

MEIxAEMO Seminar Series



Quarterly Energy Dynamics report: Q1
2024



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Melbourne
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Presenter

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Moderator

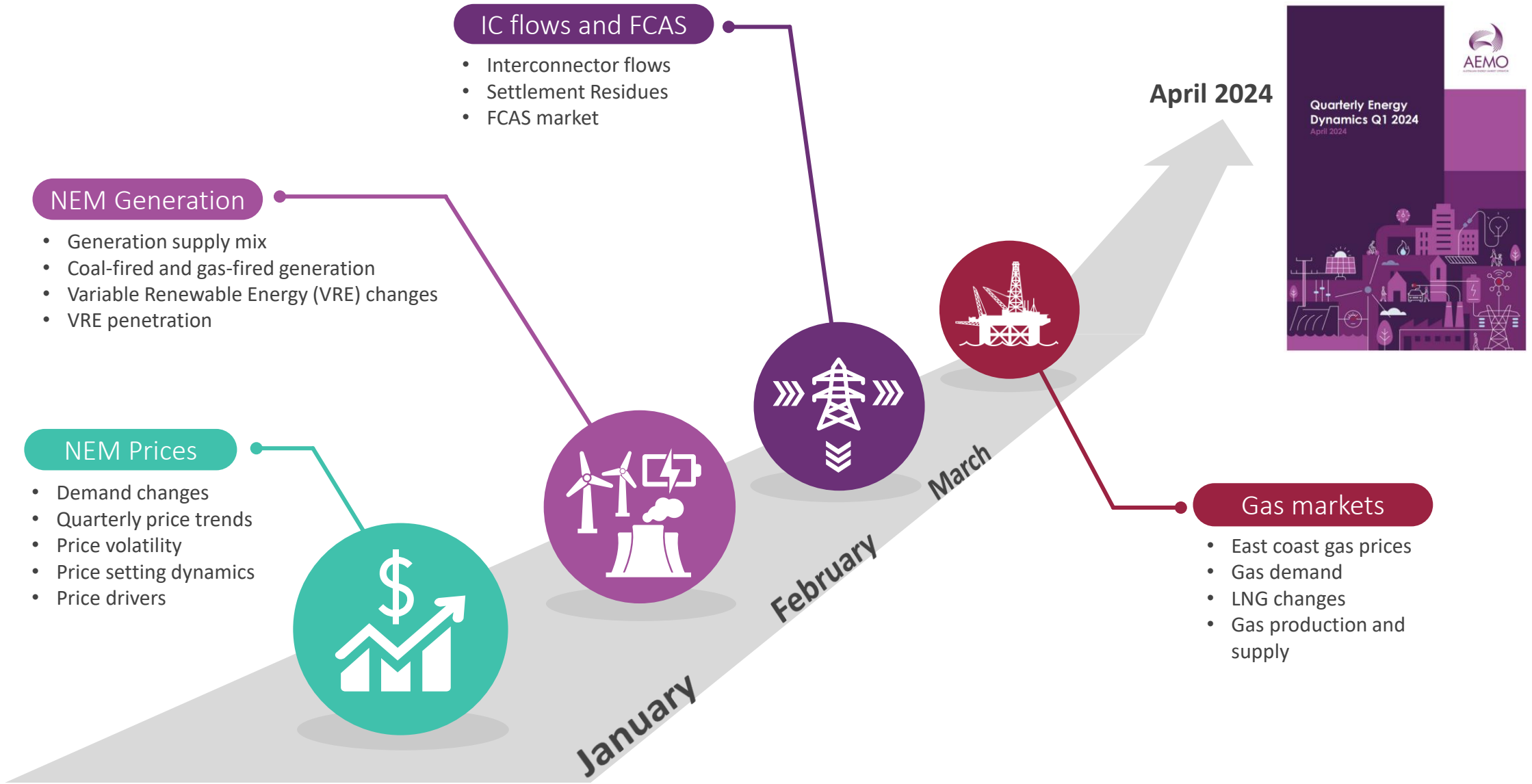
Sleiman Mhanna

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Systems Electrical and Electronic
Engineering, *The University of Melbourne*

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

We pay respect to Elders past and present.

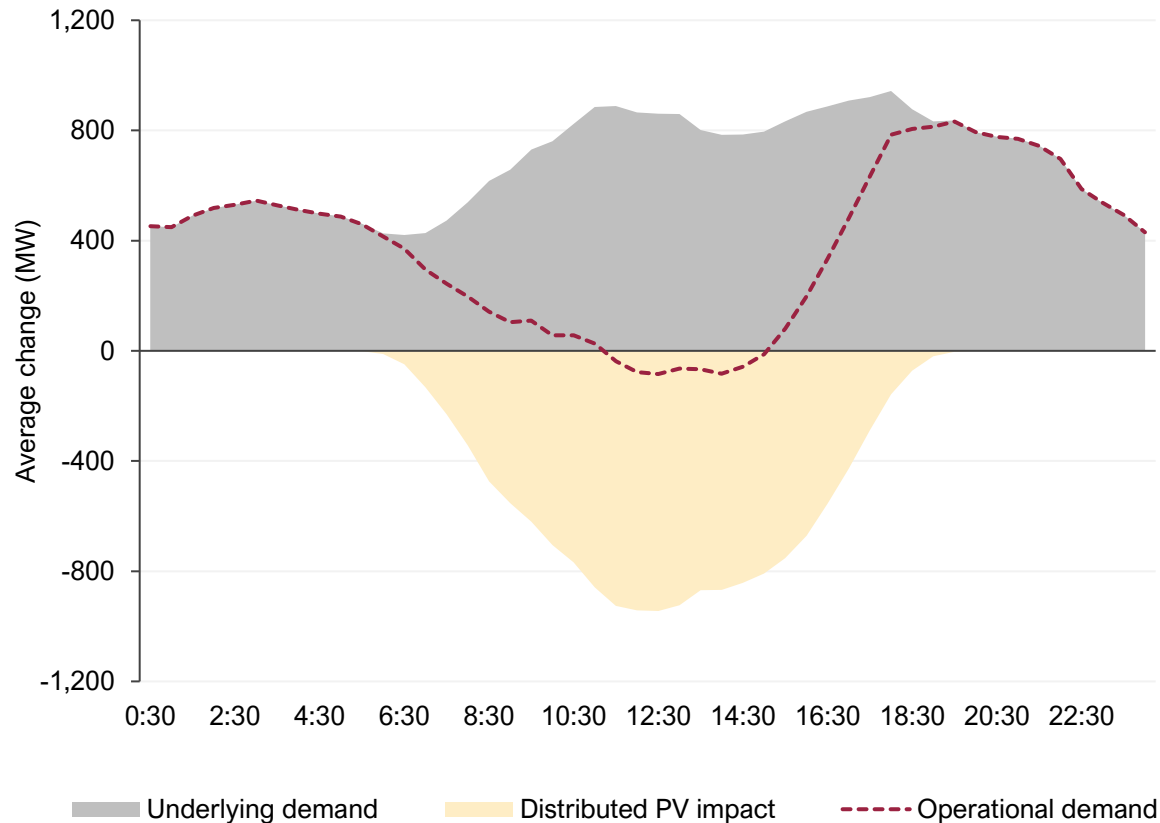
Agenda



Demand outcomes

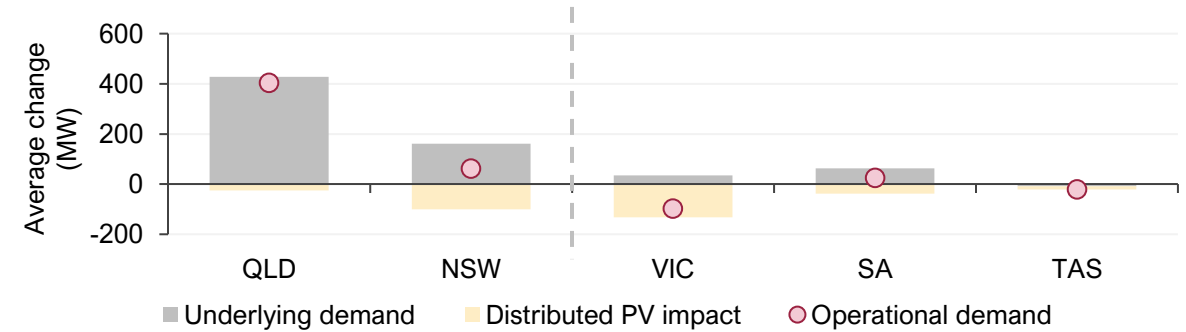
- Significant increase in underlying demand drove higher operational demand

Changes in operational demand – Q1 2024 vs Q1 2023



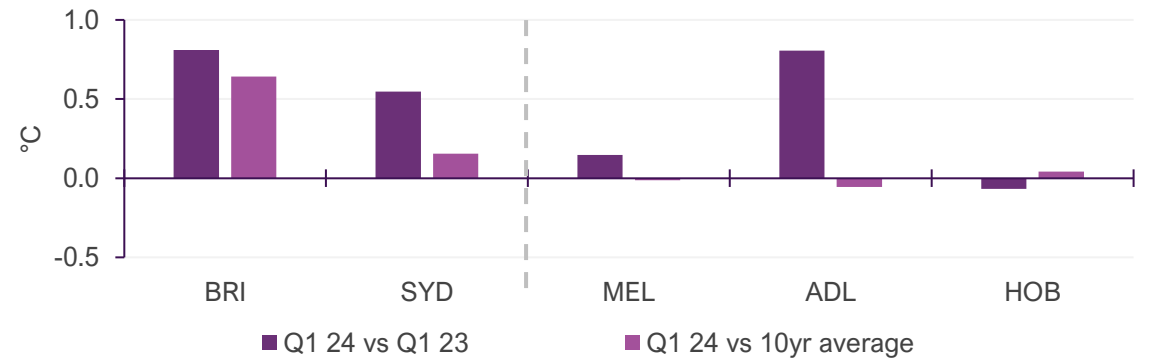
- Northern regions drive the NEM's operational demand increase

