

# Key messages from the APEC Energy Demand and Supply Outlook 8th Edition

**IEEJ Webinar**

**27 October 2022**

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# Scenarios

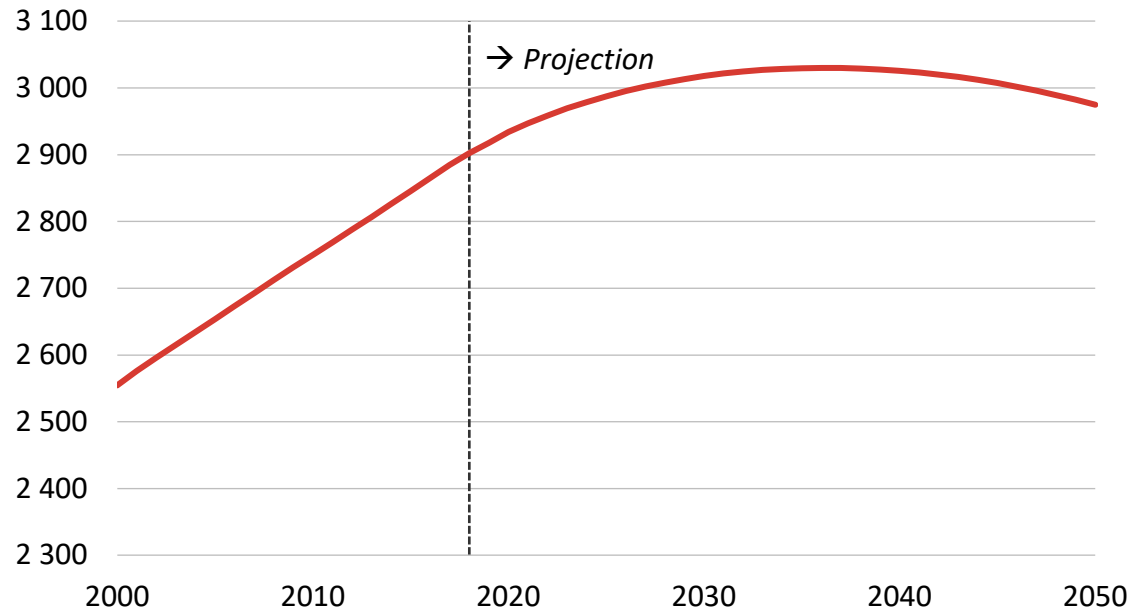
	Reference (REF)	Carbon Neutrality (CN)
<b>Definition</b>	Recent trends and current policies.	Hypothetical decarbonisation pathways for each APEC economy.
<b>Purpose</b>	Provides a baseline for comparison with the Carbon Neutrality scenario.	Additional energy sector transformations that support decarbonisation objectives.
<b>Key assumptions</b>	Current policies and trends continue.	Increased levels of energy efficiency, electrification, behavioral changes, fuel switching, and CCS deployment.
<b>Limitations</b>	Assumes that recent trends, including relevant decarbonisation measures continue.	Does not consider non-energy impacts on CO <sub>2</sub> or removal.

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

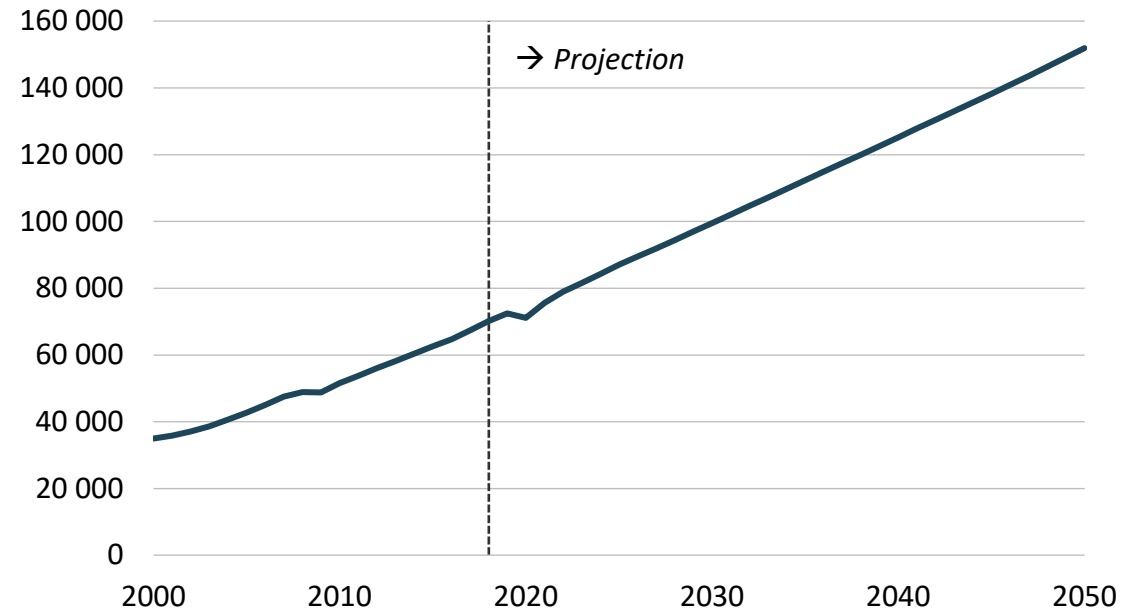
*The analysis was performed prior to March 2022 and does not include current disruptions to international energy markets.*

