Asia-Pacific Economic Cooperation

APERC Asia Pacific Energy Research Centre

APEC Energy Demand and Supply Outlook 8th Edition

SIEW Energy Insights
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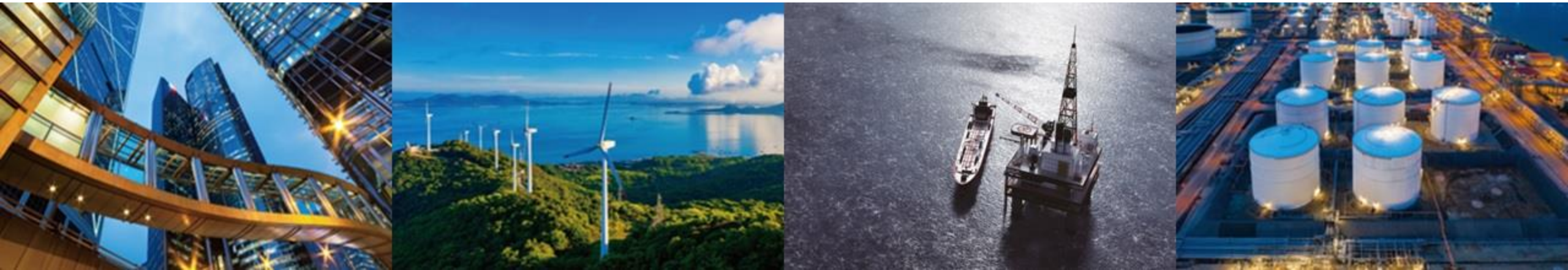


Scenarios

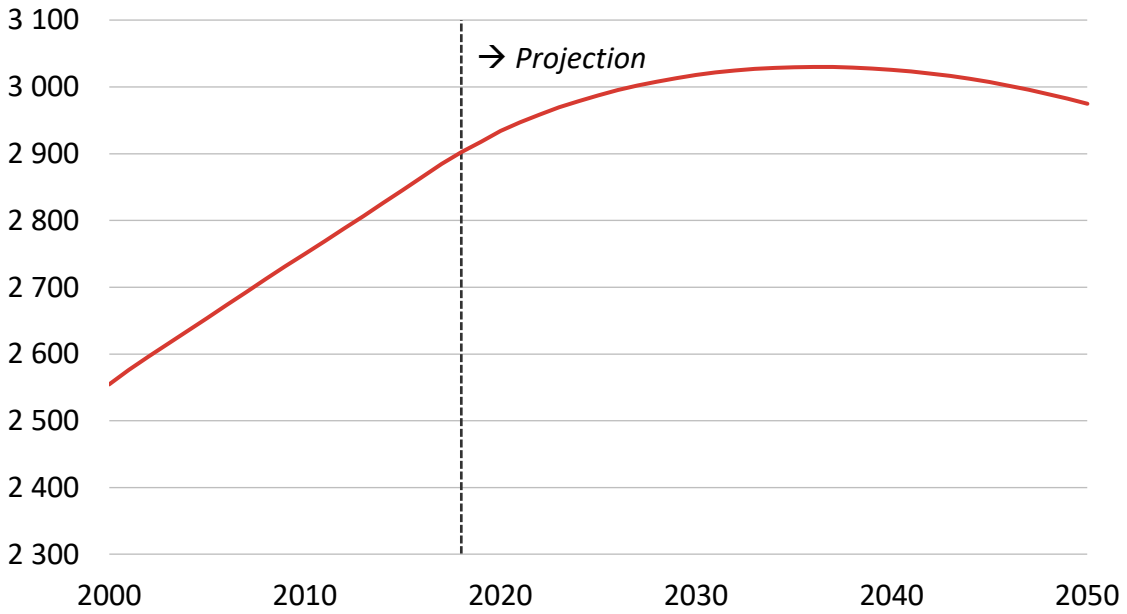
	Reference (REF)	Carbon Neutrality (CN)
Definition	Recent trends and current policies.	Hypothetical decarbonisation pathways for each APEC economy.
Purpose	Provides a baseline for comparison with the Carbon Neutrality scenario.	Additional energy sector transformations that support decarbonisation objectives.
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.

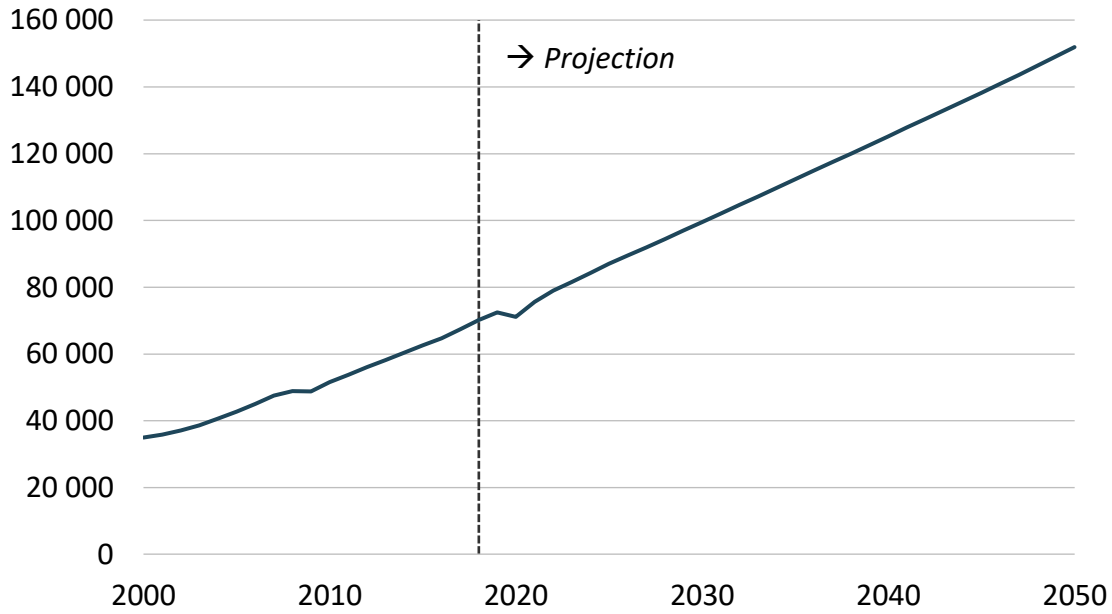
The analysis was performed prior to March 2022 and does not include current disruptions to international energy markets.