Changes in average demand components by region – Q1 2024 vs Q1 2023



- Minimums warmer than 10-year average in most mainland capital cities

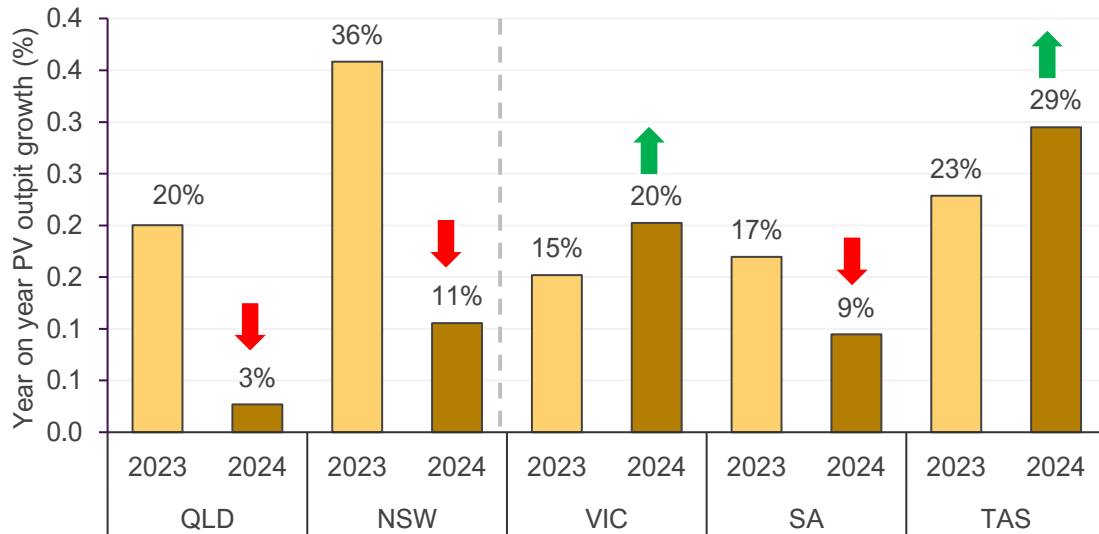
Average quarterly minimum temperature variance by capital city



Distributed PV output

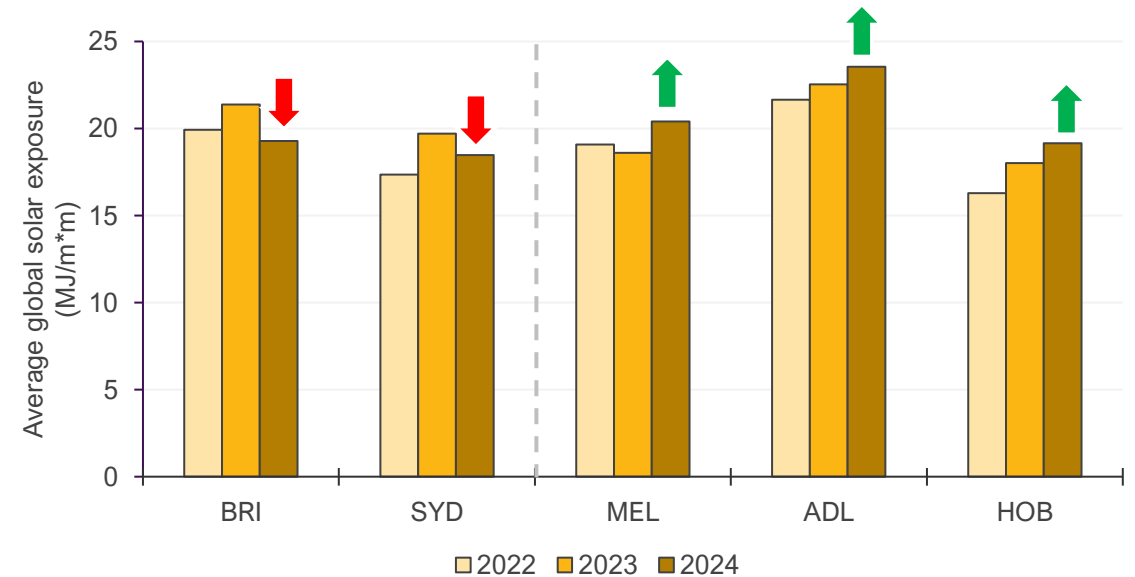
Significant drop in QLD's dPV growth while VIC and TAS saw increases

Distributed PV year on year growth (%) by region – Q1s



Incident sunlight levels fell in northern regions

Quarterly average global solar exposure by capital city (MJ/m²) – Q1s

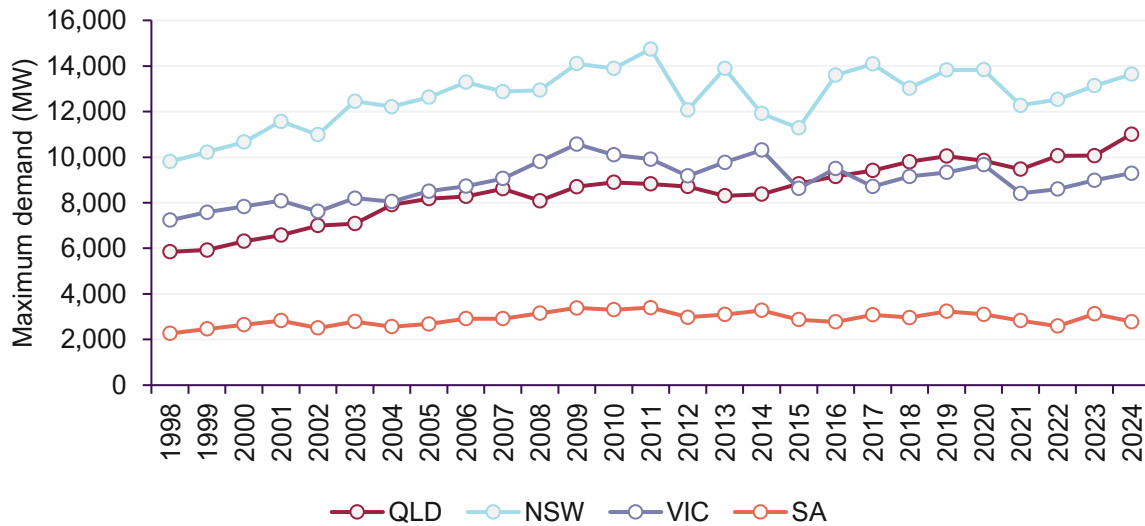


NEM	QLD	NSW	VIC	SA	TAS
3,270 MW	931 MW	1,050 MW	787 MW	445 MW	58 MW
+10%	+3%	+11%	+20%	+9%	+29%
Second-highest quarterly average	Highest Q1 average	Highest Q1 average	Highest quarterly average	Highest quarterly average	Highest quarterly average

Demand records

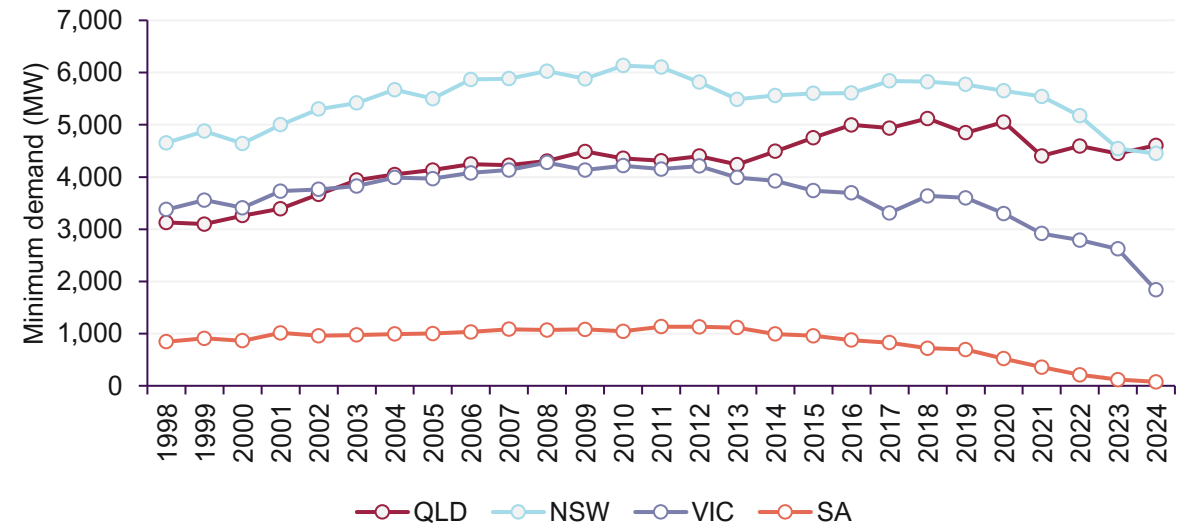
Maximum demand reached all-time high in Queensland

Q1 maximum operational demands for mainland regions



Minimum demands fell to Q1 lows in NSW, VIC and SA

Q1 minimum operational demands for mainland regions



Region	All-time Maximum Demand Record	Date	Move
NEM	32,973 MW (Since 2020)	22/2/2024 17:30:00 PM	+2,252 MW (+7.3%) from Q1 2023
QLD	11,005 MW	22/1/2024 17:00:00 PM	+935 MW (+9.3%) ↑

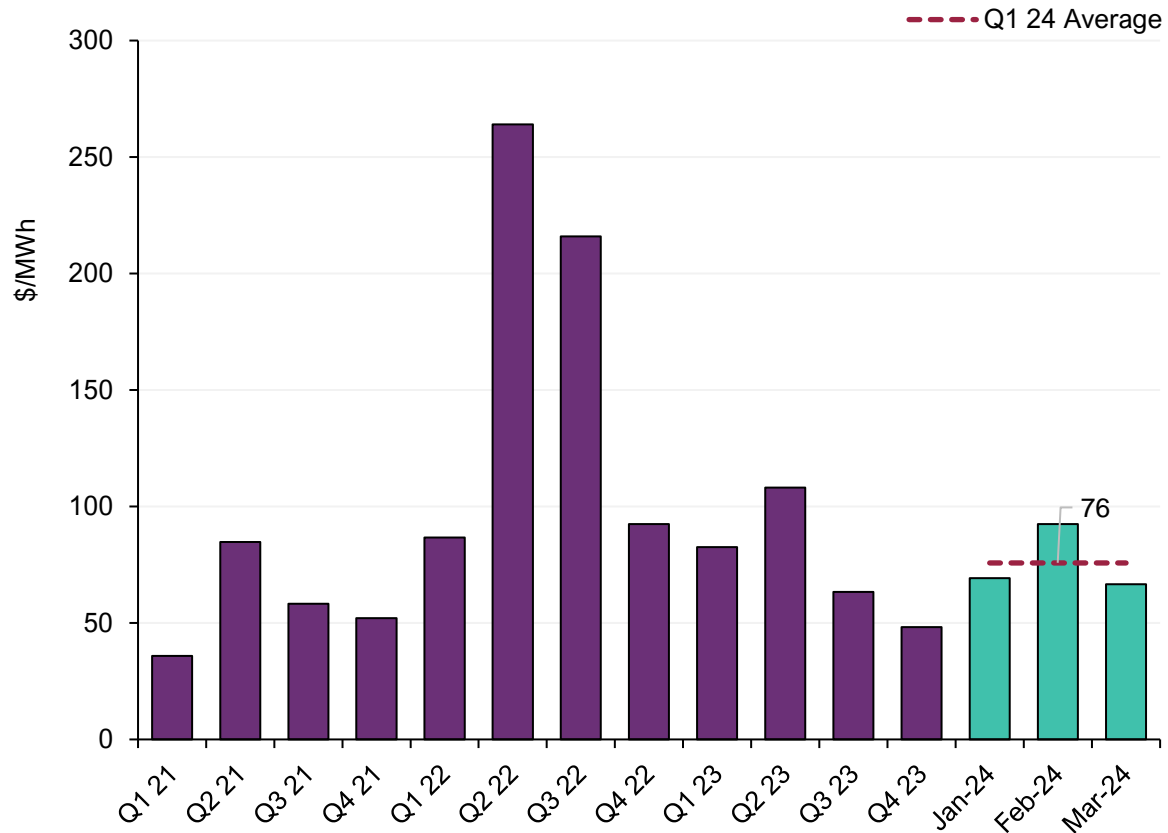
During the quarter, the operational demand in Queensland surpassed the previous record of 10,070 MW on **three** occasions.

