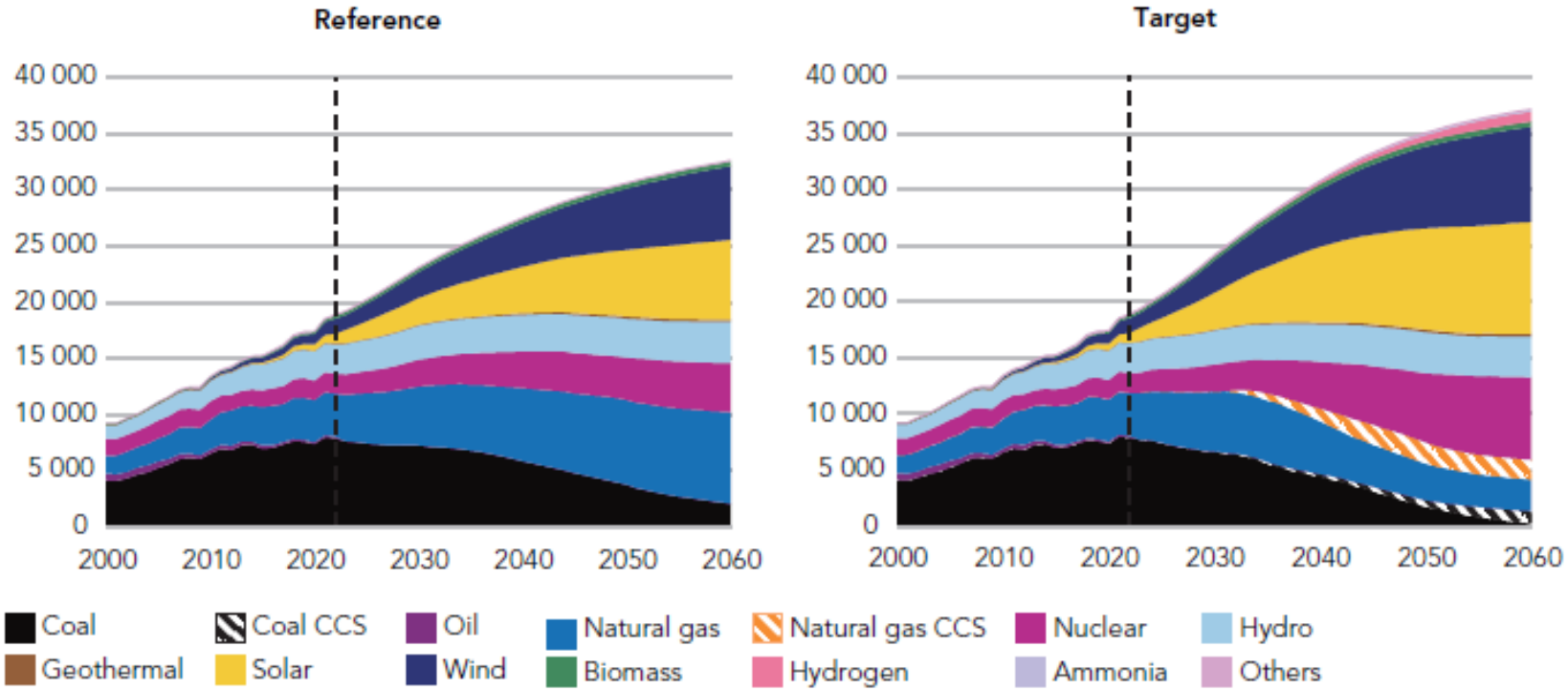
- In REF from 2022 to 2060, energy consumption in industry, transport, and buildings grows by 14%, 0%, and 32%, respectively.
- In TGT, energy use changes in industry, transport, and buildings by +5%, -40%, and +13%.
- The largest efficiency gains are in transport. Efficiency improvements in buildings are more than offset by growth energy use in data centres.

