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Energy
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MEIxAEMO Seminar Series

Quarterly Energy Dynamics report: Q1 2023

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Q1 2023 Overview

NEM Q1 2023 Highlights

- Q1 operational demand falling to it's lowest Tasmania joined NEM
- Record high distributed PV average quarterly output
- Wholesale prices returning to historic levels; averaging \$83/MWh in Q1 2023
- Continued price separation between northern and southern regions in the NEM
- Increased renewable generation, decreased thermal generation
- Increased VRE curtailment

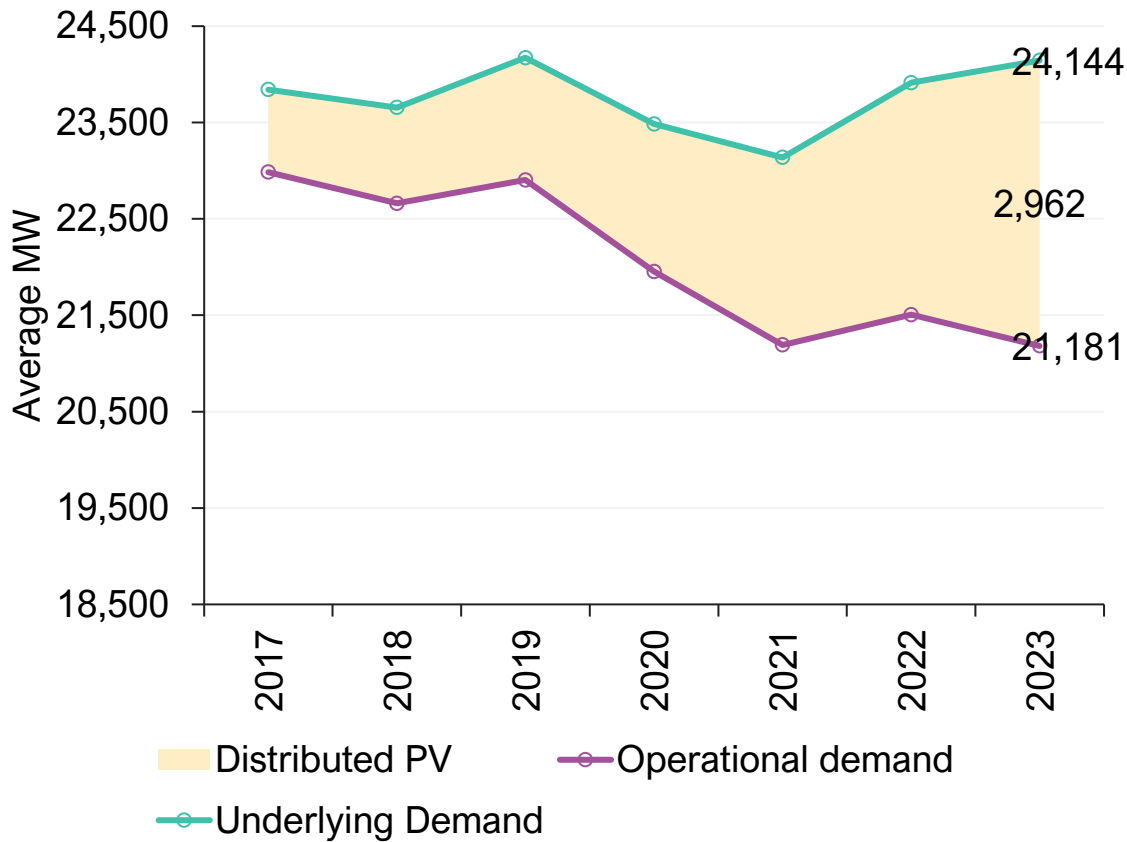
East Coast Gas Markets Highlights

- East coast gas prices declining from Q4 2022, but still at record levels for Q1
- Gas demand at lowest Q1 levels since 2016
- Production issues continue at QCLNG's LNG export facility, leading to additional QLD supply into the domestic market
- Iona Underground Gas Storage facility at near capacity at the end of Q1

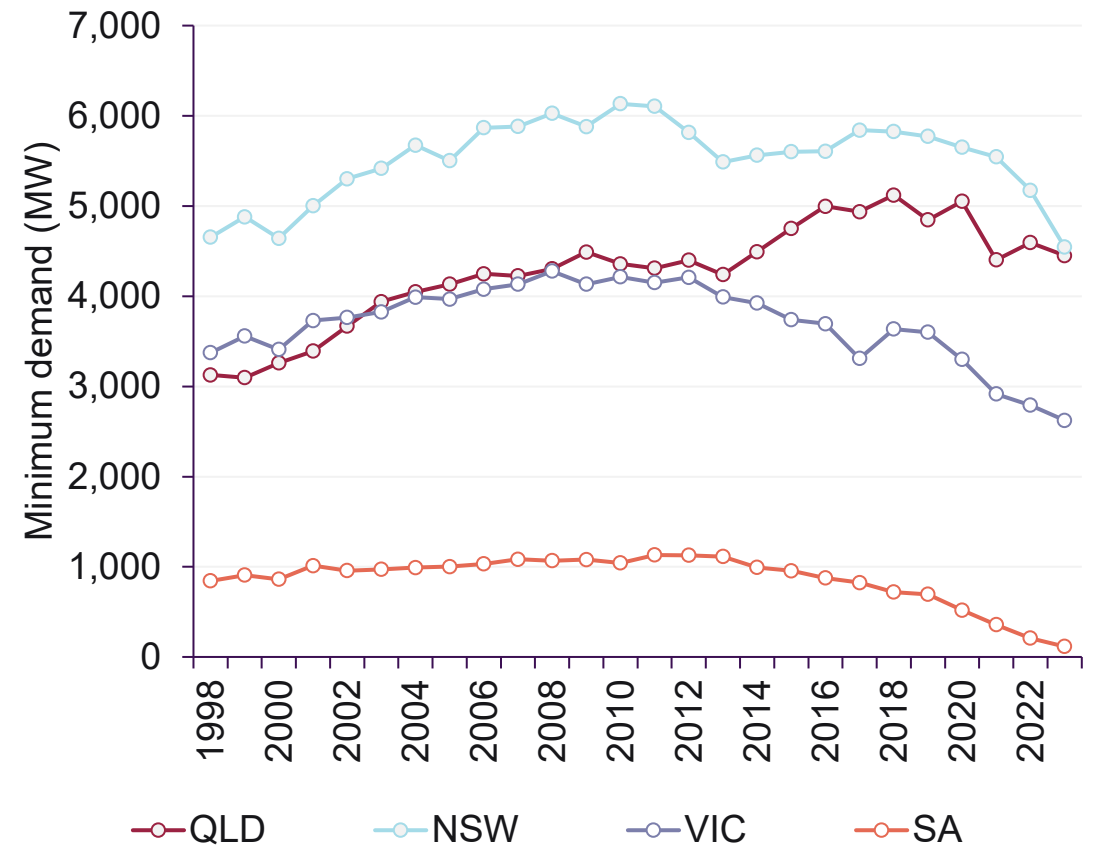
Operational Demand

Operational demand decreases despite increase in underlying demand

NEM average operational and underlying demand Q1

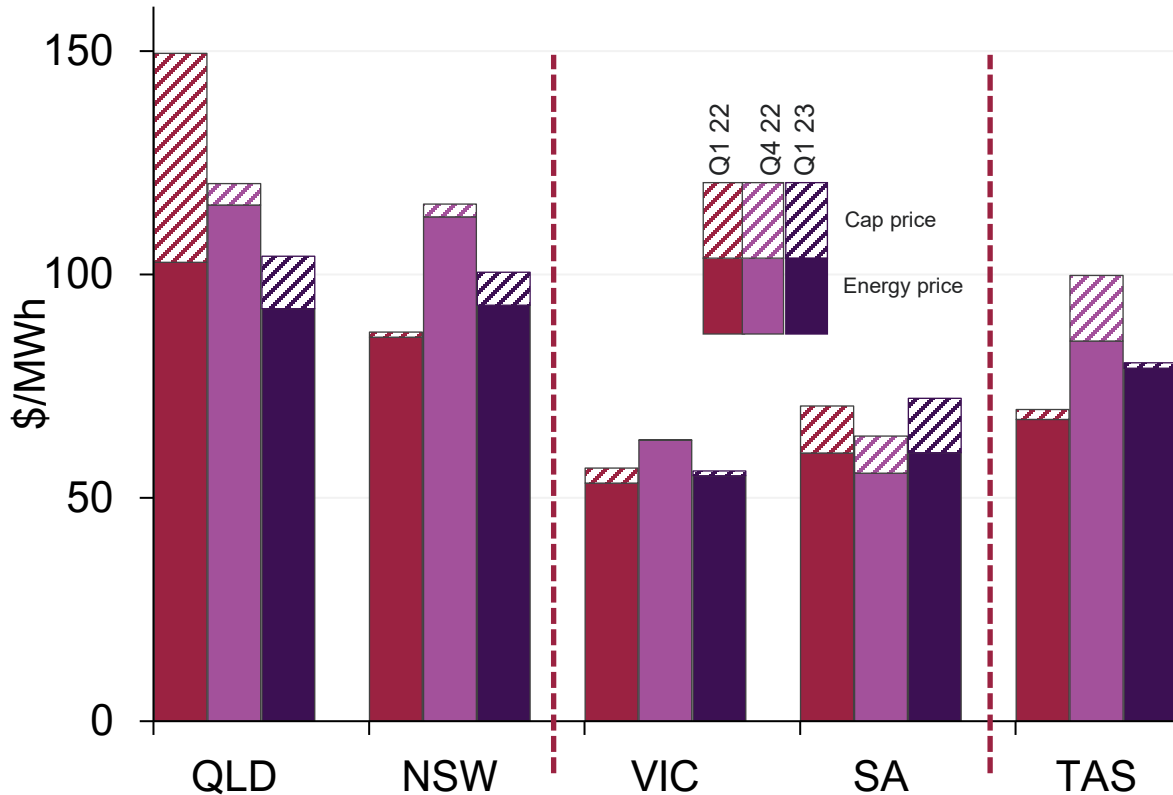


Record Q1 minimum demand in NSW, VIC & SA
Q1 minimum operational demands for mainland regions