Region	Minimum Q1 Demand Record	Date	Move
NEM	13,119 MW	30/3/2024 12:30:00 PM	-1,256 MW (-8.7%) ↓
NSW	4,449 MW	30/3/2024 12:00:00 PM	-96 MW (-2.1%) ↓
VIC	1,837 MW	1/1/2024 11:30:00 AM	-786 MW (-30.0%) ↓
SA	76 MW	24/2/2024 13:30:00 PM	-41 MW (-35.0%) ↓

Wholesale electricity prices

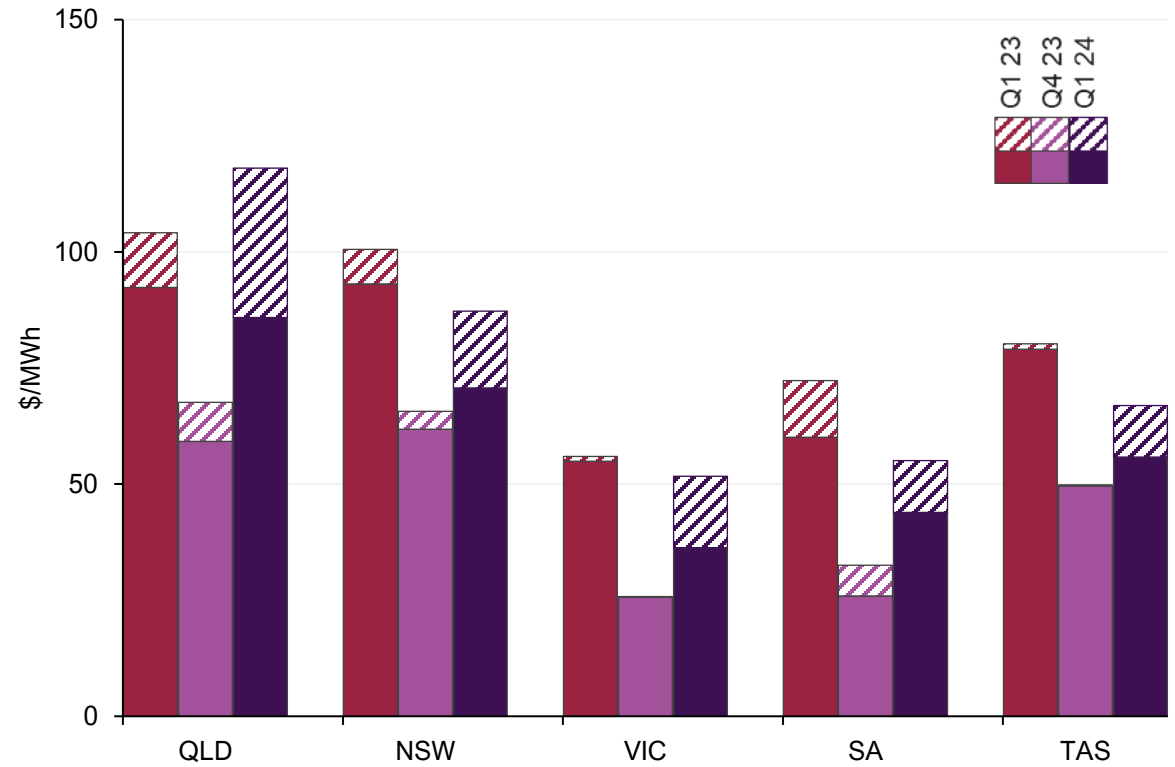
□ Average NEM prices down by 8% on Q1 2023, but up by 57% on Q4 2023

NEM average wholesale electricity prices – quarterly since Q1 2021



□ All regions except South Australia saw increased cap returns on Q1 2023

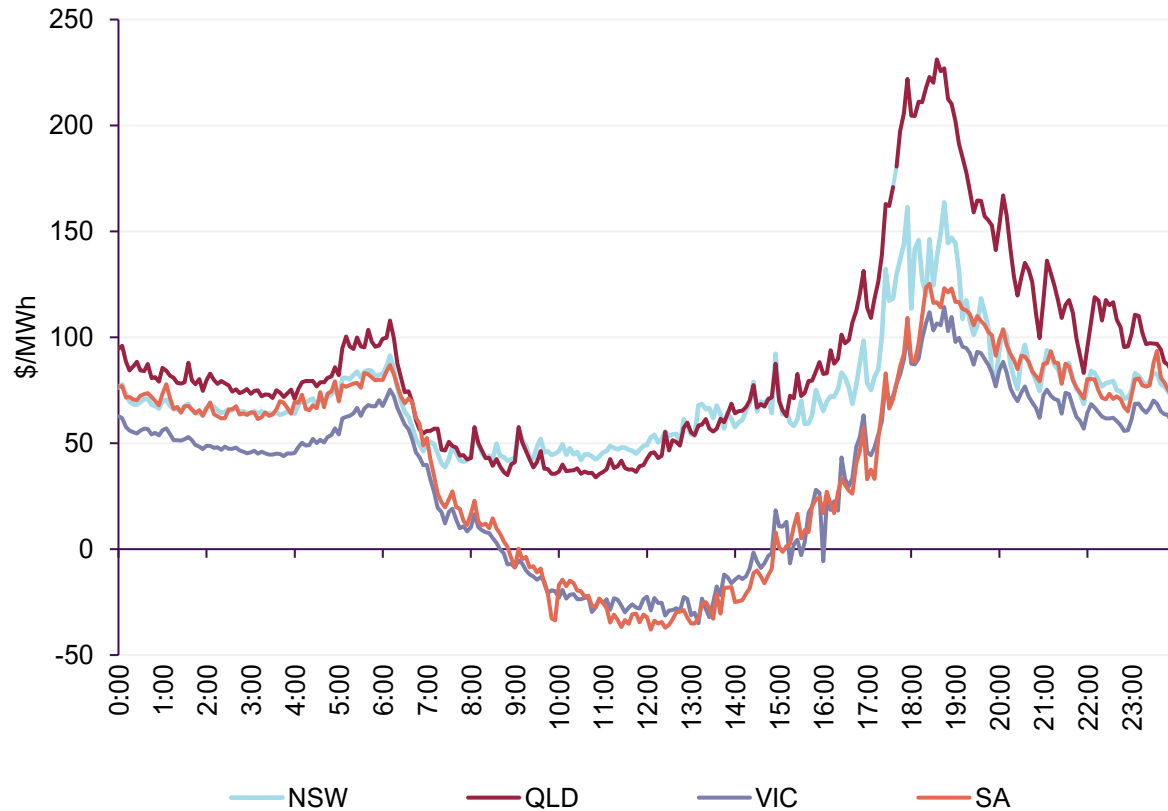
Wholesale electricity spot price by region – energy and cap return components for selected quarters



Regional price dynamics

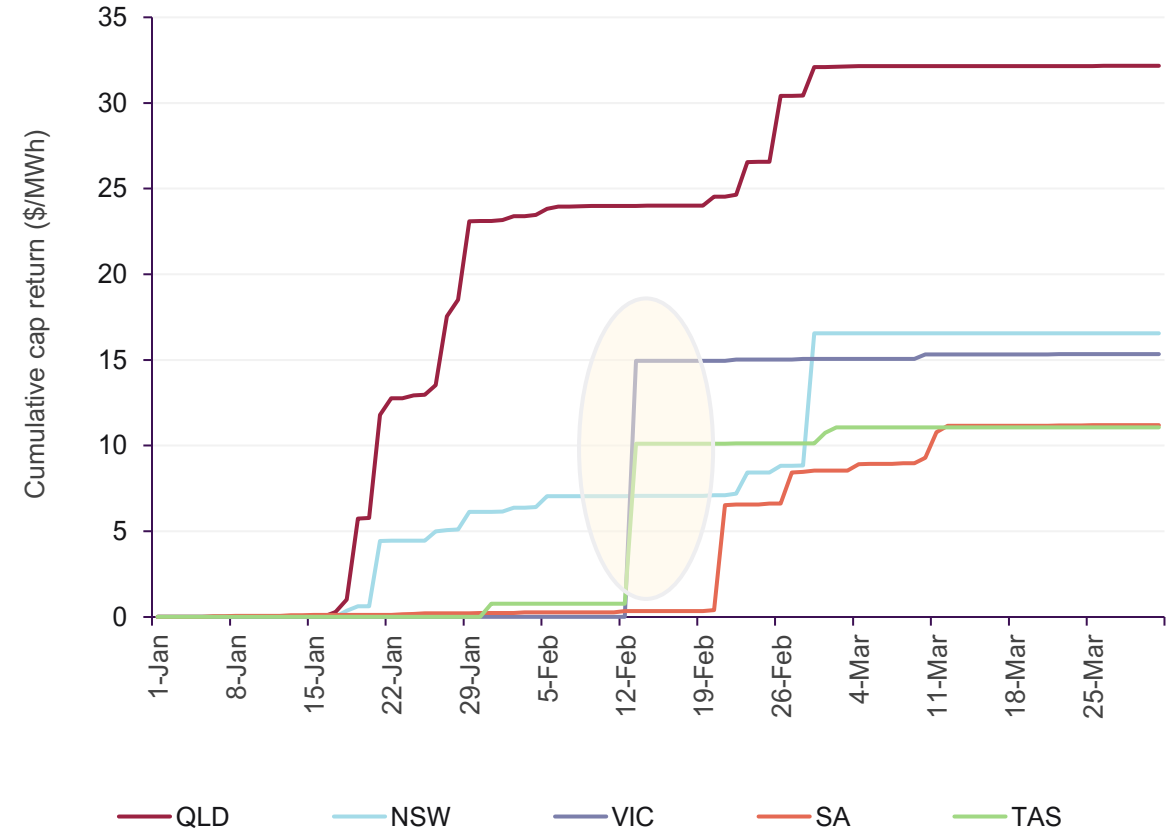
Price separation between northern and southern regions widened in daytime hours

