MEIxAEMO Seminar Series

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Quarterly Energy Dynamics report: Q2 2024

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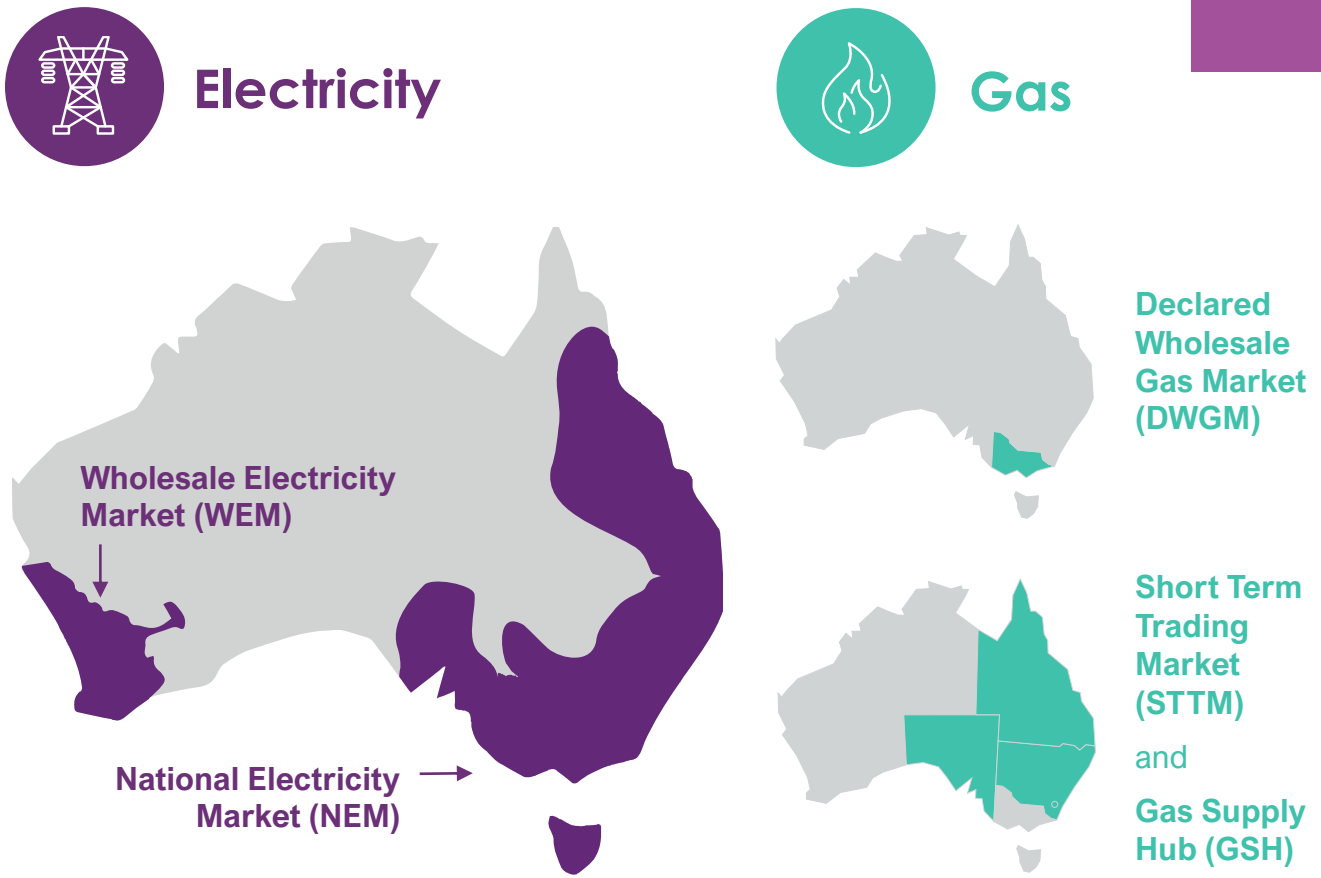
Quarterly Energy Dynamics Q2 2024 Report

Presented by:
Kerry Galloway

Agenda

1. National Electricity Market (NEM)
   - Demand and price
   - Interconnector flows and frequency control and ancillary services (FCAS)
   - Generation
2. East coast gas outcomes



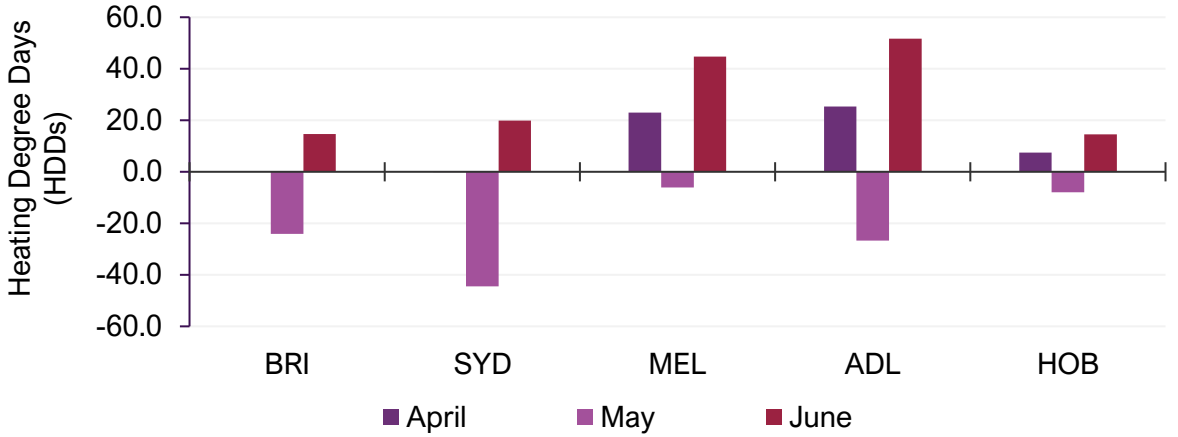
NEM dynamics

Colder weather pushed underlying demand up

- QLD saw a warmer April (increased cooling demand), while VIC experienced a very cold June (increased heating demand).
- Underlying demand up 359 MW (1.5%) to a new Q2 record high of 23,964 MW.
- Distributed PV reached its highest Q2 record at 2,050 MW (up 163 MW, +9%).
- NEM operational demand increased by 196 MW (+0.9%) to 21,913 MW.
- The increase in operational demand was particularly evident outside solar peak hours.

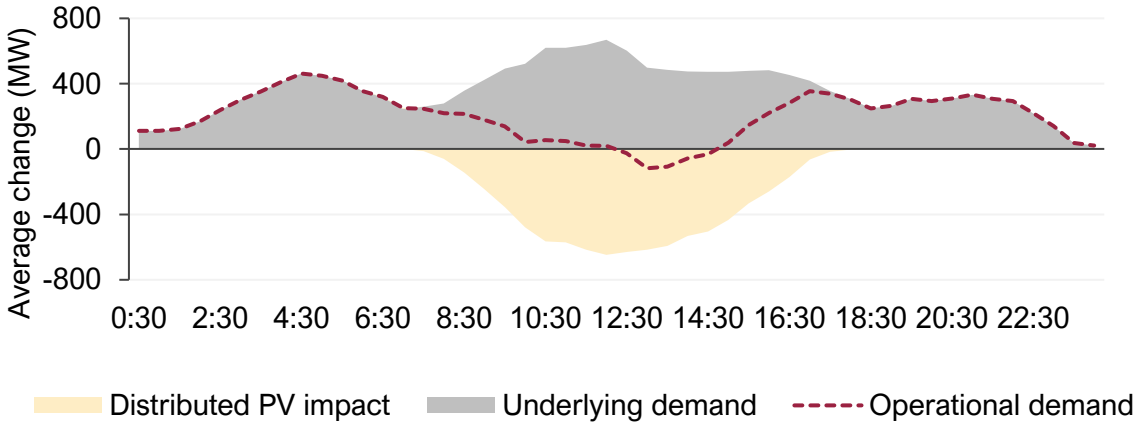
❑ **Higher April and June HDDs in southern regions**

Change in monthly Heating Degree Days (HDDs) - YOY



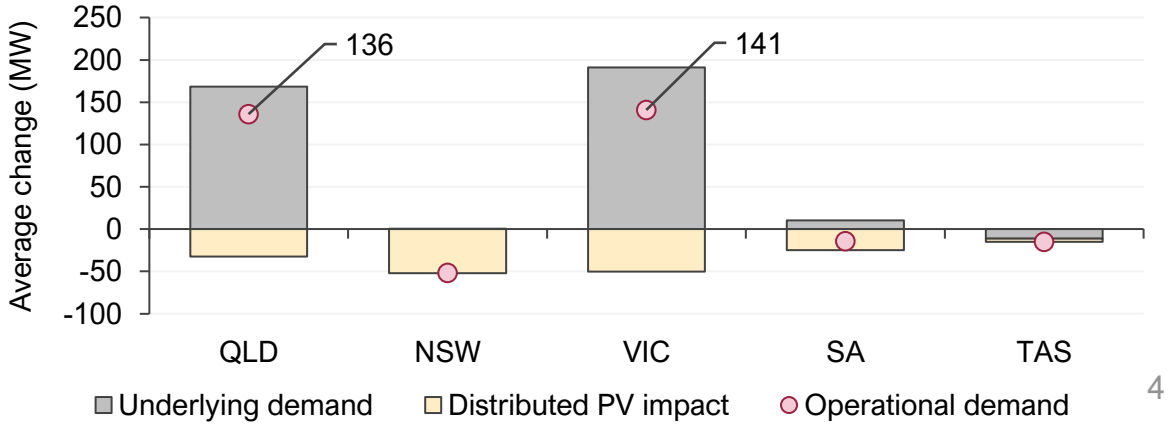
❑ **Operational demand increased at all times of the day except during solar peak**

Changes in NEM average operational demand by time of day – YOY



❑ **QLD and VIC accounted for the increase in NEM operational demand**

Changes in average demand components by region – YOY

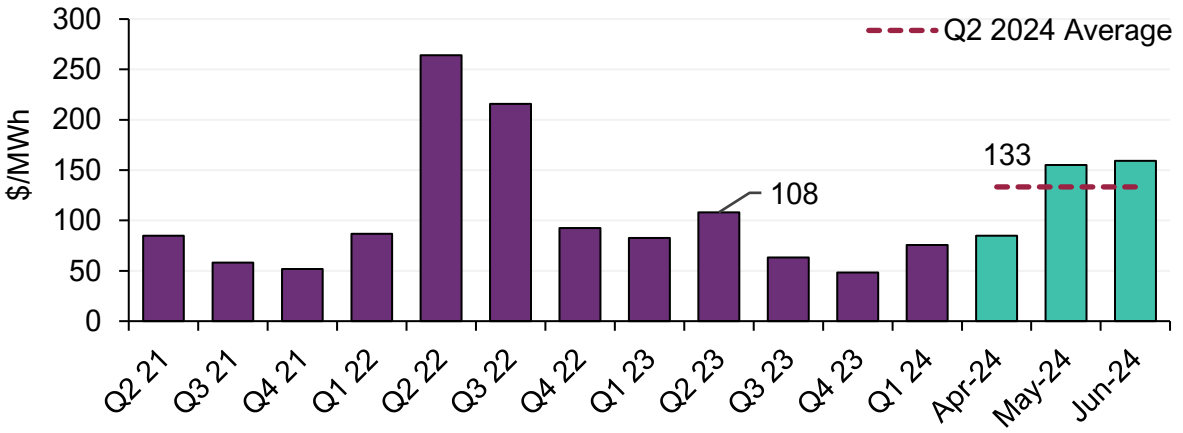


Low wind and rainfall levels followed by increased thermal generation drove prices up

- NEM quarterly average spot price up by $25/MWh (+23%) from Q2 2023.
- This increase was driven by lower wind availability and hydro generation, and transmission outages and limitations during Q2 2024.
- This increase in prices was seen in all regions, except QLD.
- NSW accounted for 79% of the cap return component.
- NEM saw less negative priced intervals this quarter → 7% relative to 9% last year.