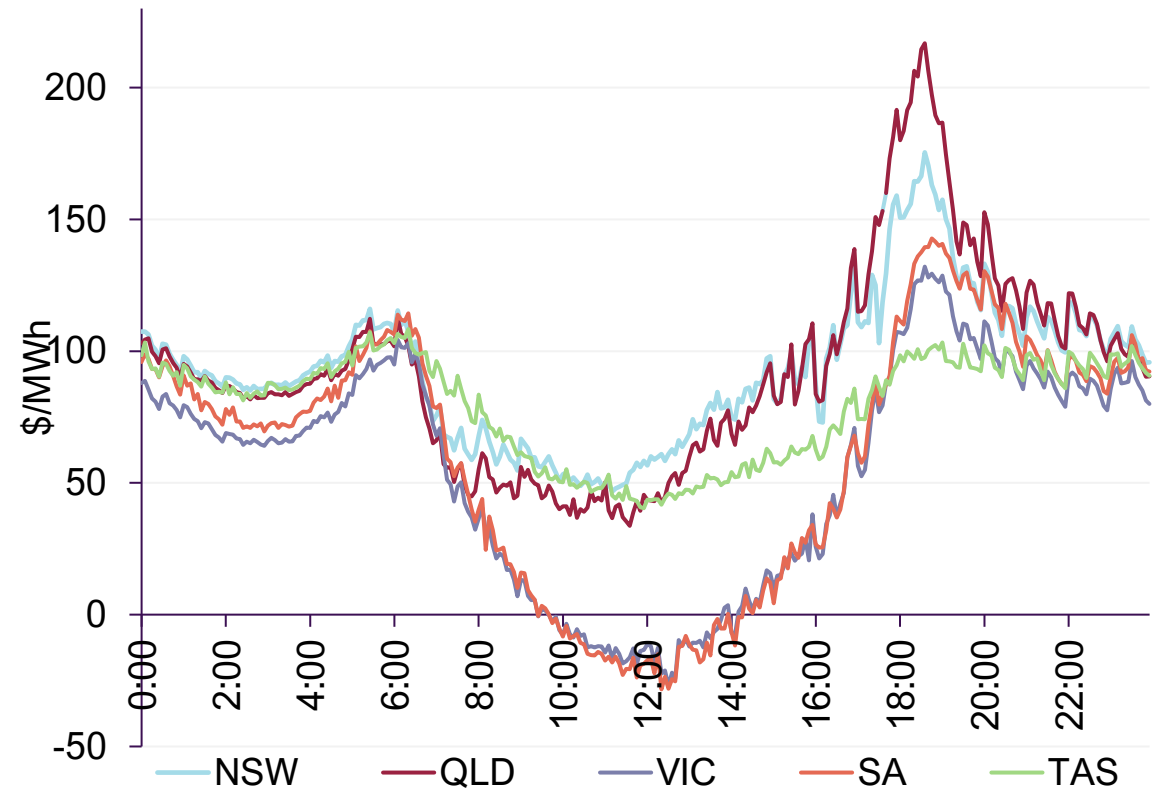


Prices vary across regions

Price divide between northern and southern regions
Q1 23 Average spot prices – energy and cap

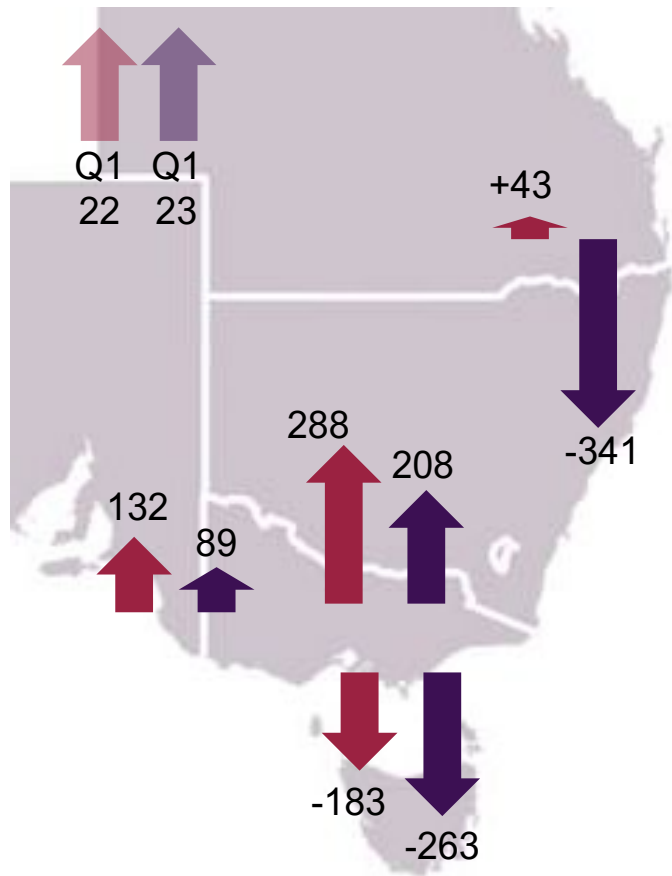


Daytime prices in Vic and SA average negative
Average NEM energy prices by time of day – Q1 2023

