

## 2-4. Power and Heat

### **APERC Workshop**

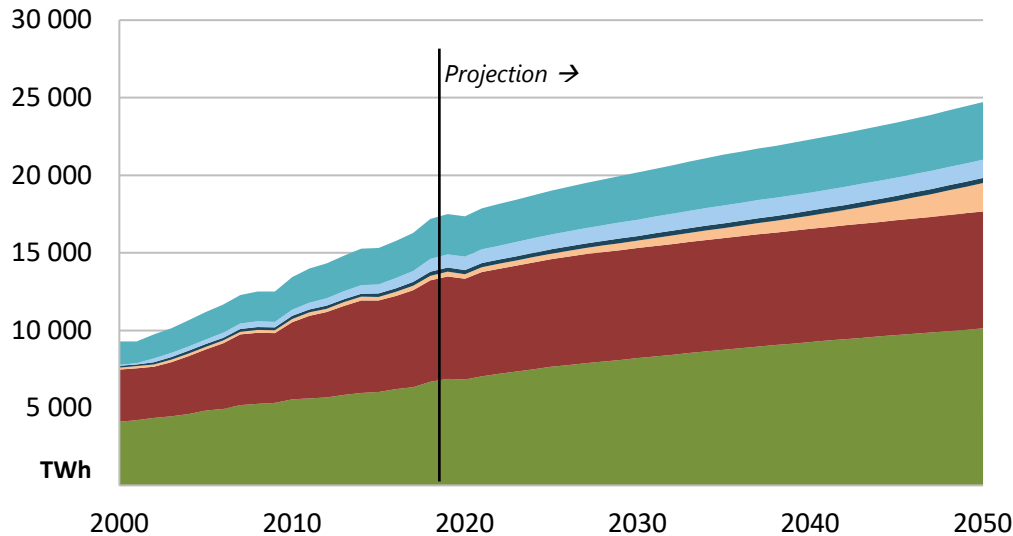
The 62<sup>nd</sup> Meeting of APEC Energy Working Group (EWG)  
17 October 2021

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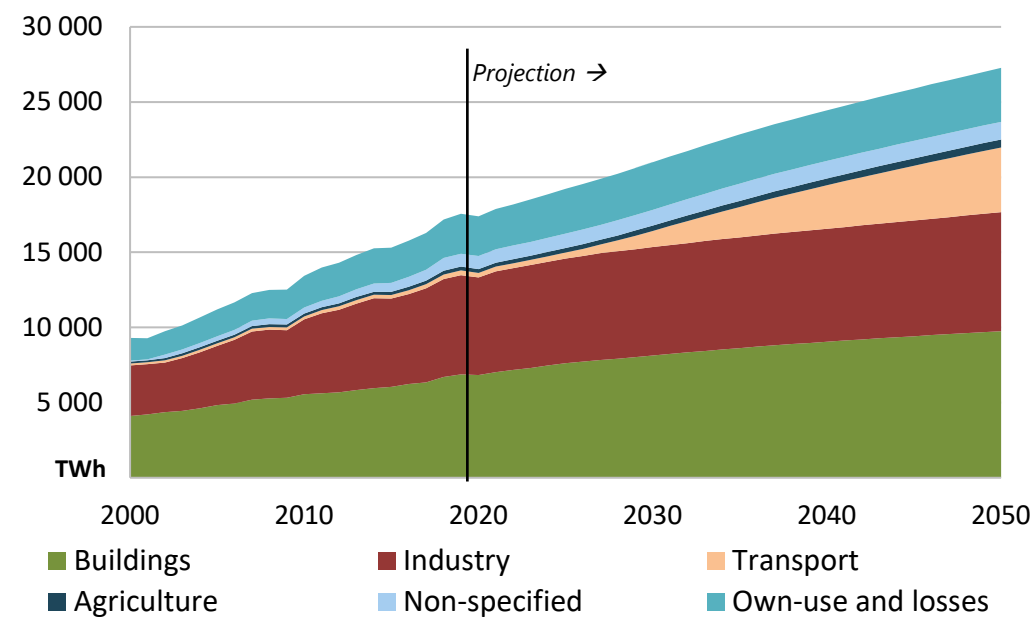
# Electricity Consumption: Transportation grows rapidly but Buildings and Industry remain predominant