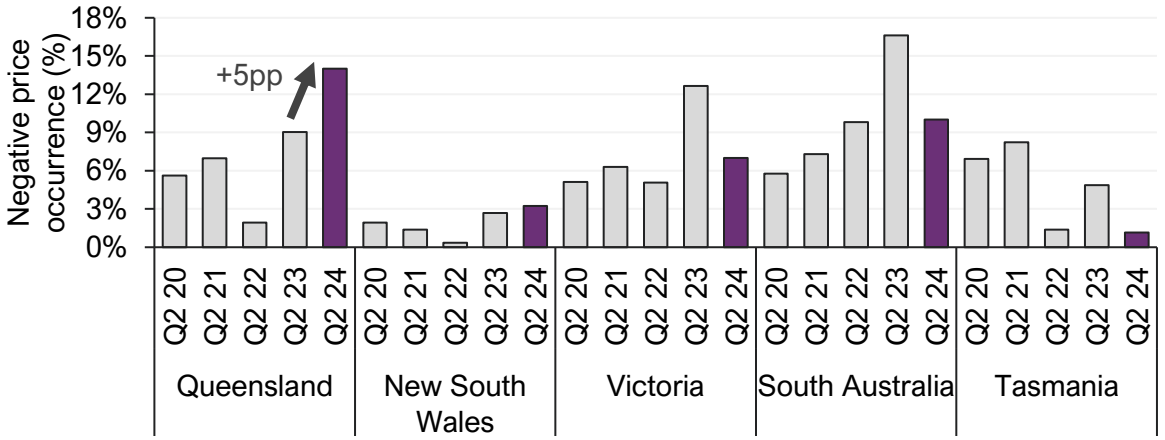
❑ **Year-on-year increase (23%) in NEM average wholesale spot prices**

NEM average wholesale electricity prices – quarterly since Q2 2021



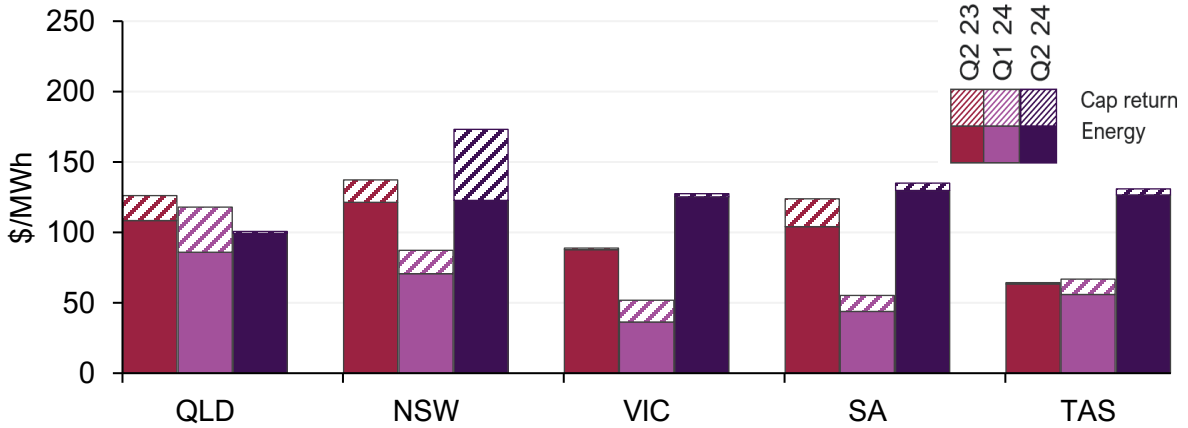
❑ **Negative price occurrence dropped in south but increased in QLD**

Negative price occurrence by time of day – Q2 2024



❑ **All regions, except Queensland, saw increase in average spot prices**

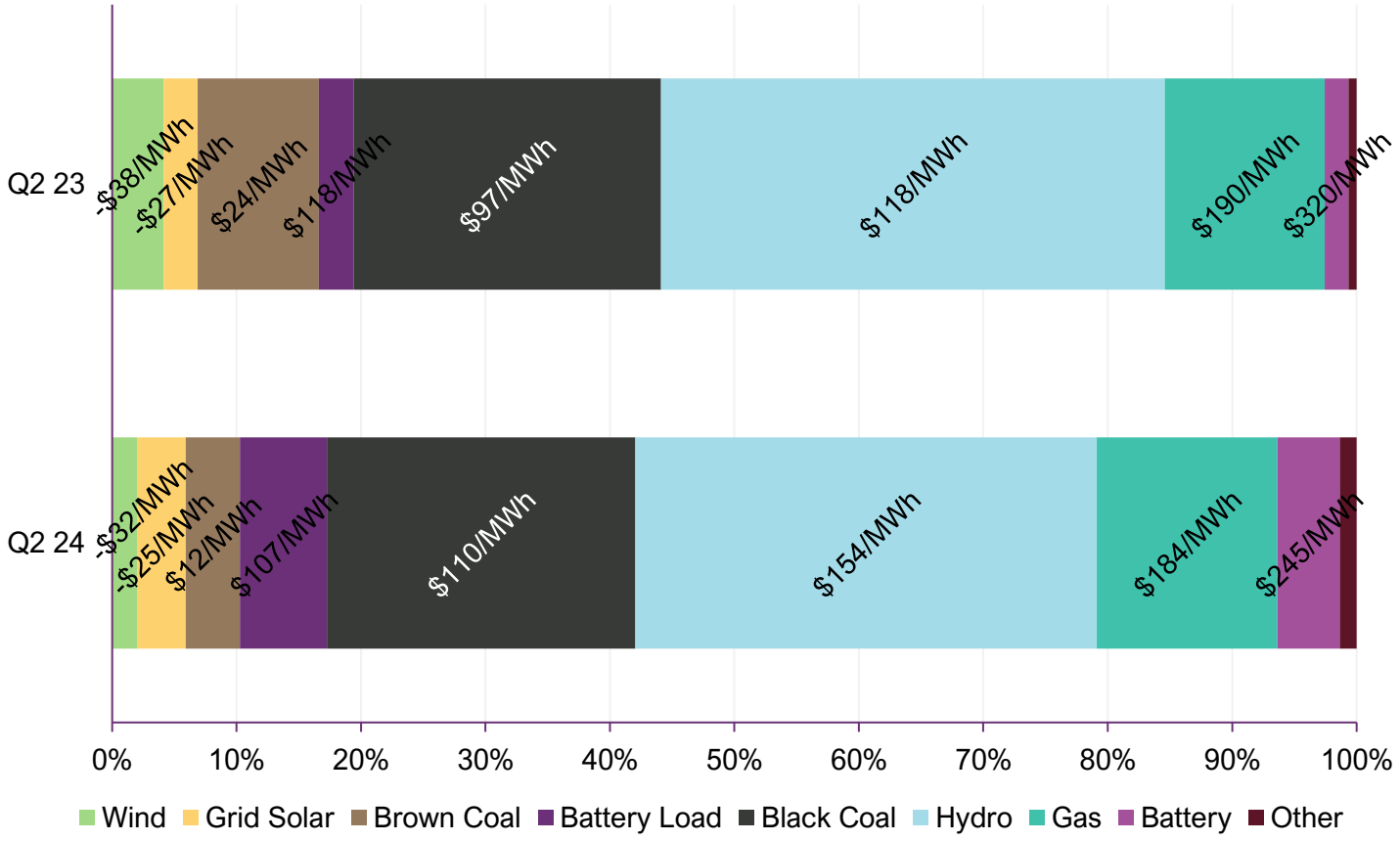
Average spot price by region – energy and cap return components



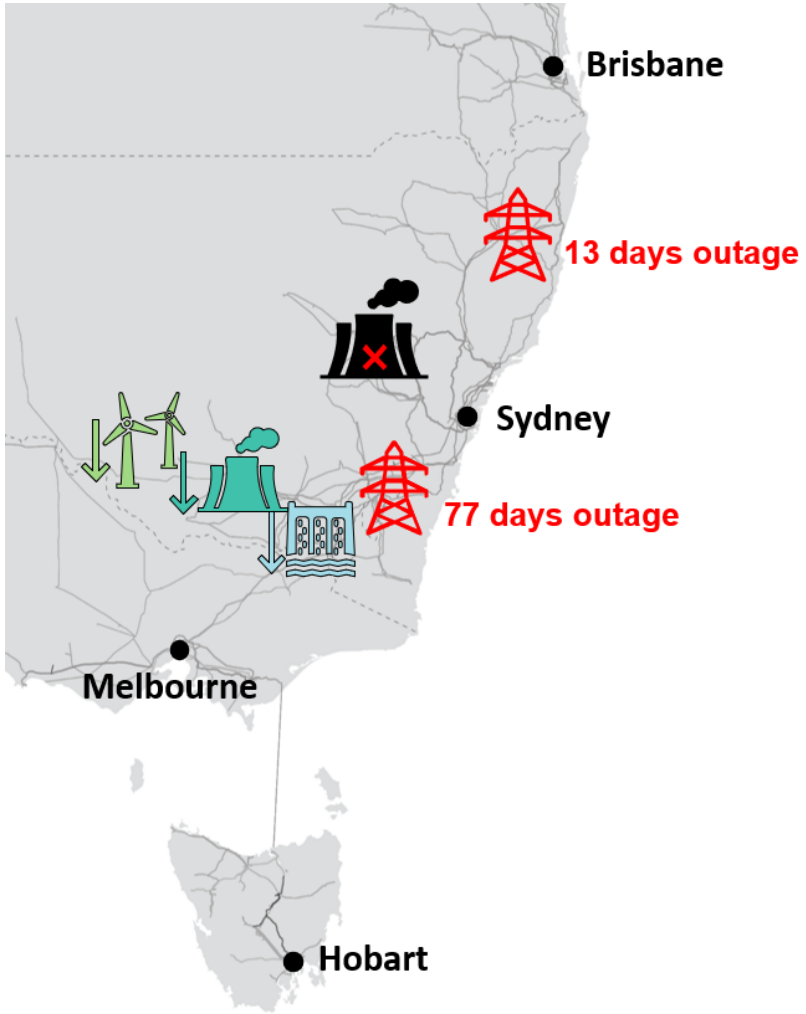
Price setting dynamics

- **Average prices set by black coal and hydro increased but dropped for battery**

NEM price-setting frequency and average price when price-setter by fuel type – YOY



Other price drivers



Regional price separation took a turn

Price separation between northern and southern regions took a turn this quarter, with southern regions on the higher end of the separation.