Macroeconomic assumptions

Population in millions



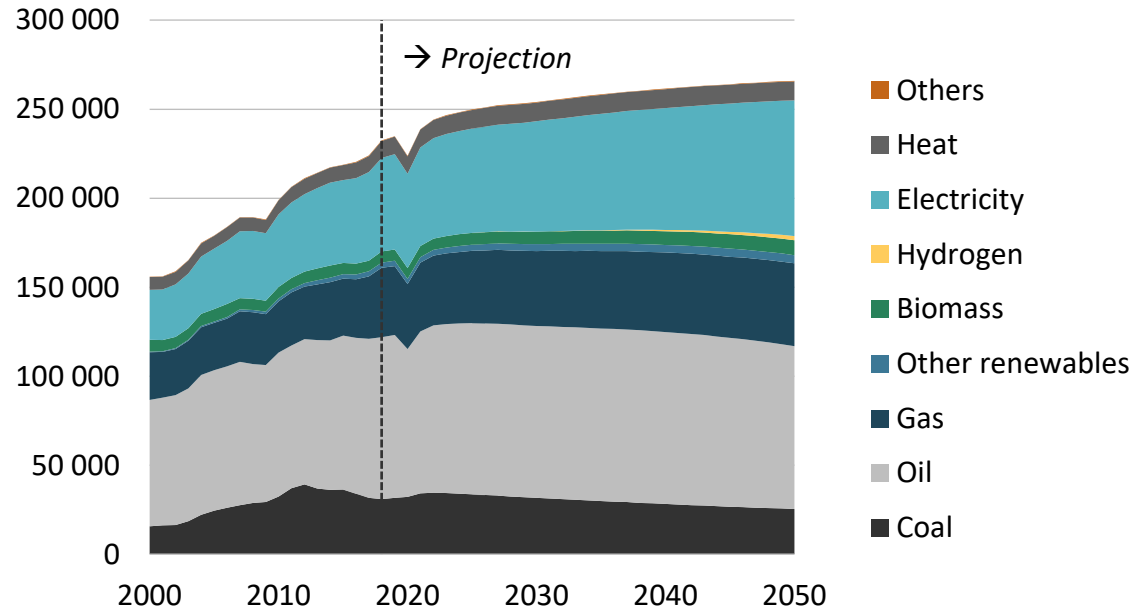
GDP in billion 2018 USD PPP



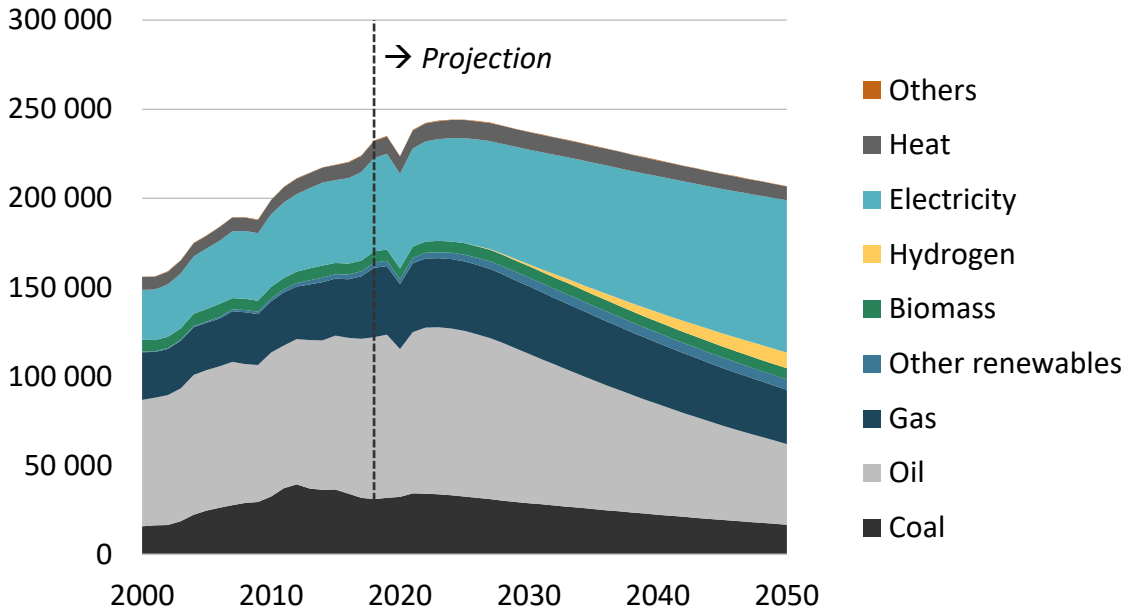
- Macroeconomic trends are expected to drive energy demand through 2050
- Trends vary by APEC sub-region and economy

Energy demand decouples significantly from economic activity

Energy demand by fuel in REF (PJ)



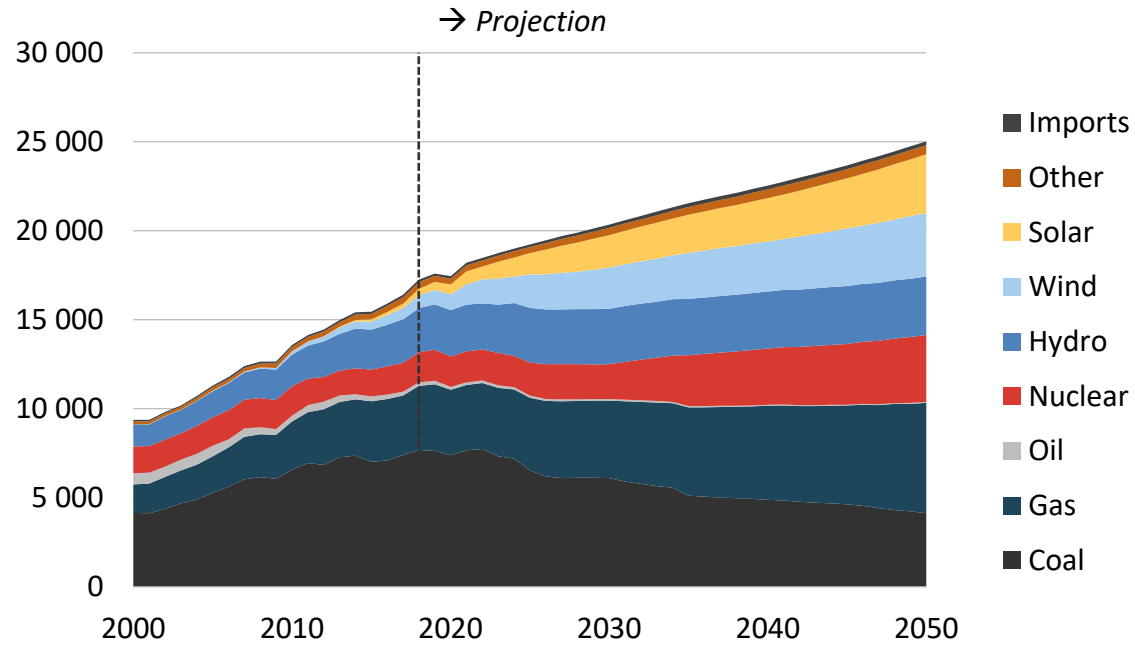
Energy demand by fuel in CN (PJ)