Average regional energy price by time of day – Q1 2024



Northern regions saw high volatility events across the quarter, contrasted by a surge in Victoria and Tasmania on 13 February

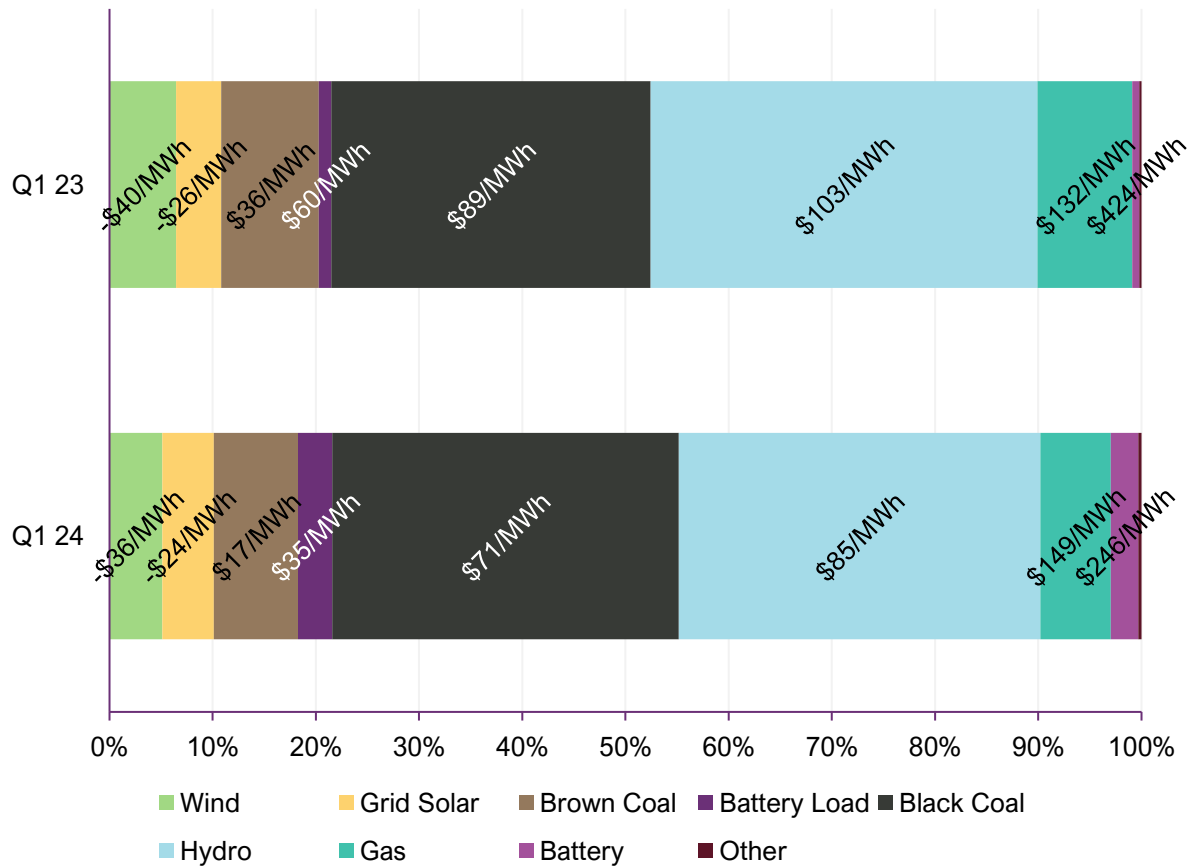
Cumulative cap return by region - Q1 2024



Price setting dynamics

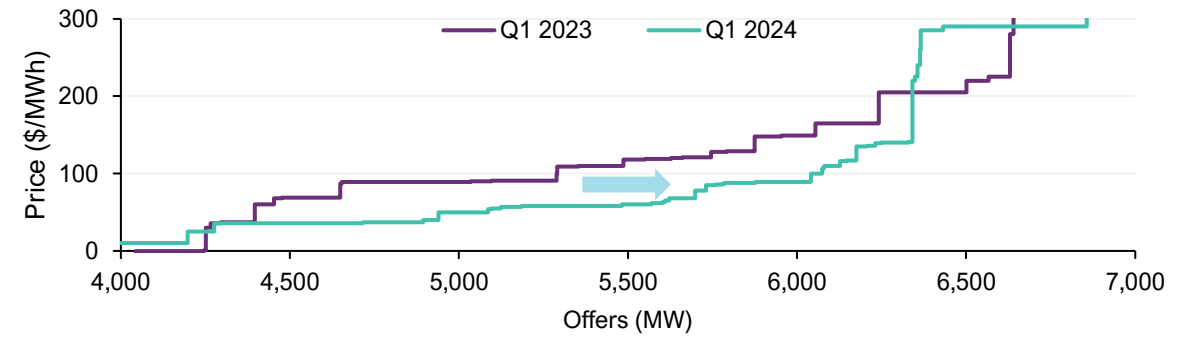
□ Average prices set by coal and batteries dropped but rose for VRE and gas

Price-setting frequency and average price when price-setter by fuel type – Q1 2023 vs Q1 2024



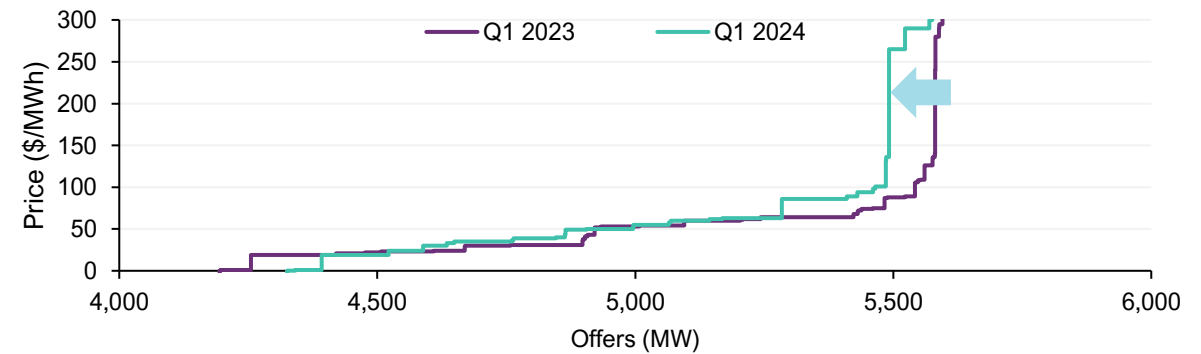
□ Higher black coal offer volumes between \$30/MWh and \$200/MWh in NSW

New South Wales black coal bid supply curve – Q1 2024 vs Q1 2023



□ Lower black coal offer volumes between \$25/MWh and \$300/MWh in QLD

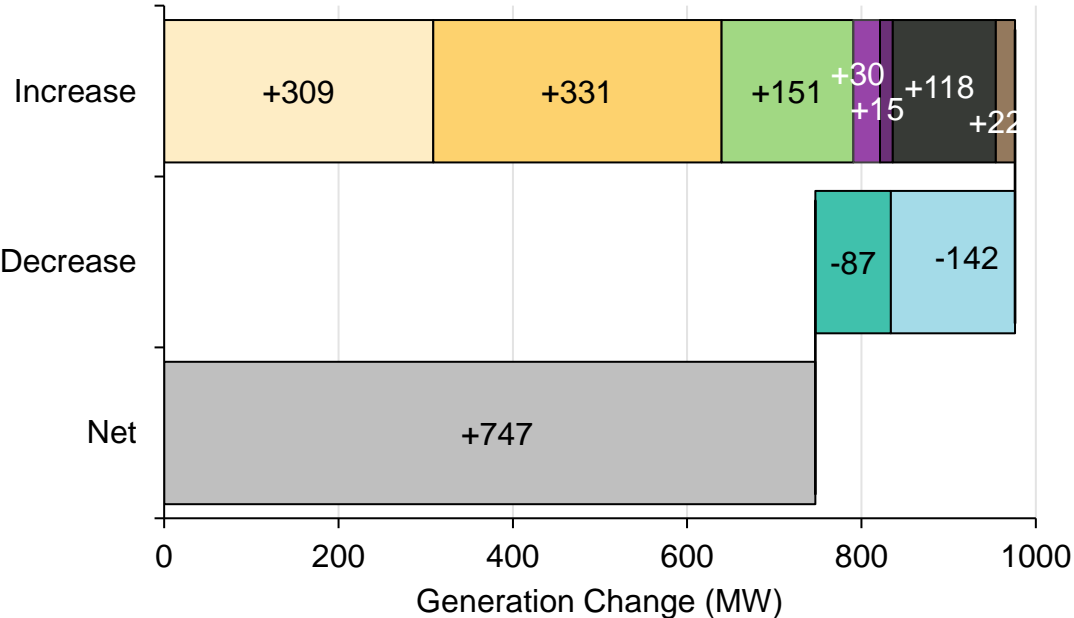
Queensland black coal bid supply curve – Q1 2024 vs Q1 2023