Lower wind availability & Higher-priced hydro offers → Higher gas generation (MW)

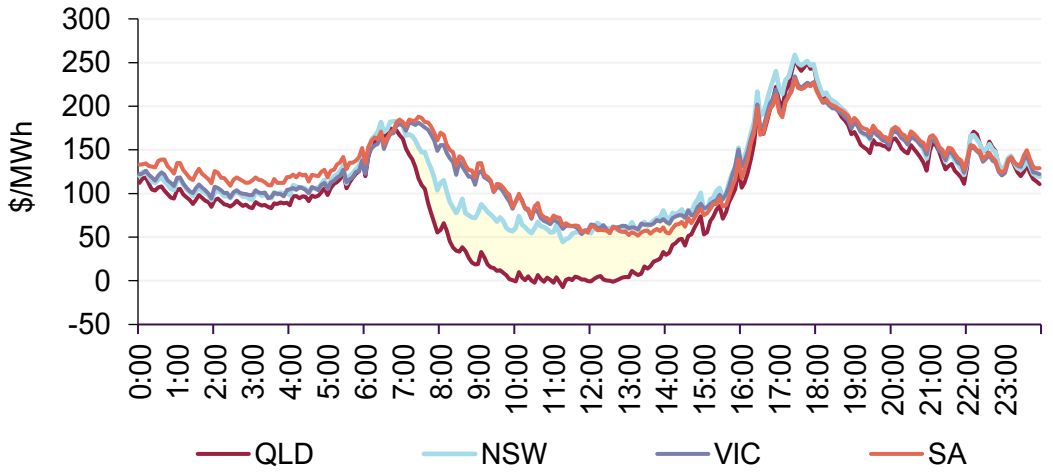
Price separation between QLD and NSW, mainly driven by:

Lower priced energy in QLD with return of Callide C3 & QLD → NSW, QNI binding during solar peak → **Lower energy prices in QLD**

Collector to Yass outage → Limiting flows from south NSW and VIC
&
Armidale to Tamworth outage → Limiting low priced energy flow from QLD
→ **Series of price spikes in NSW**

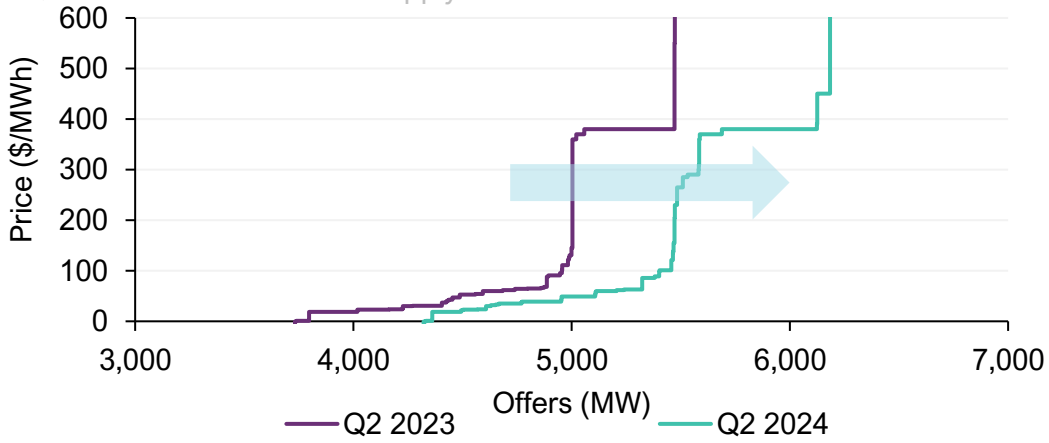
❑ **Southern region prices shift upward**

Average regional energy price by time of day – Q2 2024

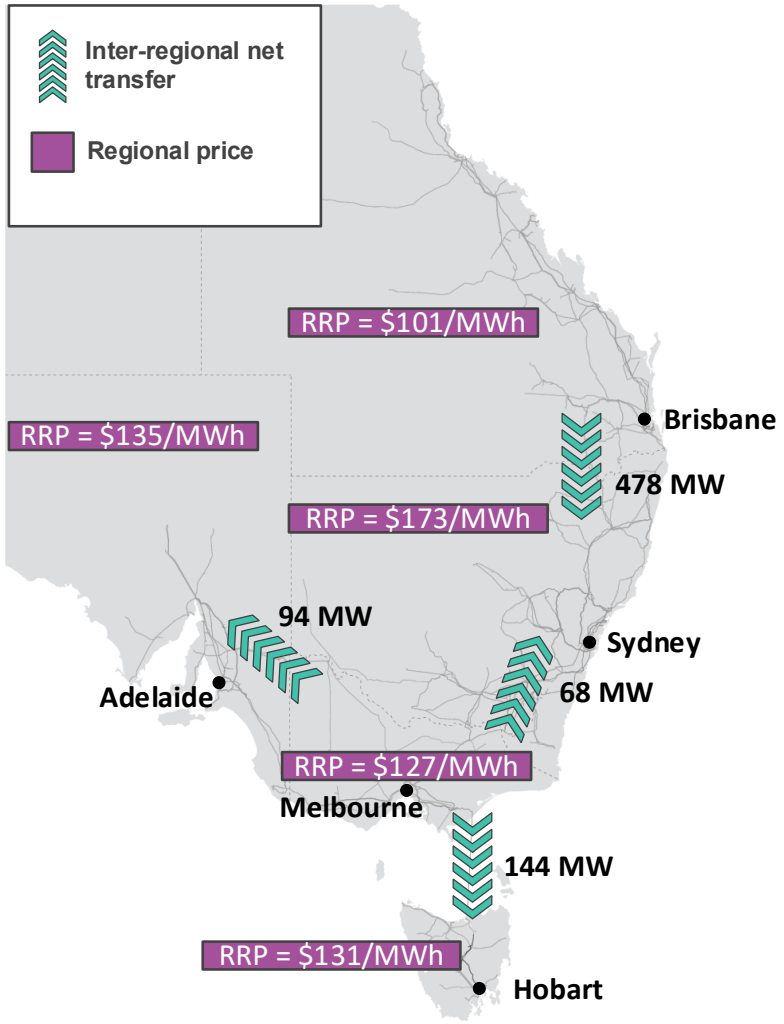


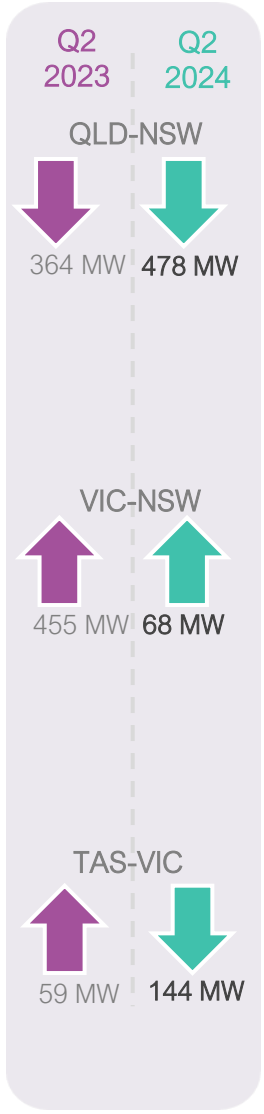
❑ **More volume offered by QLD's black coal at all price bands**

Queensland black coal bid supply curve - YOY

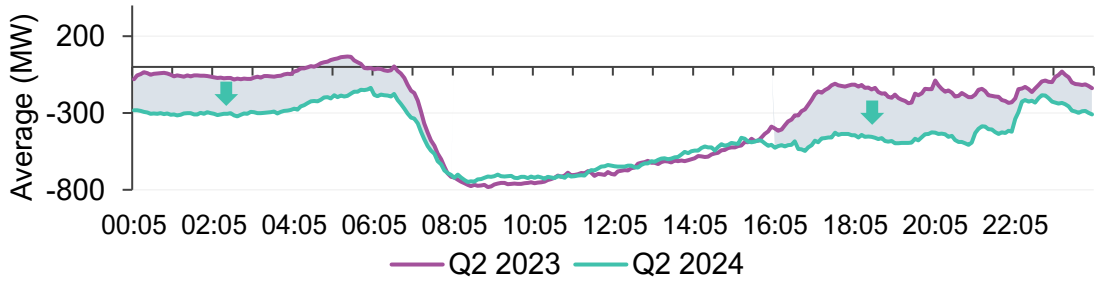


Southward shifts in inter-regional energy transfers

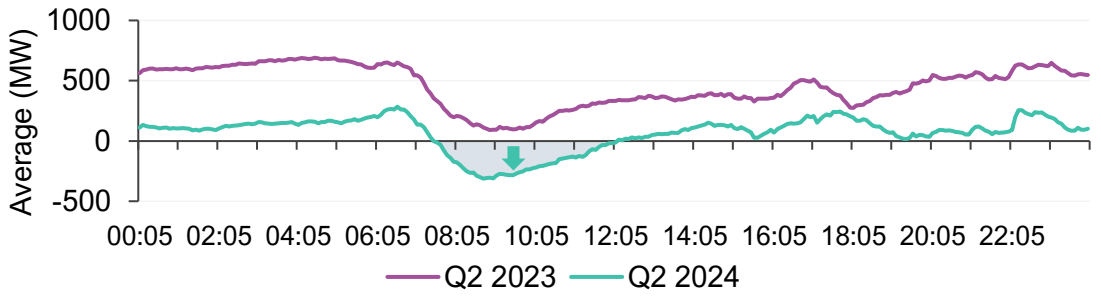




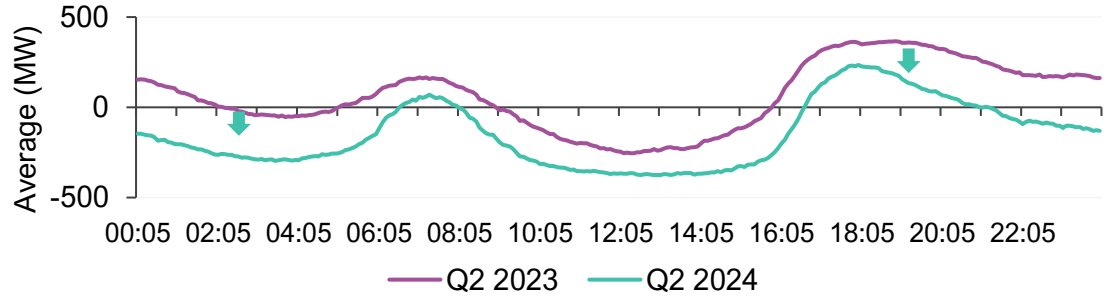
❑ QNI southward flows increased outside daylight hours