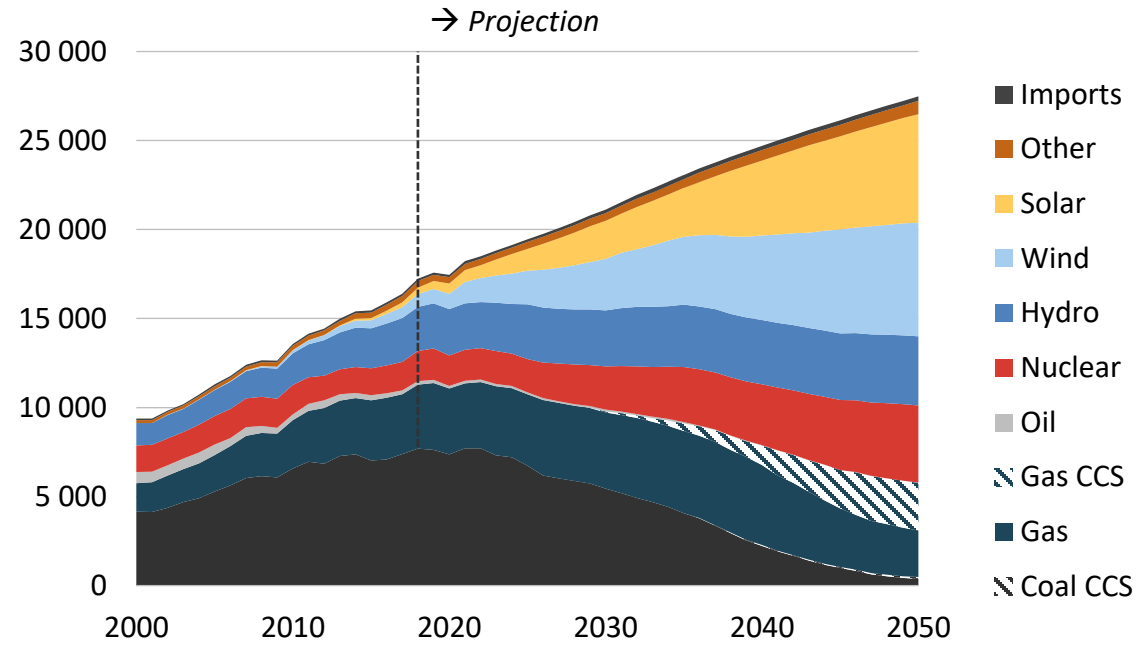
- While economic activity doubles, energy demand increases 14% in REF.
- Energy efficiency gains and electrification lead to energy demand being almost one-quarter lower by 2050 (CN vs REF).
- Substantial fossil fuels demand remains even in CN.

Electricity demand is increasingly met with generation from wind and solar

Electricity generation in REF (TWh)



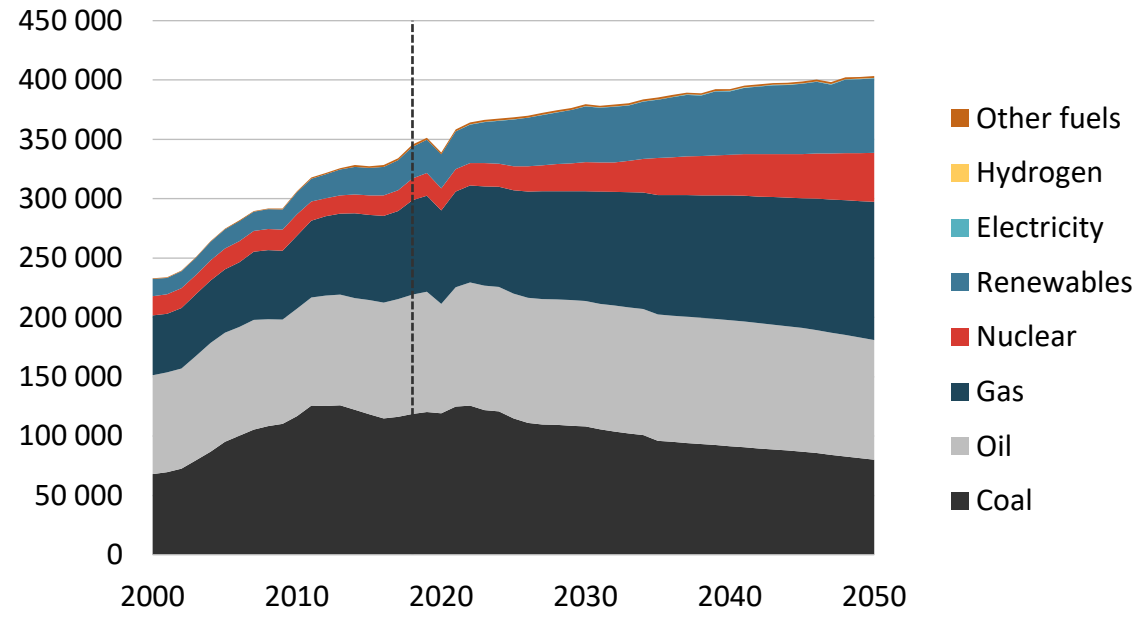
Electricity generation in CN (TWh)



