

# The challenge of decarbonising the national electricity market



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## Electricity system non-negotiables

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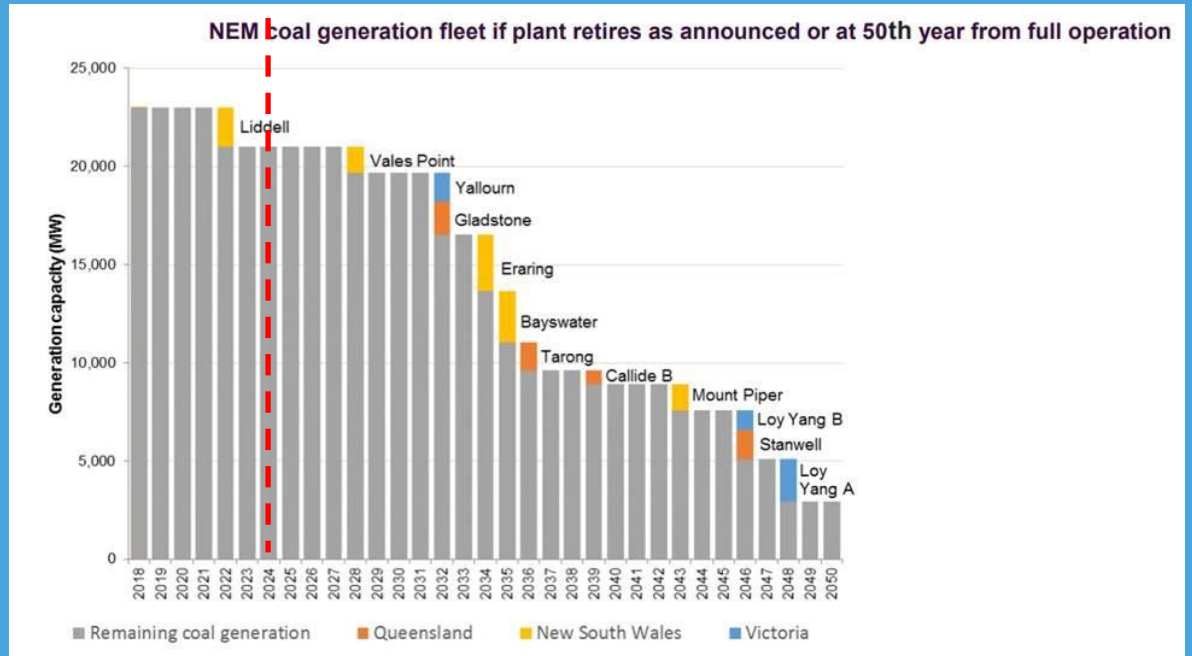
**Reliability:** supply meets demand

**Power Quality\*:** frequency, voltage, system strength, inertia

**Energy Security\*:** enough energy/diversity to manage future scarcity events, diversity, isolation

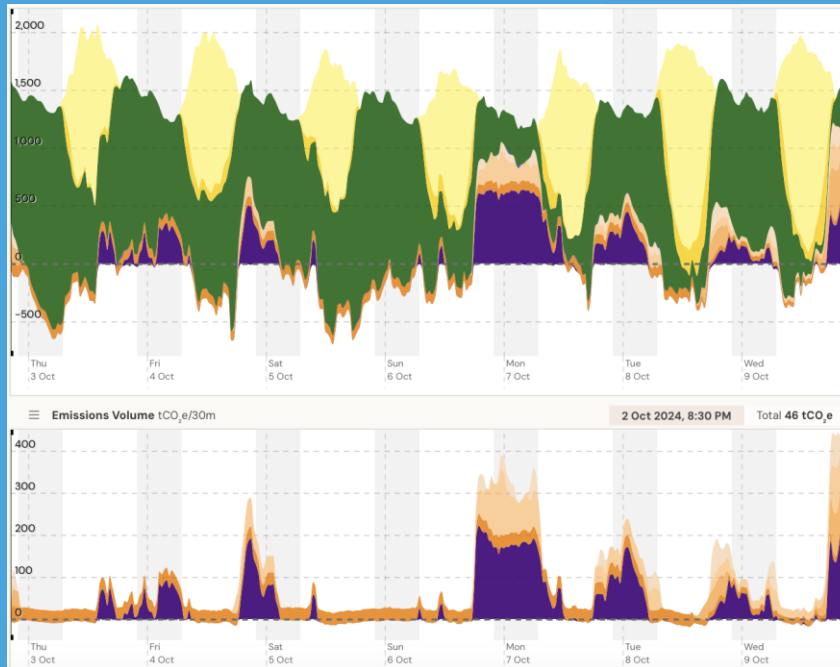
# New replacement capacity is needed **now**