❑ VNI flows shift southward during mornings



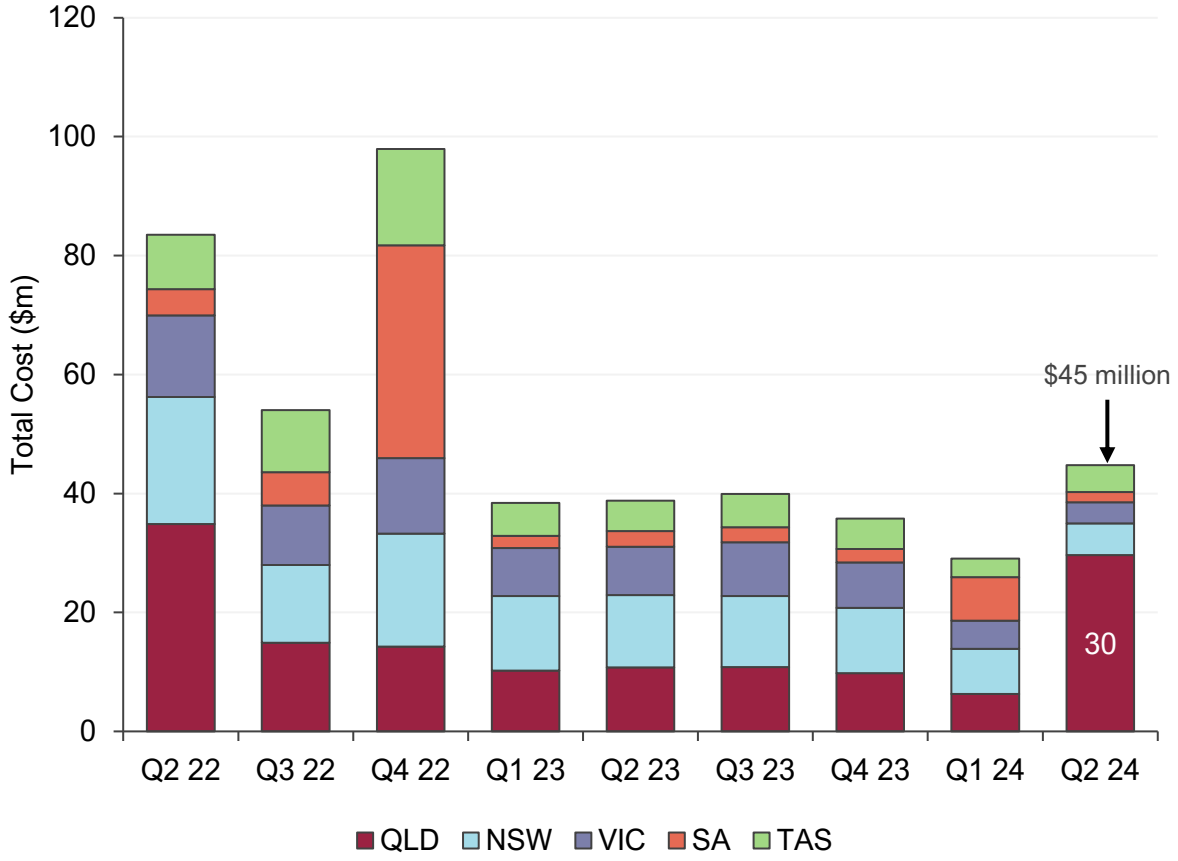
❑ Basslink flows shifted strongly southward



Lower FCAS costs across all regions except Queensland

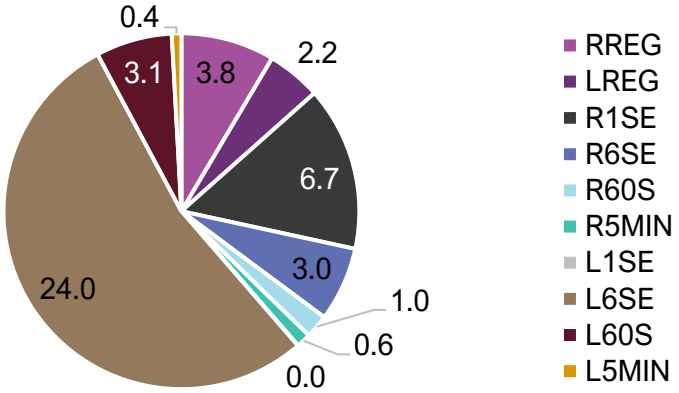
❑ **FCAS costs reduced across all regions except Queensland**

Quarterly FCAS costs per region



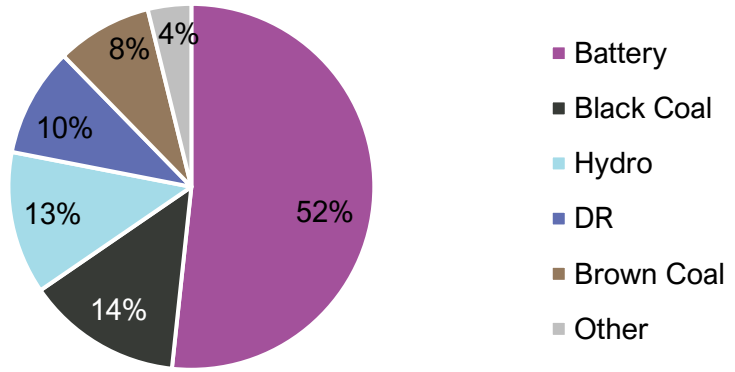
❑ **L6SE contributed more than half of the total FCAS costs**

NEM quarterly FCAS cost by market – Q2 2024 ($m)



❑ **Batteries further grew FCAS market share**

FCAS volume market share by technology – Q2 2024



Q & A

Low wind and hydro output drove increased thermal generation

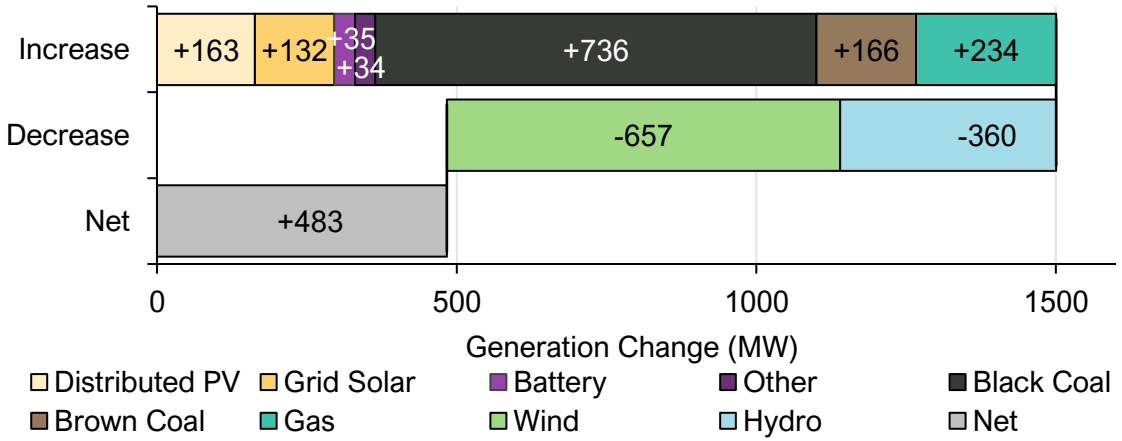
- Total NEM quarterly average generation up 2.0% from 23,881 MW in Q2 2023 to 24,364 MW this quarter, driven by the increase in NEM underlying demand.
- Significant year-on-year reductions in wind generation (-20%) and hydro generation (-18%) with calm conditions and low rainfall.
- All other fuel types increased generation, largest increases in black coal (+7%) and gas generation (+16%).
- NEM total emissions increased (2.0 MtCO2-e) on Q2 2023 levels reaching 30.7 MtCO2-e and emissions intensity increased to 0.65 from 0.61.

❑ **NEM supply mix contribution by fuel type**

Quarter	Black coal	Brown coal	Gas	Liquid fuel	Distributed PV	Wind	Grid solar	Hydro	Battery	Biomass
Q2 2023	42.4%	15.8%	6.2%	0.0%	7.9%	13.9%	5.4%	8.2%	0.2%	0.0%
Q2 2024	44.6%	16.2%	7.0%	0.1%	8.4%	10.9%	5.8%	6.6%	0.3%	0.1%
Change	2.2%	0.4%	0.8%	0.1%	0.5%	-3.0%	0.4%	-1.6%	0.1%	0.1%

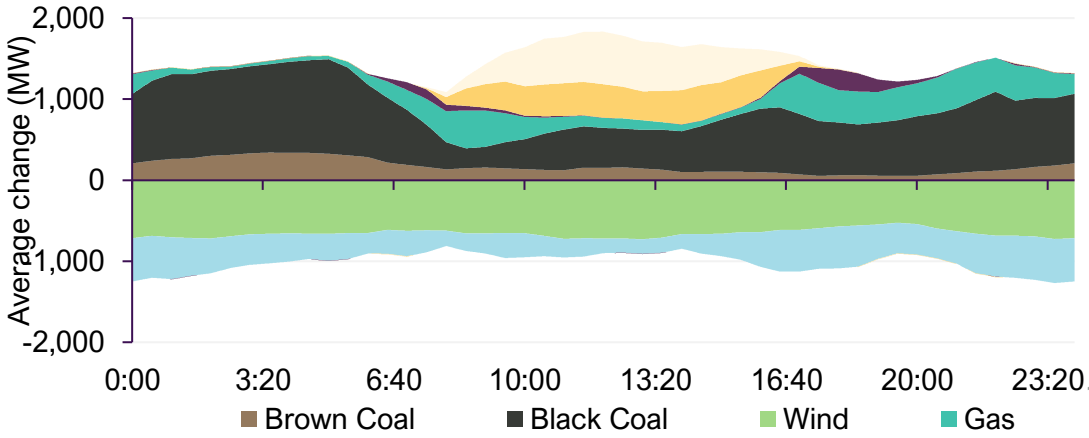
❑ **Significant reductions in wind and hydro generation**

Change in NEM supply by fuel type – Q2 2024 vs Q2 2023



❑ **Large decreases in wind and hydro generation across all hours of the day**

NEM generation changes by time of day – Q2 2024 vs Q2 2023

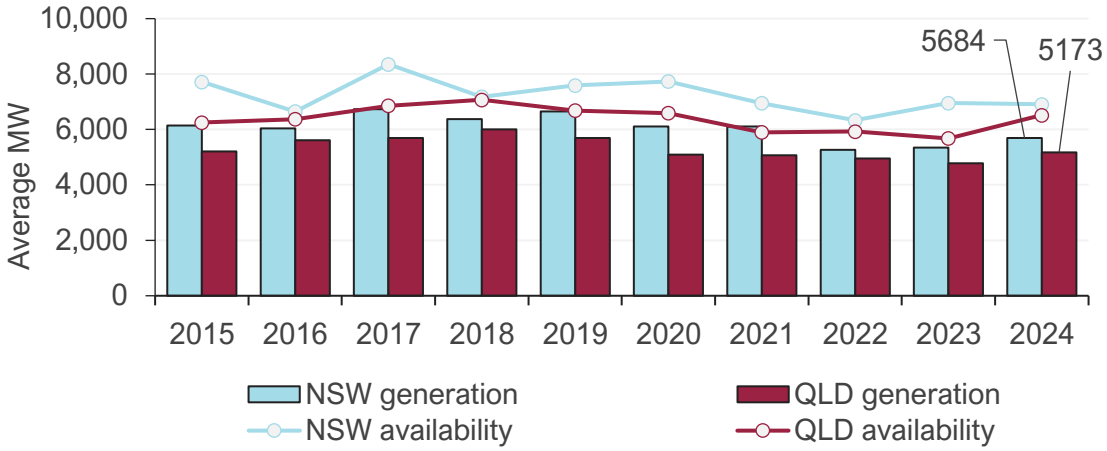


Coal-fired and gas-fired generation increased

- In Queensland, black-coal fired availability (+838 MW, +15%) and generation increased (+398 MW, +8%) year on year.
- In New South Wales, black coal-fired availability decreased (-52 MW, -1%) while generation increased (+338 MW, +6%).
- Brown coal-fired generation increased (166 MW, +4%), with only a marginal increase in availability (13 MW, +0.3%).
- Gas generation increased year-on-year (+234 MW, +16%) with increases in all regions except Queensland.