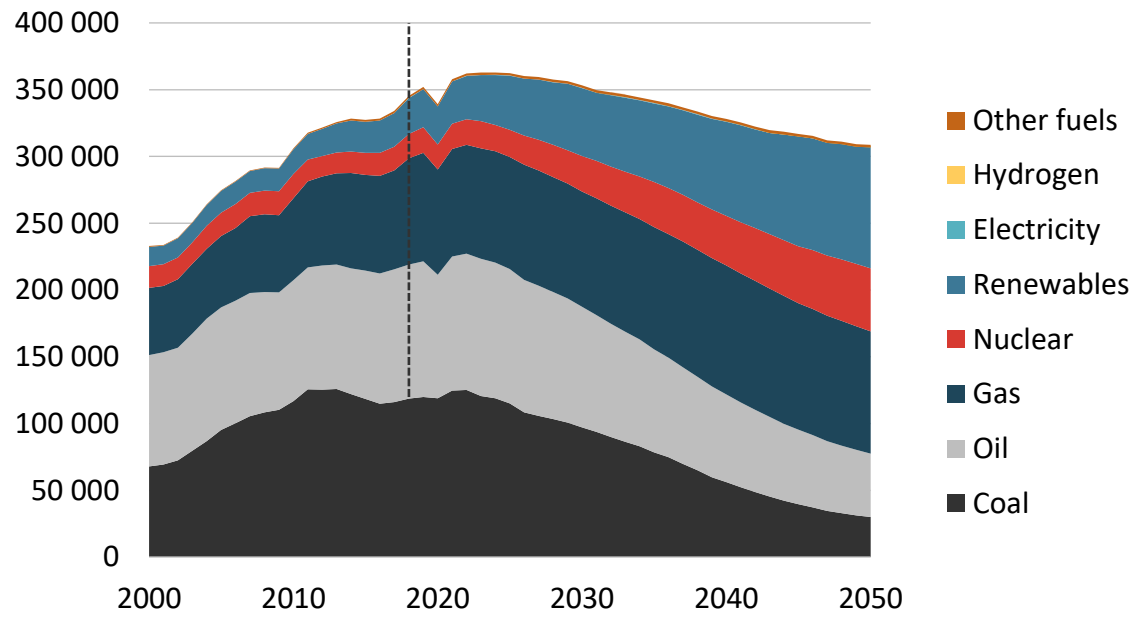
- Growth in electricity generation to meet increased buildings and transport demand.
- Natural gas substitution for coal continues and provides balancing and ancillary services to the electricity grid.

Fossil fuels remain a large share of APEC energy supply

Energy supply in REF (PJ)



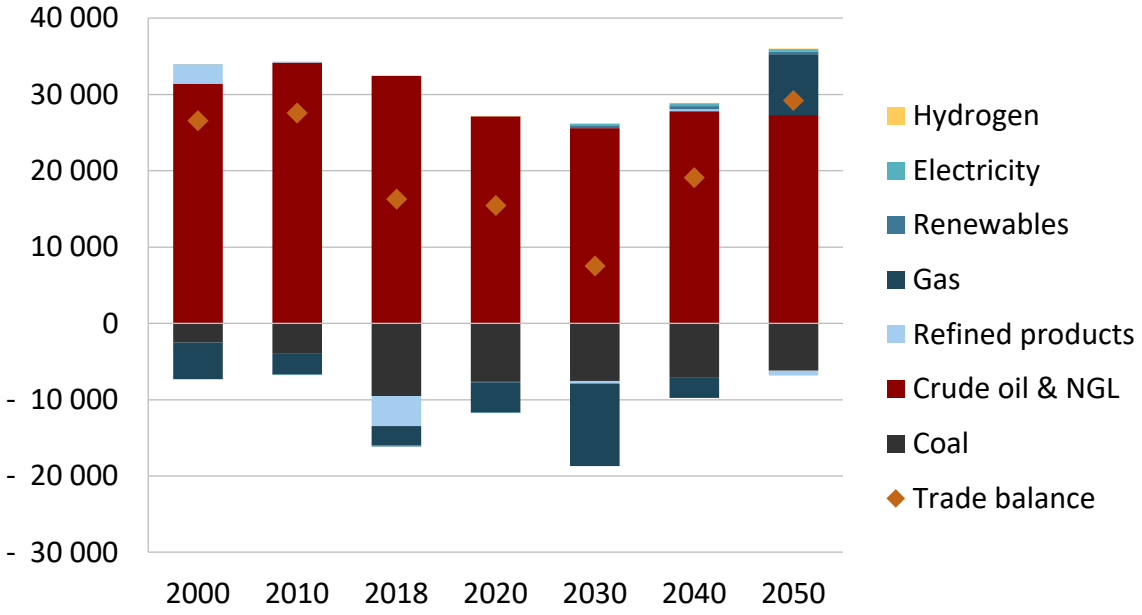
Energy supply in CN (PJ)



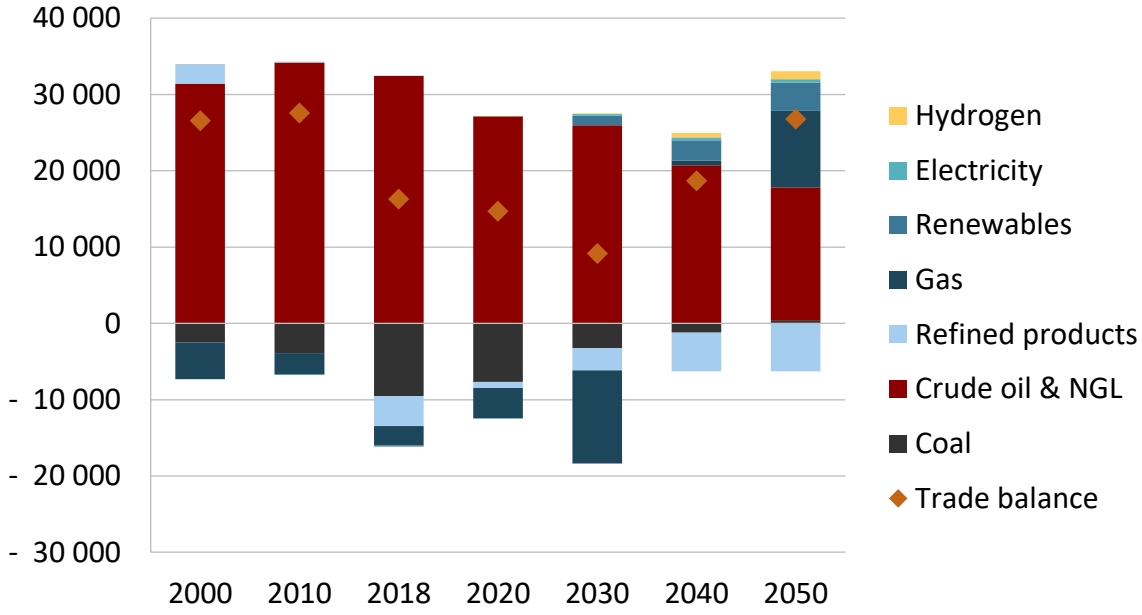
- Natural gas supply increases in both scenarios as coal declines.
- Oil supply is level in REF and declines in CN as APEC and global oil use declines.