# Macroeconomic assumptions

## Population in millions



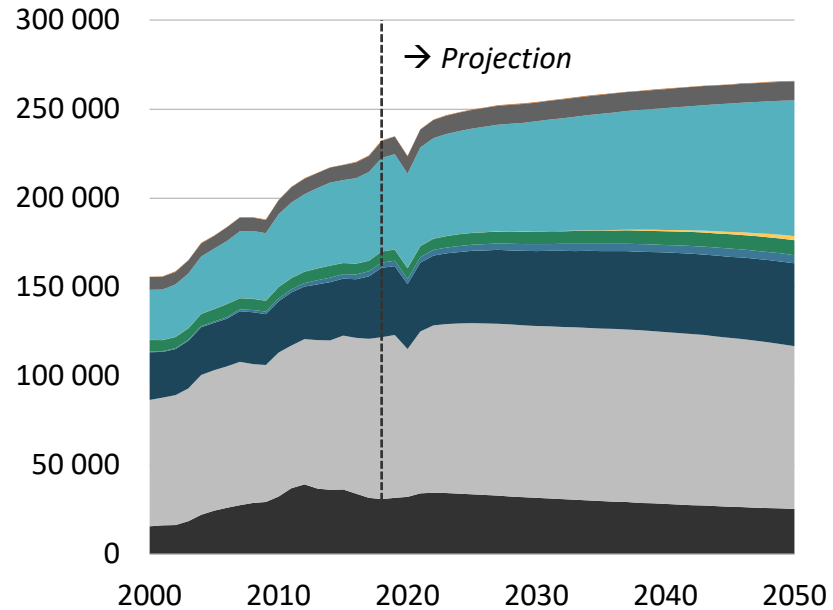
## GDP in billion 2018 USD PPP



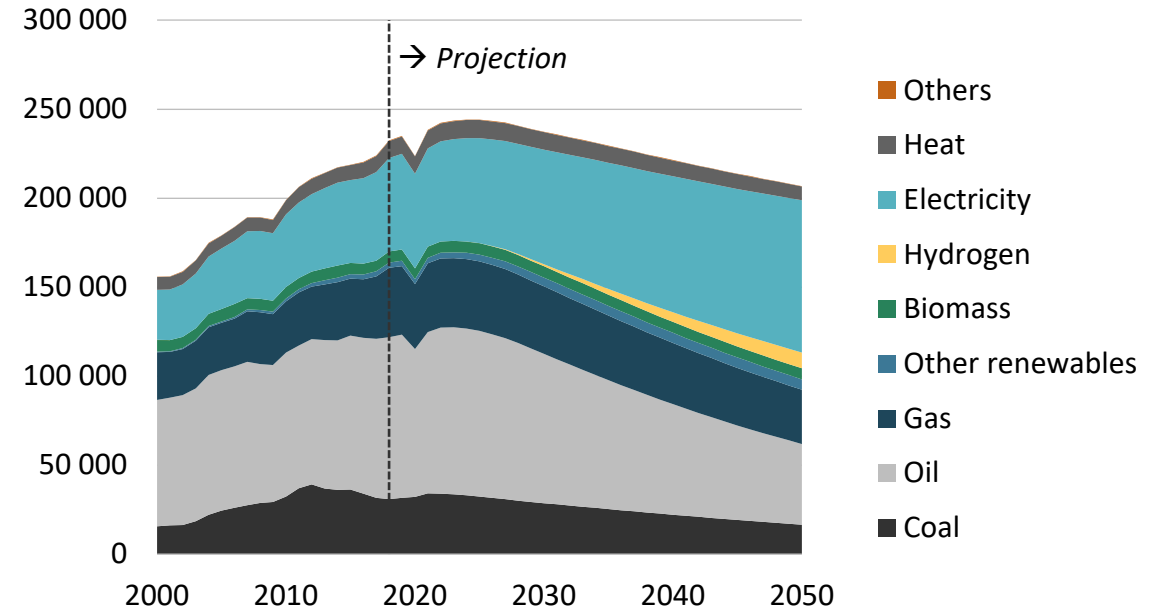
- Macroeconomic trends are expected to drive energy demand through 2050
- Population is expected to peak in the 2030s
- Economic activity (GDP) is expected to continue
- Trends vary by APEC sub-region and economy

# Energy demand decouples significantly from economic activity

Energy demand by fuel in REF (PJ)