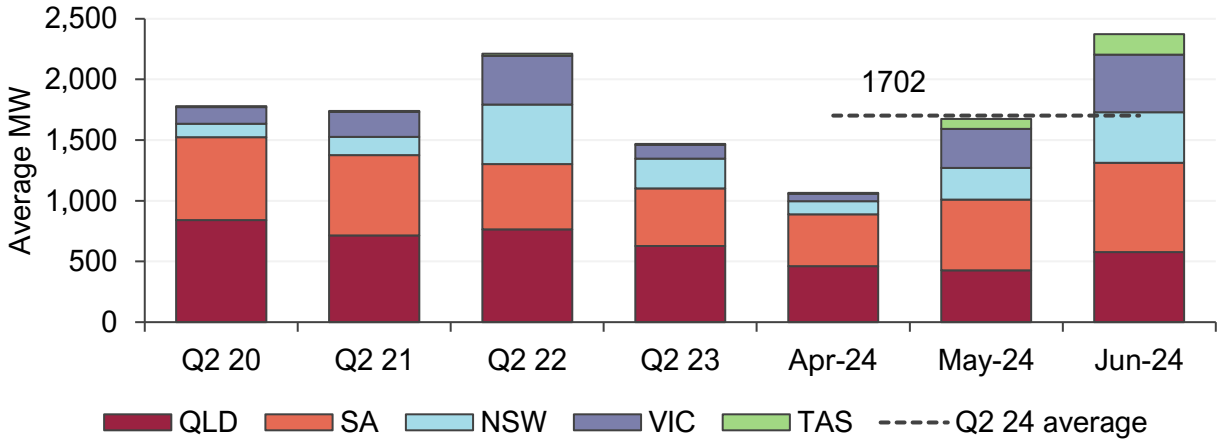
❑ Black coal-fired generation increased in QLD and NSW

Quarterly average black coal-fired generation and availability by region – Q2s



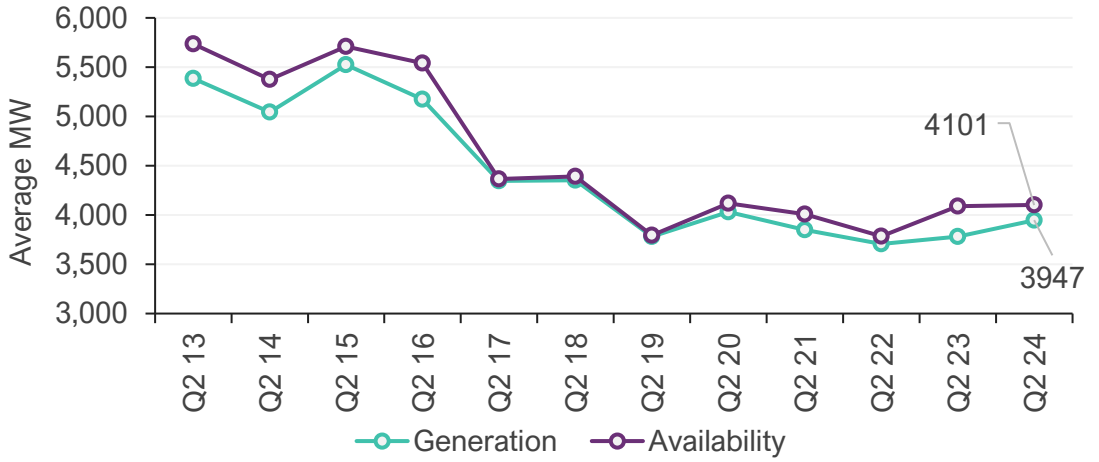
❑ Gas-fired generation ramped up over the quarter

Average gas-fired generation by region – Q2s



❑ Brown coal-fired generation increased

Quarterly average generation and availability – Q2s

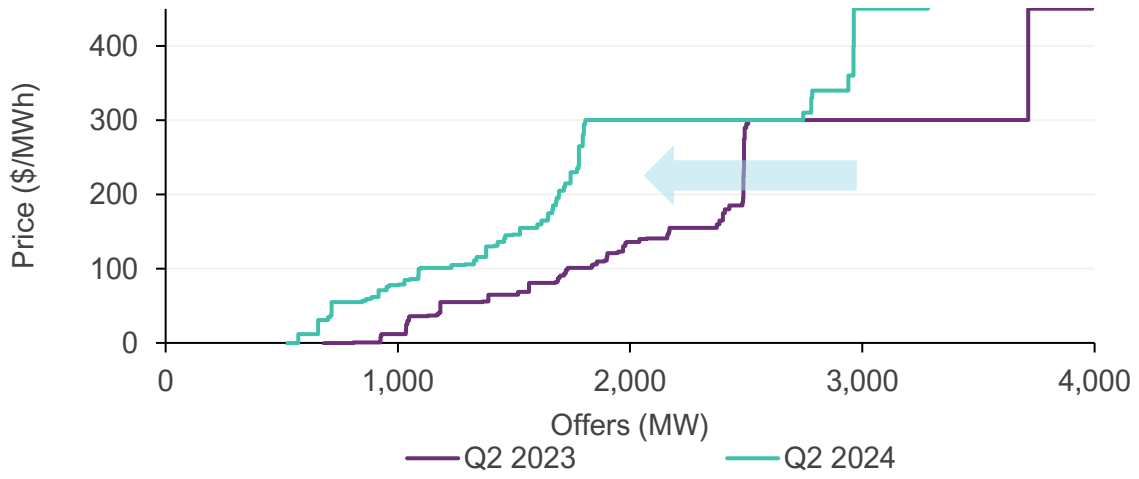


Hydro output lowest Q2 average since Q2 2017

- Hydro generation reduced in Tasmania (-243 MW, -21%) with energy in storage across the main storage system ending the quarter at 31.5%, compared to 40.5% at the end of Q2 2023
- New South Wales hydro generation reduced (-168 MW, -39%). Storage levels at Lake Eucumbene were at 49% at end of the quarter, compared to 62% at the end of Q2 2023.
- Hydro generation increased in Queensland (+19 MW, +14%) and in Victoria (+31 MW, +12%).

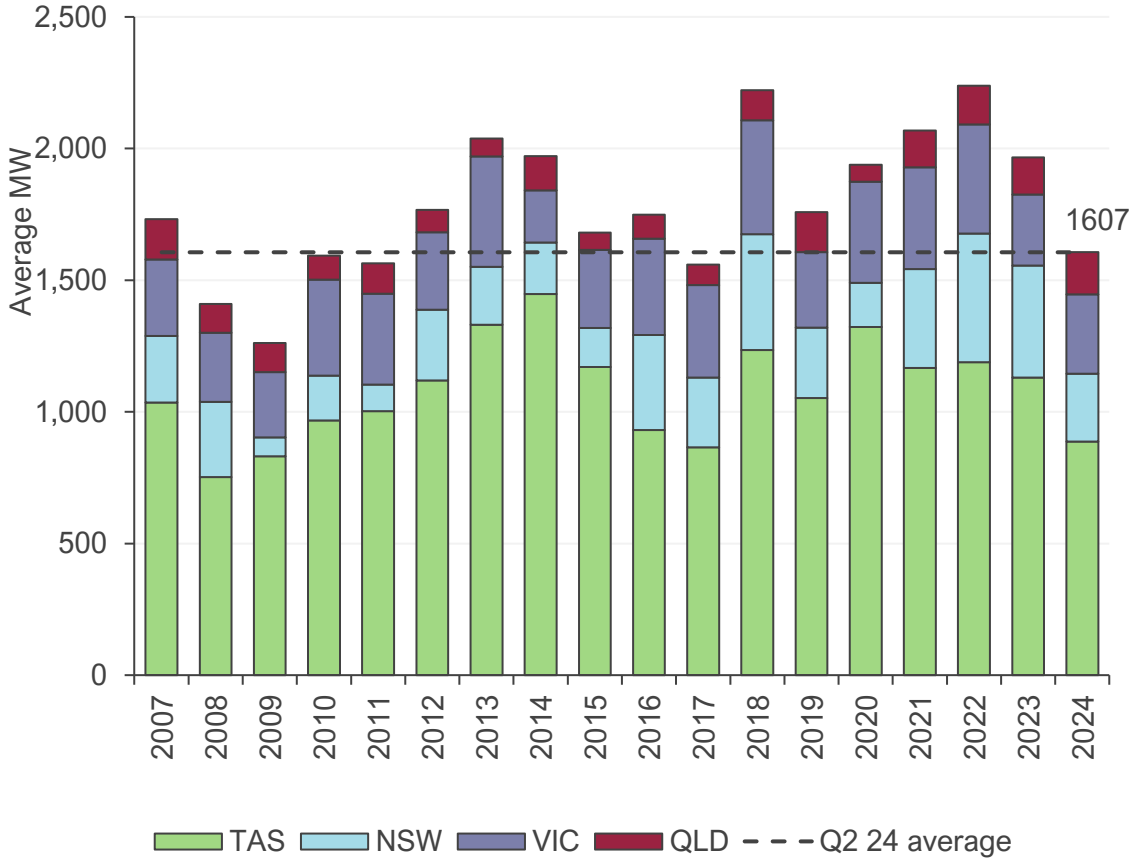
❑ Hydro generation low-priced offer volumes declined

Hydro generation bid supply curve – Q2 2024 vs Q2 2023



❑ Hydro generation dropped in New South Wales and Tasmania

Average hydro output by region – Q2s

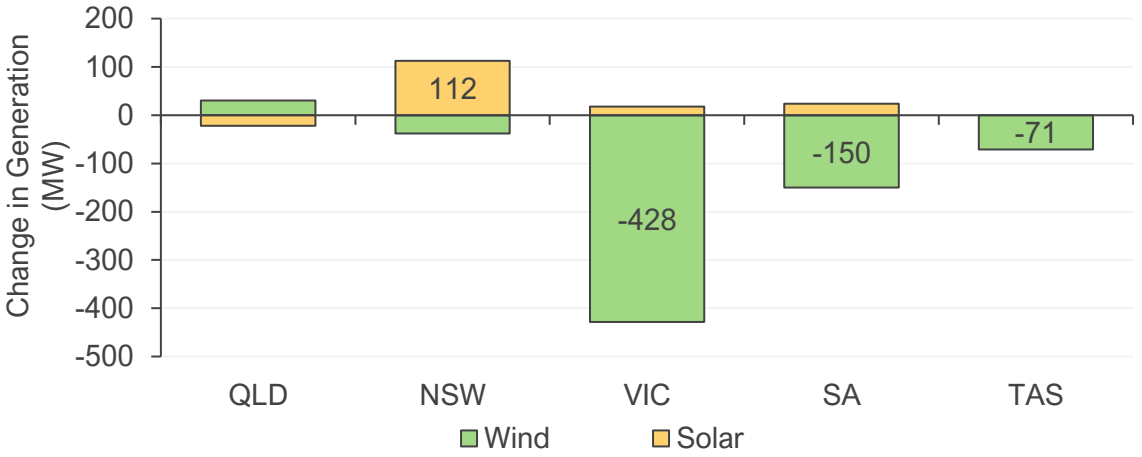


Large decrease in wind generation, small increase in solar generation

- Wind generation declined in all regions except Queensland, with the largest drop in Victoria (-428 MW, -31%).
- Solar generation increased overall (+132 MW, +10%) driven by New South Wales facilities (+112 MW, +23%) .
- NEM-wide quarterly volume-weighted available capacity factors for solar generation increased marginally to 19% (up 0.3 percentage points).