Generation change year-on-year

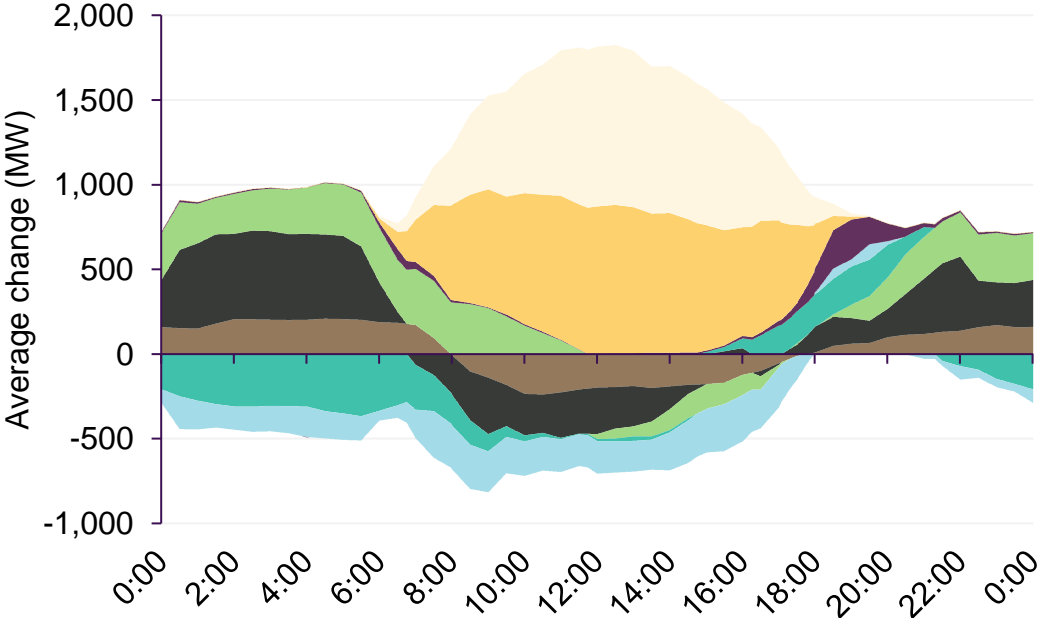
☐ All fuel types saw increased output, except gas and hydro

Change in NEM supply by fuel type – Q1 2024 vs Q1 2023



☐ VRE output increased during the day, pushing down gas, coal, and hydro output

NEM generation changes by time of day – Q1 2024 vs Q1 2023



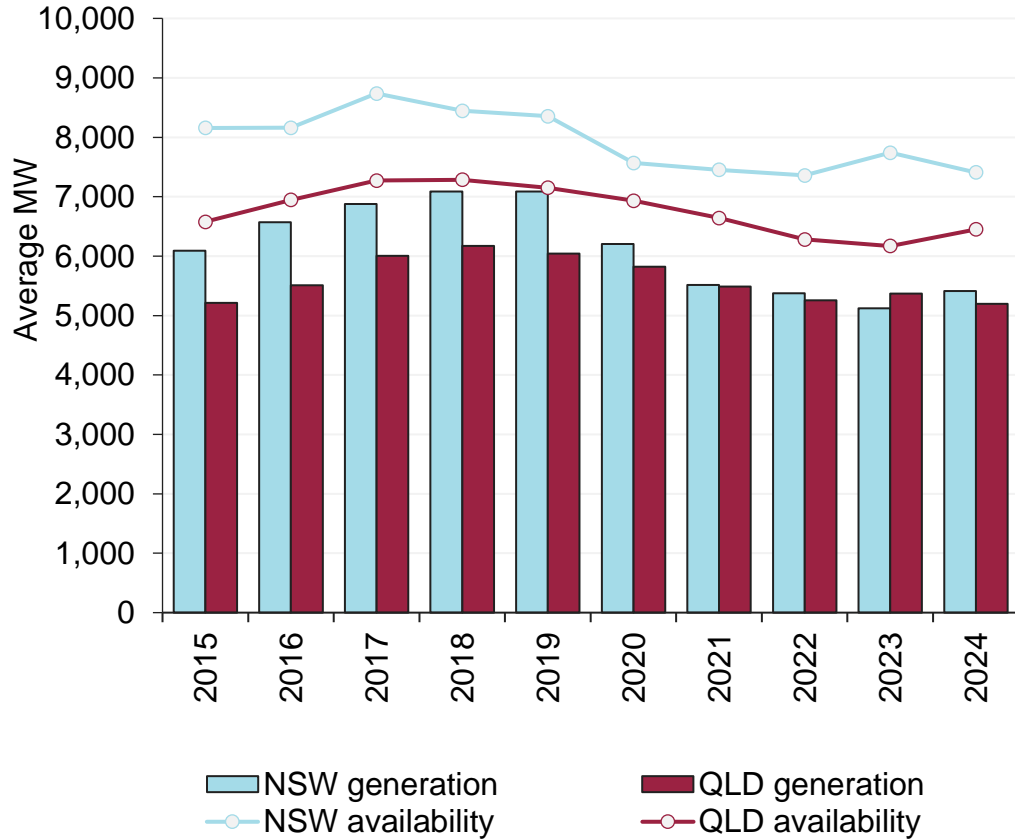
- ☐ Distributed PV
- ☐ Grid Solar
- ☐ Wind
- ☐ Battery
- ☐ Other
- ☐ Black Coal
- ☐ Brown Coal
- ☐ Gas
- ☐ Hydro
- ☐ Net

- ☐ Brown Coal
- ☐ Black Coal
- ☐ Wind
- ☐ Gas
- ☐ Hydro
- ☐ Battery
- ☐ Grid Solar
- ☐ Distributed PV

Black coal and gas-fired output

Black coal-fired generation down in QLD, but up in NSW

Quarterly average black coal-fired generation and availability by region (including decommissioned units) – Q1s



Gas-fired generation reduced to its lowest Q1 level since 2004

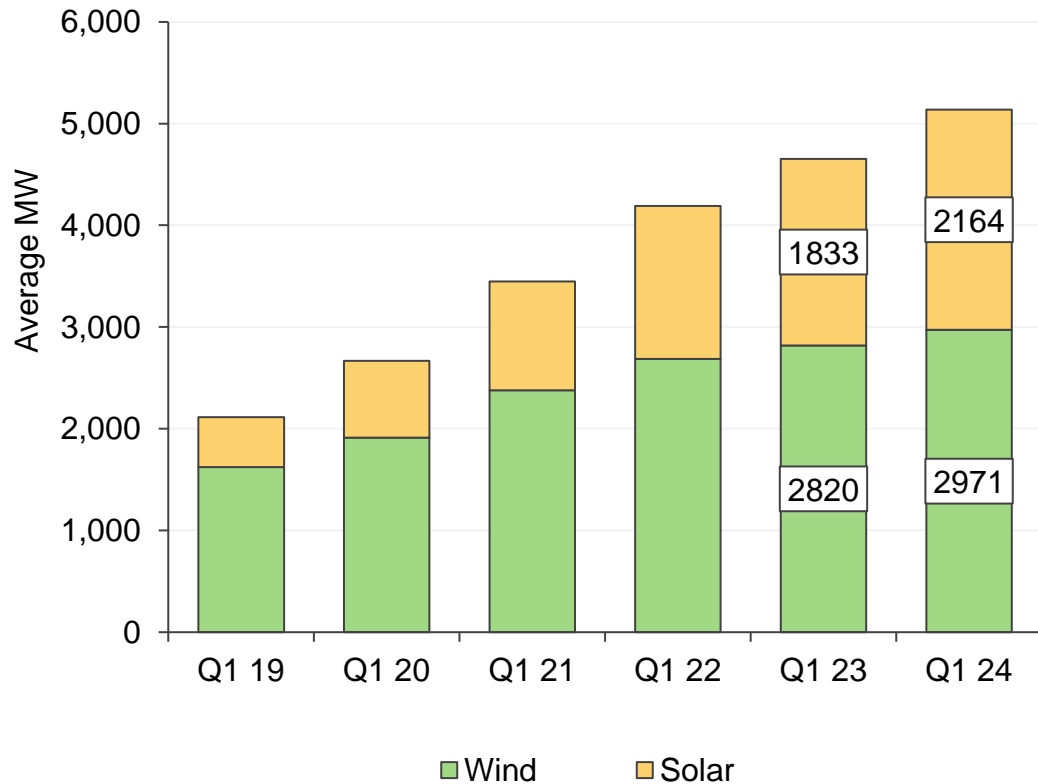
Average gas-fired generation by region – Q1s