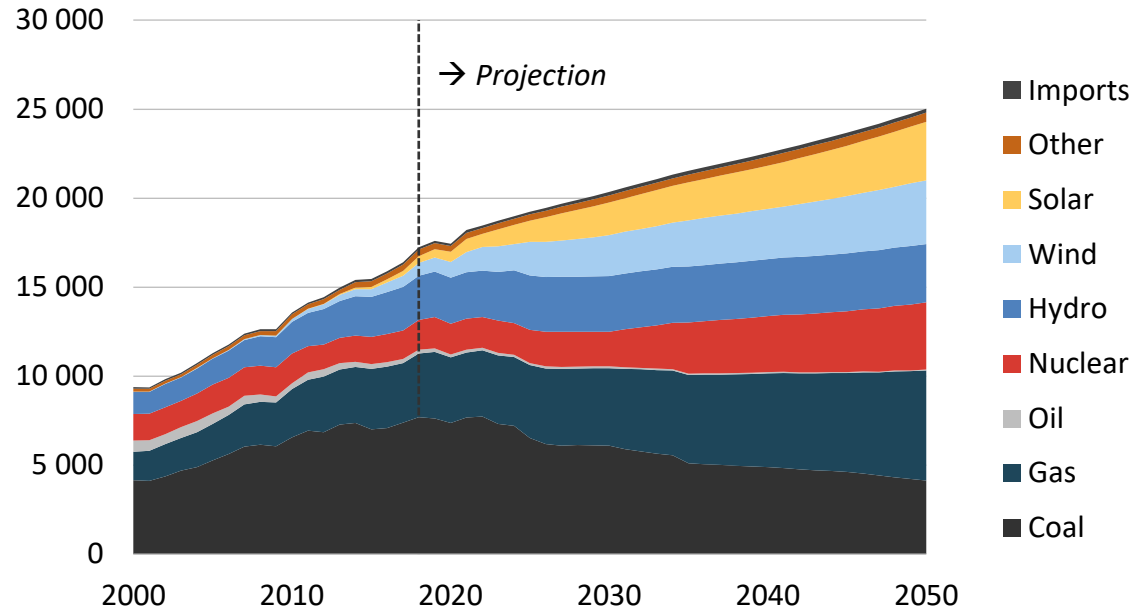
Energy demand by fuel in CN (PJ)



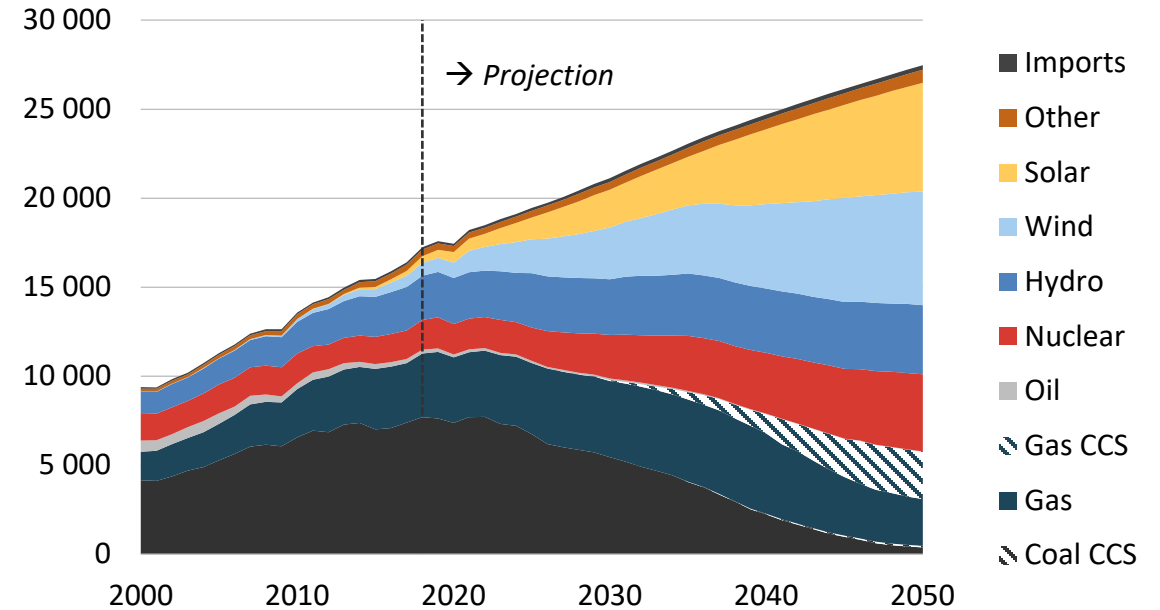
- Energy efficiency gains and electrification lead to energy demand being almost one-quarter lower by 2050 (CN vs REF).
- Substantial fossil fuels demand remains even in CN.

# Electricity demand is increasingly met with generation from wind and solar...

Electricity generation in REF (TWh)



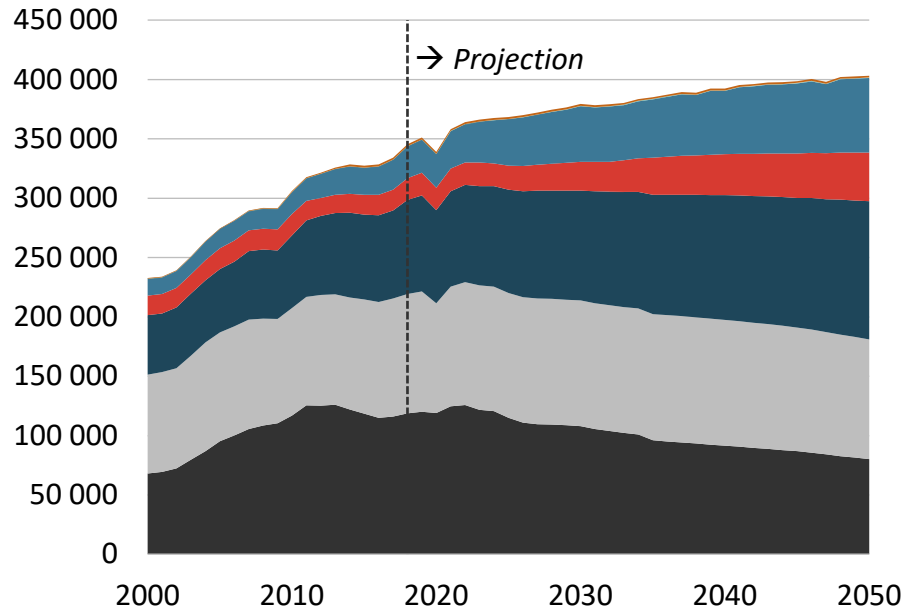
Electricity generation in CN (TWh)