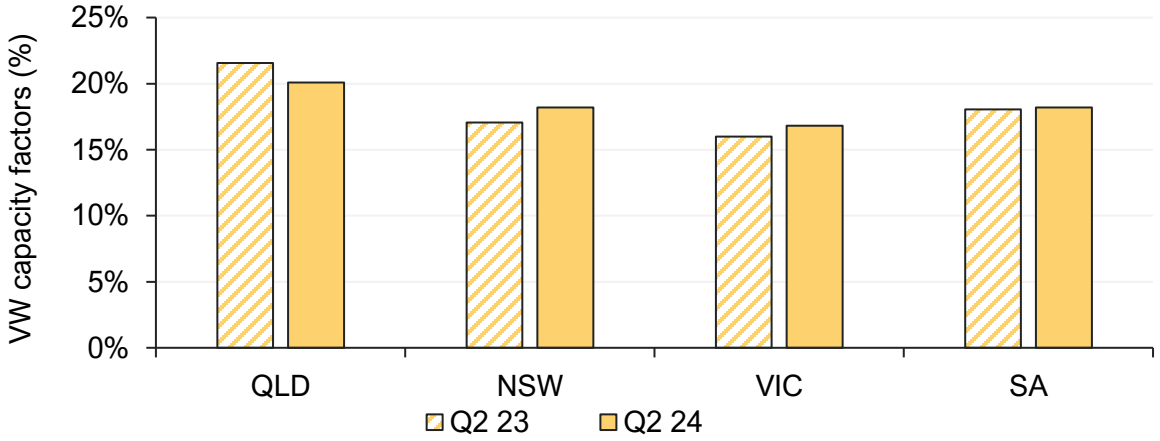
❑ Wind generation dropped in southern regions

Average change in VRE output by region – Q2 2024 vs Q2 2023



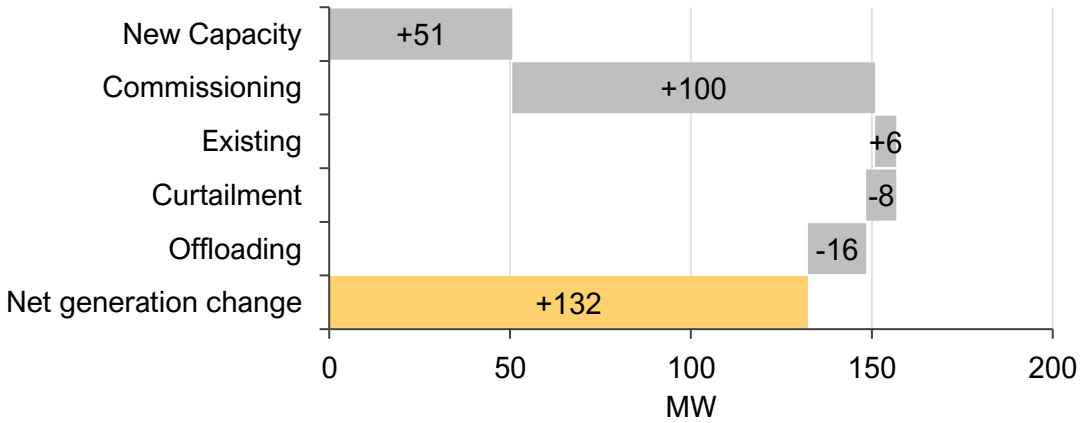
❑ Grid-solar availability rose in all regions except QLD

Volume-weighted grid-scale availability capacity factors – Q2s



❑ Growth in output at new and commissioning grid-scale solar farms

Changes in grid-scale solar generation – YOY

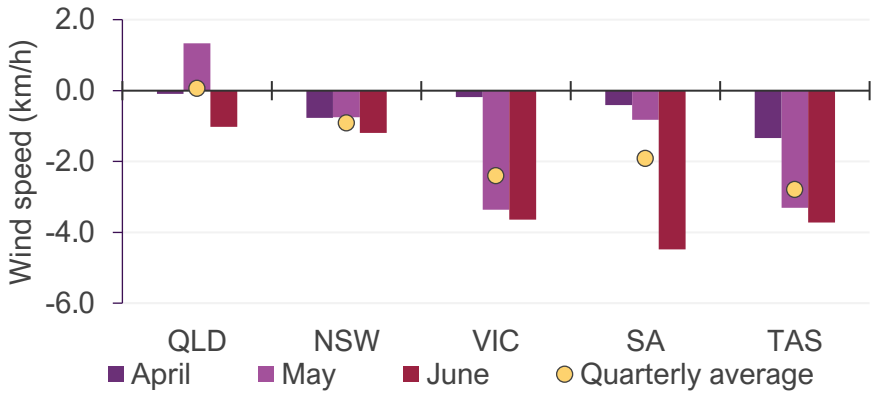


Lowest wind availability since Q2 2017 and lowest output since Q2 2021

- Wind availability capacity factors reduced in all regions, to average 25.2% (down 9.3 pp from 34.5% in Q2 2023).
- New and commissioning wind farms added 167 MW to availability, with the majority from facilities in New South Wales and Queensland .
- Despite the overall calm conditions, a record half-hourly wind generation was reached on 30 May with wind generation of 8,375 MW.

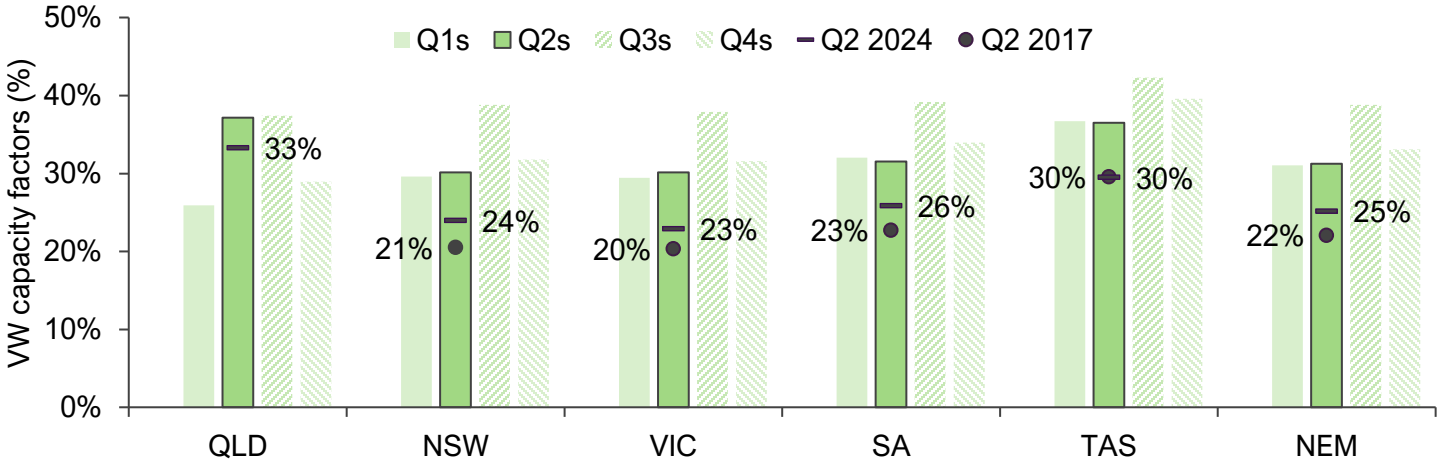
❑ **Significant drops in wind speed in all regions except QLD**

Changes in average wind speed by region – Q2 2024 vs Q2 2023



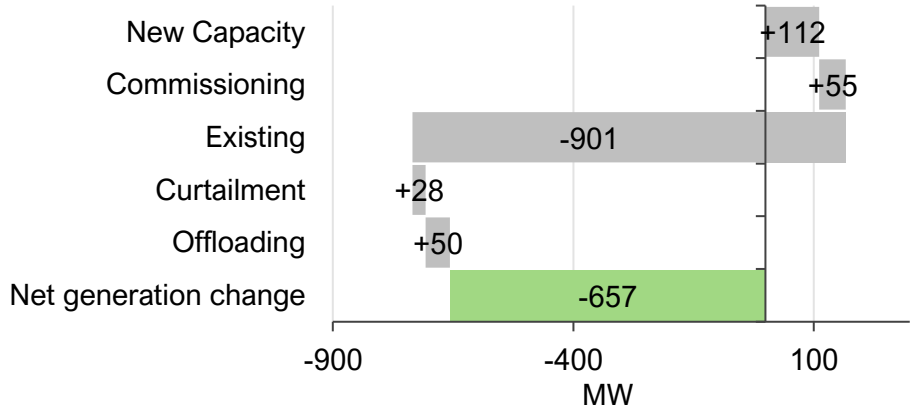
❑ **Wind resource in Q2 2024 below long-term average for Q2s, but higher than Q2 2017 wind drought**

Volume-weighted wind availability capacity factors



❑ **Significant reduction in output at existing wind farms**

Changes in wind generation – Q2 2024 vs Q2 2023

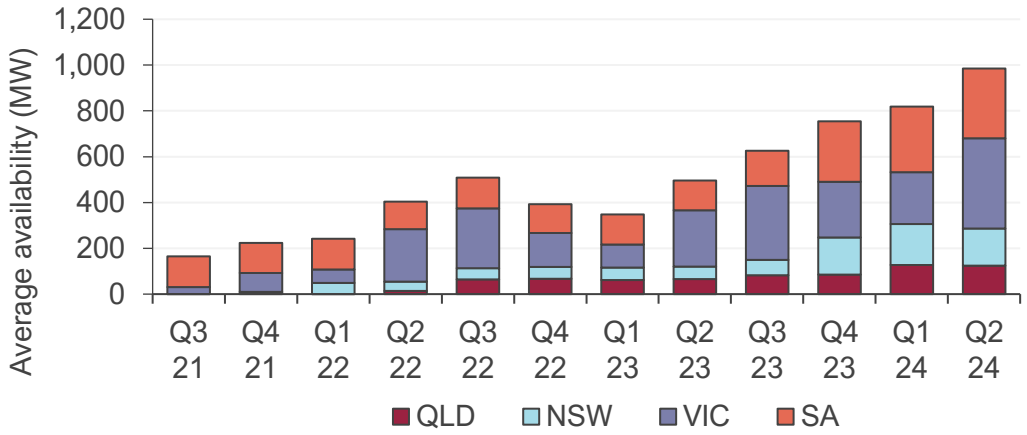


Growth in battery storage availability and revenue

- Total estimated net revenue for NEM grid-scale batteries was $41.2 million in Q2 2024, up $13.6 million from Q2 2023.
- Energy revenue, including charging at negative prices was $41.9m (up $22.6m, 117%), offsetting the increase in energy costs (up $10 m, +155%) to $16.5m.
- Revenue proportion from FCAS markets reduced from 54% in Q2 2024 to 39% this quarter.
- NEM-wide battery availability increased to 985 MW, from 496 MW in Q2 2023.