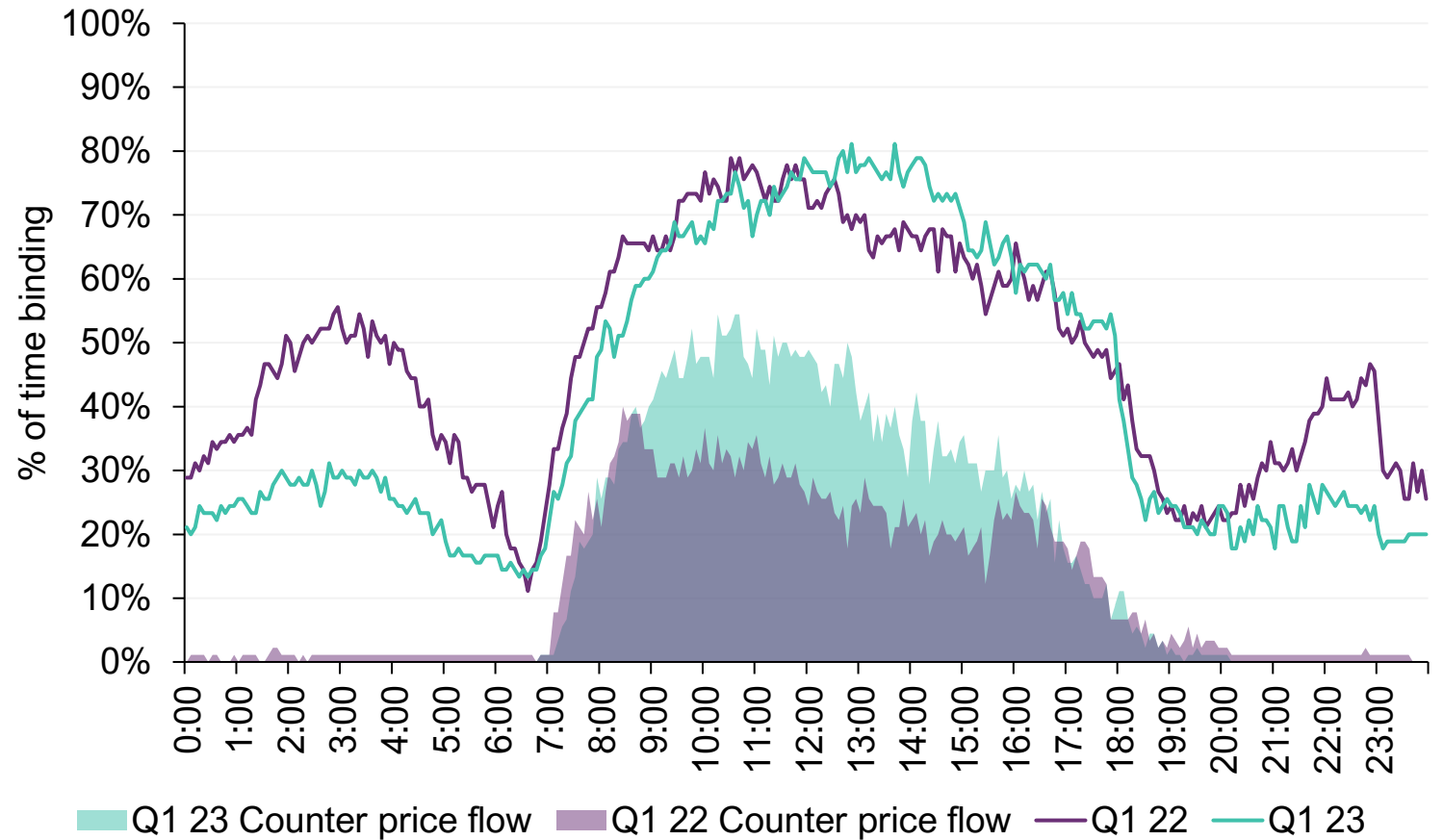


Interconnector flows

Interconnector flows has tended southwards
 Quarterly inter-regional transfers



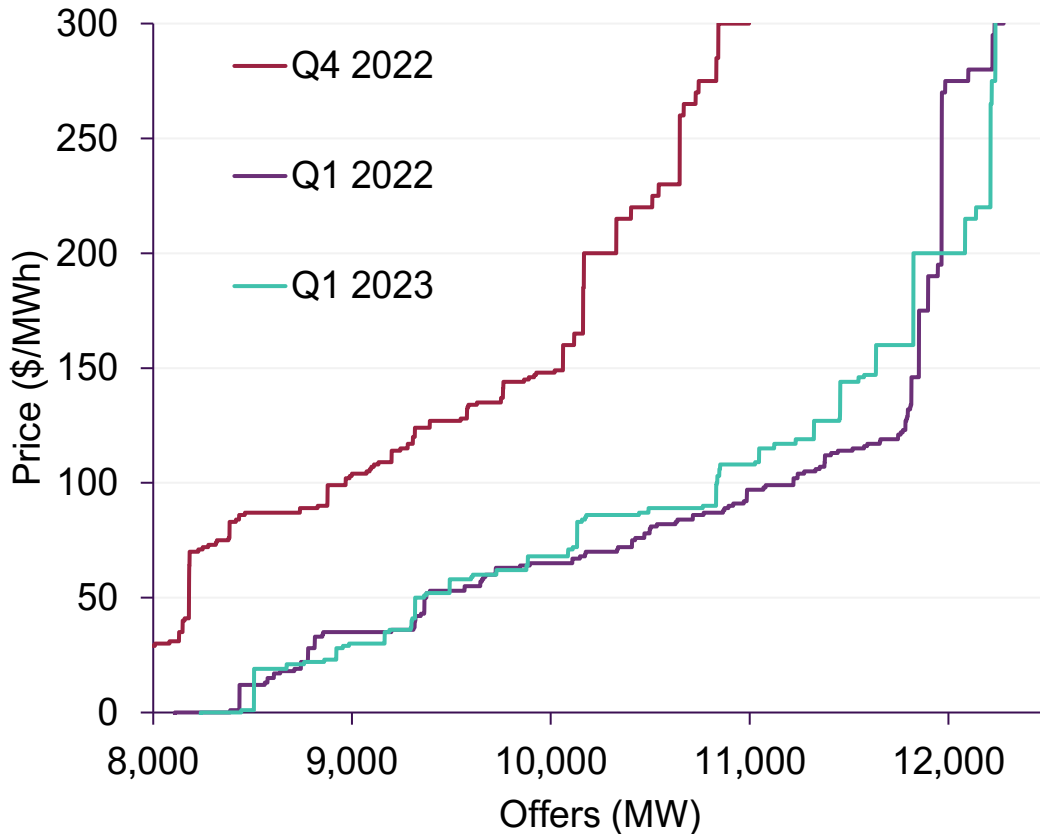
Increased frequency of counter-price flows from NSW to Vic
 % of time VNI export bound by time of day – Q1 2023 vs Q1 2022



Lower coal-fired generation offers

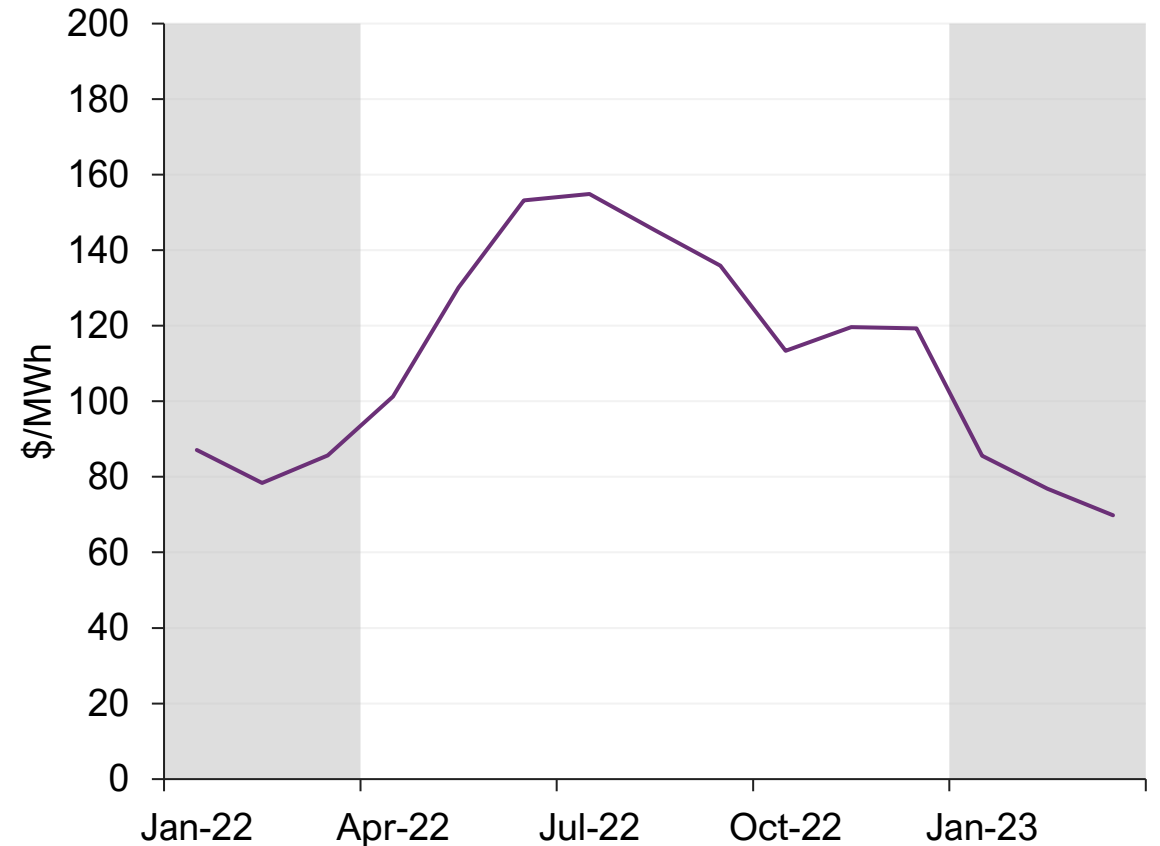
Black coal offer curves similar to Q1 2022 levels

