

DECARBONIZING CHINA

Implications for Australia

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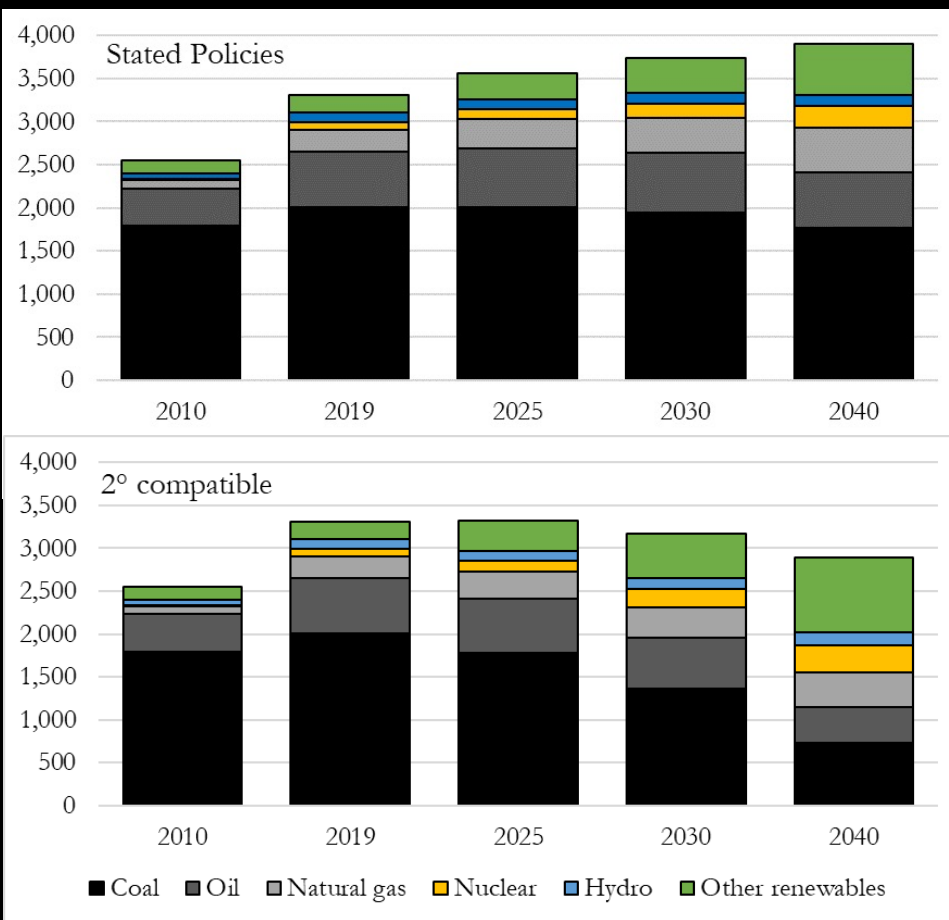


CHINA'S 30-60 TARGET

Key implications for Australia in:

- Coal
- Gas
- Hydrogen
- Steel





IEA World Energy Outlook 2020

Coal: slow phase out

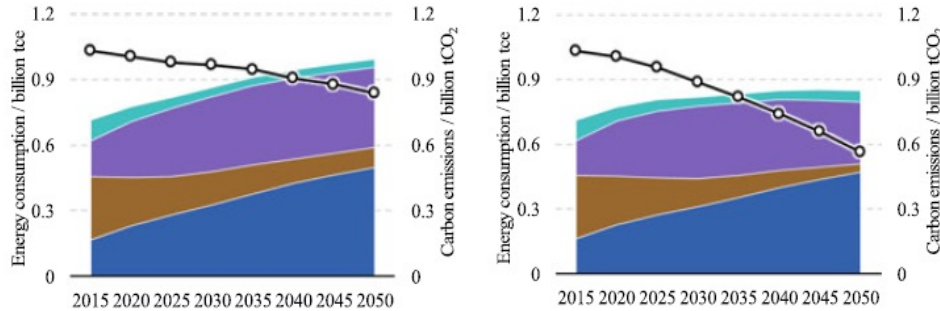
- Increasing capacity but decreasing consumption

BECAUSE

- Energy security-self sufficient
- Safeguard grid system
- No new coal-fired plants purely for power generation (some provinces banned all new)