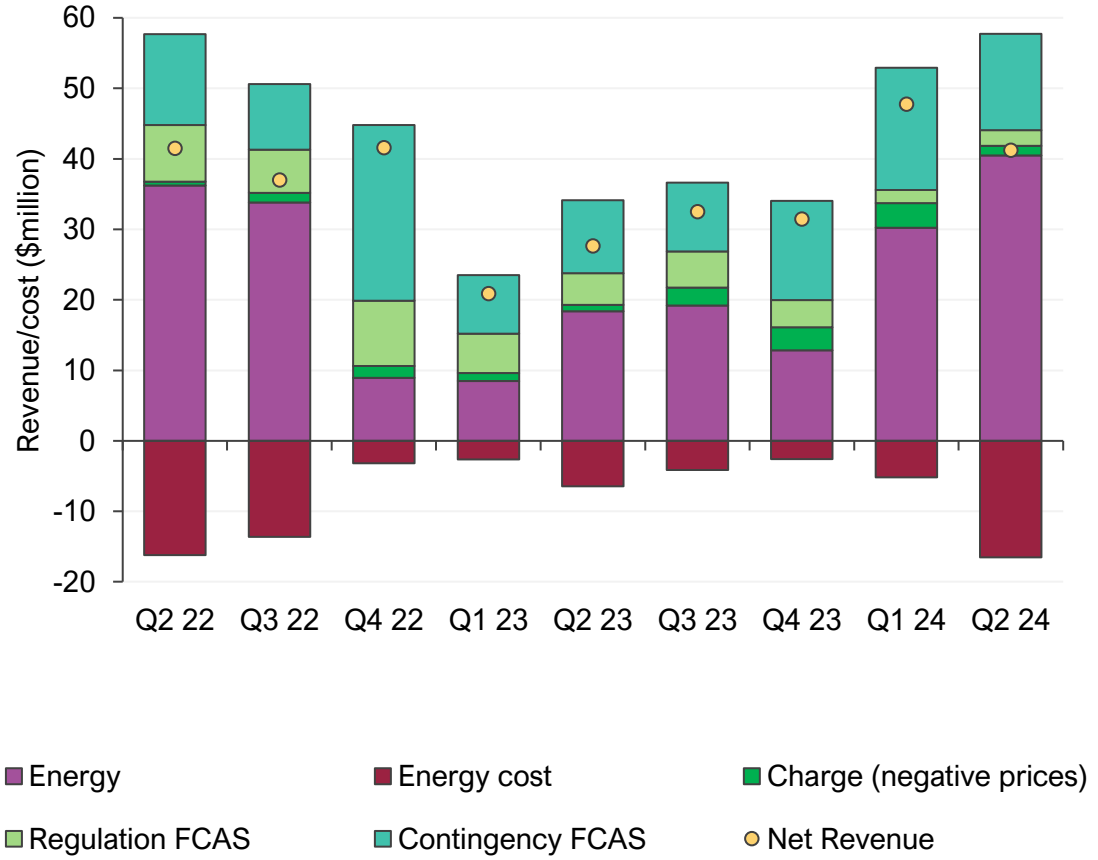
❑ Increase in battery generation availability

Average quarterly battery generation availability

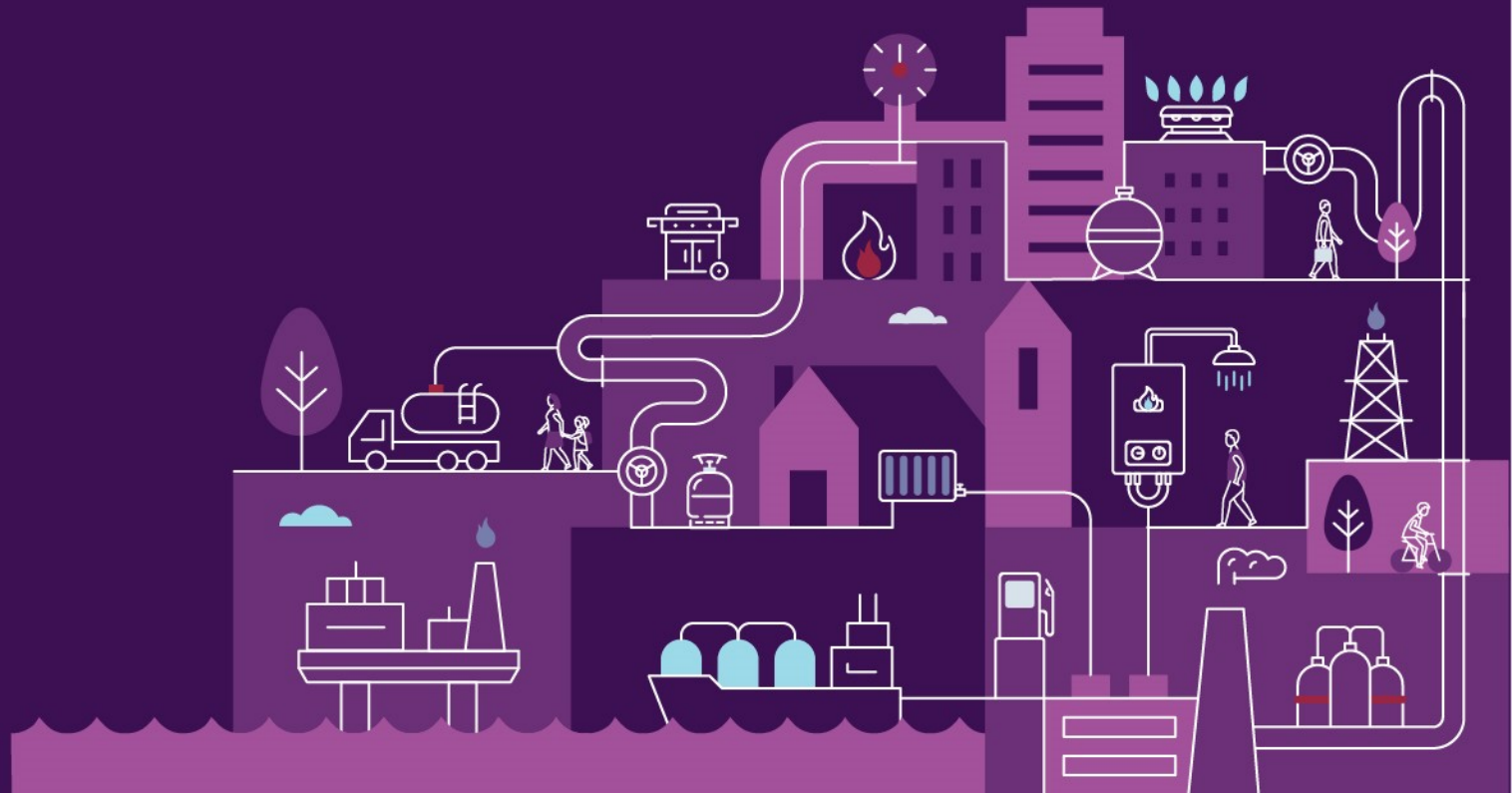


❑ Increase in battery revenue from higher energy arbitrage

Quarterly revenue from NEM battery systems by revenue stream



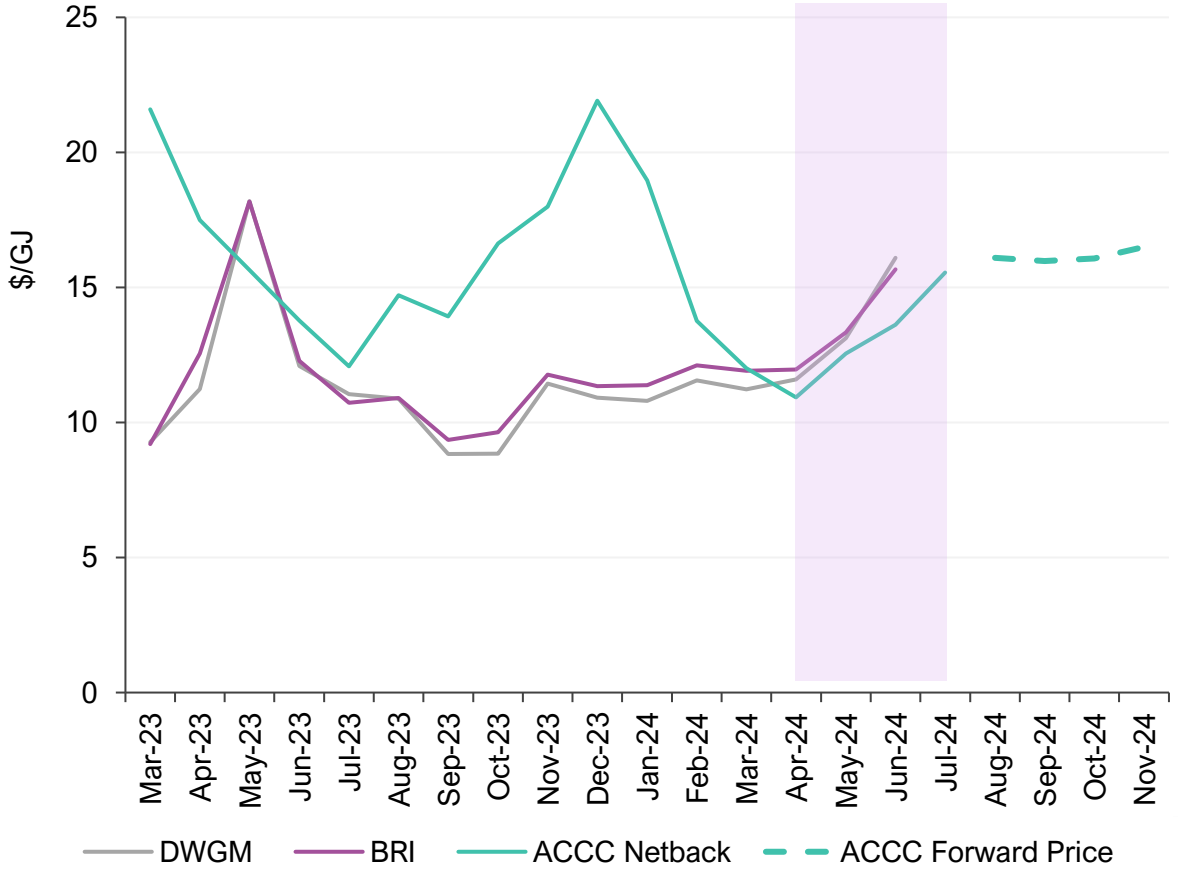
Gas market dynamics



East coast gas prices and demand

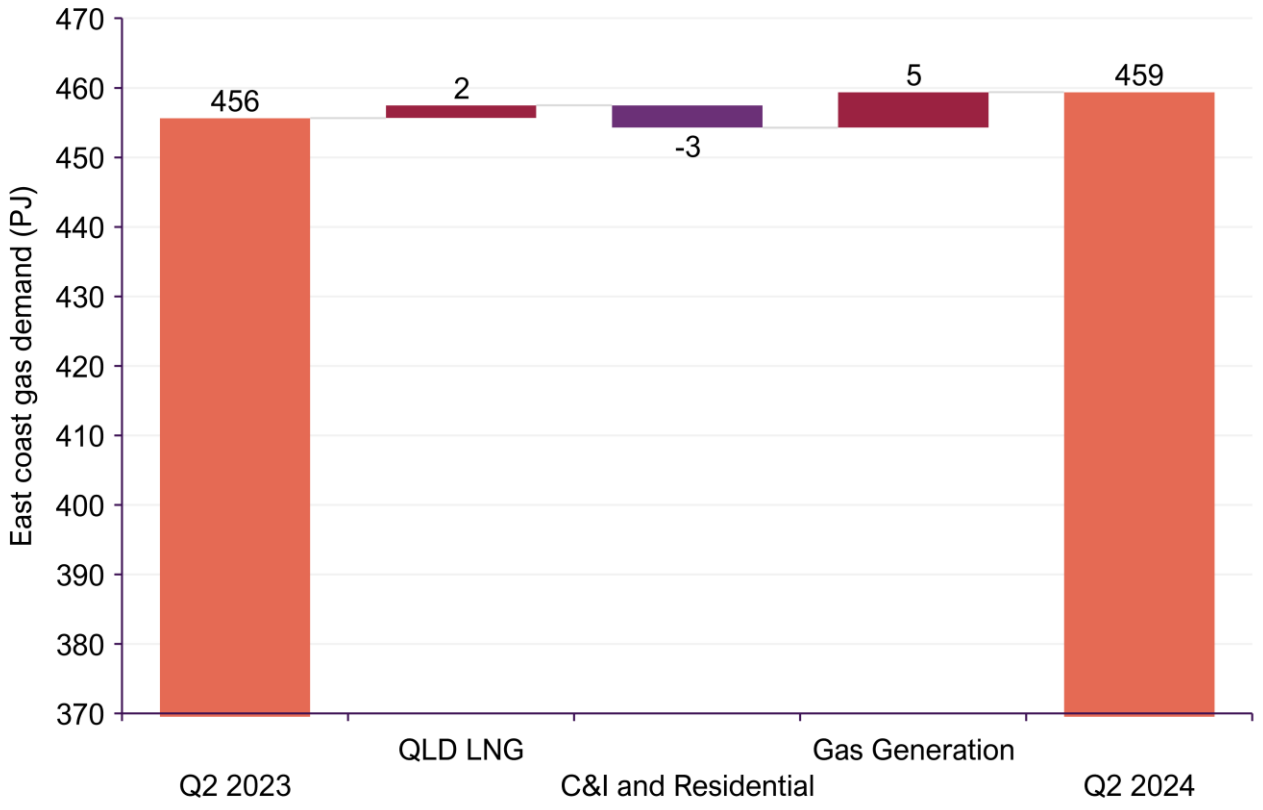
❑ **Domestic gas prices and the ACCC netback prices both increased over the quarter, but the factors driving these trends were significantly different.**