Black coal generation bid supply curve – Q4 22, Q1 22 and Q1 23



Black coal-fired generator marginal offer pricing declines

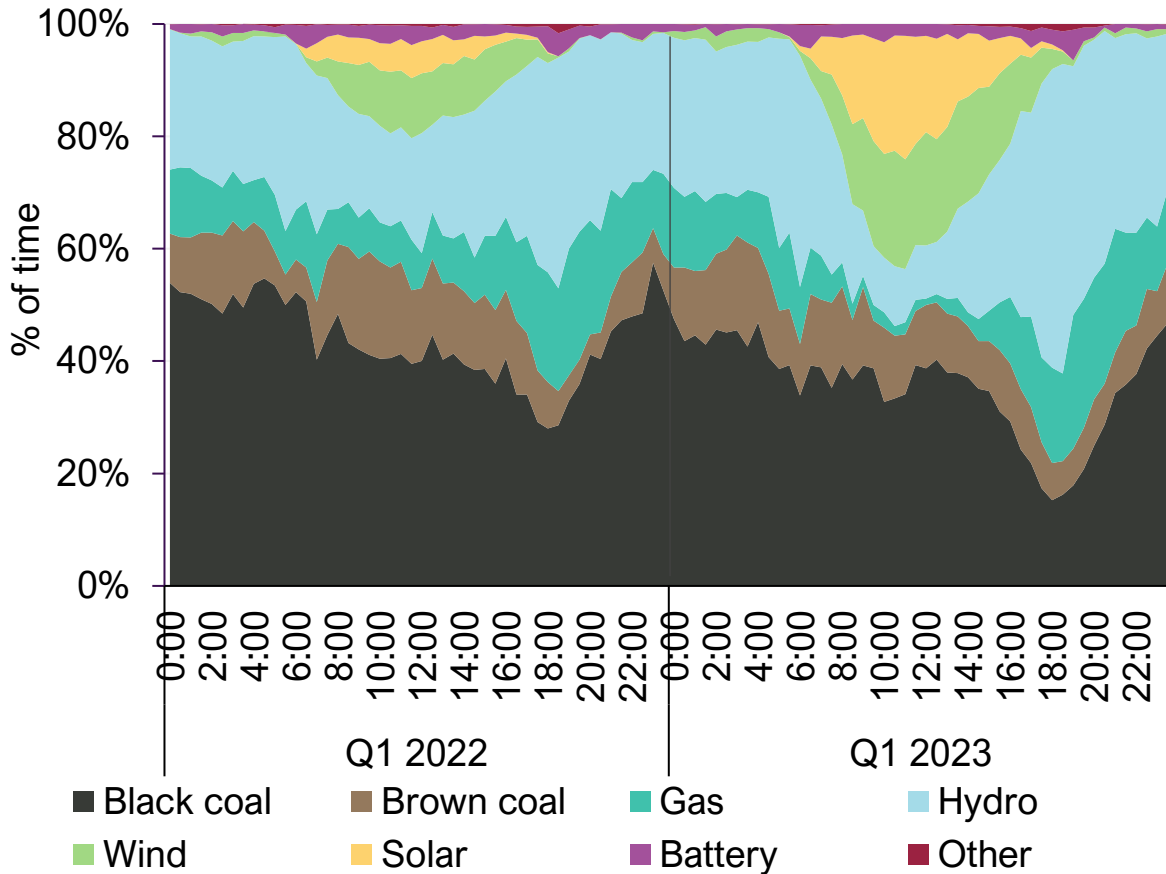
Monthly volume-weighted marginal offers



Price-setting Dynamics

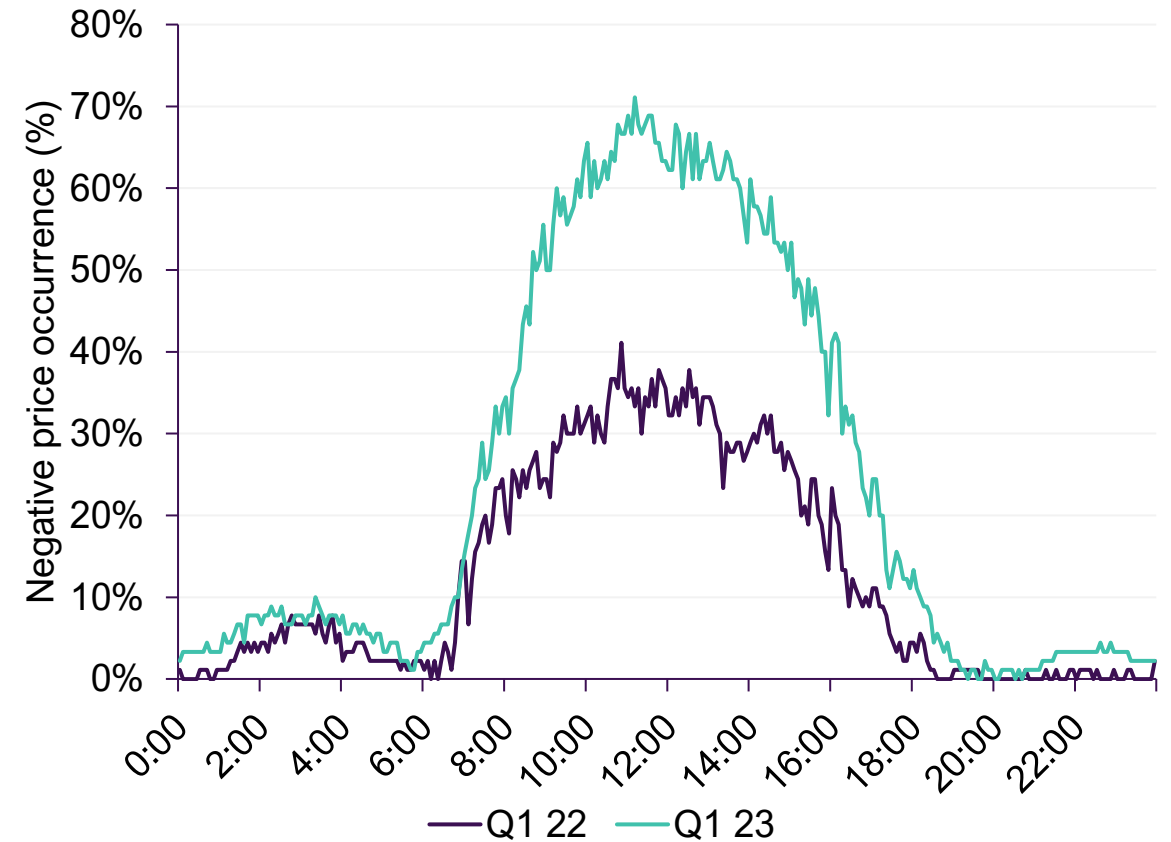
Grid-scale solar and wind increase price-setting frequency

Mainland NEM price-setting frequency and average price set by fuel type



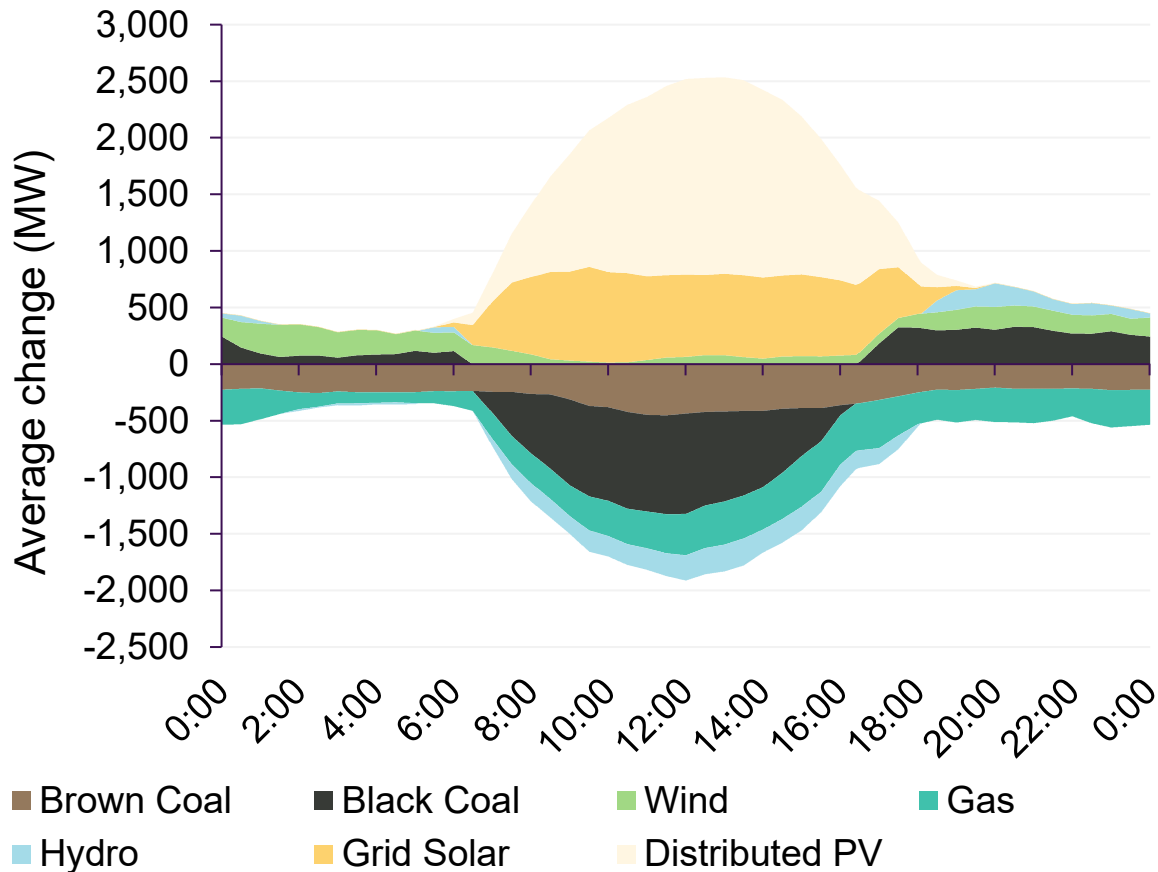
Large daytime increase in Victorian negative price occurrence

Occurrence of Victorian negative or zero prices by time of day

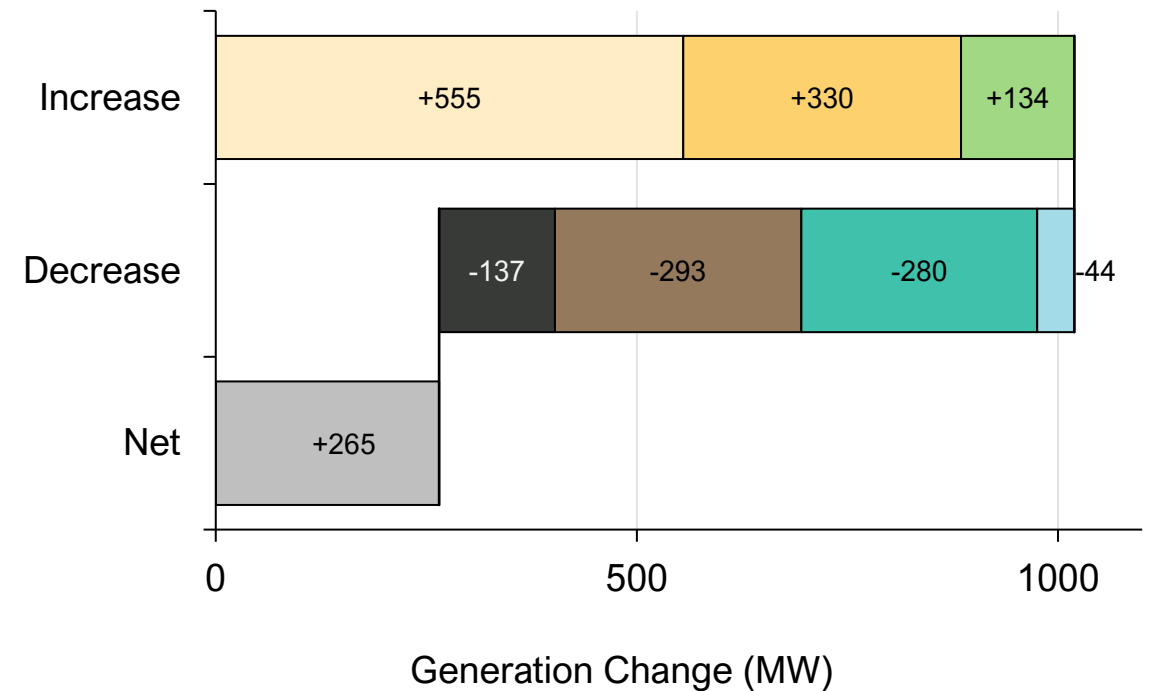


Supply Mix Changes

Middle of the day solar uplifts offsets coal, gas and hydro
Change in supply mix by time of day Q1 2022 to Q1 2023