## The Reference Scenario (REF)



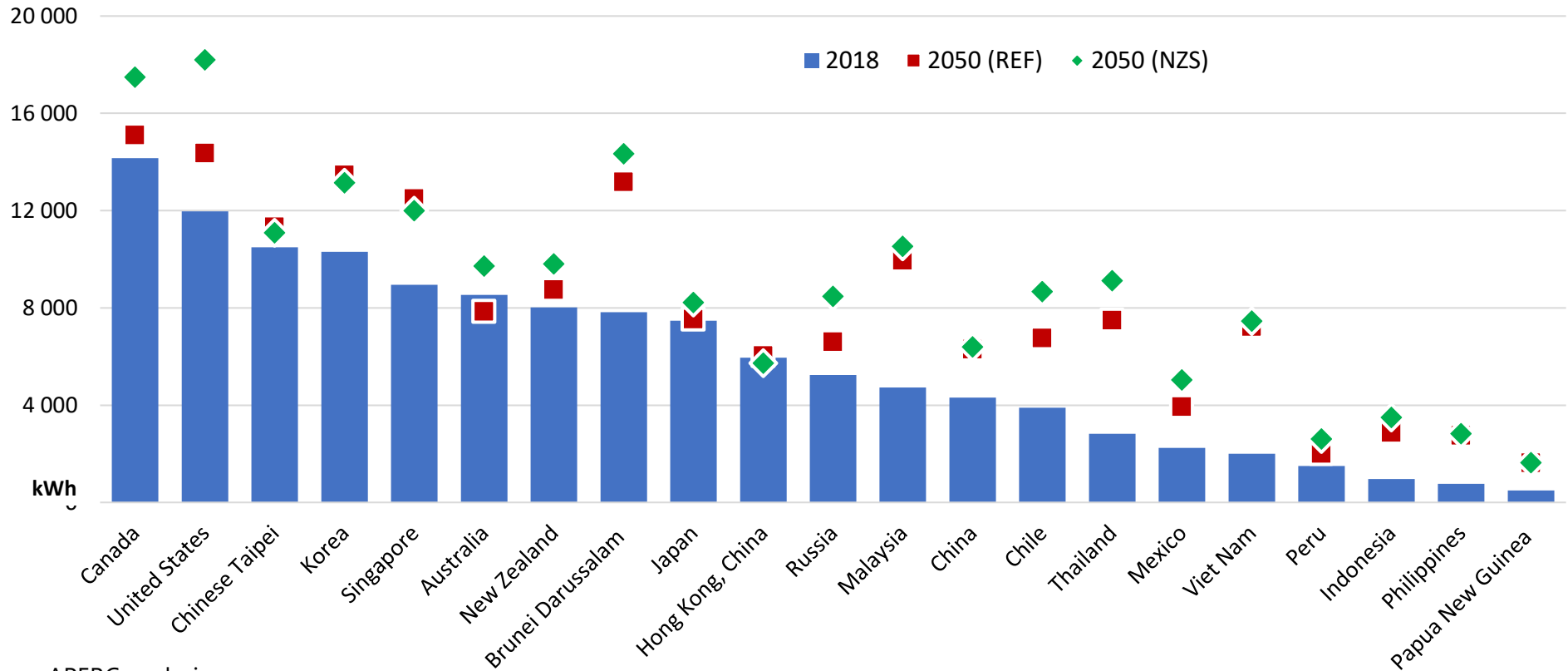
Source: APERC analysis

## The Net Zero Scenario (NZS)



- In REF, electricity consumption rises to around 25 000 TWh in 2050, a more than 40% increase from 2018.
- In NZS, consumption rises to more than 27 000 TWh, 67% higher than 2018.
- Buildings and Industry maintain the predominant share, in total 65-75% by 2050 compared to 77% in 2018, driven by electrification programs in both sectors.
- Transport increases significantly in the NZS (13 times higher in 2050, share increases 8 times) as a result of the rapid growth of electric vehicles (EVs).