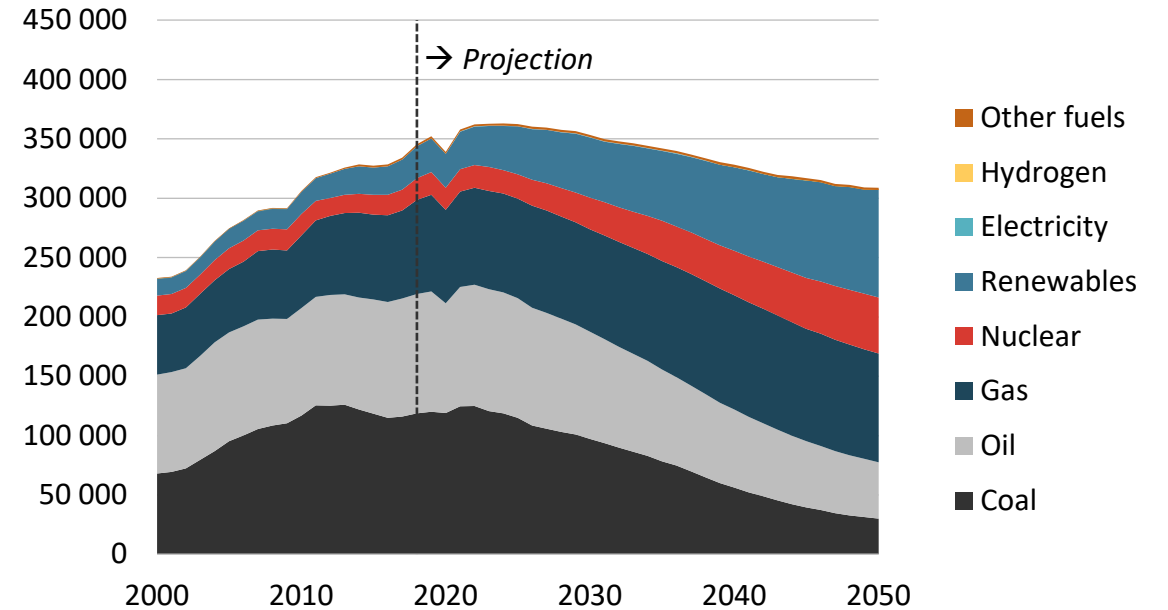
- Growth in electricity generation to meet increased buildings and transport demand.
- Natural gas substitution for coal continues and provides balancing and ancillary services to the electric grid.

# Yet, fossil fuels remain a large share of APEC energy supply

Energy supply in REF (PJ)



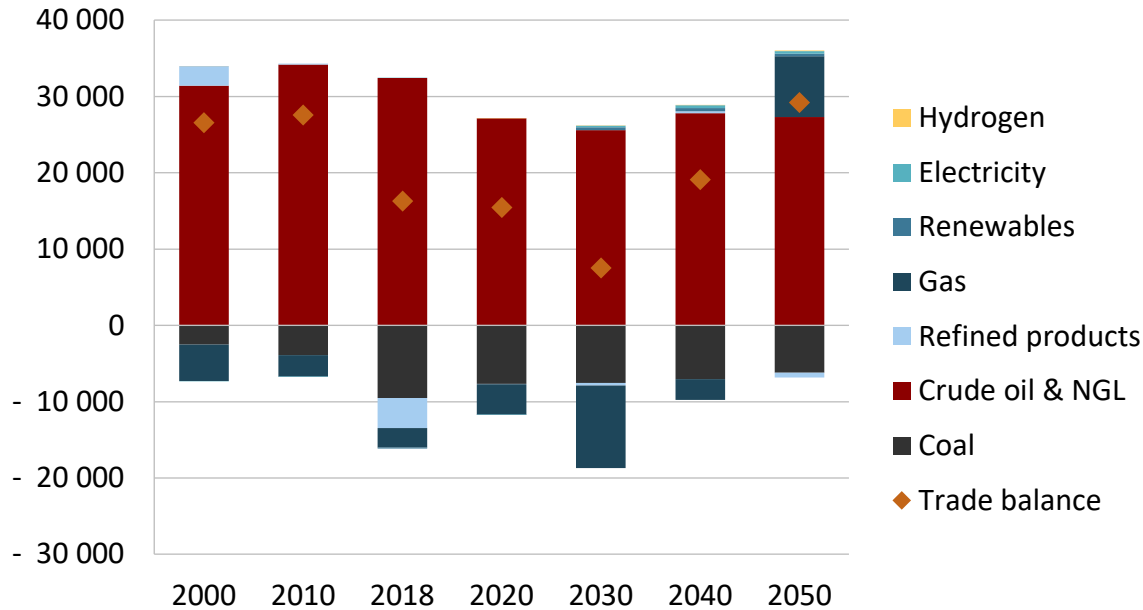
Energy supply in CN (PJ)