Q1 record low for coal and gas, Q1 high for wind and solar
Change in average MW by fuel type, Q1 2022 to Q1 2023

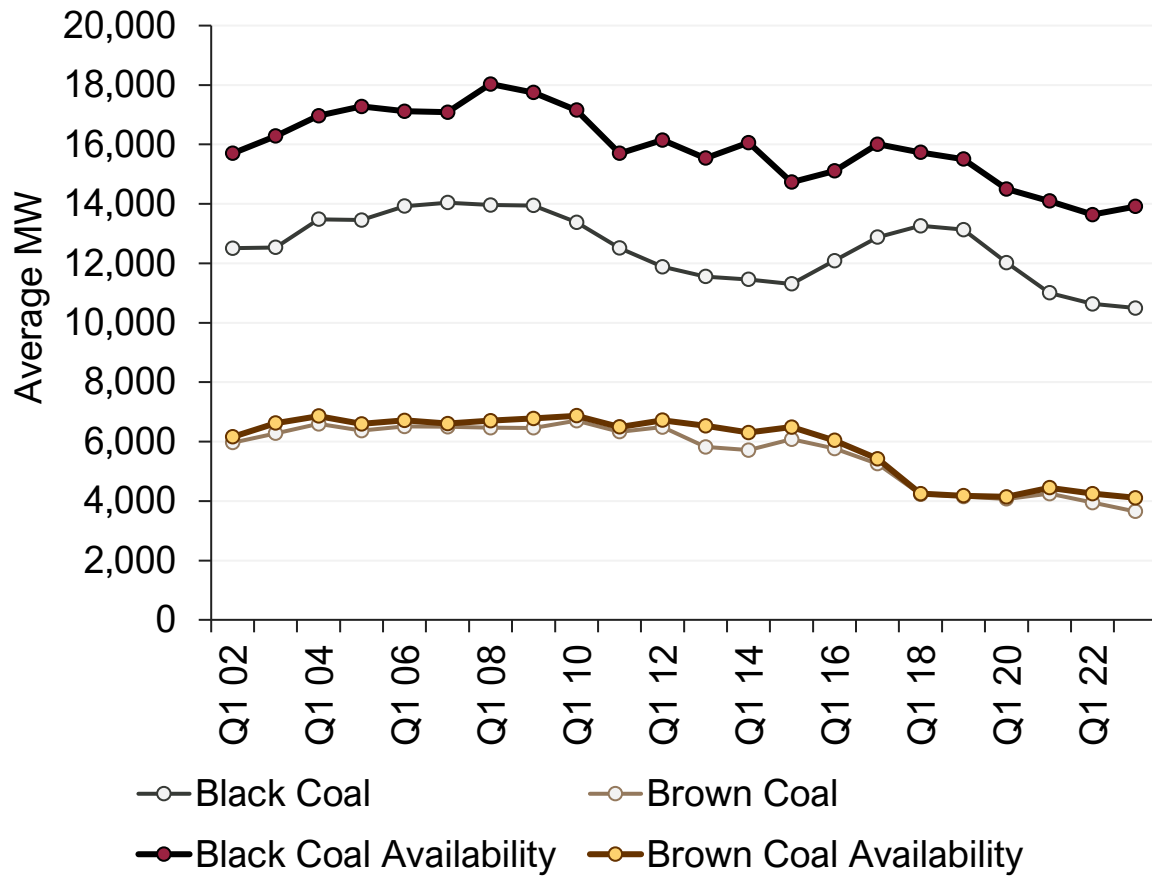


- Distributed PV
- Grid Solar
- Wind
- Black Coal
- Brown Coal
- Gas
- Hydro
- Net

Black Coal Output

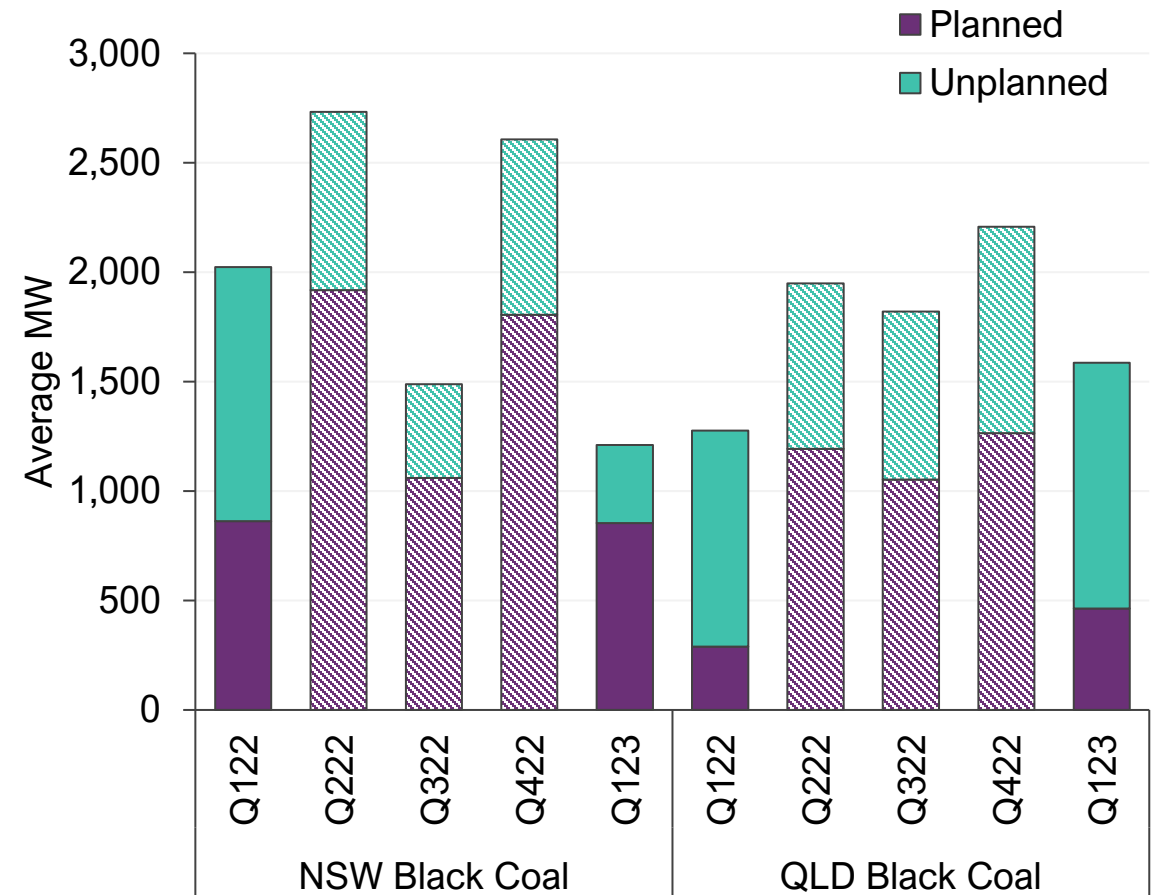
Black coal declines 1.3% while brown coal declined 7.4%

Q1 coal generation and availability through time



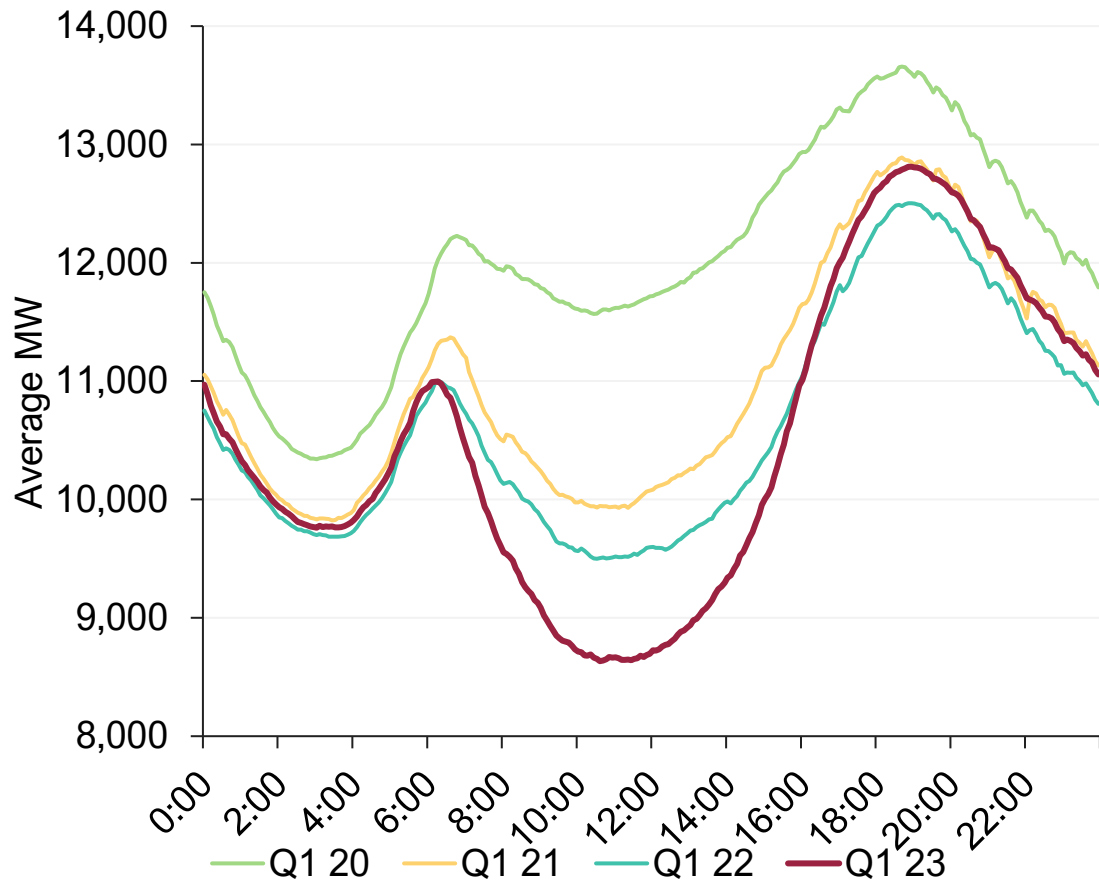
353 MW decline in black coal outages (in service units).