# High growth of per-capita electricity demand in emerging economies

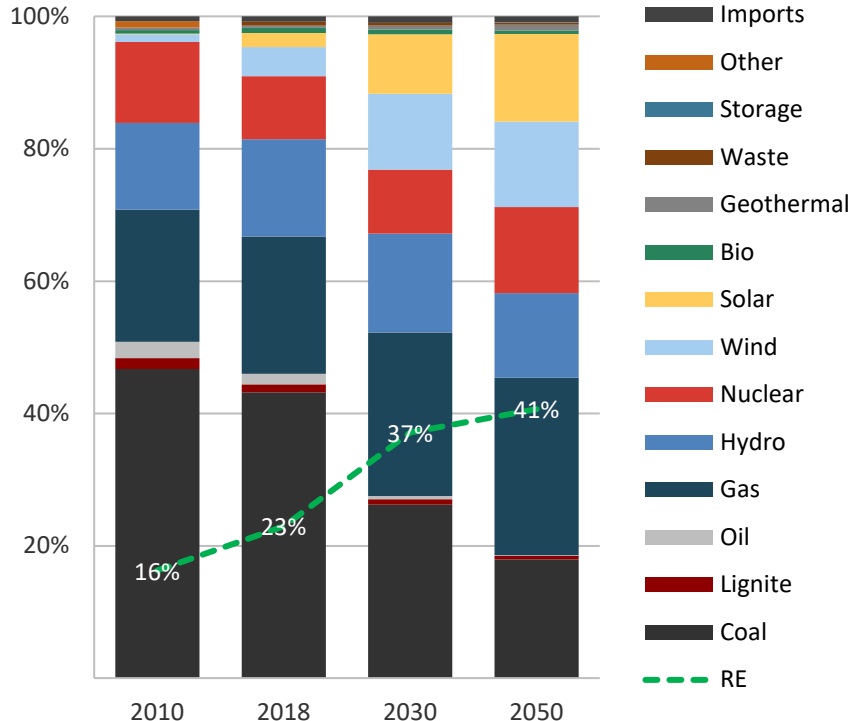
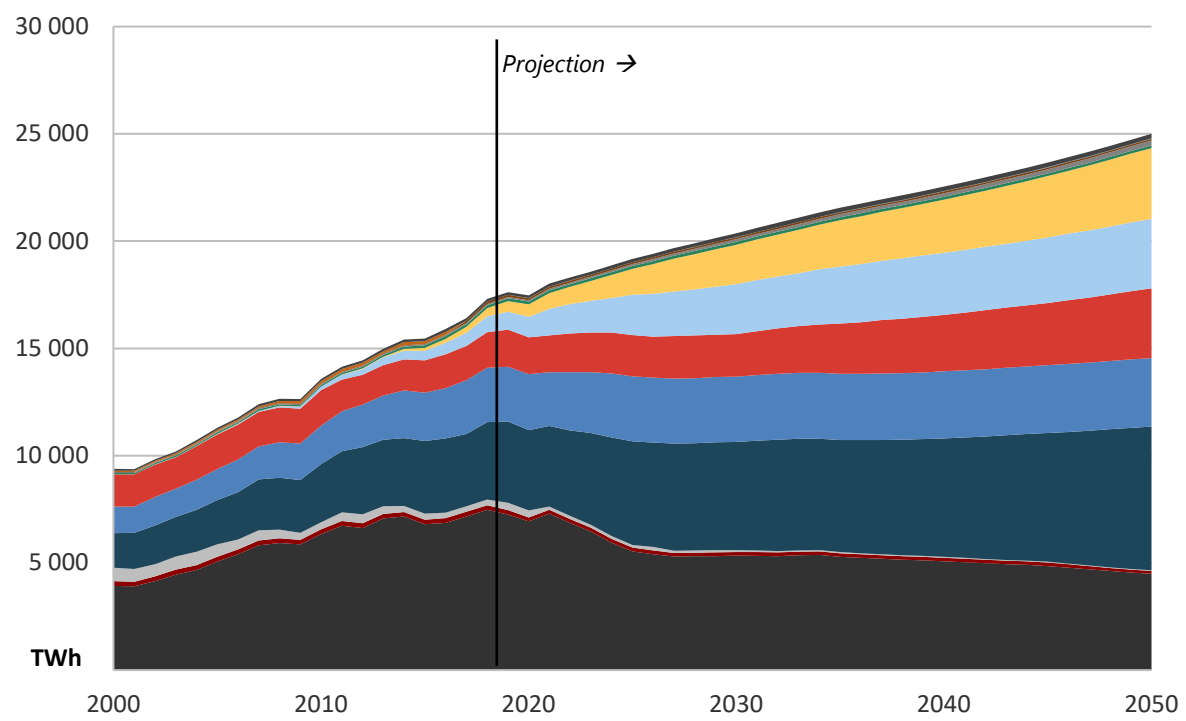