Total Final Consumption by Fuel (PJ)



- In both REF and TGT, electricity substitutes for petroleum products and coal, and to a lesser extent, natural gas.
- In REF, electricity use grows by 75%.
- In TGT, electricity grows by 96% and oil drops by 50%.

Electricity Generation by Technology (TWh)



- Wind and solar generation increases sixfold and eightfold in REF and TGT, respectively, raising its share from 12% in 2022 to 42% in REF and 50% in TGT by 2060,.
- The share of dispatchable generation declines from 88% in 2022 to 58% in REF and 50% in TGT by 2060.
- In absolute terms, dispatchable generation will grow slightly but shifts away from fossil fuel generation toward zero-carbon sources (nuclear and hydro).

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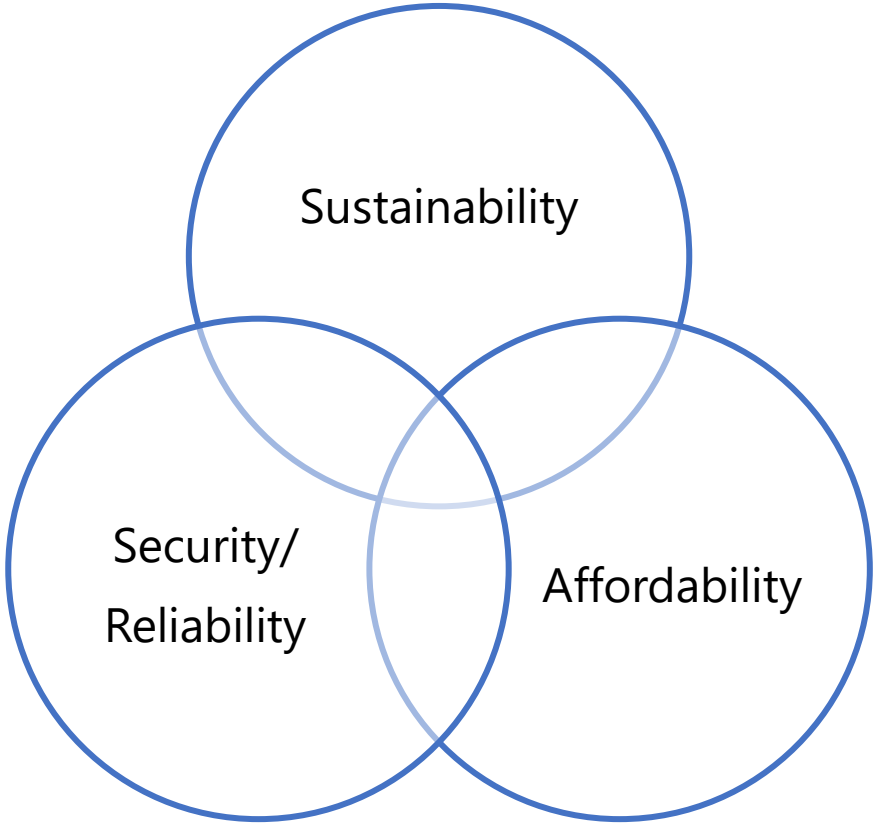
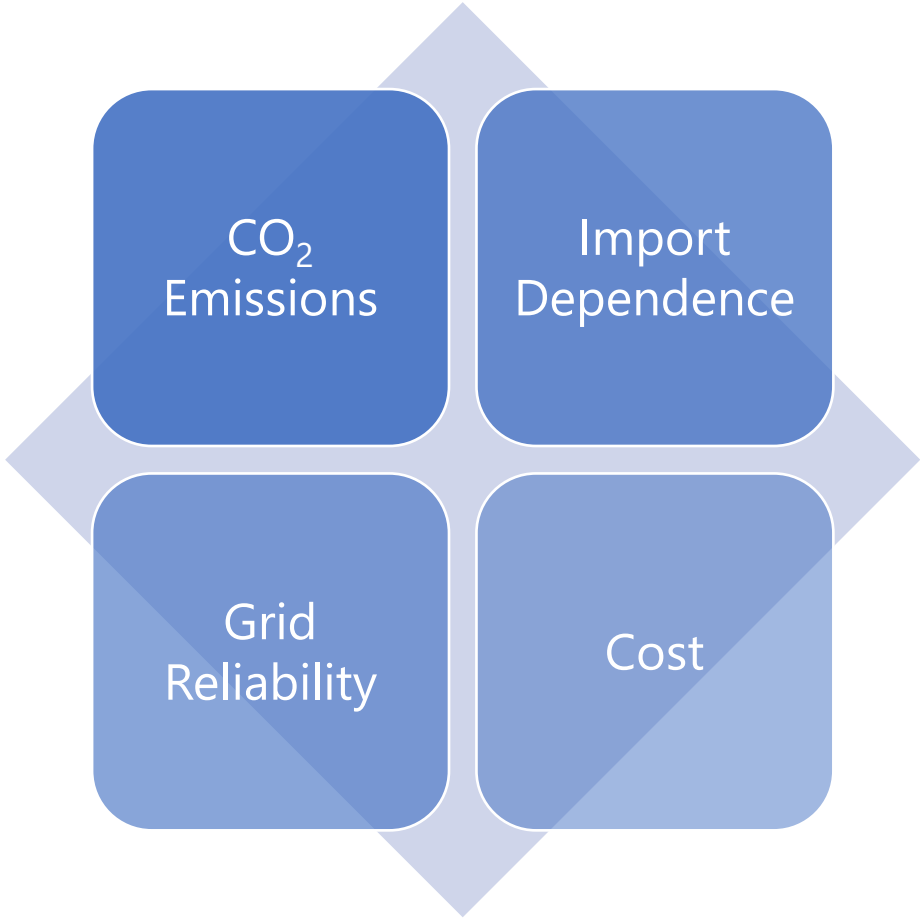
Key Takeaways of the 9th Outlook