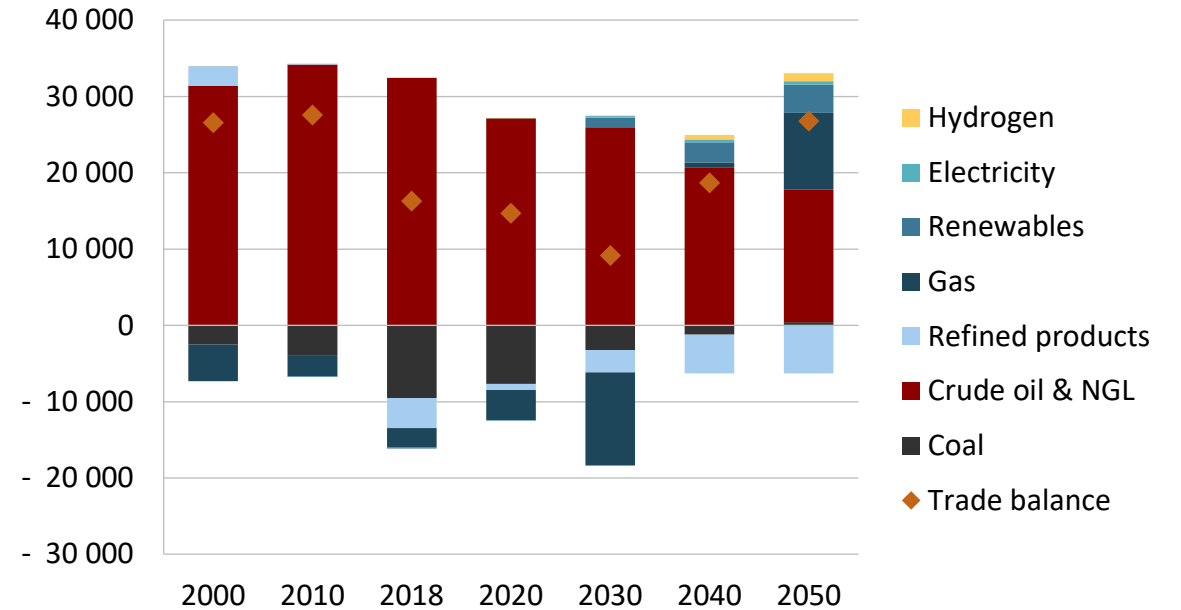
- Natural gas supply increases in both scenarios as coal declines.
- Oil supply is level in REF and declines in CN as APEC and global oil use declines.

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

Net energy trade in REF (PJ)



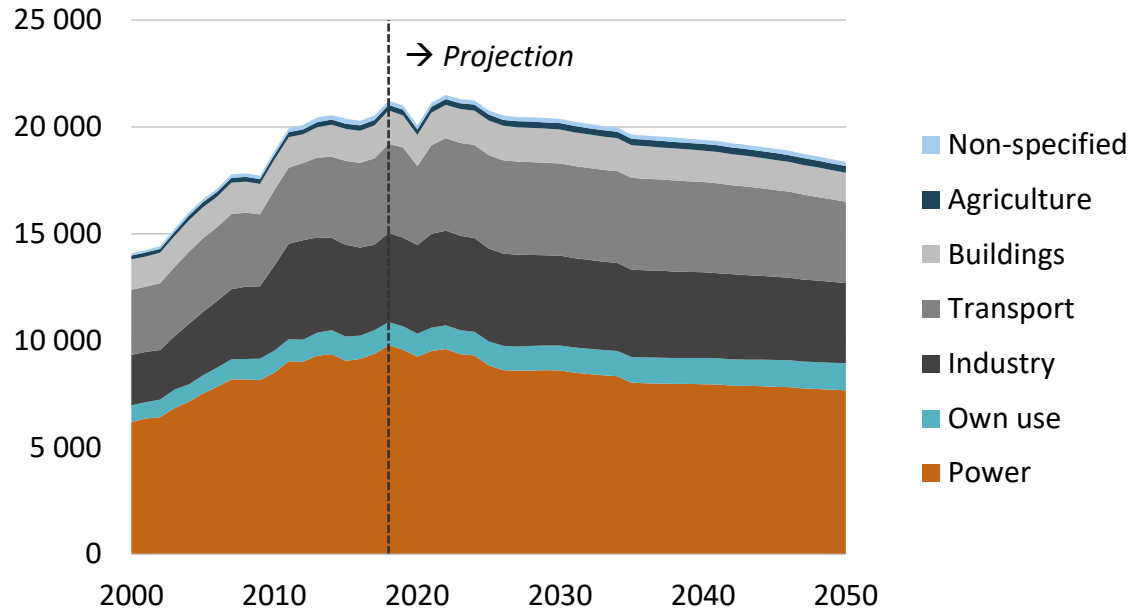
Net energy trade in CN (PJ)



