Institute for Energy Economics and Financial Analysis

Financing green energy solutions

Challenges and opportunities in Australia

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Introduction

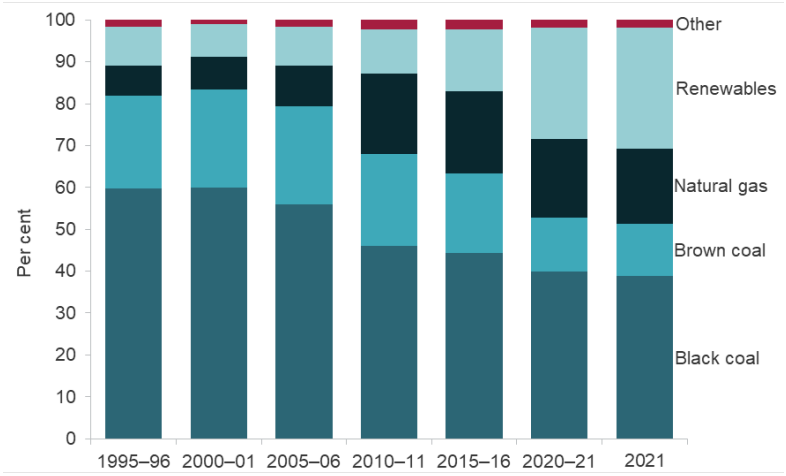
- How to finance higher renewables penetration in Australia and elsewhere?
  - Large investment required to replace fossil fuel power generation and oil and gas use
  - Large investments in new transmission and grid integration assets are required to establish renewable energy zones (REZ)
  - Deep and long-duration storage (pumped hydro) requires large investments and is risky
- Brief review of green energy financing arrangements in Australia – national and New South Wales (NSW)
- Possible implications for other jurisdictions

Wellerawang coal fired power station (credit: Greenspot/Liberty Industrial)

The energy transition is happening in Australia; however substantial energy is still supplied by fossil fuels

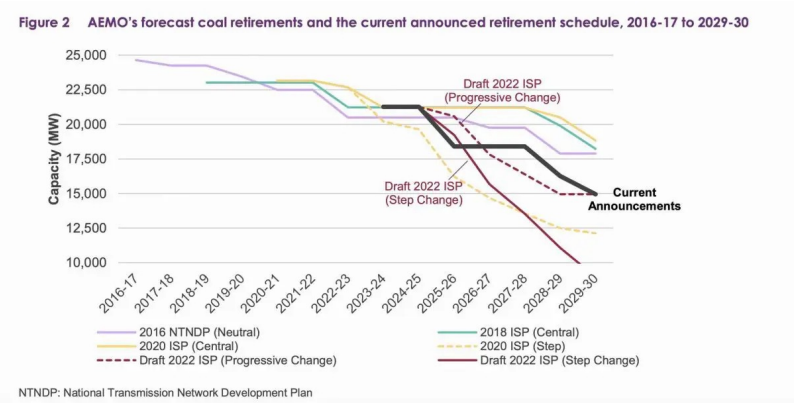
- Renewables lowest new build cost, increasing penetration, and fleet of coal and gas plants are retiring
- Abundant renewable resources and rooftop solar capacity is now over 20GW and 8.4% of generation
- However, 90% of primary energy used for electricity generation is fossil (71% of electricity generation)