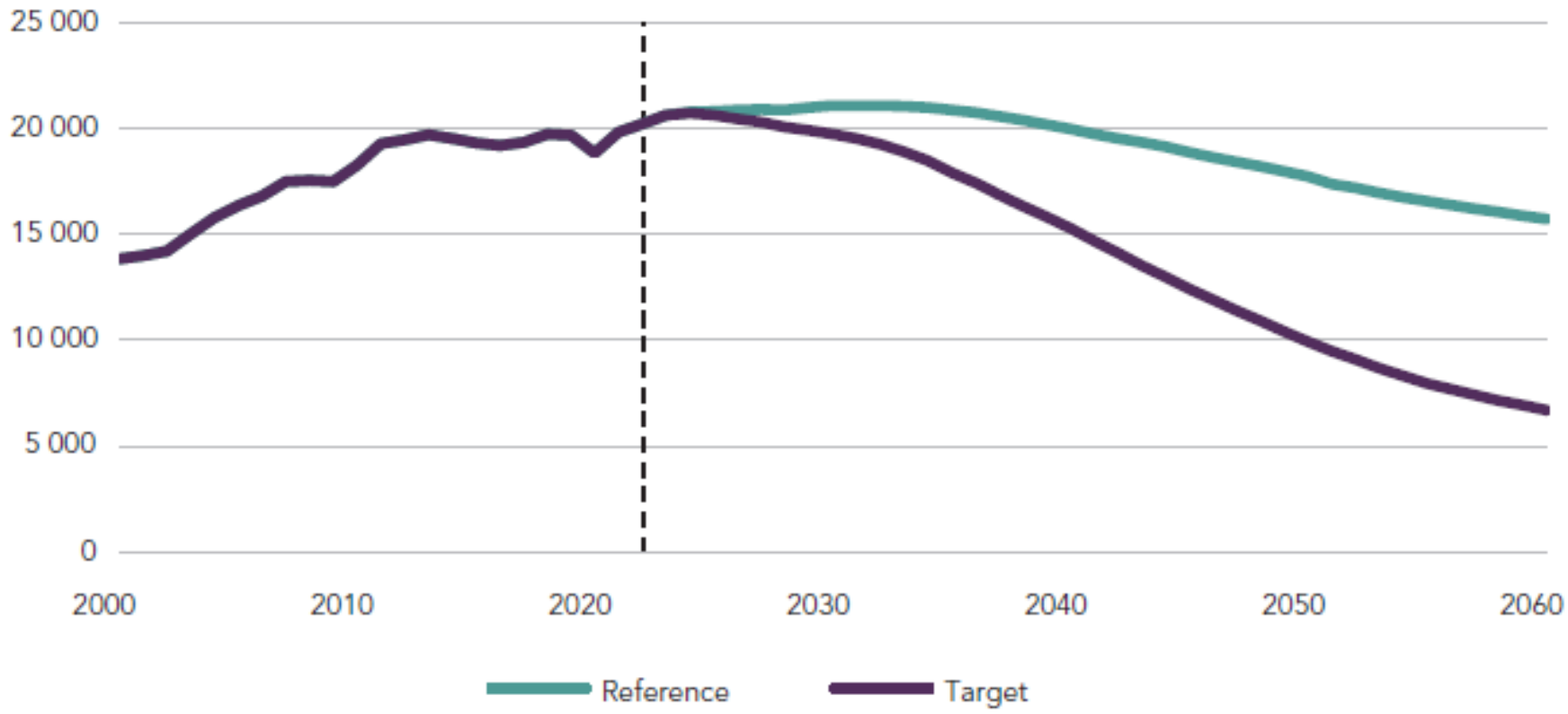
The Energy Trilemma



Key Parameters



APEC CO_2 Emissions (million tonnes)