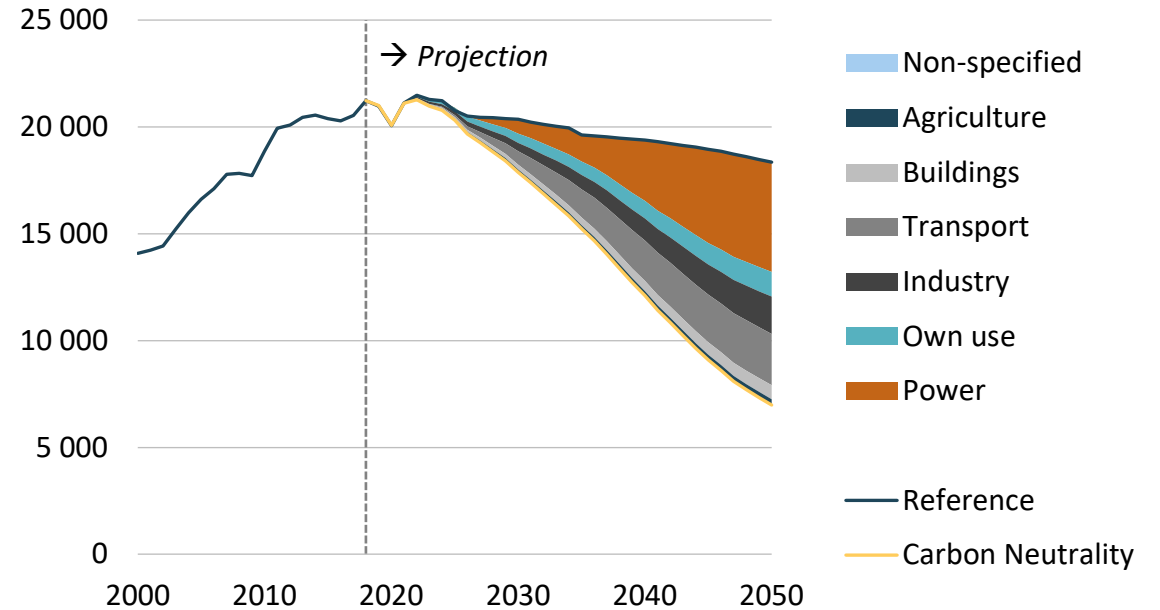
- USA, China, Russia, and Canada account for essentially all the production growth in REF.
- Natural gas production declines at a faster rate than consumption in the 2040s.
- Interfuel and regional competition are key factors.

# CN delivers ambitious CO<sub>2</sub> emissions reductions...

Energy-related CO<sub>2</sub> emissions in REF (million tonnes)



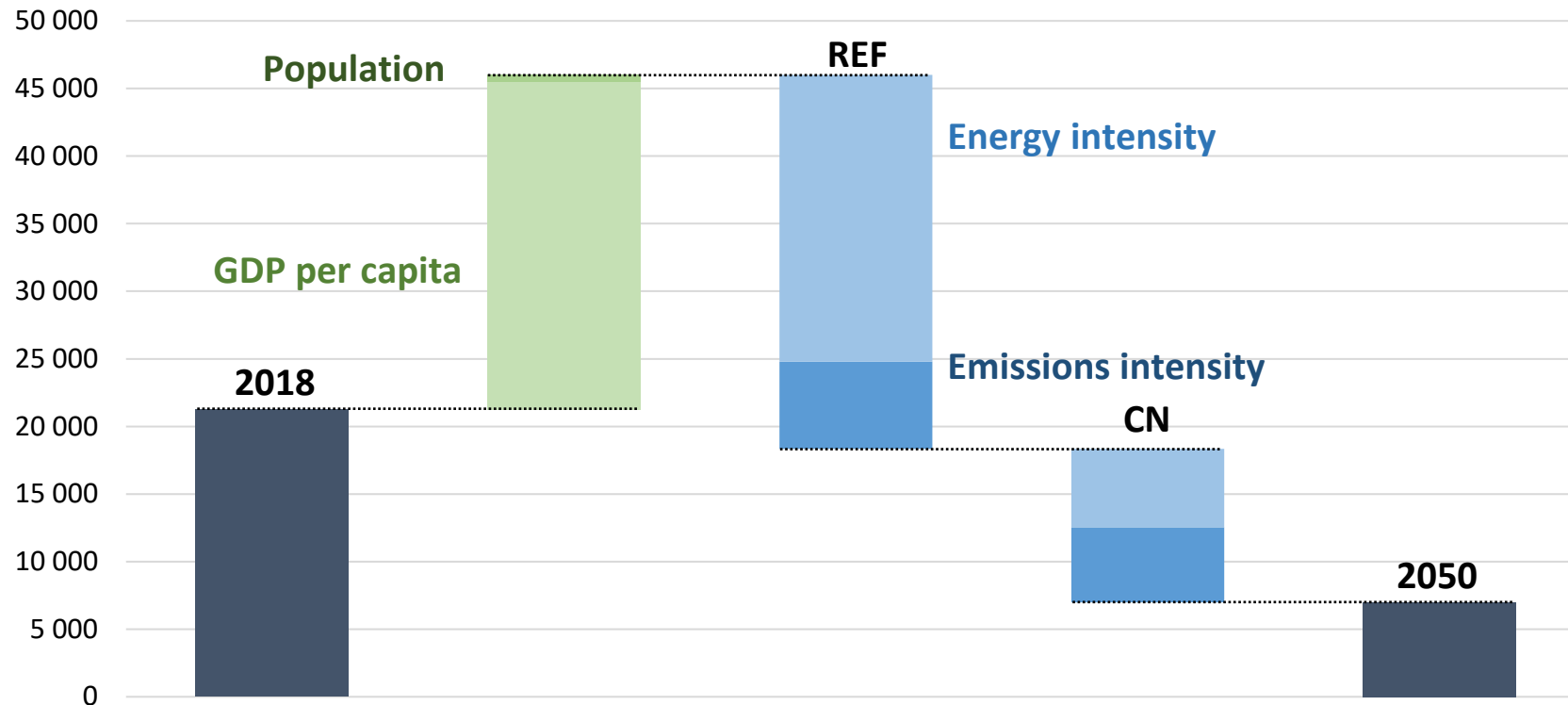
Decrease between REF and CN (million tonnes)