Wind and solar output

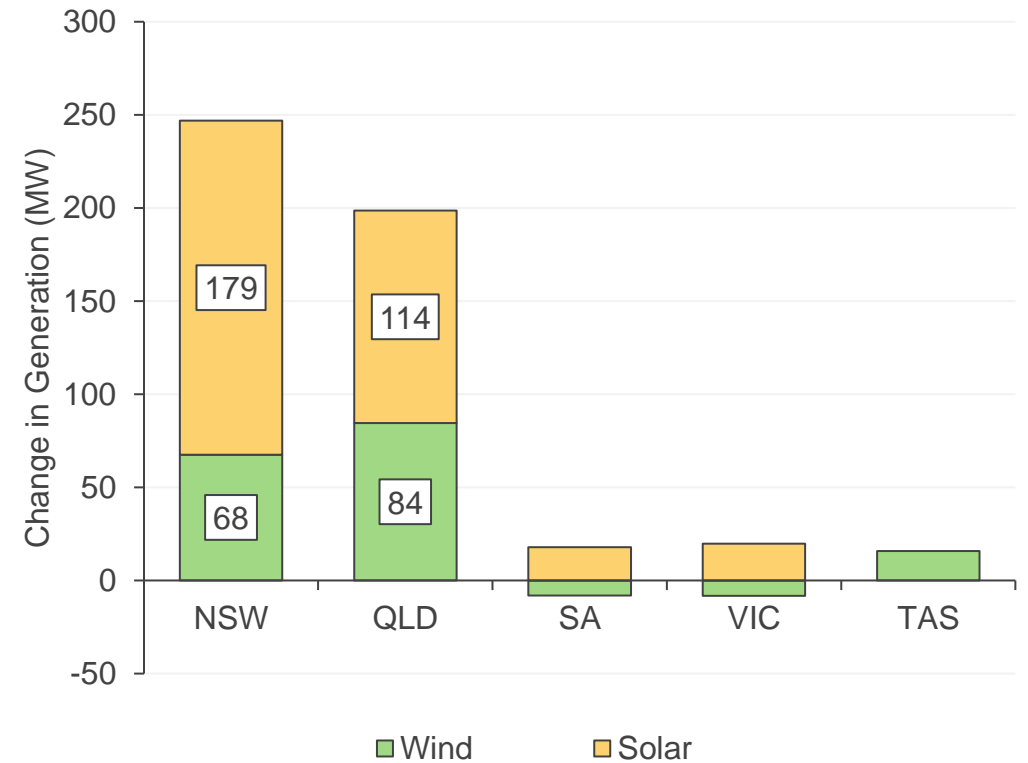
Steady VRE growth continued

Average quarterly VRE generation by fuel type – Q1s



VRE increases led by QLD and NSW

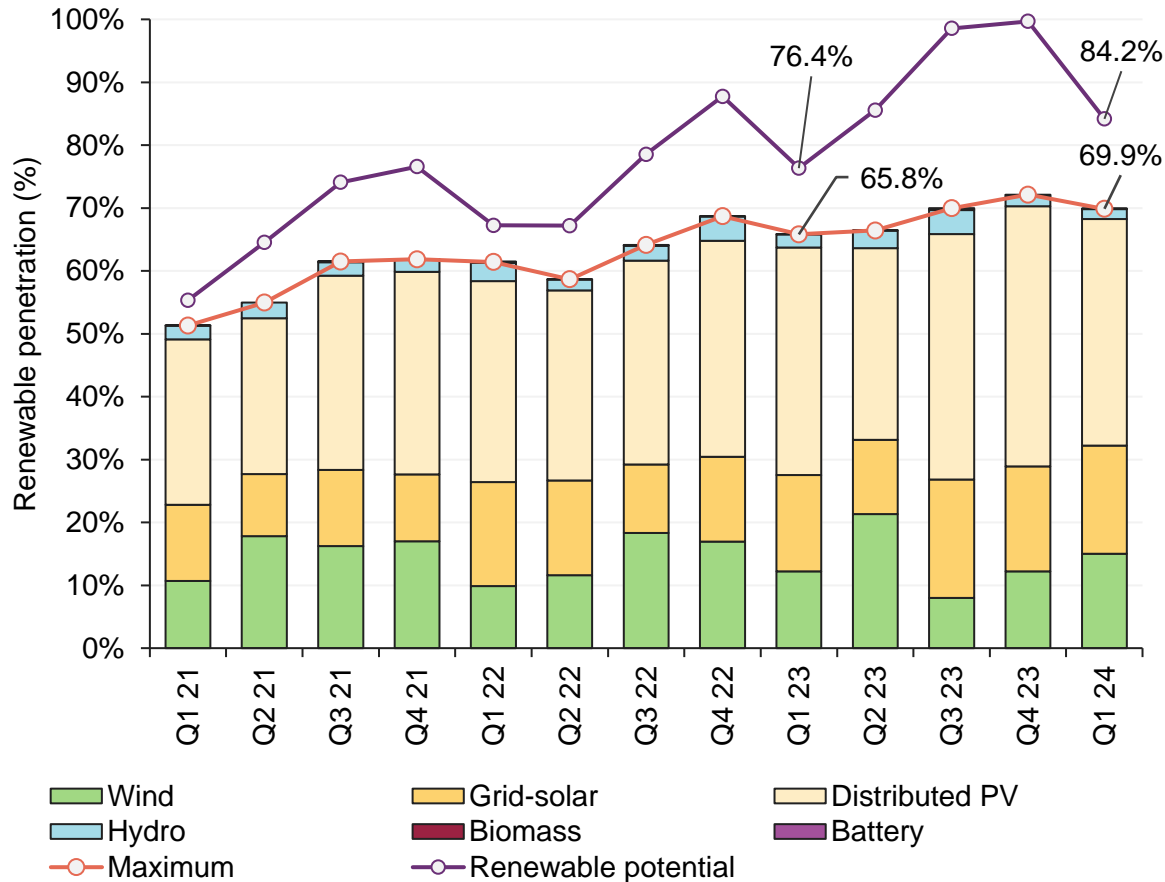
Average MW change in output – Q1 2024 vs Q1 2023



Renewable output

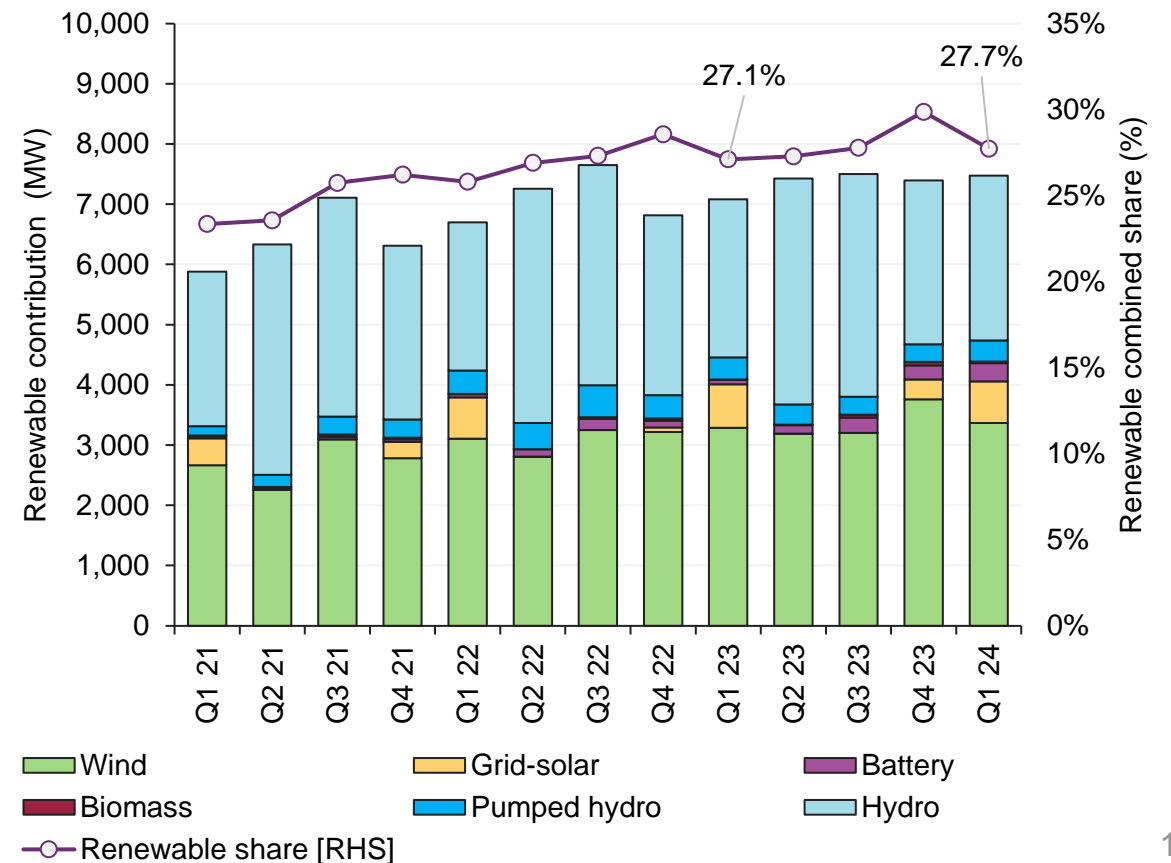
Instantaneous penetration reduced with an increasing contribution from wind

Maximum instantaneous percentage of NEM supply from renewable energy sources



YOY increase in renewable contribution to meeting daily maximum demand

Average renewable contribution and combined share at time of daily maximum operational demand

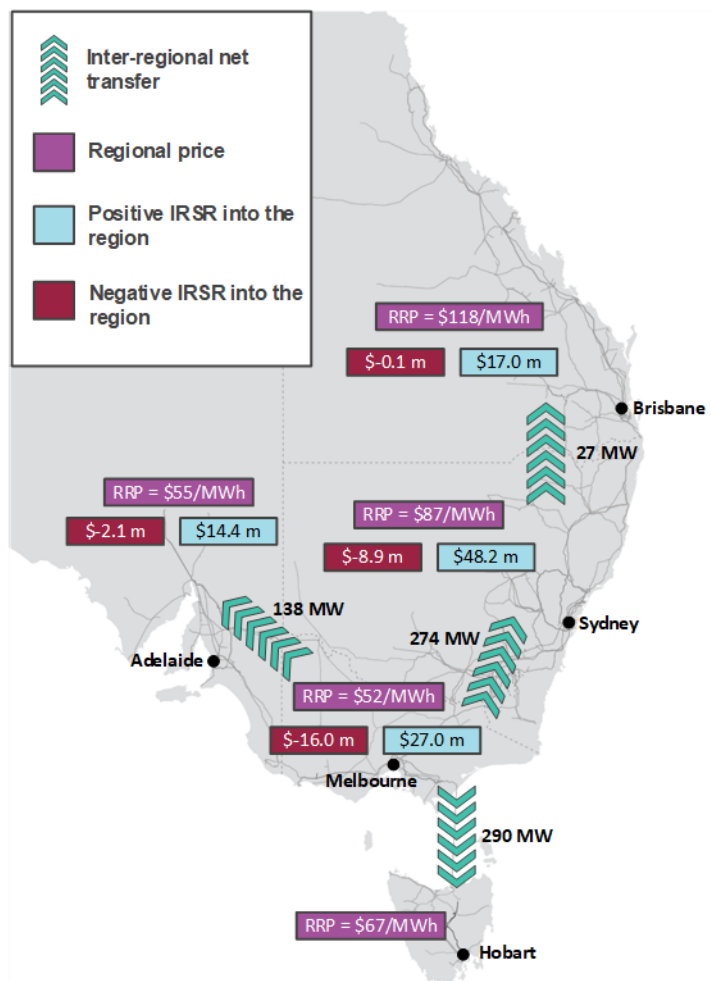


Break for Q&A



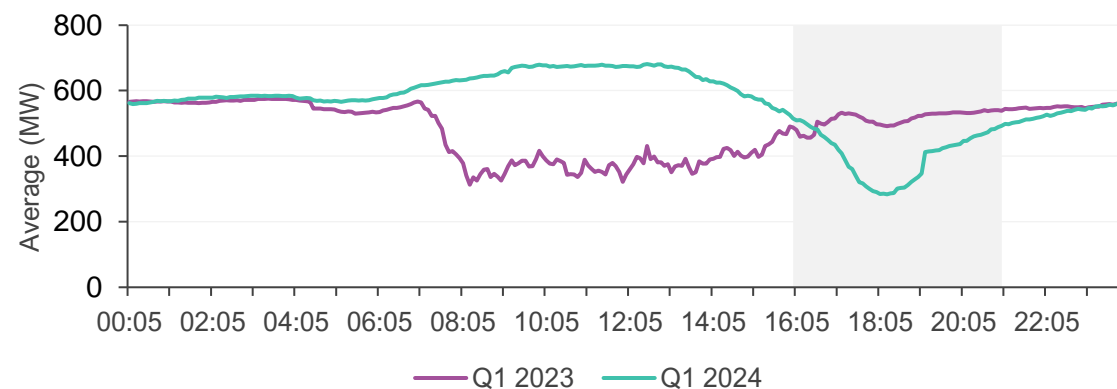
Inter-regional transfers and settlement residues