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

Net energy trade in REF (PJ)



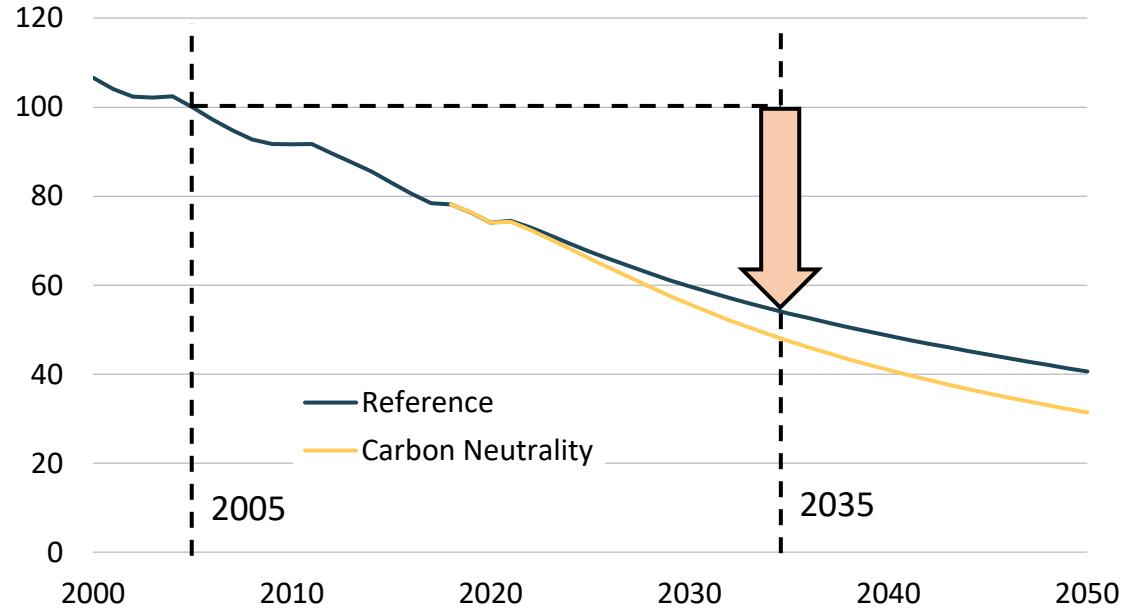
Net energy trade in CN (PJ)



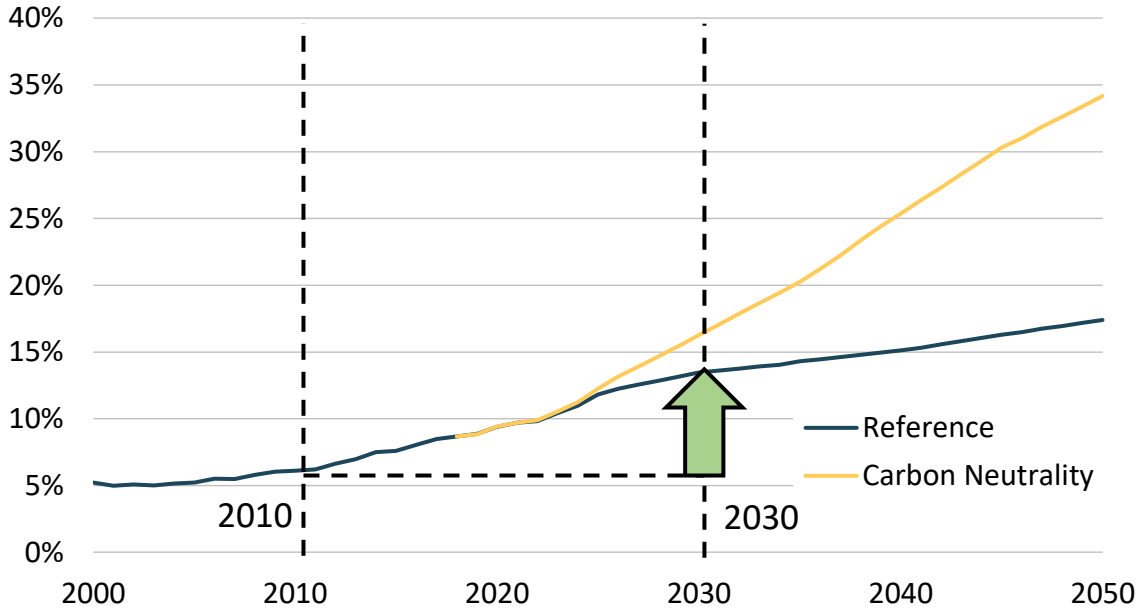
- USA, China, Russia, and Canada account for essentially all the production growth in REF.
- Natural gas production declines at a faster rate than consumption in the 2040s.
- Crude oil imports persist on production peak in REF, fall in CN on the electrification of transport
- LNG increases its share of gas trade in both scenarios

APEC projected to meet two energy goals

Final energy intensity (2005 = 100)