- APEC-wide CO<sub>2</sub> 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.



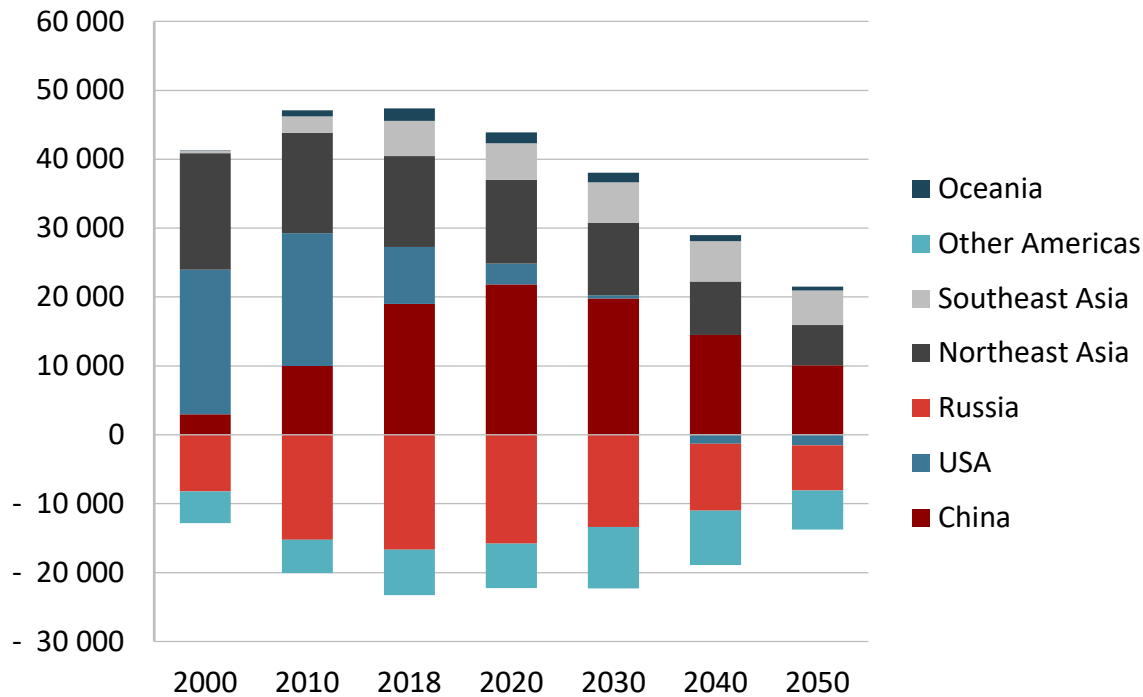
# ...through energy and emissions intensity improvements



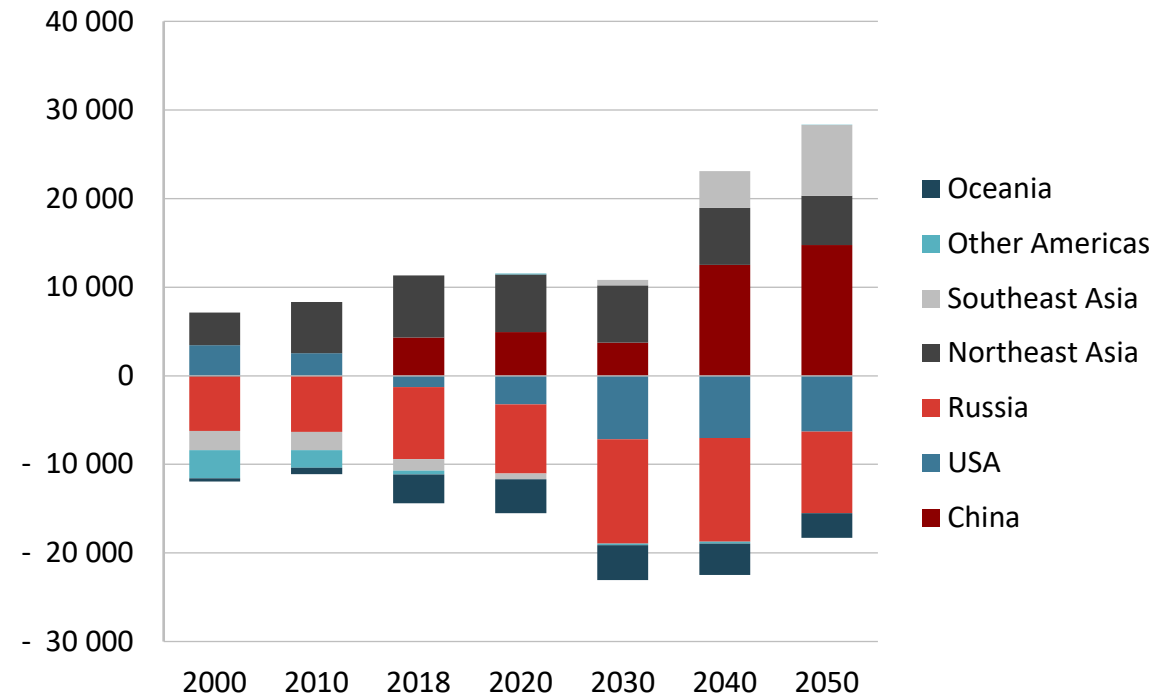
- The Kaya Identity splits CO<sub>2</sub> emissions into macroeconomic and energy components.
- Lower energy intensity delivers approximately three-quarters of the emissions reductions in REF and CN.
- In CN, energy and emissions intensity reductions provide roughly equal incremental benefits.