Quarterly average MW on outages

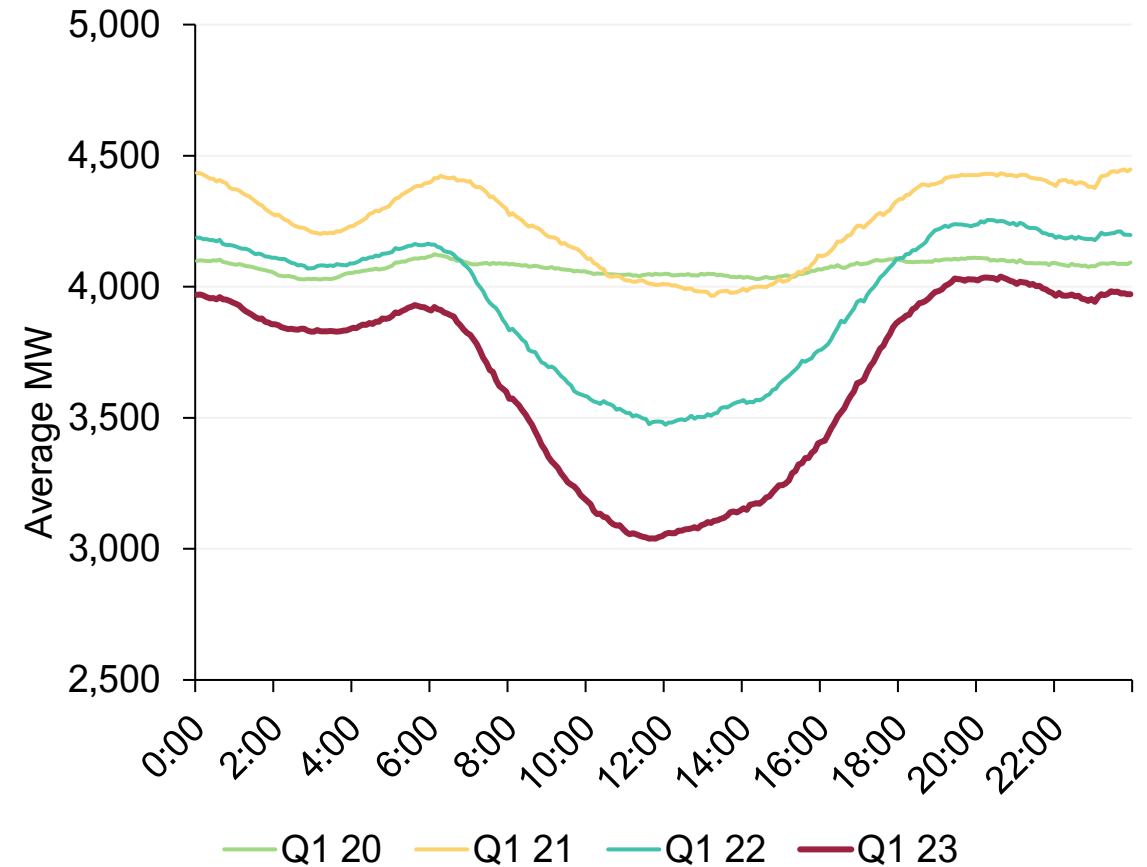


Intraday variability at coal

Black coal intraday variability increased 1172 MW
Time of day black coal output

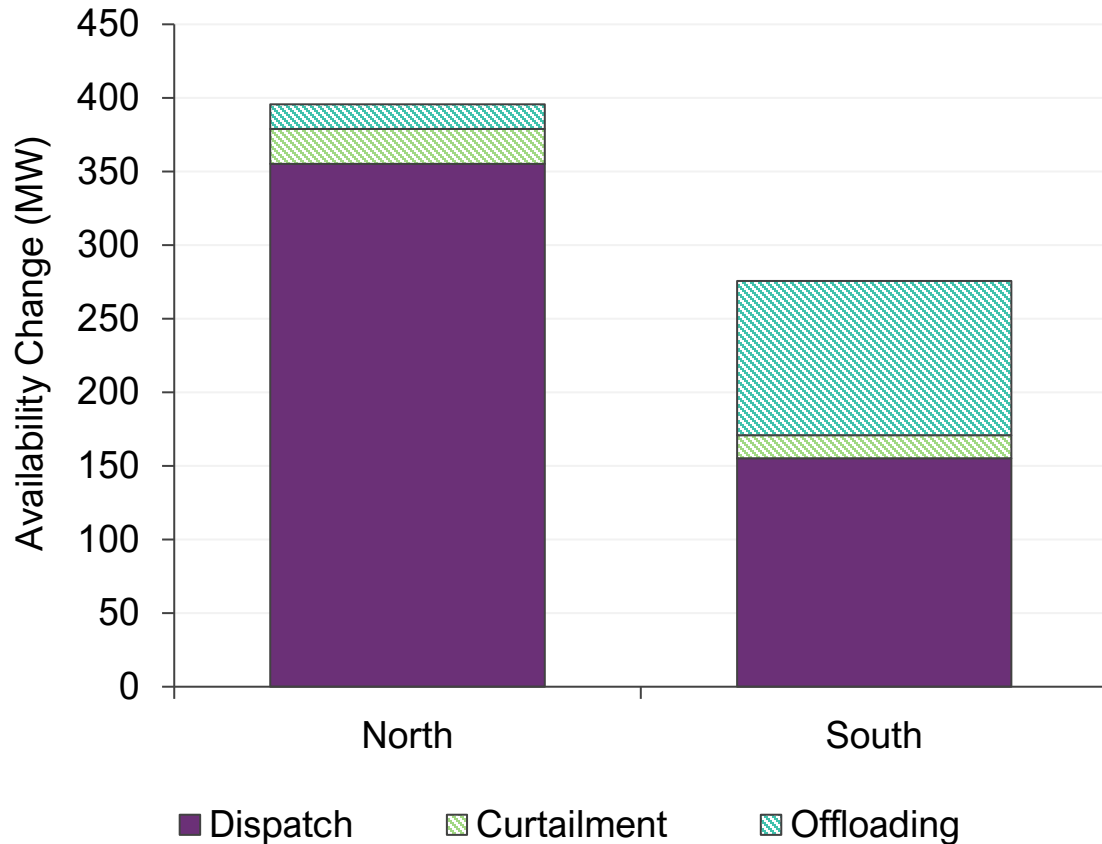


Brown coal intraday variability increased 220 MW
Time of day brown coal output

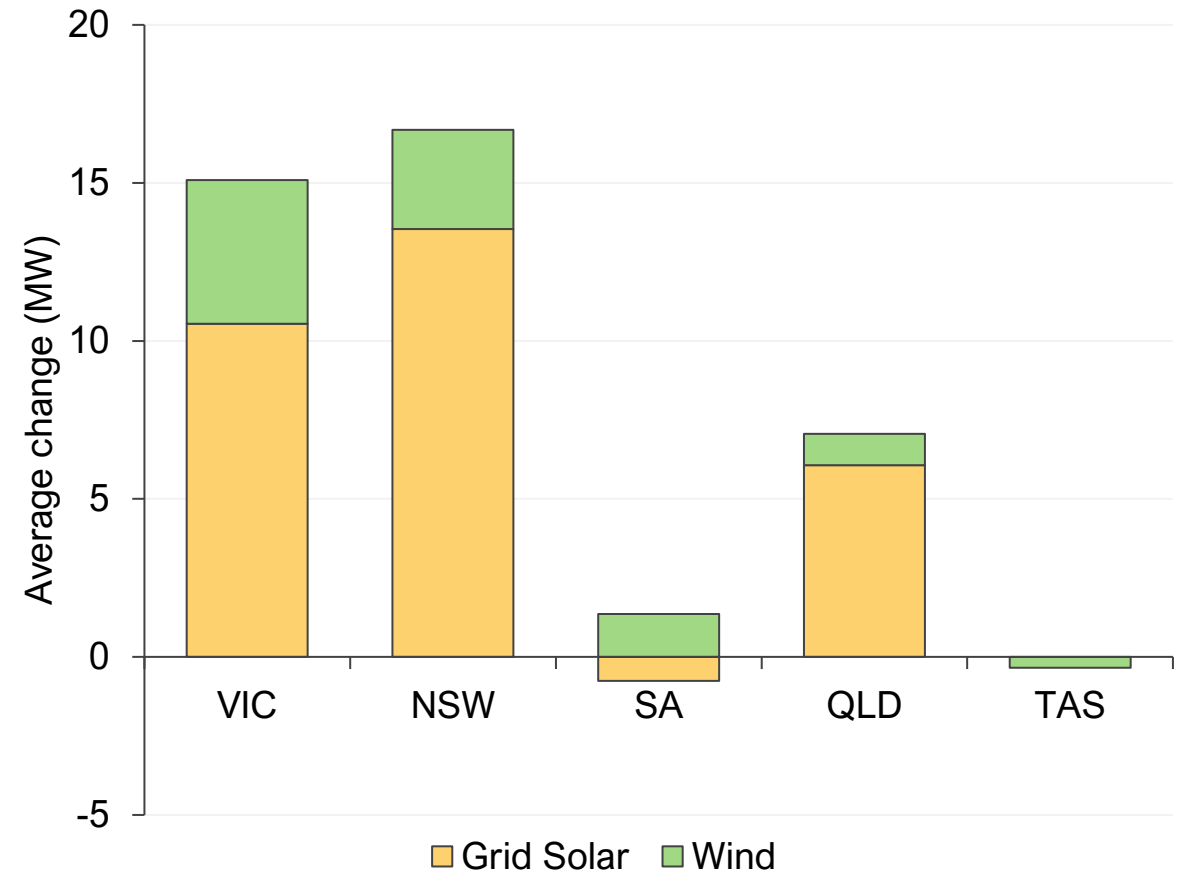


Wind and Solar output

Spilled energy was highest in southern mainland regions