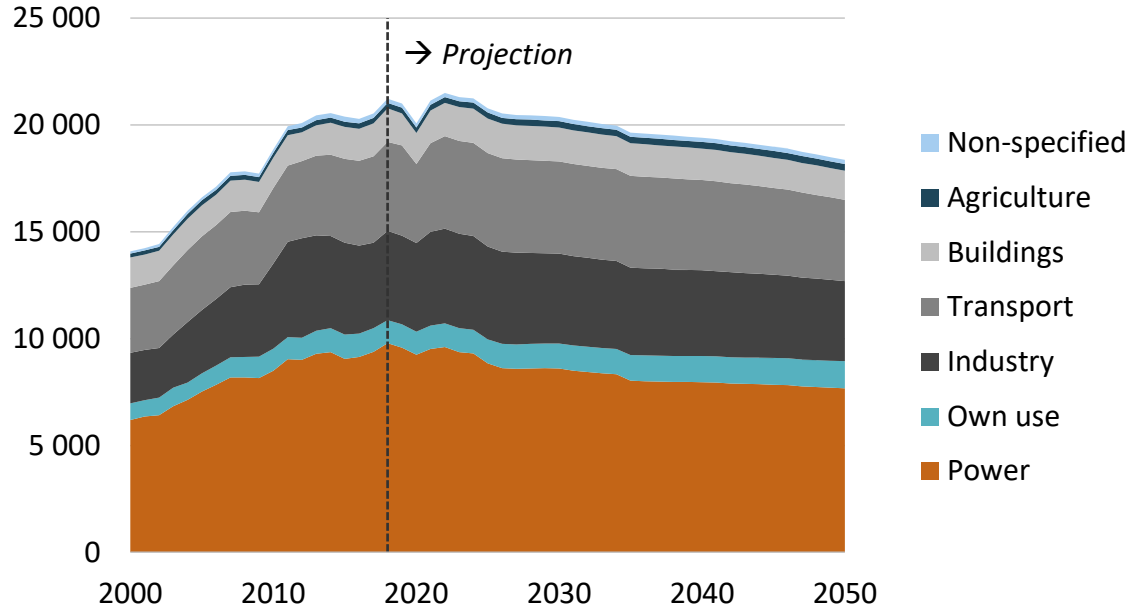
Share of modern renewable energy



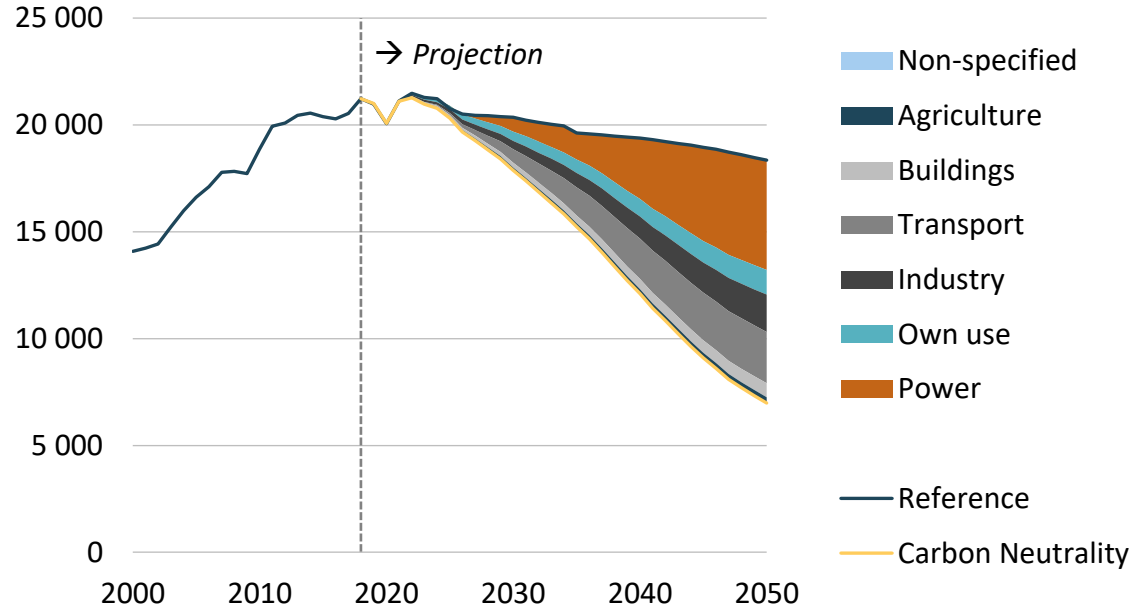
- Final energy intensity on track to decline 45% by 2034 (REF).
- Modern renewable energy share doubles by 2026 (REF).

CN delivers ambitious CO_2 emissions reductions…

Energy-related CO_2 emissions in REF (million tonnes)