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

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



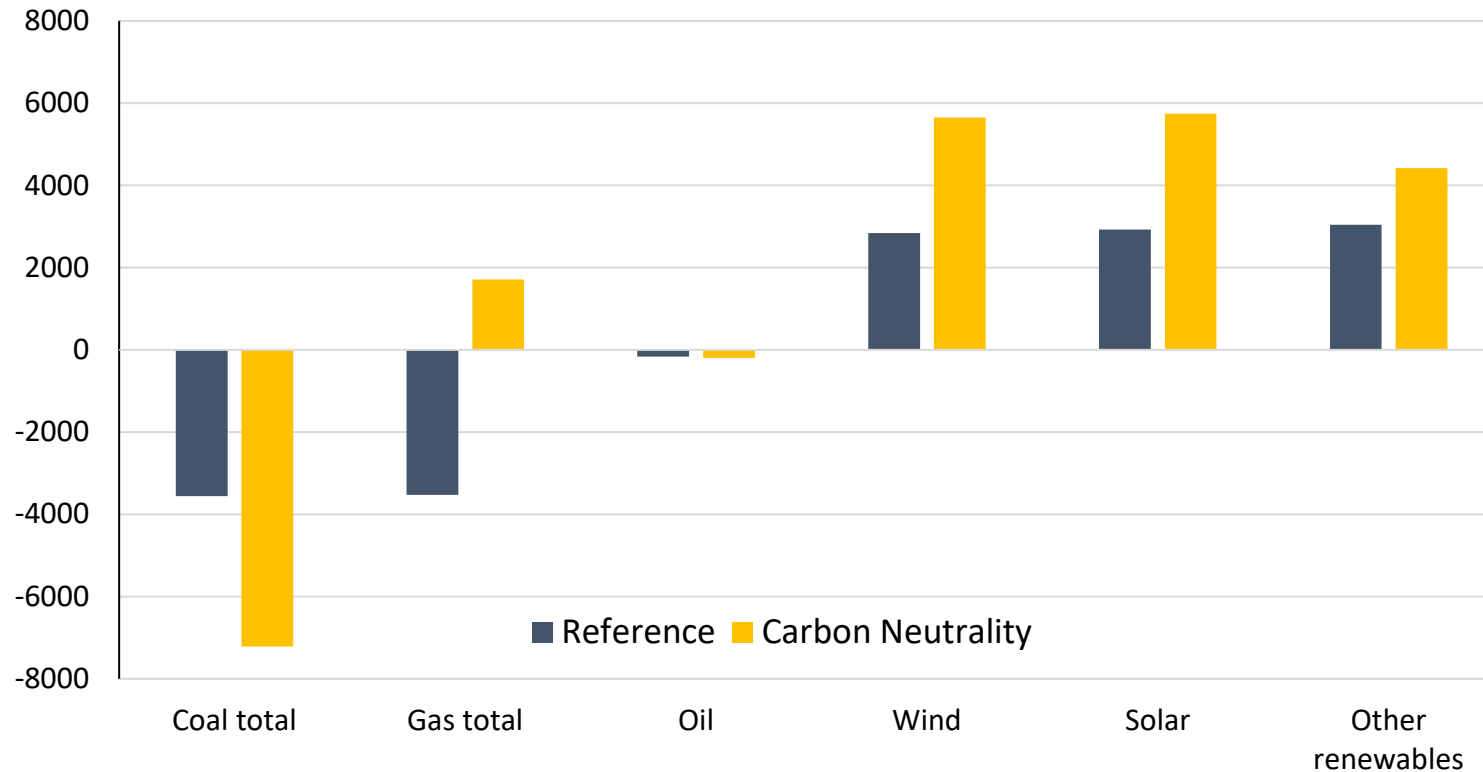
Net natural gas imports in CN, 2000-2050 (PJ).



- Efforts to discourage oil and gas investment reduce supply elasticity and energy security.
- Those efforts can also lead to reduced production by entities with market power.

# Electric grid reliability

Change in electricity generation by fuel and scenario, 2018-2050 (TWh)



- 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
- Fossil fuels remain
- 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

# Thank you.

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