Change in Availability and Output Q1 2022 to Q1 2023

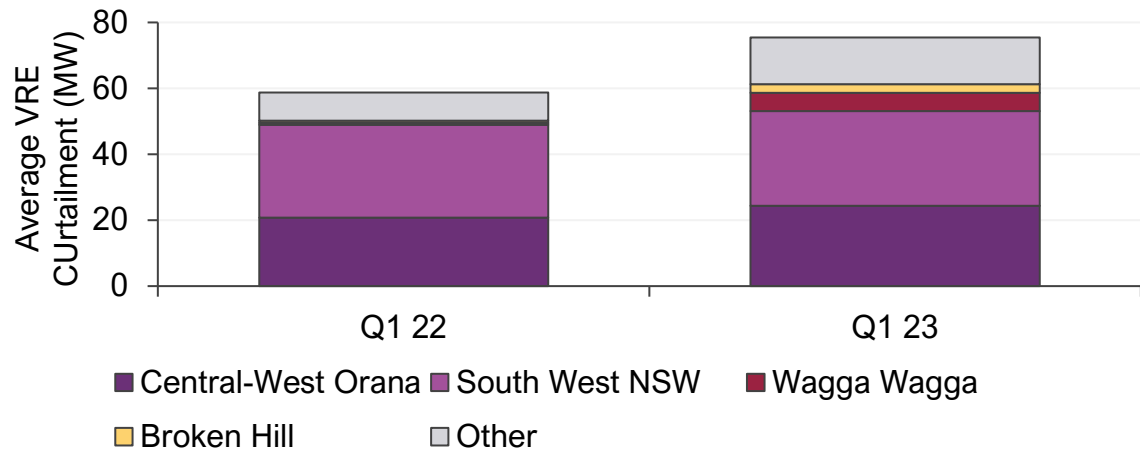
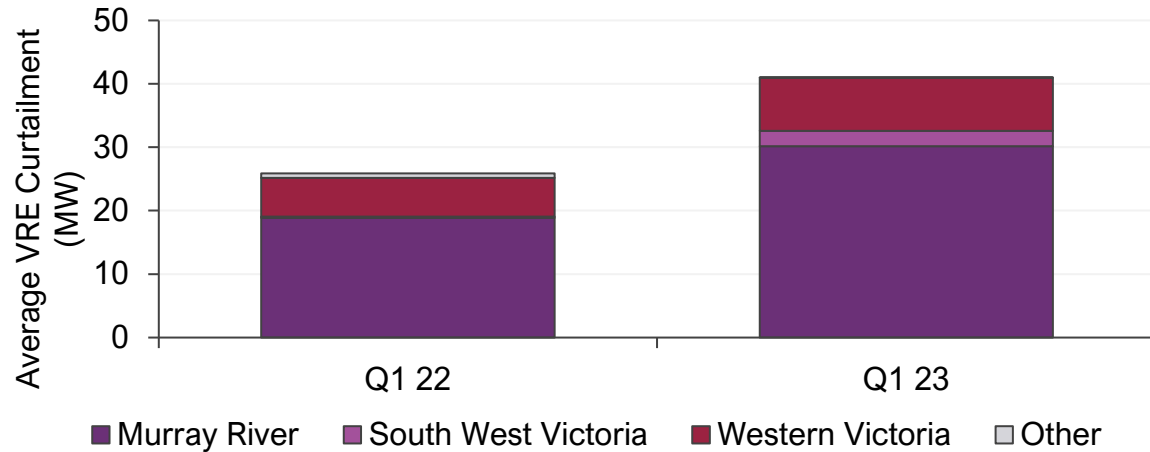


Curtailment from network system security constraints rose 39%
Change in curtailment from Q1 2022 to Q1 2023 by region

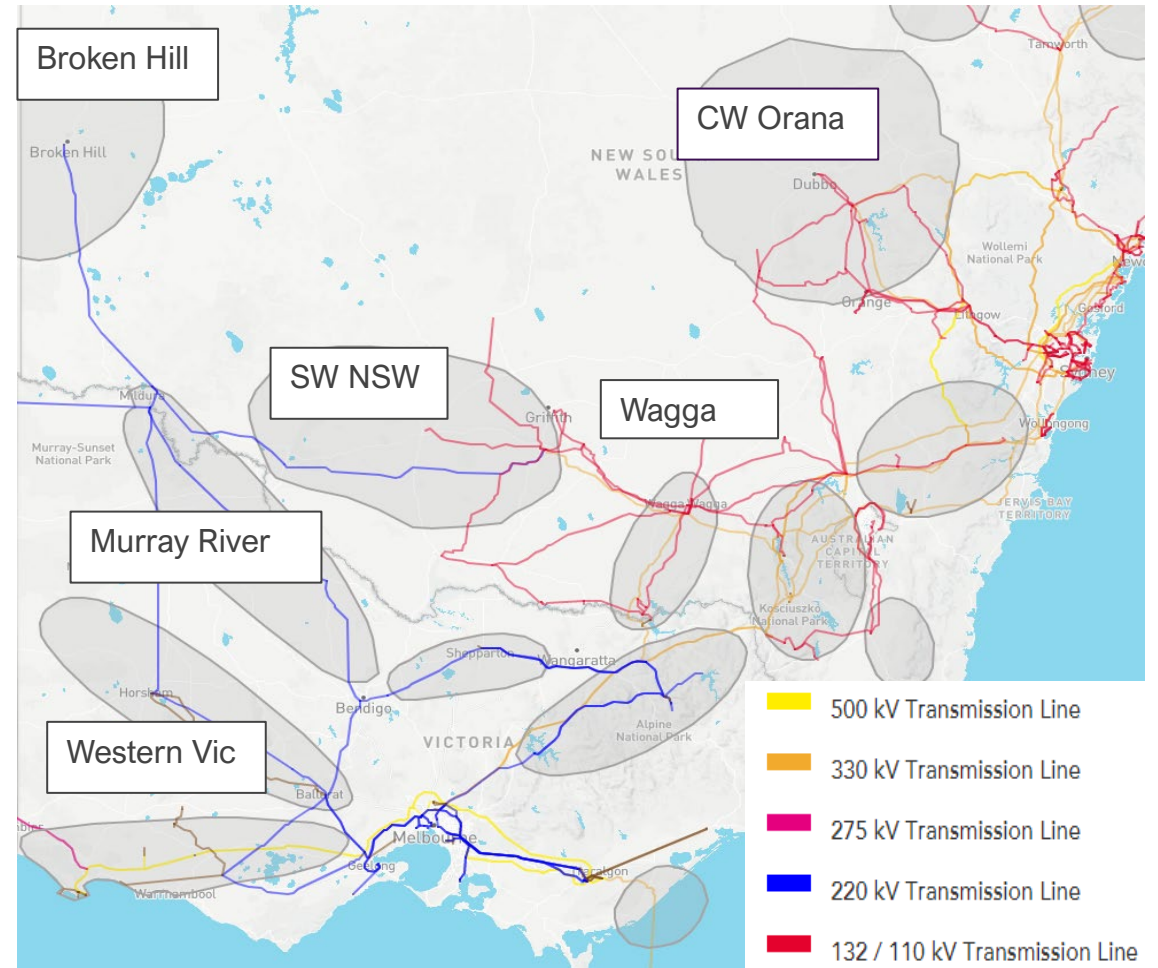


Curtailment by REZ area

Curtailment (MW) was highest in the NW Vic and SW NSW regions
 The average VRE curtailment by REZ region Q1 2022 and Q1 2023