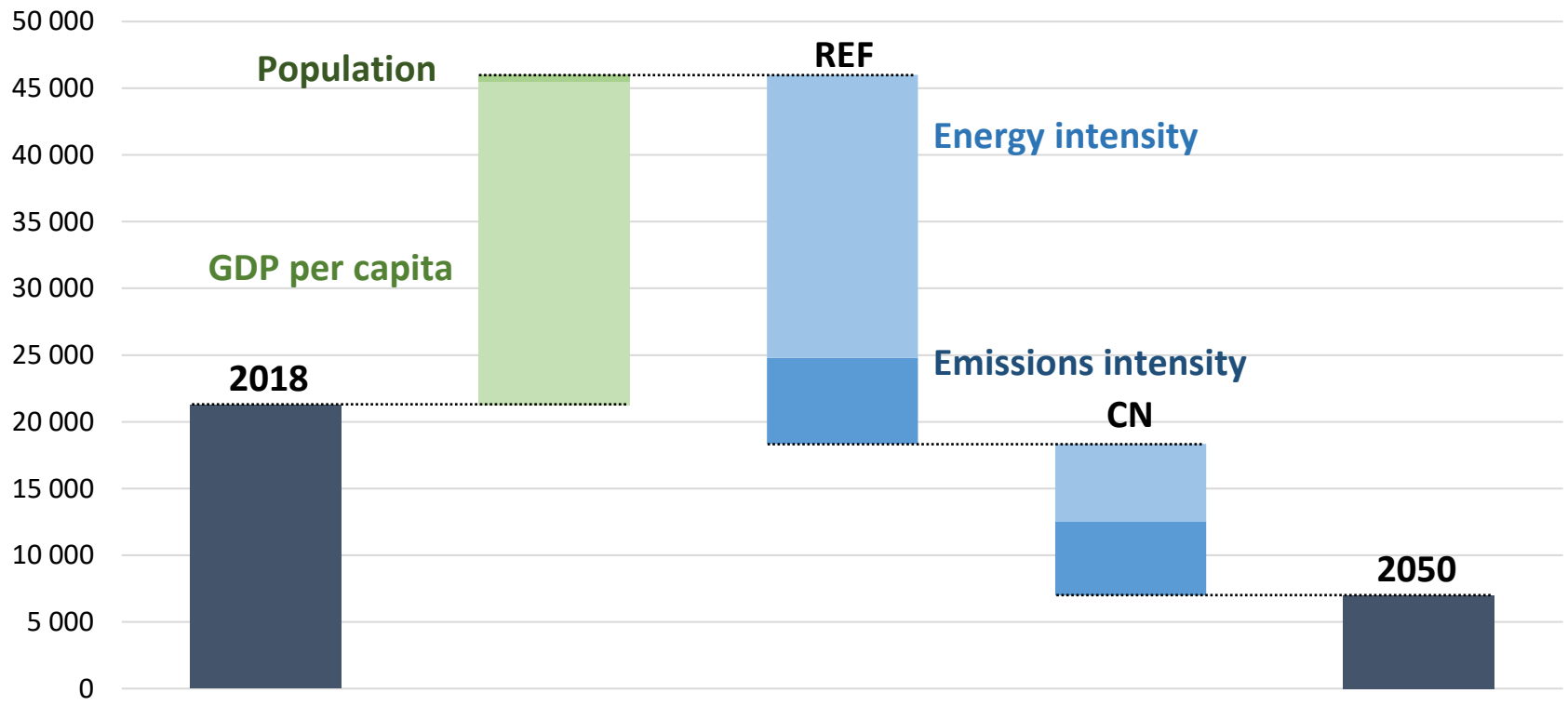


Decrease between REF and CN (million tonnes)



- APEC-wide CO_2 emissions decline by 14% in REF and by 67% in CN.
- The power and transport sectors are the most influential in driving emissions lower in CN.

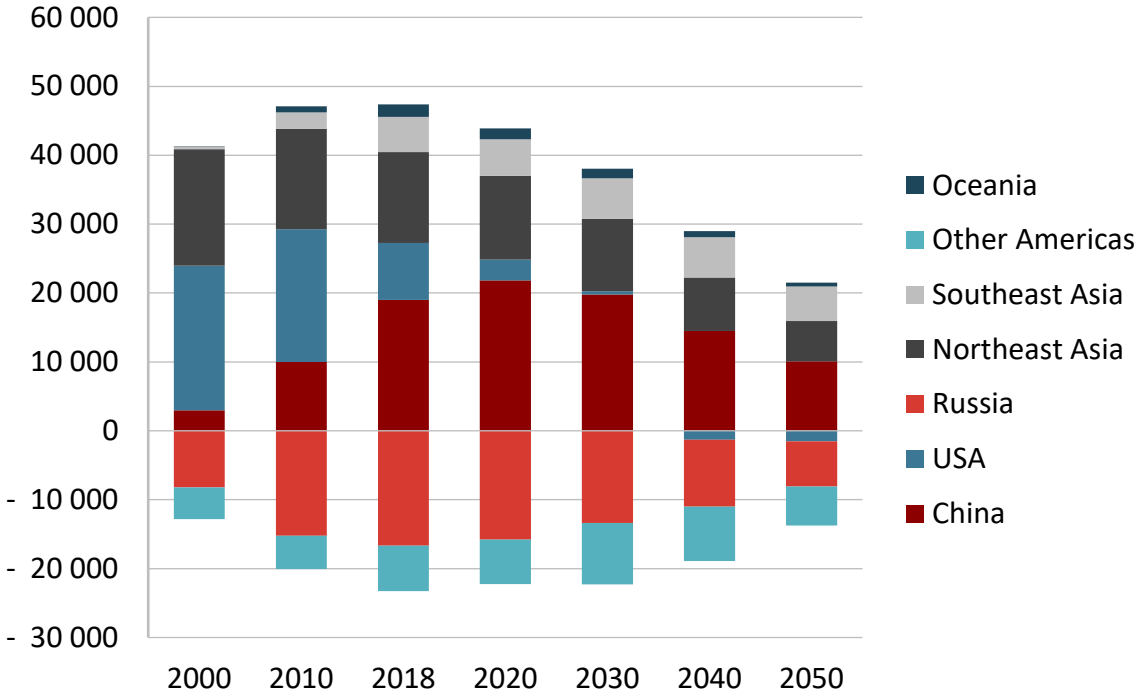
…through energy and emissions intensity improvements



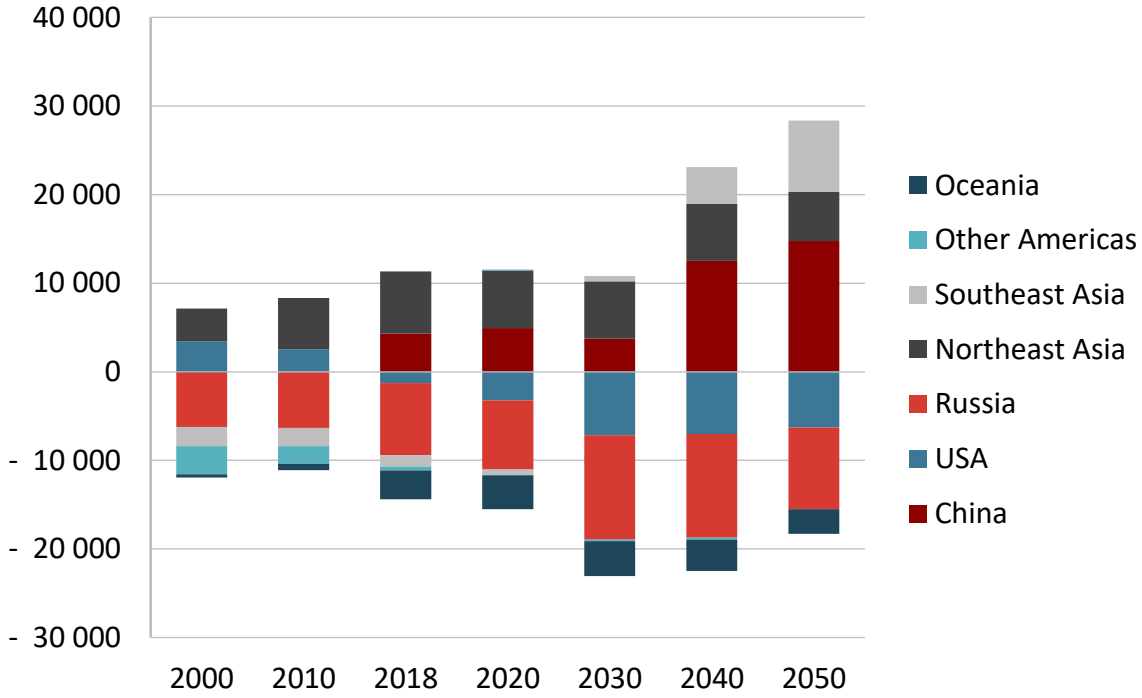
- Lower energy intensity delivers almost 70% of the emissions reductions in CN.
- Emissions intensity, such as from switching to less carbon intensive fuels (and energy carriers), power, industry, hydrogen, and own-use sectors delivers the remaining 30% of emissions reductions.