Electricity generation fuel type trends



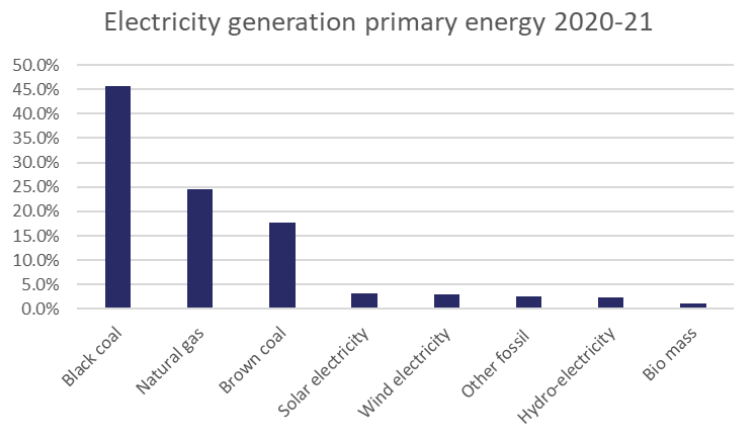
Source: energy.gov.au

Coal-fired power station closures accelerating



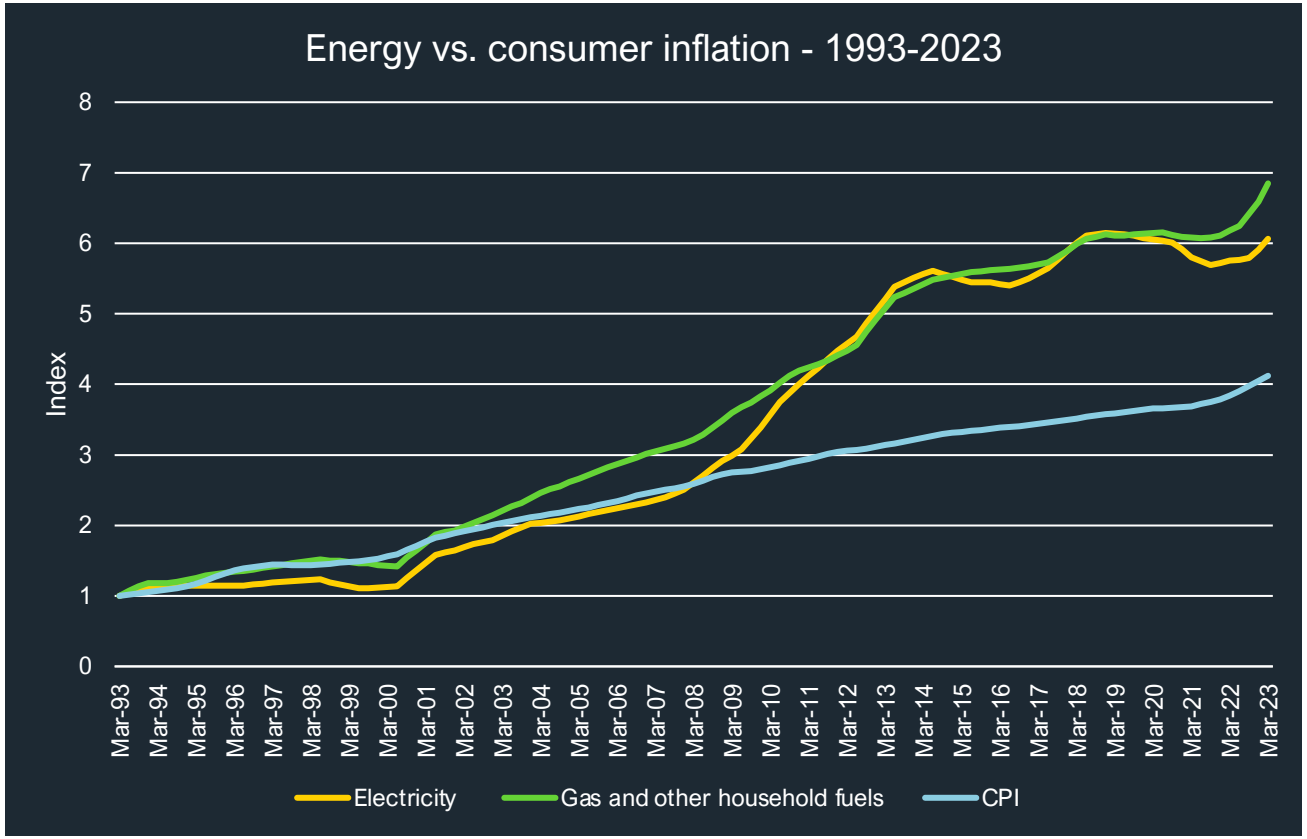
Source: National transmission network development plan

Fossil fuels still predominate primary energy (losses)



Source: Australian Energy Statistics 2022 Table A

Despite abundant energy, prices are rising due mainly to global coal and gas prices