- Inter-regional transfers, regional reference price, and settlement residues



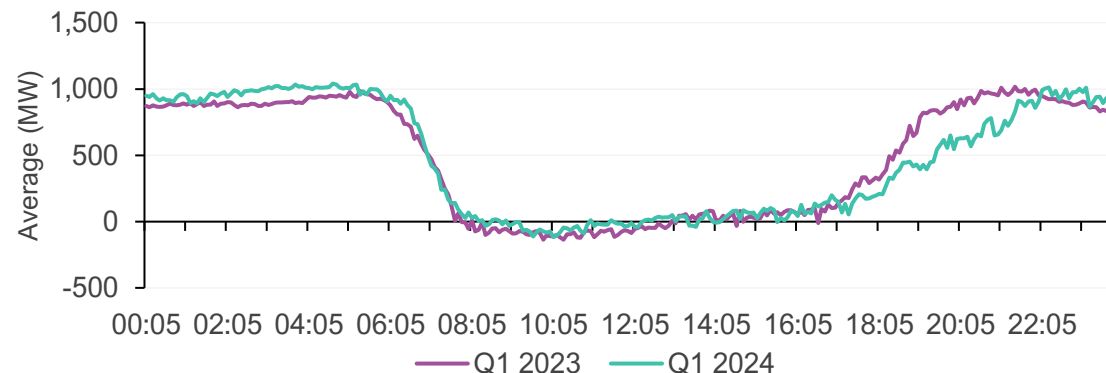
- QNI export limit significantly reduced during the evening peak

Average QNI export limit when binding, by time of day



- VNI export limit constraints extending past daylight hours

Average VNI export limit when binding, by time of day



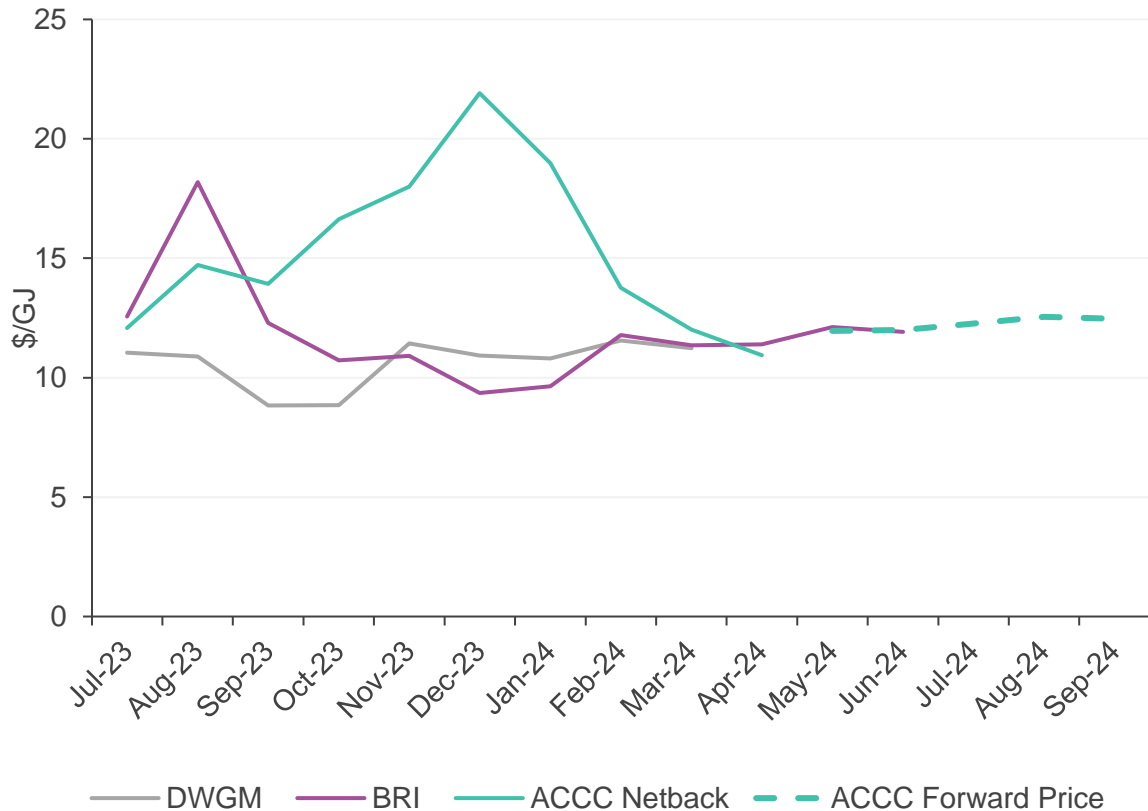
Gas market dynamics



East coast gas prices and demand

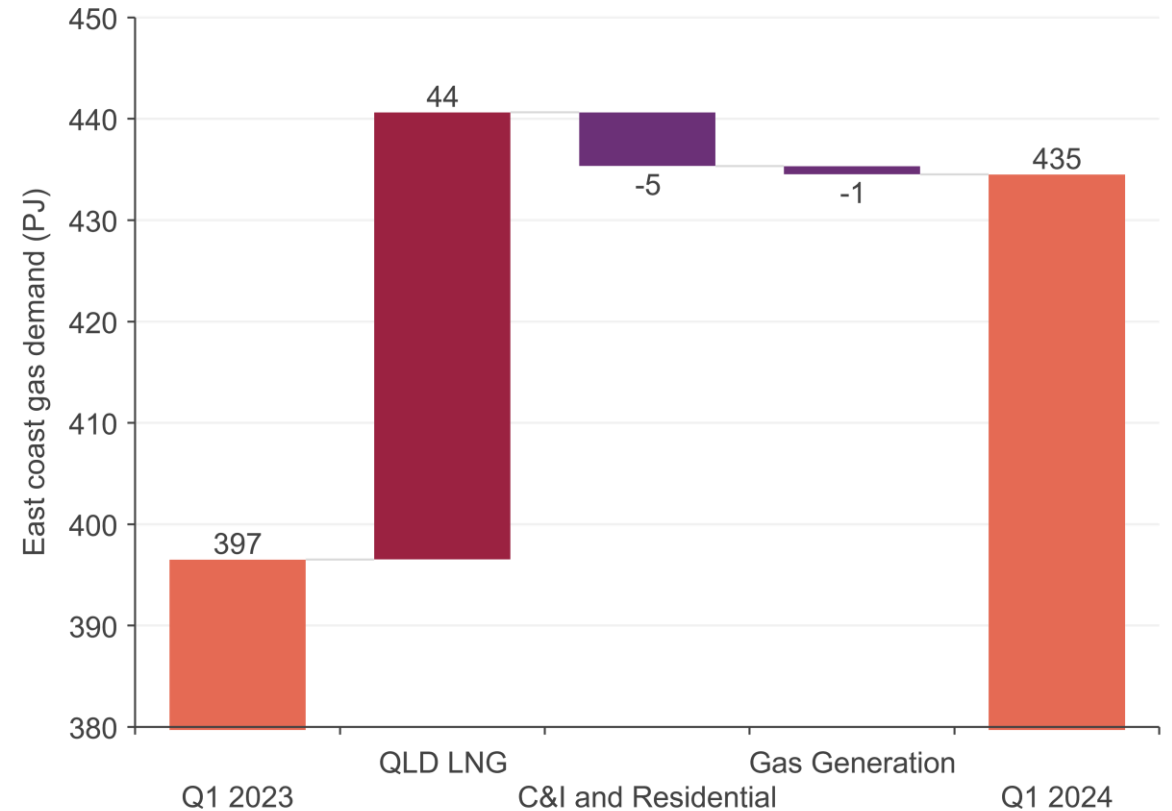
□ Convergence between domestic gas prices and ACCC netback prices during Q1 2024.

DWGM and Brisbane average price compared to ACCC LNG Netback price



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

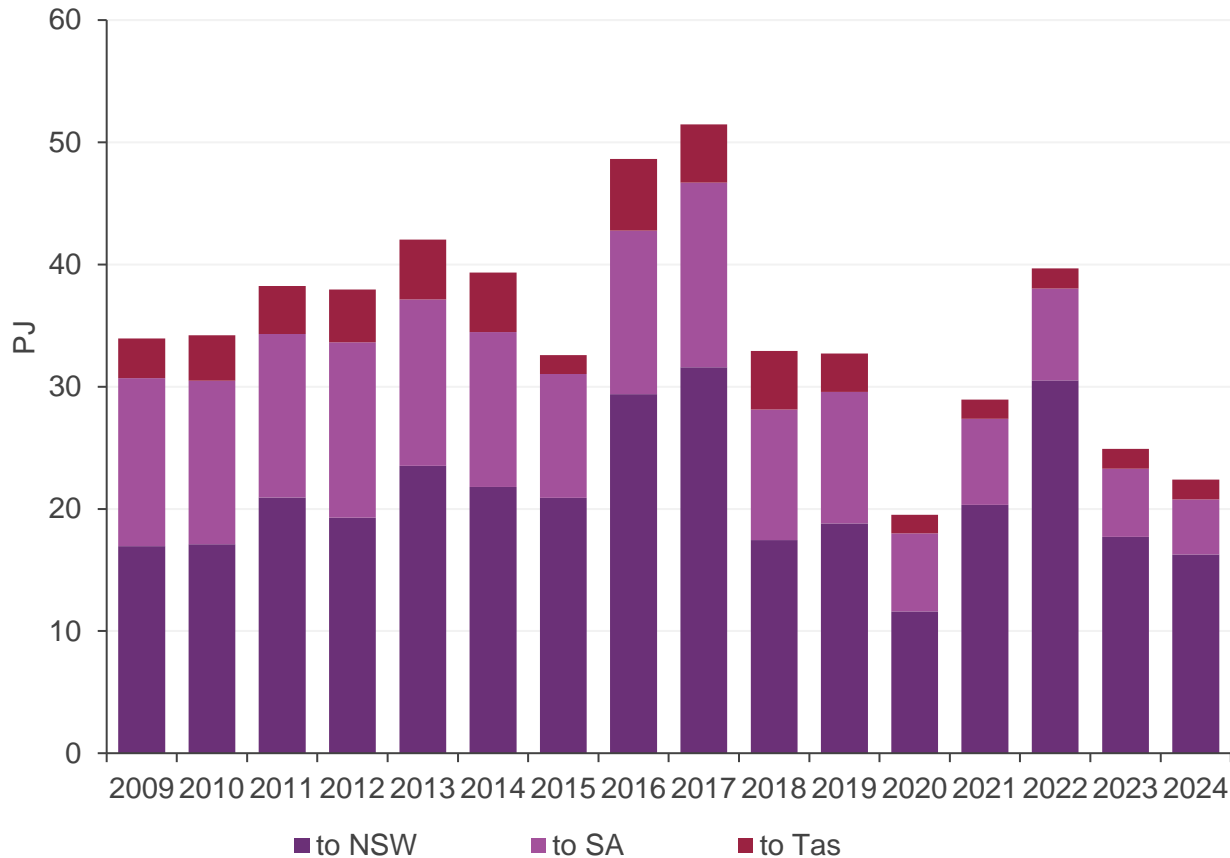
Components of east coast gas demand change – Q1 2023 to Q1 2024