Source: APERC analysis

Note: excluded own use & losses

- Per capita electricity demand is projected to grow in almost all economies.
- Significant increase in emerging economies.
- Net-zero scenario pushes electricity consumption higher in most economies.

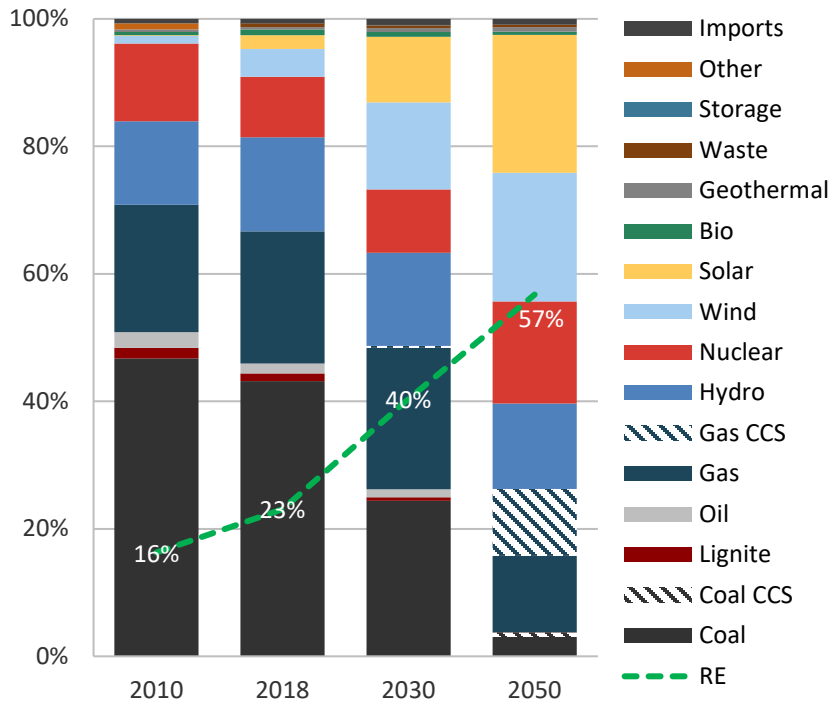
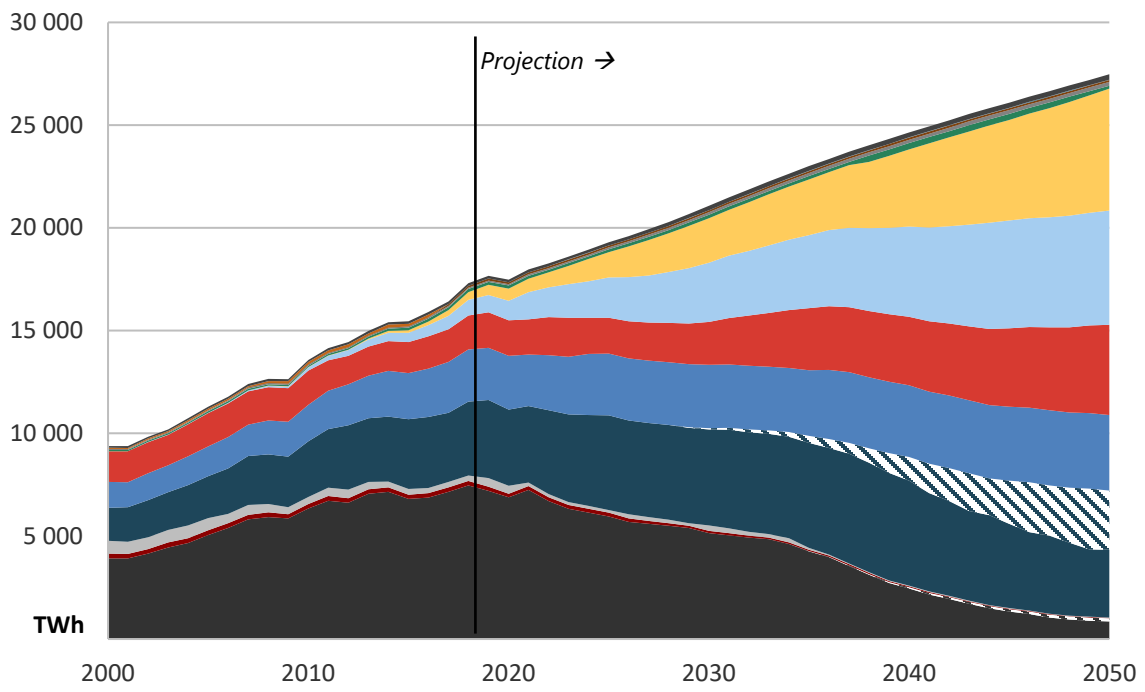
# In REF, fossil fuel-fired electricity generation remains, but renewables grow significantly