- Energy price rises lifted off in the late 2000s, compared with other sectors, due mainly to distribution network augmentation
- Gas generation is marginal and hence influences wholesale price trends
- Repeal of carbon pricing in 2014 did not result in lower prices (not cause of runup)
- Gas prices rose due to large-scale investment in gas liquefaction for export, from 2015
- Energy prices have risen further since early 2022 due to new sanctions on Russian energy exports
- Protection from forward hedging now falling away and 20-25 percent retail price rises effective from 1 July 2023
- Price rises are driving further rooftop solar uptake leading to lower revenues for fossil generation

Data source: Australian Bureau of Statistics

Significant network build out is required to connect new Renewable Energy Zones

- Planned national transmission investment through to 2040 is approaching $US24billion
- Cost estimates are likely to be conservative – the bill is likely to be higher
- More than $US7 billion of this transmission is theoretically funded from generators (recovered from wholesale markets)
    - However, some of the cost will be funded from other charges added to power bills
- The balance of the total transmission investment is being funded by increases in regulated network charges for consumers.

Planned transmission expenditure to around 2040

Australia wide announced to May 2023 ($USD)	Estimated capital value	Percentage of capital value
Total transmission	$ 24,889.54	100.0%
Consumer funded	$17,513.11	70.4%
Generator funded (in theory)	$7,376.42	29.6%

Source: Australian energy market operator and government announcements

Finance is moving to renewables and storage through the public and private sectors

- Clean energy finance corporation (CEFC) – a government-owned and funded 'green bank' – established in 2012
- Total committed clean energy financing now exceeds $US42billion
- More than $US20 billion private capital via CEFC alone
- Australian governments are establishing a new $US13 billion Rewiring the Nation fund for network upgrades
- In addition, governments are directly investing in large-scale pumped hydro in NSW (Snowy 2.0) and Queensland

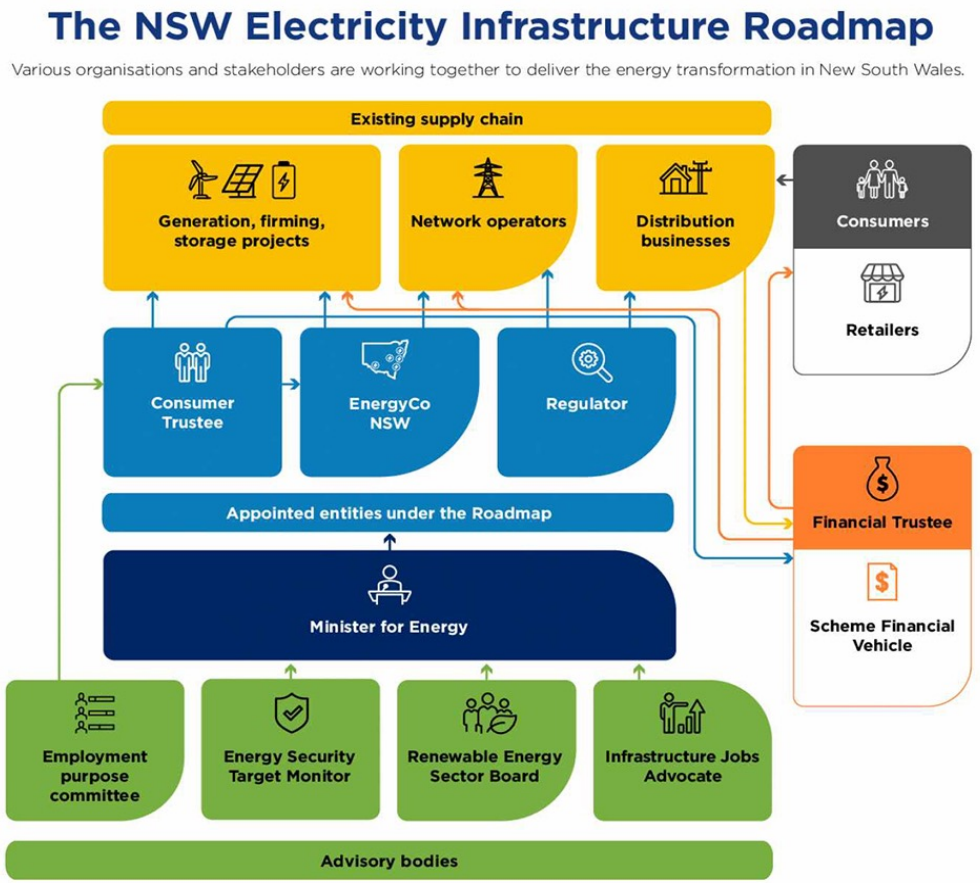
Clean energy finance corporation and rewiring the nation