DWGM and Brisbane average price compared to ACCC LNG Netback price



❑ **QLD LNG demand increases overall east coast demand, with lower domestic gas consumption**

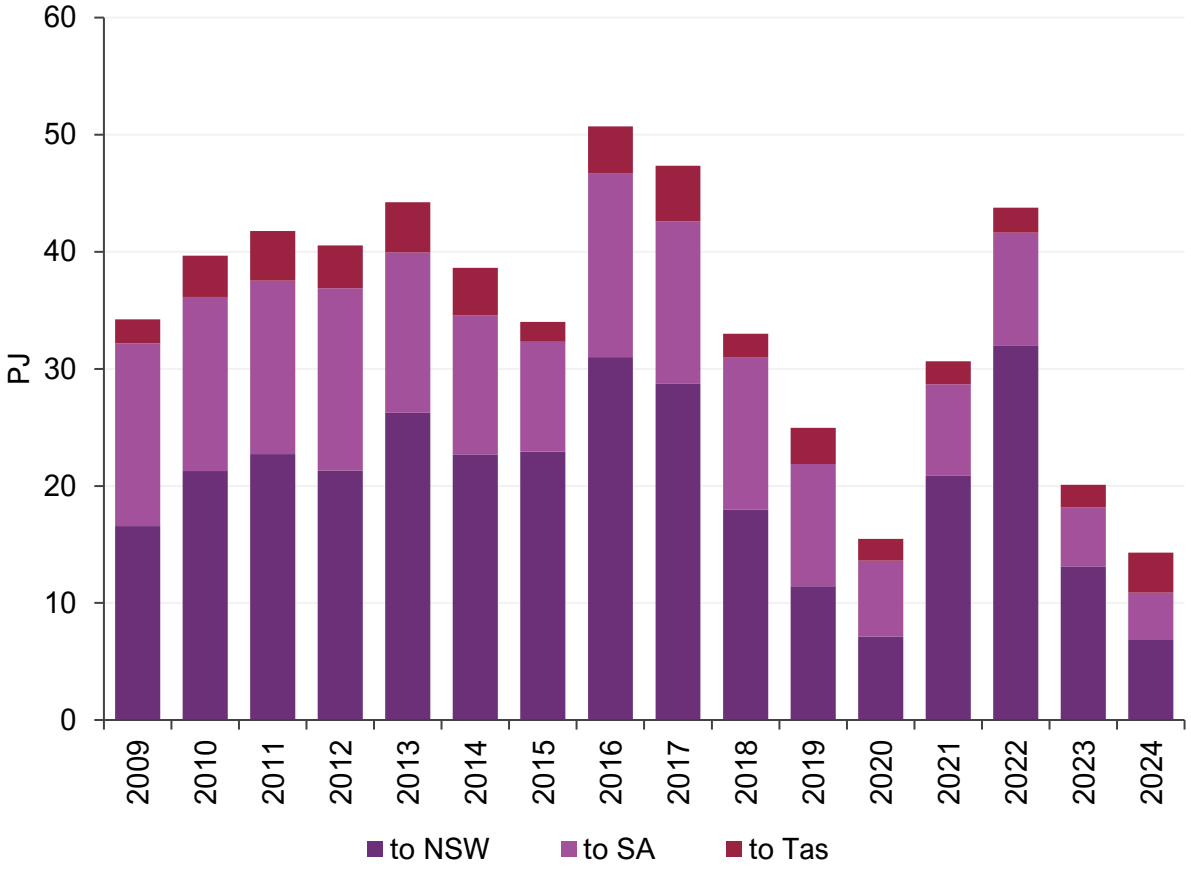
Components of east coast gas demand change – Q2 2023 to Q2 2024



Victorian exports continue to decline while Queensland supply increases

❑ **Lowest Q2 Vic gas exports overall, since data reporting began.**

Victorian net gas transfers to other regions – Q2s



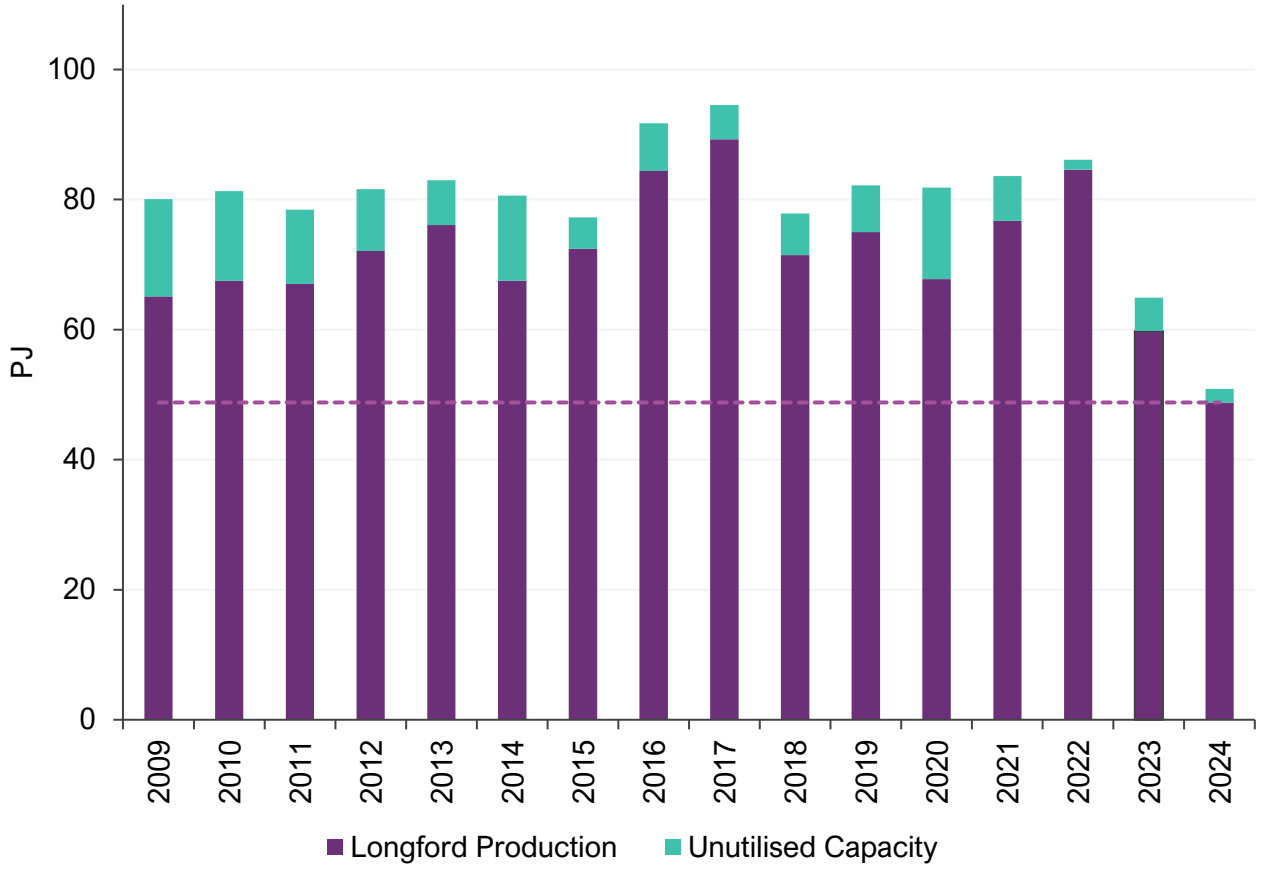
❑ **Record SWQP Q2 southerly flows**

Flows on South West Queensland Pipeline at Moomba

Longford aggregate and daily production continues to decline

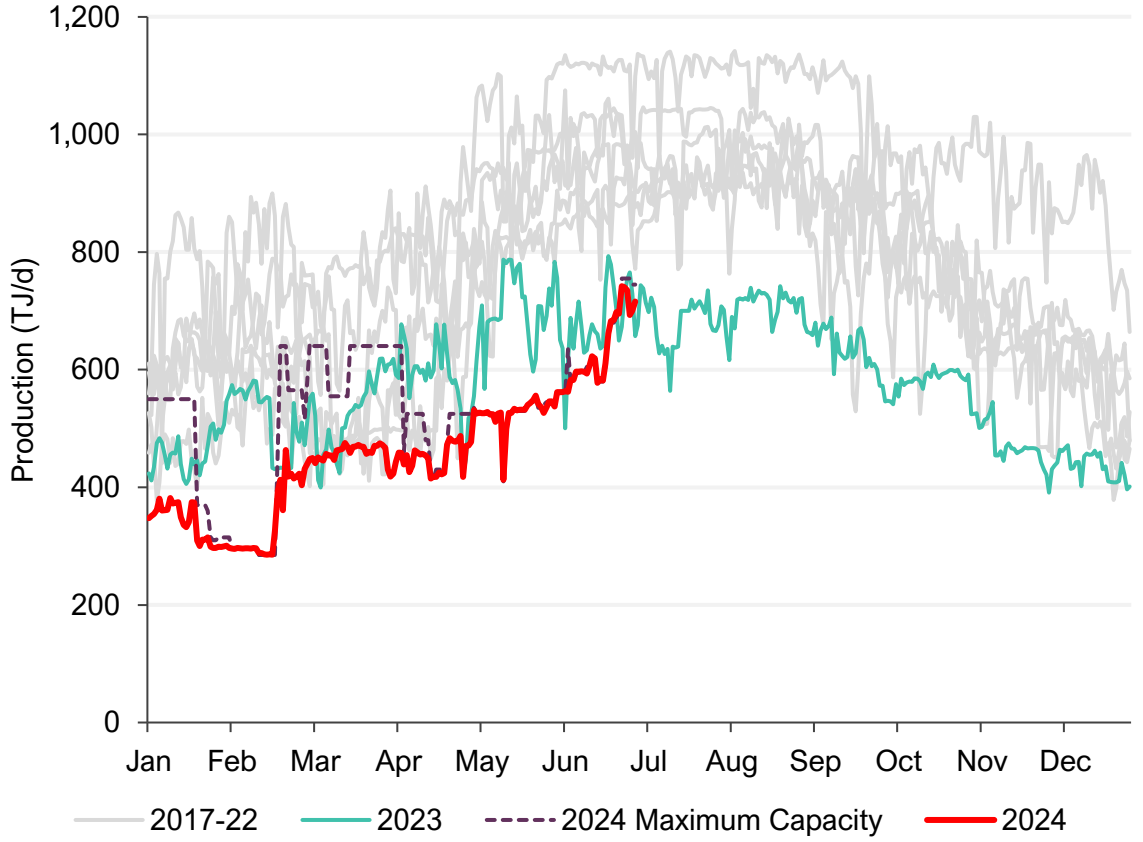
❑ **Lowest Longford Q1 production since data reporting began**

Longford Q1 production versus unutilised capacity



❑ **Daily Longford production continued to decline**

Daily Longford production 2017-2024, maximum capacity profile 2024



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