Source: APERC analysis

- Electricity generation increases to over 25 000 TWh.
- Coal and gas remain the predominant sources, though the share decreases to 45% compared to 65% in 2018.
- Renewables share almost doubles in 2050 compared to in 2018. Renewables expansion contributes to the RE goal.

# In NZS, coal-fired electricity generation drops and renewables grow

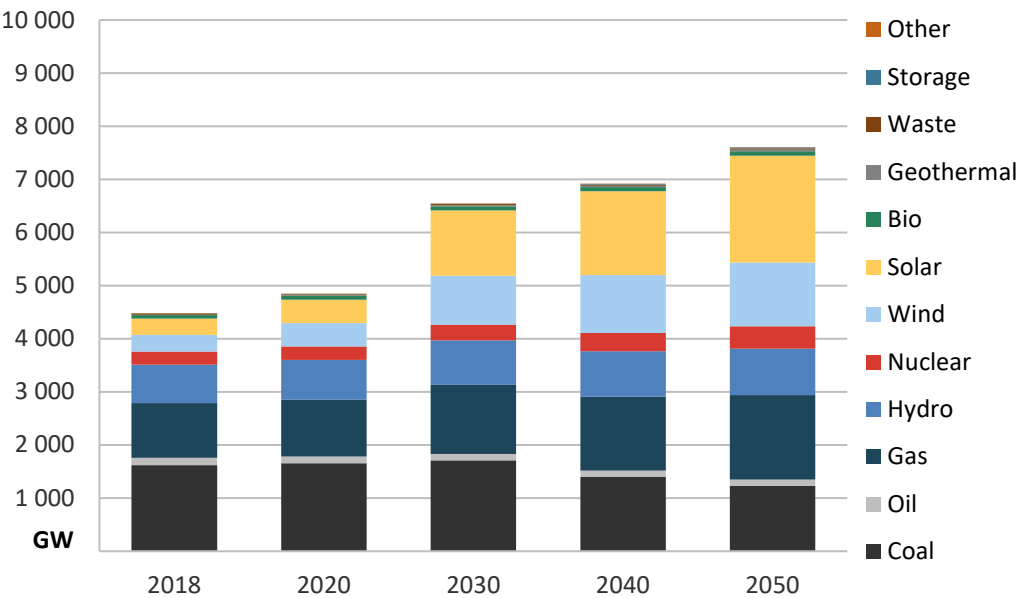


Source: APERC analysis

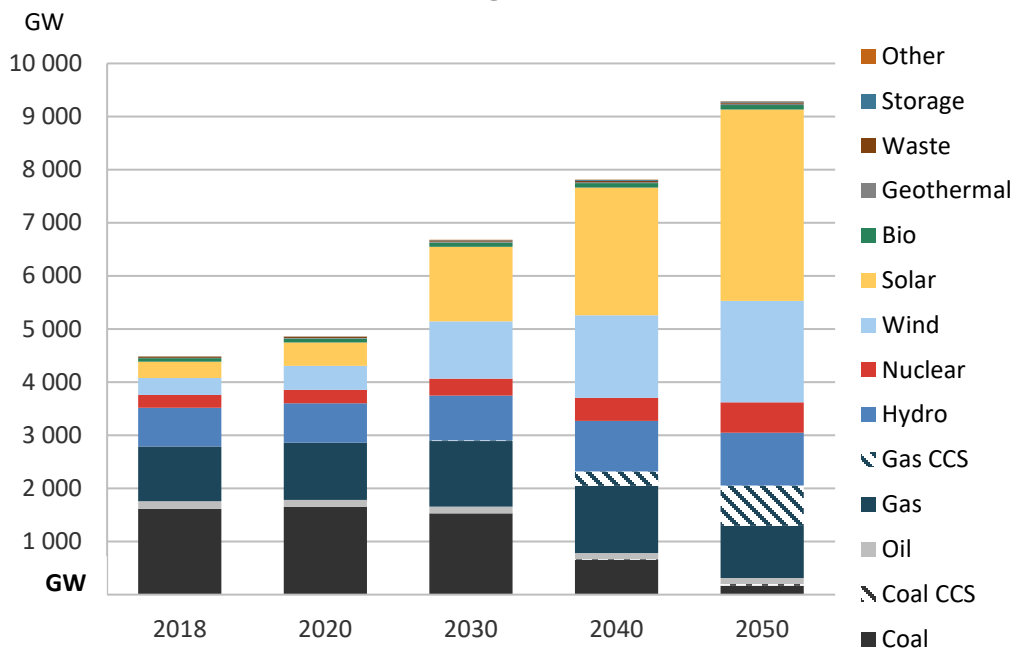
- Electricity generation increases by 59% to more than 27 000 TWh.
- Coal generation drops significantly (by almost 90% compared to 2018).
- Renewable electricity production triples, leading to a share of 57% in 2050.
- Nuclear increases but at a slow pace, with renewables substituting for coal.