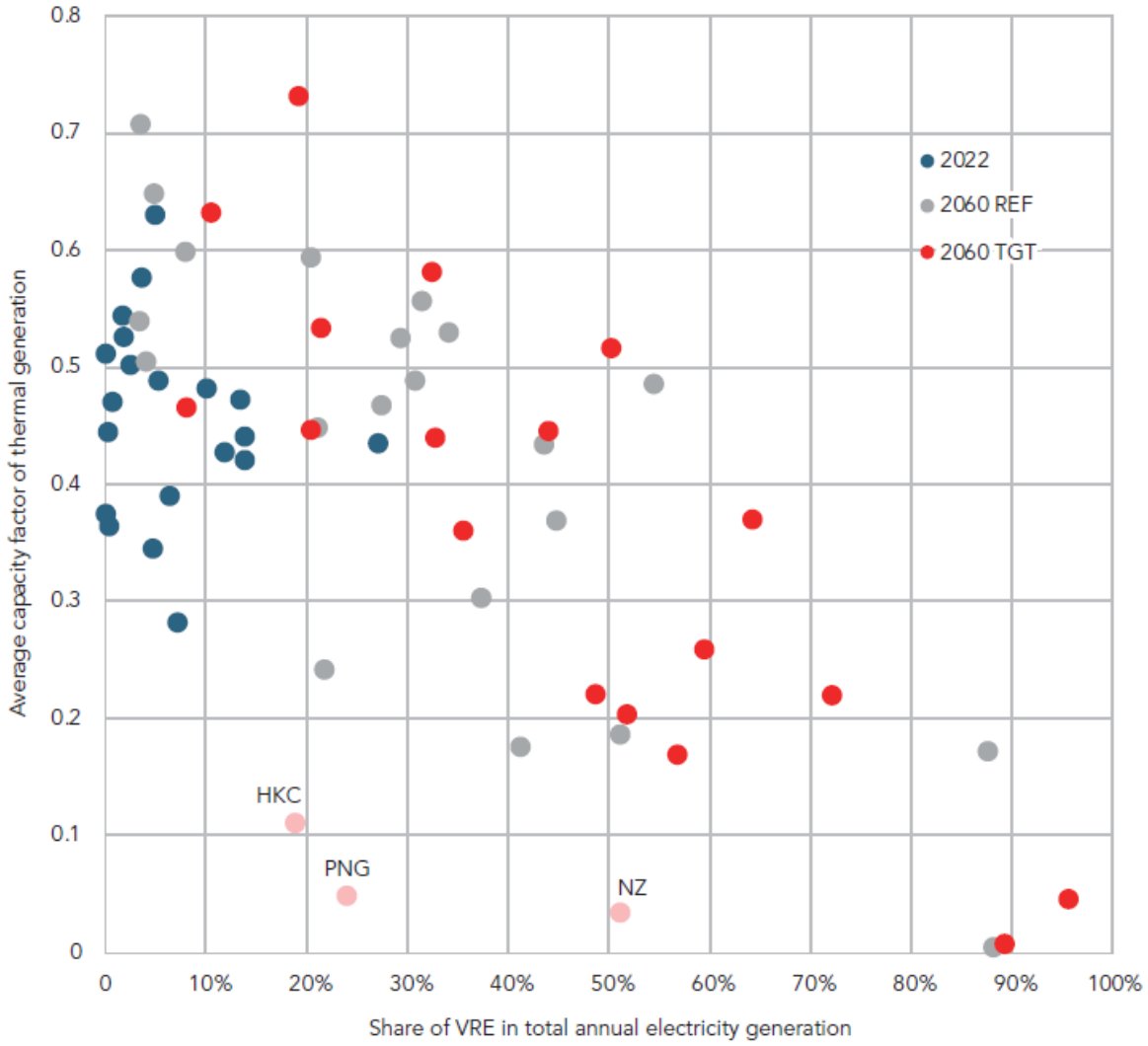


- CO_2 emissions decline in both scenarios, but the decline is much greater in TGT.
- In REF, CO_2 emissions in 2060 is 22% lower than the 2022 level.
- In TGT, CO_2 emissions are down 67%.

Net imports (PJ) and import share of TPES (%) in APEC importing economies

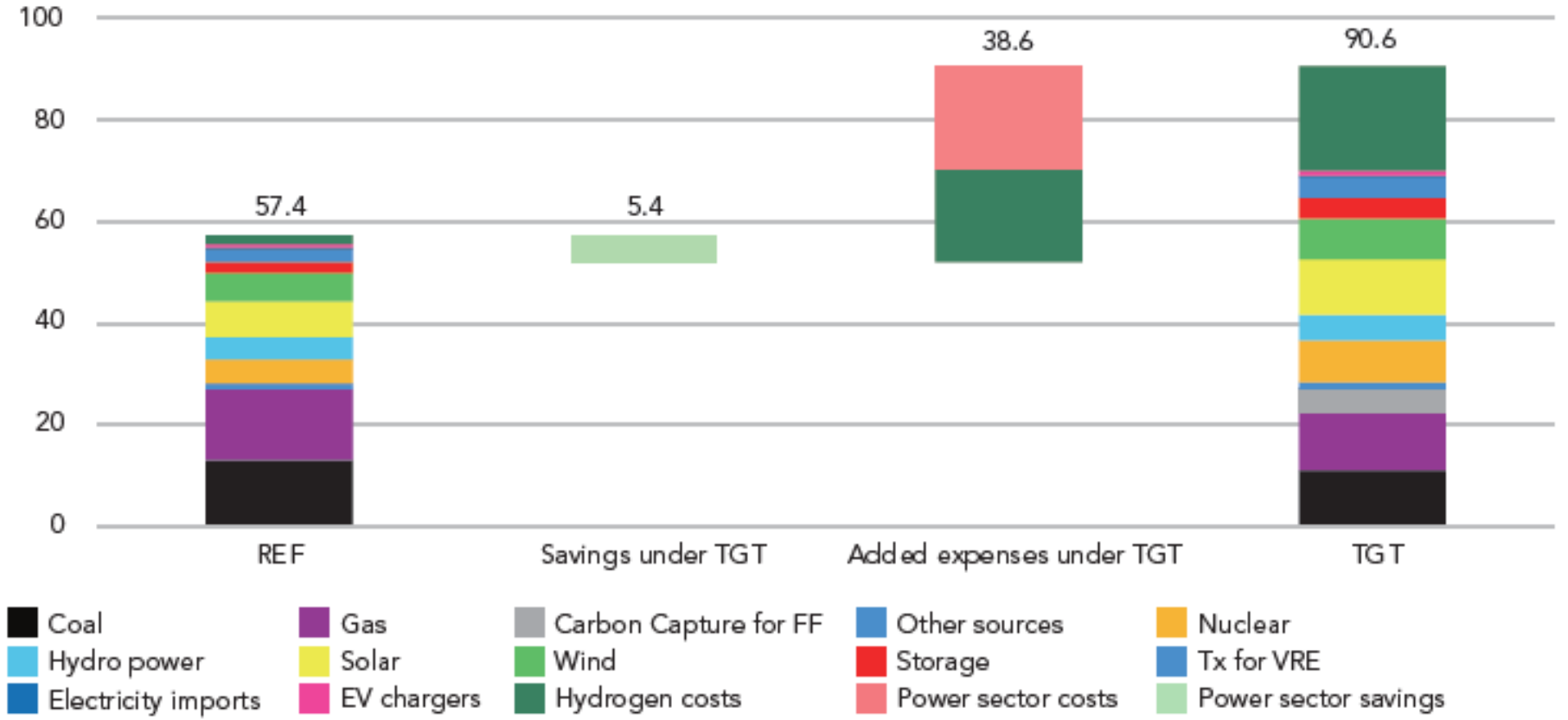
- To quantify the security risks associated with energy imports, we grouped APEC economies together that has positive net imports of a fossil fuel in 2030.
- The net import group included 14 economies for coal, 16 for petroleum liquids, and 13 for natural gas.
- In REF, import dependence stays below 20% of consumption for coal, but goes above 80% for oil and 70% for gas.
- In TGT, the shares of imports are lower, but still significant for oil and gas.