Victorian exports continue to decline while Queensland supply increases

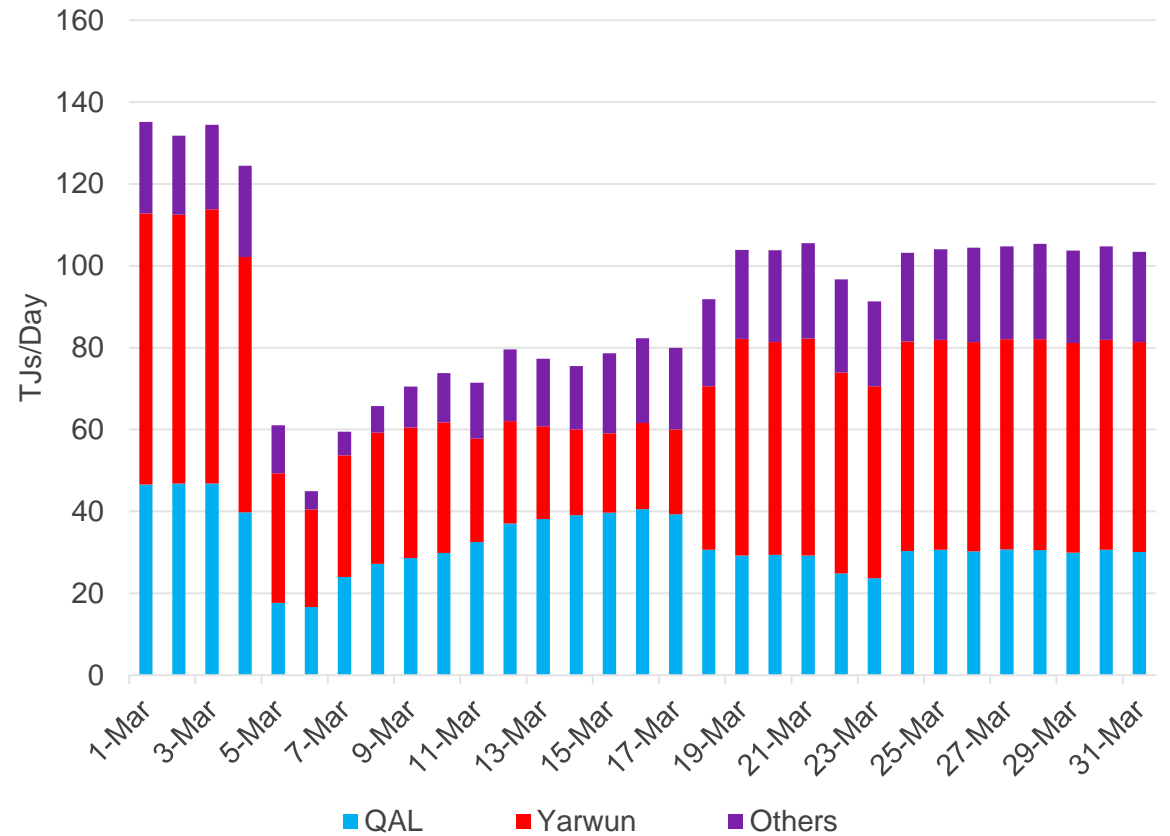
□ Second lowest Q1 Vic gas exports overall, since data reporting began.
 Lowest if you exclude 2020

Victorian net gas transfers to other regions – Q1s



□ Result of the QGP event from March 2024

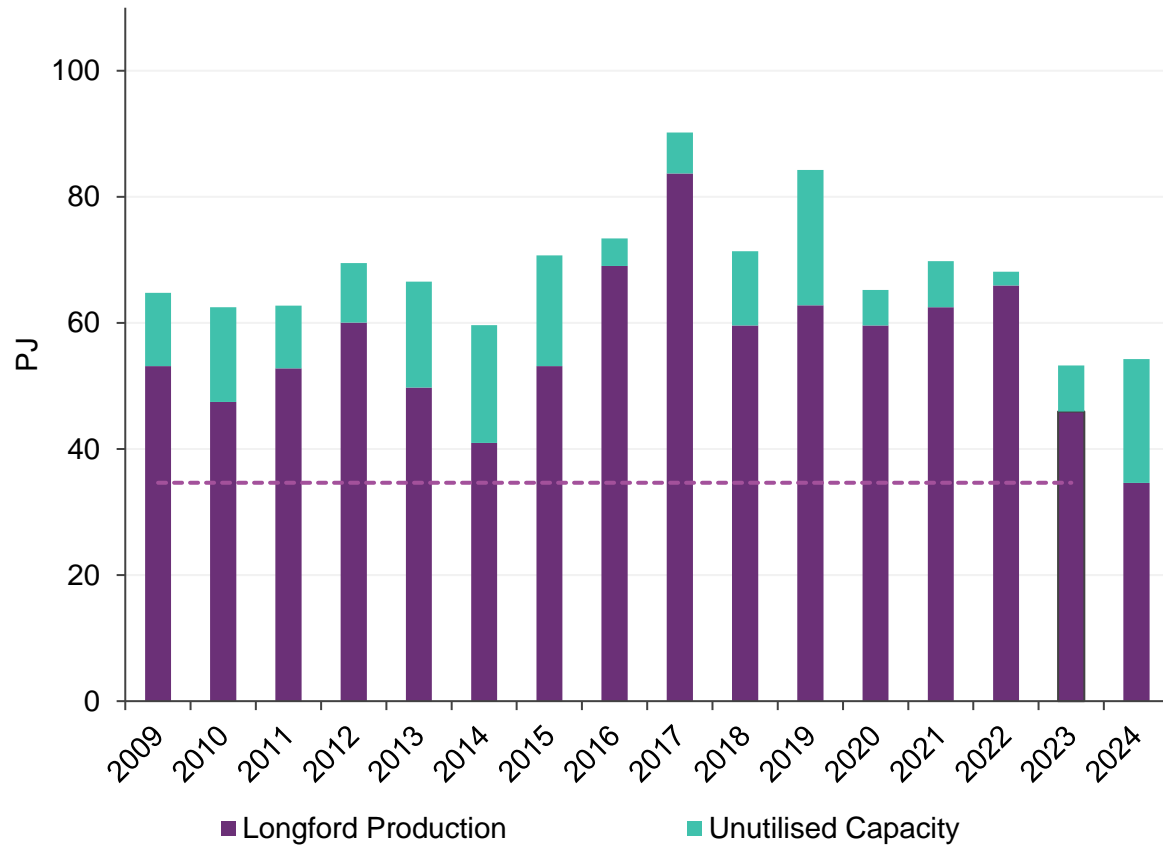
Delivery impacts to customers on the QGP



Longford aggregate and daily production continues to decline

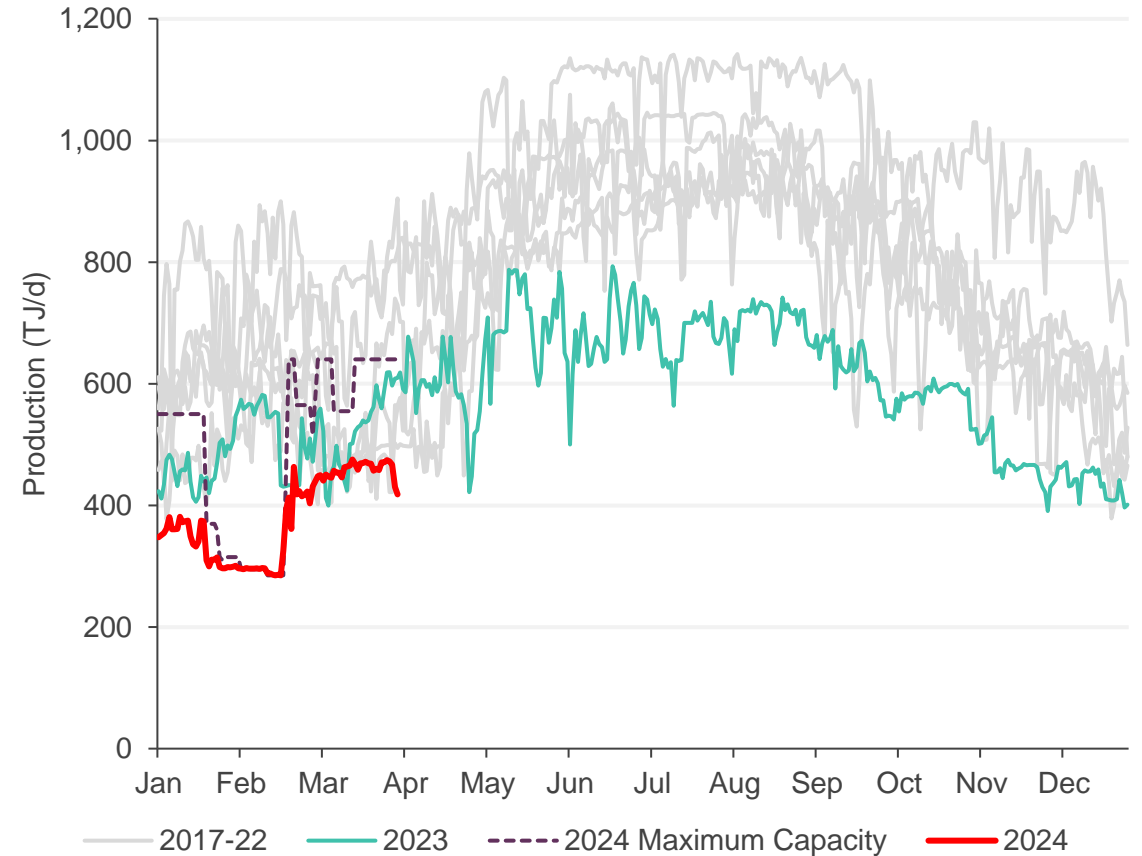
Lowest Longford Q1 production since data reporting began

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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