# Power Capacity: coal declines, gas grows slightly, renewables grow rapidly

REF



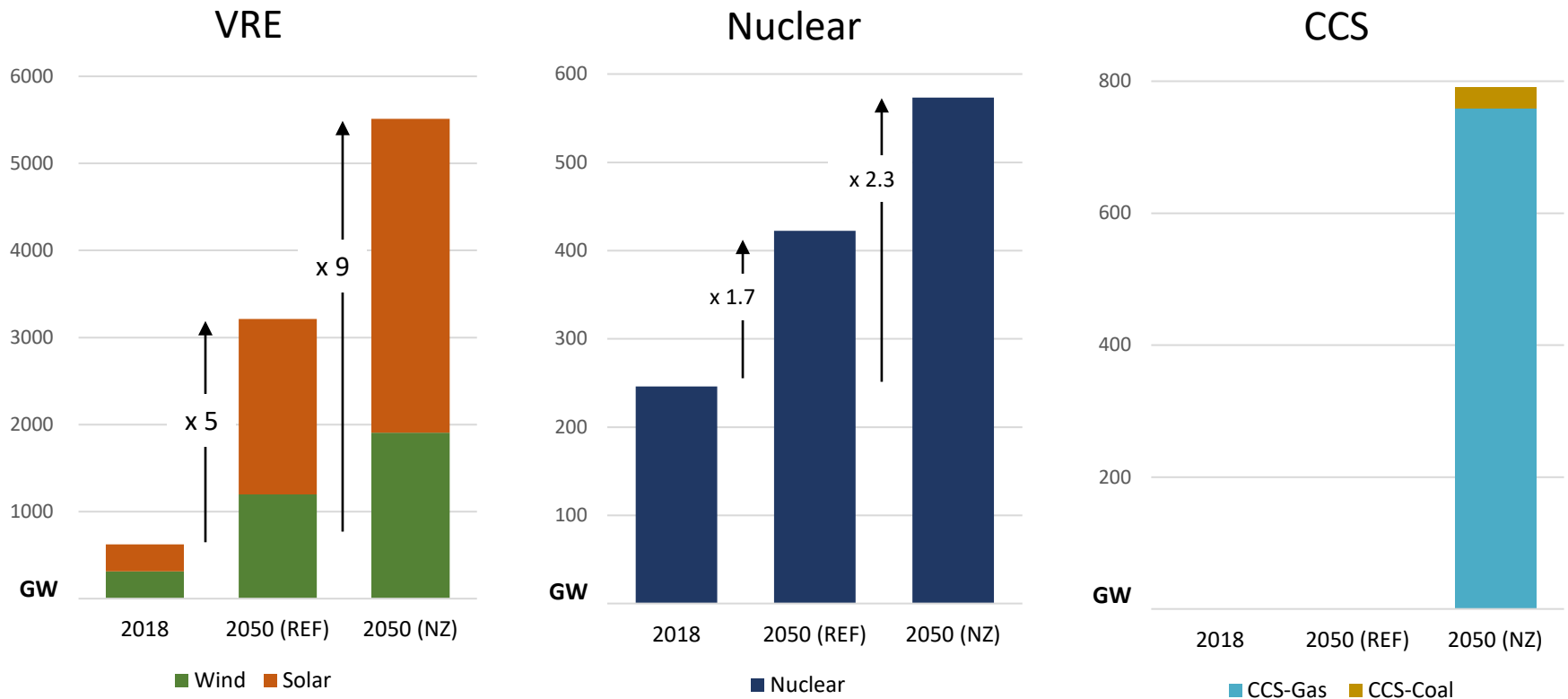
NZS



Source: APERC analysis

- Power capacity increases by 70% ( 7 600 GW) by 2050 in REF and doubles ( 9 300 GW) in NZS.
- Renewables show the most significant growth, threefold in REF and more than six times in NZS.
- Solar shows the highest growth in both scenarios.
- High VRE penetration requires more flexible generation and energy storage technologies to maintain system stability and reliability.