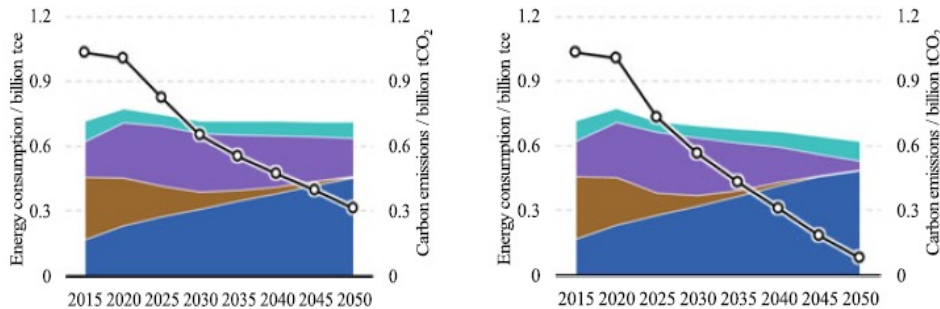


Gas: a transition fuel



a) Policy scenario

b) Reinforced policy scenario



c) 2°C scenario

d) 1.5°C scenario

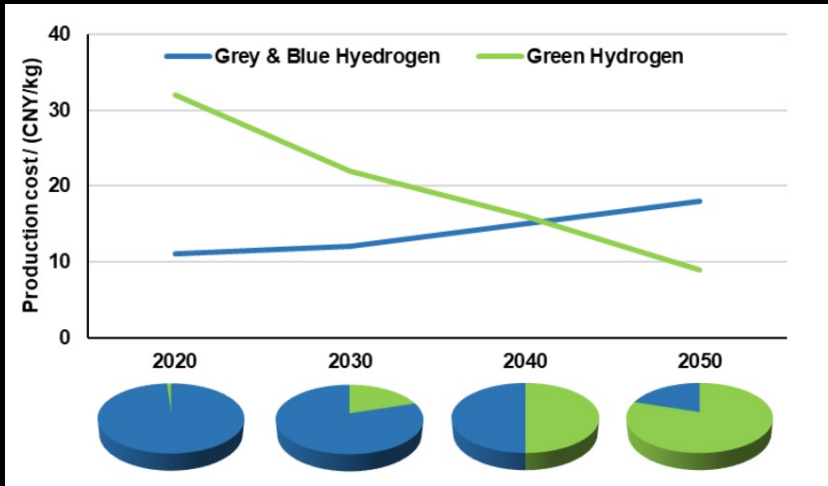
Legend: Electricity (blue), Coal (brown), Oil (orange), Gas (purple), Biomass (teal), Direct and indirect heat emissions (right) (line with markers)

- Coal-to-gas transition reduce 127-200 Mt CO₂ by 2030
- Replacing coal in cities by 2040s
- Chinese demand:
 - 450 billion m³ by 2025
 - 600 billion m³ by 2030
- 220 billion m³ gap filled with imports incl. from Australia



Hydrogen: a hot cake

- Currently mostly as transport fuel
- Almost all provinces(28) have hydrogen development plans
- Refuelling stations:
 - >200 in 2024
 - >1,500 in 2035
 - >10,000 in 2050
- 99% hydrogen is from fossil fuels
- Need technical support for H₂ use in chemical and steel industries



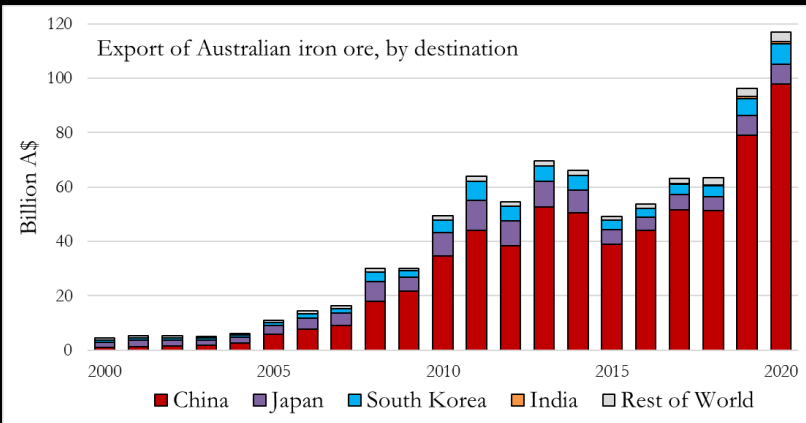
Lin et al 2022. *Sustainability*, <https://doi.org/10.3390/su132212548>

Hydrogen production		Percentage
Methods	Raw materials	
Hydrogen production from fossil energy	Coal-to-hydrogen	62%
	Natural gas reforming to hydrogen	19%
	Hydrogen production from petroleum, coke oven gas, chlor-alkali tail gas, etc.	18%
Hydrogen production by the electrolysis of water	—	1%

X Zhang 2021. *Engineering*, <https://doi.org/10.1016/j.eng.2021.04.012>



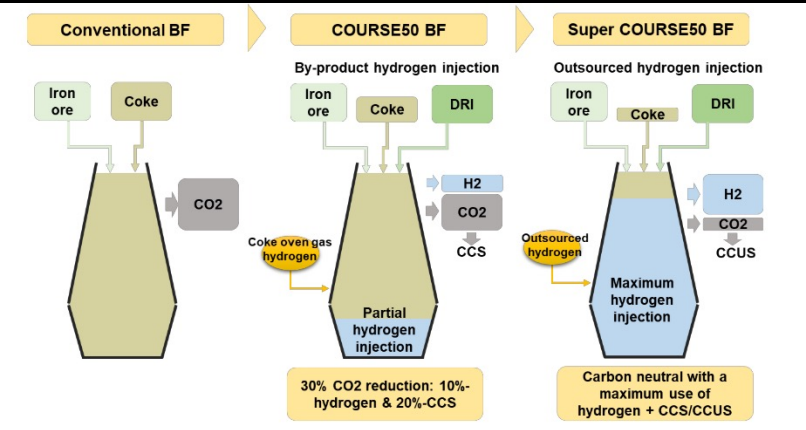
Green steel: in sight



DISER, REQ Dec 2021

- China: 60% of global steel production
- ~17% of Chinese carbon emissions

- 2022 policy: low-carbon and green steel industry by 2025



- Inner Mongolia: 0.5 Mt/y green hydrogen by 2025, for steel and chemicals

- Large technical gaps: electrolysis of water and hydro-based iron-making

Lin et al 2022. Sustainability, <https://doi.org/10.3390/su132212548>



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Recap

Implications

- China will reduce import fossil-fuels? YES and NO
- Coal is phasing out slowly ↓
- Natural gas as a transition fuel ↑
- Hydrogen and relevant industries is becoming a big cake in China. ↑



THANK YOU

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