Impact of increased VRE on the capacity factor of thermal plants



- Our proxy for grid reliability is the capacity factor of thermal plants, which are often the primary source of dispatchable power.
- Dispatchable power is essential for grid reliability.
- As the share of VRE grows beyond 30% of total generation, the capacity factor of thermal plants in most economies falls below 40%, which is uneconomic.
- Running thermal plants at low capacity factors increases electricity costs and reduces grid reliability.

Costs in Power and Hydrogen Sectors (2025-2060, trillion USD)



- As demand for electricity grows, APEC economies will incur substantial costs in the power and hydrogen sectors to meet demand.
- In REF, we estimate these costs to be 57 trillion USD across all APEC economies.

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Summary

- In REF, total energy demand continues to grow through to 2060. **In TGT, demand peaks** in **2034** and is **17%** lower than REF by 2060.
- **Fossil fuels continue to play a major role** in both REF and TGT, despite the growth in renewables and nuclear energy. **Natural gas** becomes the **most important fossil fuel**.
- APEC electricity demand is projected to **grow 75% in REF** and **96% in TGT** by 2060.
- Increased reliance on low-carbon energy sources and electric vehicles reduces CO_2 emissions. **In TGT, emissions are down 67%** from the 2022 level.
- Some APEC economies remain **highly dependent** on imported oil and gas.
- As the power sector transitions to more solar and wind generation, the **capacity factor** for thermal plants **declines**, which **degrades grid reliability and increases the cost of electricity**.
- Substantial costs are incurred in **APEC's power and hydrogen sectors** in both scenarios.

To access a digital version of the *APEC Energy Demand and Supply Outlook* **Volume 1**, please scan the QR code or visit the following website:

https://aperc.or.jp/reports/APEC_Outlook_9th_Edition-Volume_1.pdf

For the energy demand and supply outlooks for each of the 21 APEC economies, please scan the QR code or visit the following website to read **Volume 2** of the 9th edition of the *APEC Energy Demand and Supply Outlook*:

https://aperc.or.jp/reports/APEC_Outlook_9th_Edition-Volume_2.pdf

Thank you.

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