Too many coal generators at or near end of life



# South Australia is a glimpse of the future...

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**...and the  
future is a  
roller coaster**

The rest of the NEM shifts energy to support SA. Not scalable without significant investment.



## What we will build

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1. Wind and solar
2. Rooftop solar PV
3. Gas peakers and storage
4. Pumped hydro (deep storage)
5. Grid batteries (short storage)
6. Synchronous condensers, grid forming inverters and other exotics to try and manage power quality

# A synchronous condenser

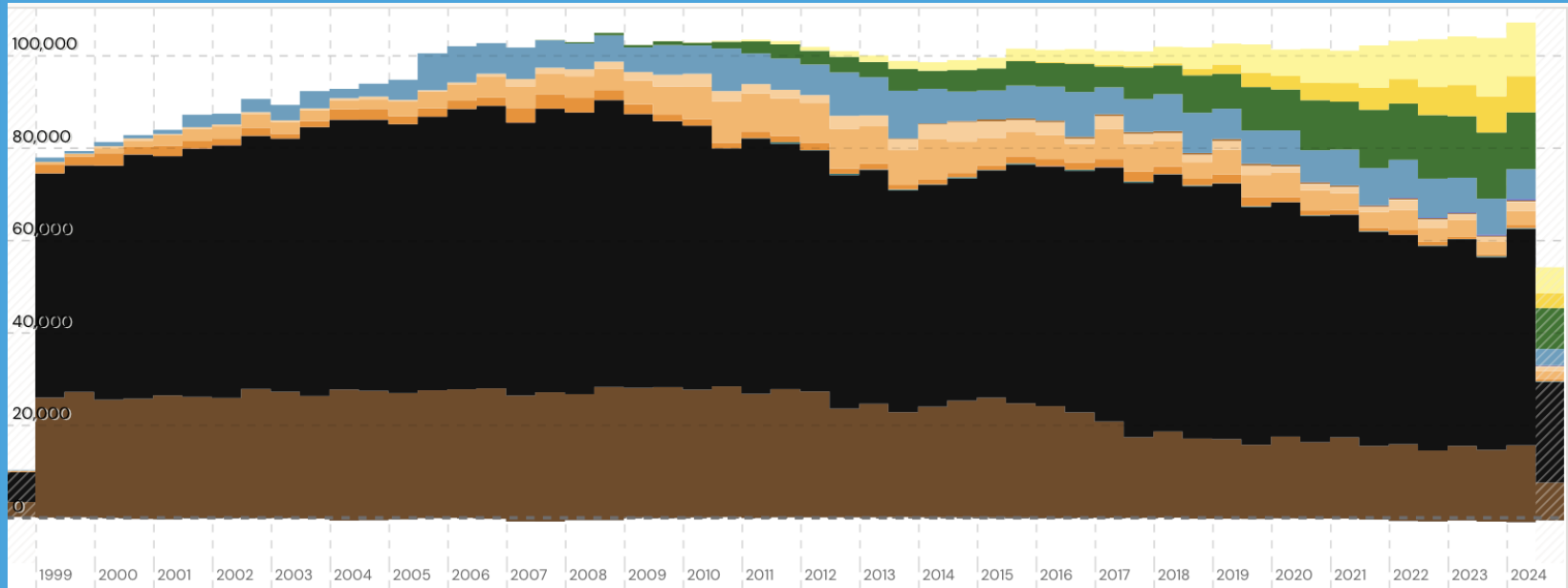
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Enough flywheels  
to recreate  
frequency wave in  
grid





# Still a system anchored by coal





# Energy security

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Renewables are a unitary source of energy. Stored energy not enough. Needs diversity of supply for energy security.



# Nuclear energy is about the long game

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Could help solve

- Power quality
- Energy security
- Last 20 per cent

Needs

- Social licence across jurisdictions and governments
- Time

