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
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)

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

<table>
<thead>
<tr>
<th></th>
<th>Estimated capital value</th>
<th>Percentage of capital value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total transmission</td>
<td>$24,889.54</td>
<td>100.0%</td>
</tr>
<tr>
<td>Consumer funded</td>
<td>$17,513.11</td>
<td>70.4%</td>
</tr>
<tr>
<td>Generator funded (in theory)</td>
<td>$7,376.42</td>
<td>29.6%</td>
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</tbody>
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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 $US42 billion
- 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

<table>
<thead>
<tr>
<th></th>
<th>AUD</th>
<th>USD</th>
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<tbody>
<tr>
<td>Rewiring the nation (network)</td>
<td>$20.00</td>
<td>$13.47</td>
</tr>
<tr>
<td>CEFC catalysed</td>
<td>$42.80</td>
<td>$28.82</td>
</tr>
<tr>
<td>CEFC commitments</td>
<td>$11.70</td>
<td>$7.88</td>
</tr>
<tr>
<td>CEFC Capital deployed</td>
<td>$9.70</td>
<td>$6.53</td>
</tr>
<tr>
<td>Private capital</td>
<td>$31.10</td>
<td>$20.94</td>
</tr>
<tr>
<td>Total committed capital</td>
<td>$62.80</td>
<td>$42.29</td>
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</tbody>
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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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