In CN, oil and gas security continues to be a concern

Net imports of crude oil and petroleum products in CN, 2000-2050 (PJ).

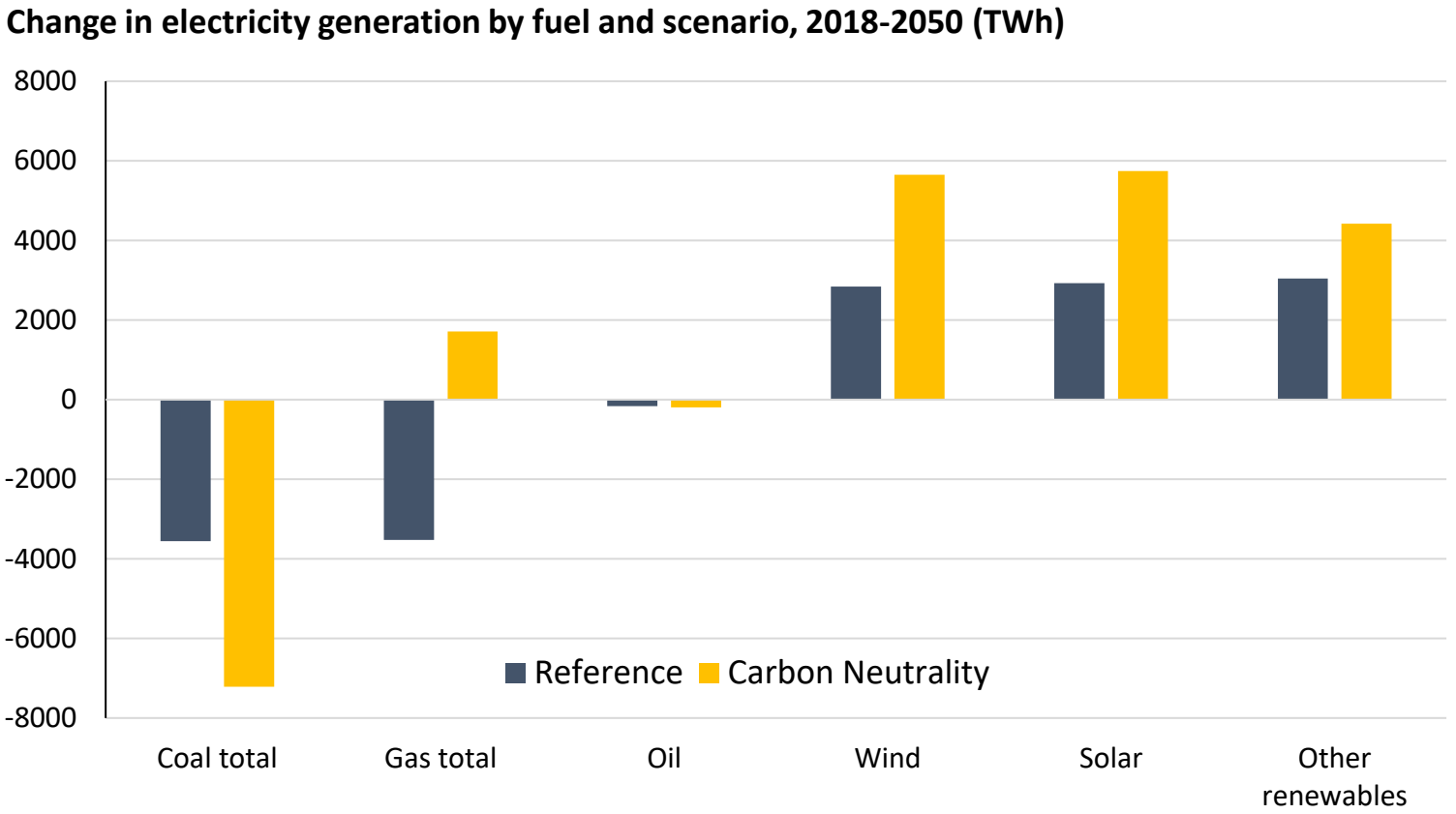


Net natural gas imports in CN, 2000-2050 (PJ).



- Efforts to discourage oil and gas investment reduce supply and energy security during the transition.
- The energy transition is more complex and expensive than many assume and will require some continued reliance on oil.

Electric grid reliability



- Increased reliance on wind and solar generation can reduce supply elasticity and necessitate higher reserve margins.
- As currently being implemented, decarbonization appears to be reducing short-term supply elasticities and increasing costs, thereby reducing energy security.

Summary

- Energy demand decouples from economic growth.
- Increased efficiency and electrification reduce demand.
- Wind and solar generation grow.
- But fossil fuels remain.
- APEC on track to meet its energy goals.
- Need both energy and emissions intensity reductions.
- Oil and gas security remains a concern in CN.
- Electric grid reliability is a challenge with increased wind and solar power generation.

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Thank you.

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