- CCS for both gas and coal contributes to decarbonization.

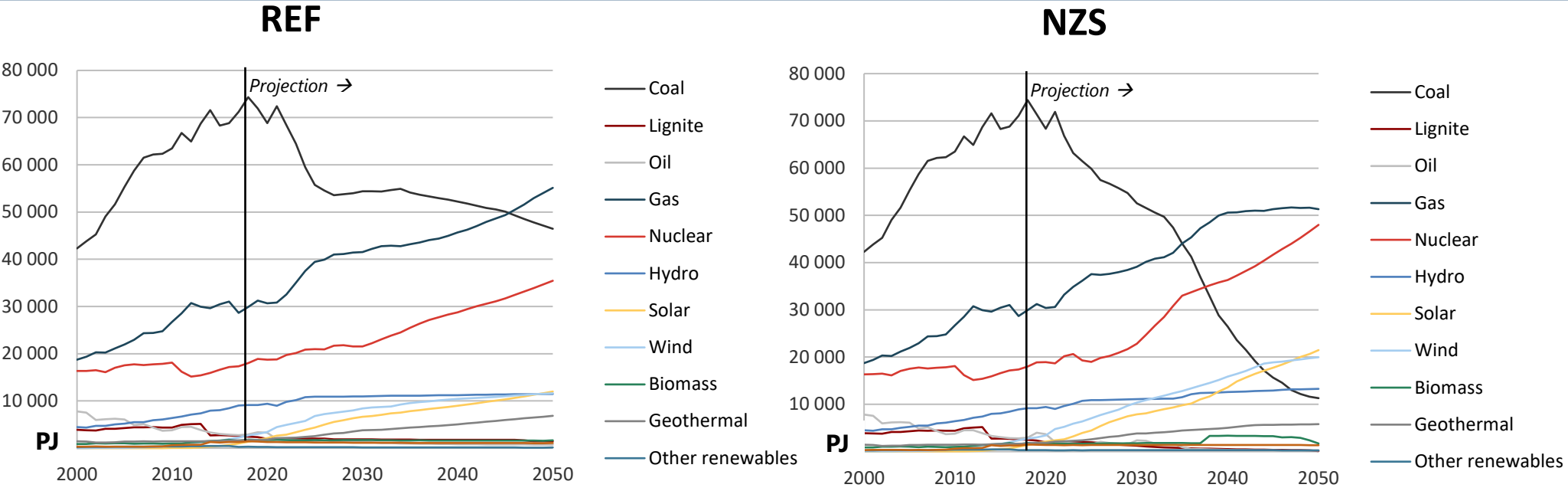
# Additional Capacity: VRE rises rapidly, nuclear grows modestly



Source: APERC analysis

- VREs contribute the most new generation capacity (9 times in NZS).
- Nuclear capacity grows modestly, mainly in south-east Asia economies.
- 41% of coal and gas power plants equipped with CCS by 2050 in NZS.