$billion over ~2023-2040	AUD	USD
Rewiring the nation (network)	$20.00	$13.47
CEFC catalysed	$42.80	$28.82
CEFC commitments	$11.70	$7.88
CEFC Capital deployed	$9.70	$6.53
Private capital	$31.10	$20.94
Total committed capital	$62.80	$42.29

Source: Australian government and CEFC announcements

Innovative financing structures are being implemented enabling public/private sector collaboration

- The largest State by population, NSW, legislated a set of new renewable energy financing arrangements, covering generation, firming and renewable energy zone REZ transmission
- It established new institutions including a Consumer Trustee, Financial Trustee and Scheme Financial Vehicle
- The arrangements support auctions for long-term energy supply agreements and new REZ transmission investments
- Costs incurred under these arrangements are reviewed by both the Australian Energy Regulator and NSW regulator
- The new financing arrangements are funded by NSW customers, including via regulated and non-regulated charges



Source: NSW government

Benefits outweigh the cost of the transition

- Substantial transition costs will be more than offset by long-term benefits
- Renewable asset investments displace high-cost, high emissions, coal, gas and liquid fuels
  - Carbon emissions reduction progress in line with Australian international treaty commitments
  - Energy system productivity will improve substantially, as conversion losses reduce
  - Wholesale energy prices will be decoupled from global coal, oil and gas price volatility
  - Reduce reliance on imported energy for transport enhances resilience
- Consumer investments in rooftop solar and other consumer resources are expected to continue – reducing overall consumer power bills
- Energy transition investment stimulates the wider economy
  - It supports skilled employment, including in regional areas
  - Australia now has one of the most efficient rooftop solar sectors and this is evolving toward virtual power plants and private power plants
- The transition is driving innovation and creating new export opportunities for Australian businesses
- The transformation is drawing global capital and skills to Australia

Risks to the transition abound, but can be minimized and managed

Risks

- Reliability and price spike threats due to delay in replacement of legacy generation by new capacity and transmission
- Winter 2022 saw low reserves, extreme prices and resort to administered prices for extended periods, driven by high coal and gas prices due to high demand post 2022 Ukraine invasion
- Cost of gaining social license for Renewable Energy Zones (REZ) and regulated transmission
- Resource constraints substantially lifting procurement and construction and asset costs for transmission, generation and storage

Risk minimization

- Supporting consumer-oriented solutions
  - Demand response, rooftop solar, energy efficient houses & appliances, batteries, electric vehicles, frictionless electricity trading
- Protecting consumers from excessive price spikes and maintaining reliability
- Sharing benefits with local communities, including jobs, environmental protection, payments to landowners and more
- Ensuring adequate capacity to maintain social license for transition
  - Greater government management of fossil power station closures until replaced
  - Development of a new Reliability and Supply Adequacy Framework for the east coast gas market

Lessons for other jurisdictions

- High global energy prices are increasing the benefits from, and speed of, the transition in Australia and elsewhere
- Distribute decision-making – some Australian jurisdictions and companies further into the energy transition avoided the impact of high global energy prices
- Governments can play a central role in mobilizing financing of renewables investments
  - Access to low-cost finance – high credit ratings
  - Legislative powers including spatial planning and cost recovery
  - Creation or use of government-owned entities to undertake key financing arrangements
- Private sector finances lower risk assets, operating under competitive arrangements
  - Retirement funds and global finance are being mobilized
- Consumer investment in small-scale resources should be encouraged & supported via feed in tariffs and other measures
- Encourage energy efficiency and demand response, including via appliance and building standards, better infrastructure pricing and consumer energy data access
- *Accept the transition will be imperfect and messy. Mistakes may be made but mistakes cost less than delay and inaction.*

Contact

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