# Fuel Consumption: coal drops significantly, gas and renewables increase

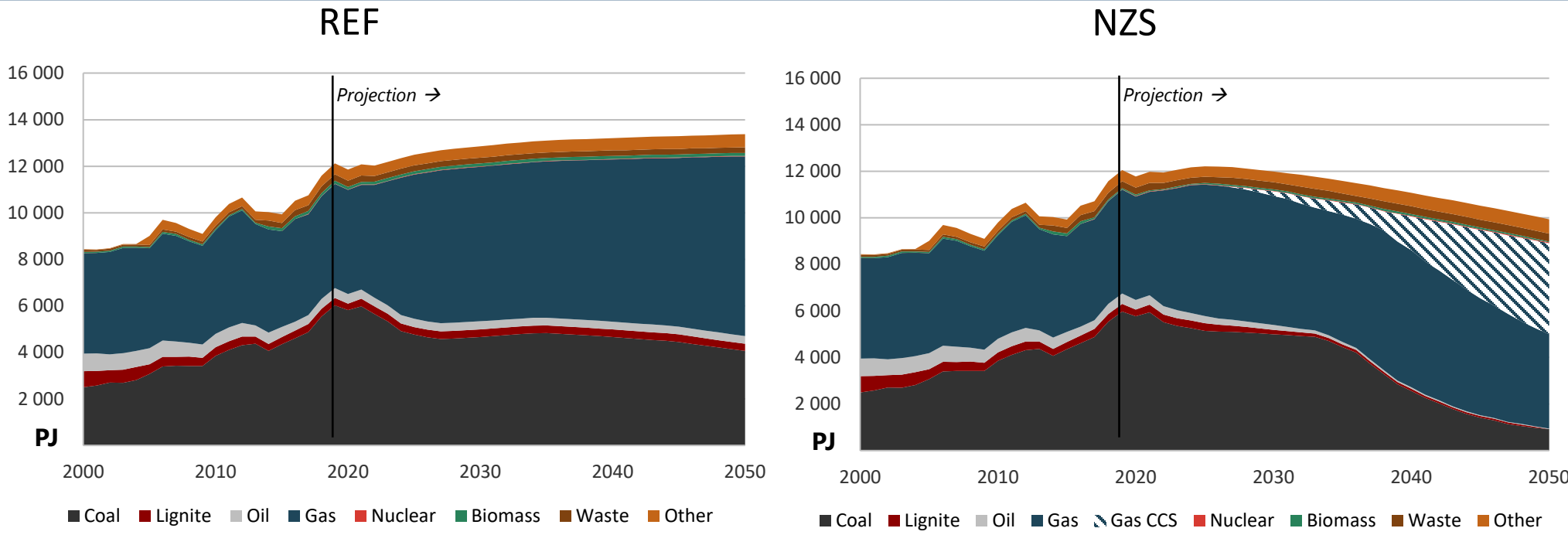


Source: APERC analysis

- Coal decreases in both scenarios, especially in NZS after 2030.
- Oil also drops drastically over the projection period, around by 85% in REF and by 95% in NZS.
- Gas increases by 70%-80% in both scenarios.
- Renewables grow significantly after 2025, including geothermal.



# Heat generation (direct process): Gas replaces coal significantly in NZS



Source: APERC analysis

- APERC explicitly accounts for heat in economies such as Japan, Canada, China, Russia and United States.
- Coal and gas are the predominant fuel for heat generation in both scenarios, however gas grows higher in NZS.
- Gas equipped by CCS starts in 2027 and grows gradually as part of the decarbonization effort.

# Summary: Preliminary power sector results

- Electricity demand in APEC grows by 40% in REF and by 70% in NZS over the projection period.
- Electric vehicle uptake leads to substantial growth in electricity demand.
- Coal and gas remain the two most significant sources of electricity generation, but renewables show robust growth.
- Coal consumption drops significantly as a result of decarbonization efforts.
- Advanced technologies such as CCS and nuclear energy also contribute to decarbonization in some economies.



**Thank you for your kind attention.**

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