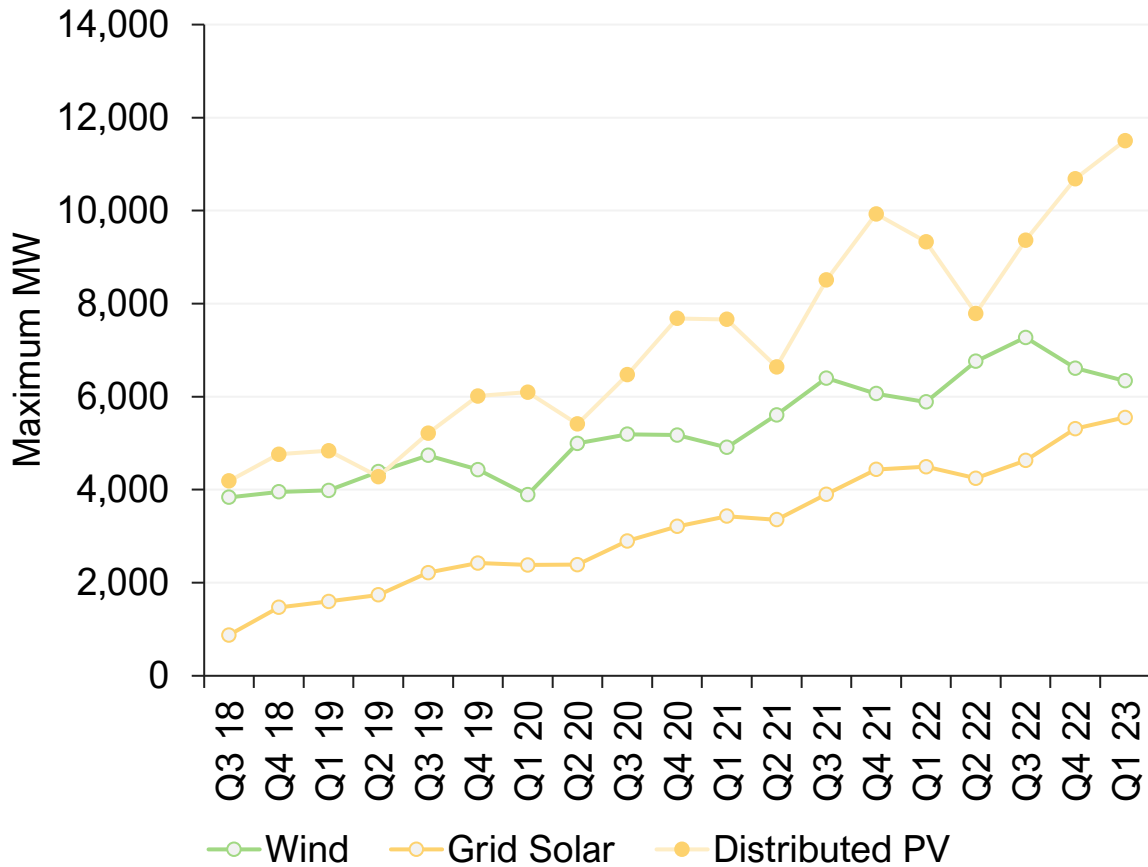


REZ areas with highest curtailment
 AEMO Map of Tx Lines and ISP REZ areas

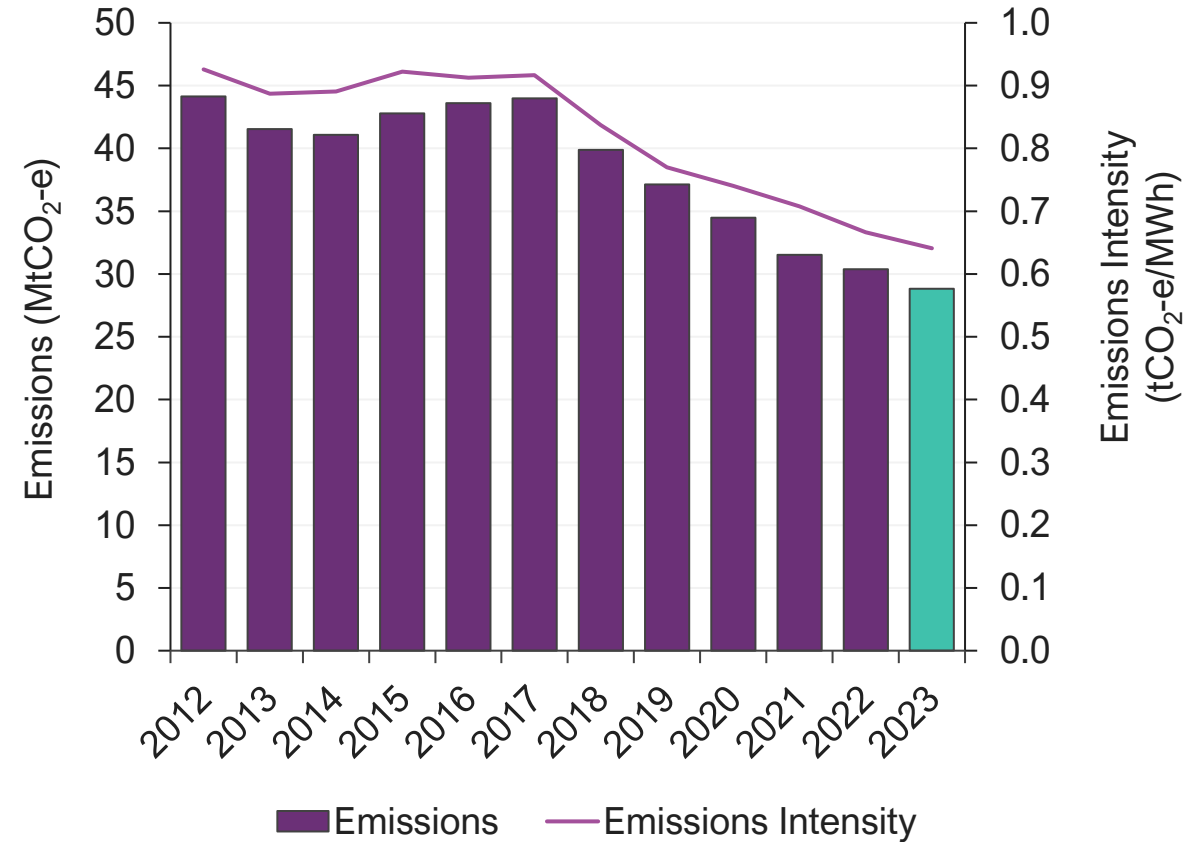


High Renewables Support Q1 Records

Instantaneous dPV climbed 23% from Q1 2022



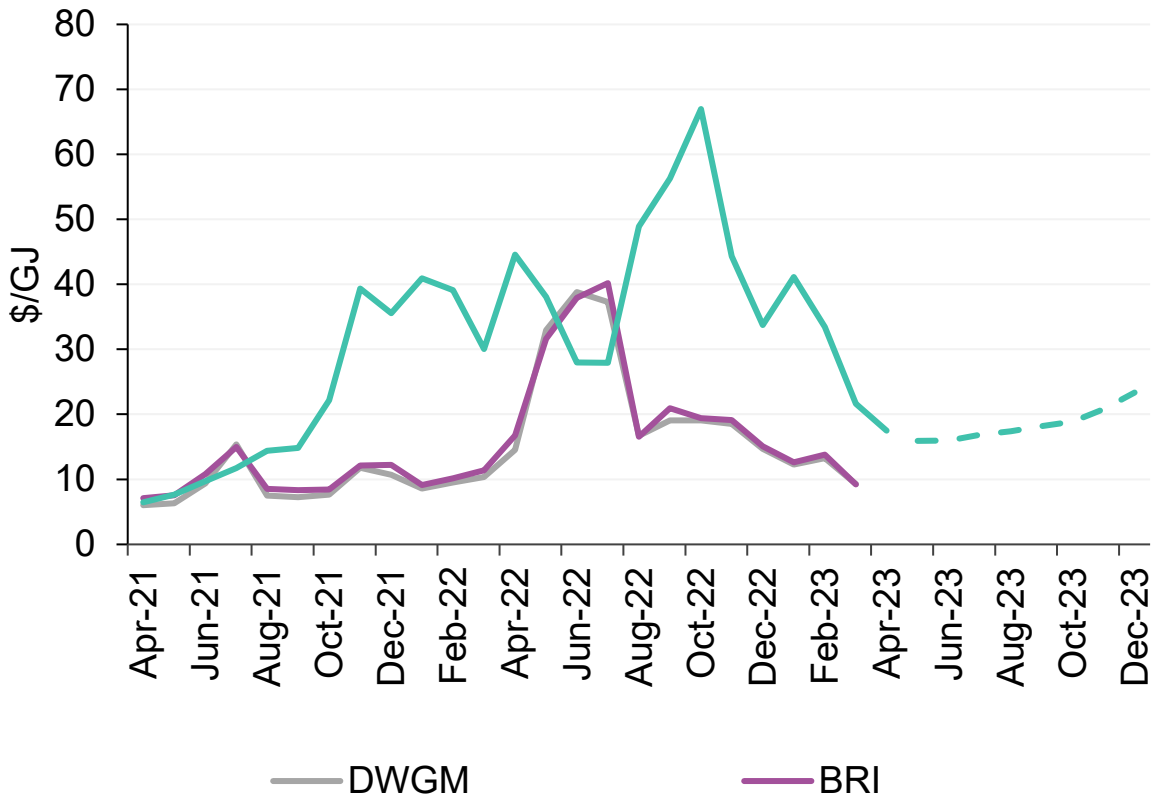
NEM emissions and emissions intensity reach Q1 lows



East coast gas prices

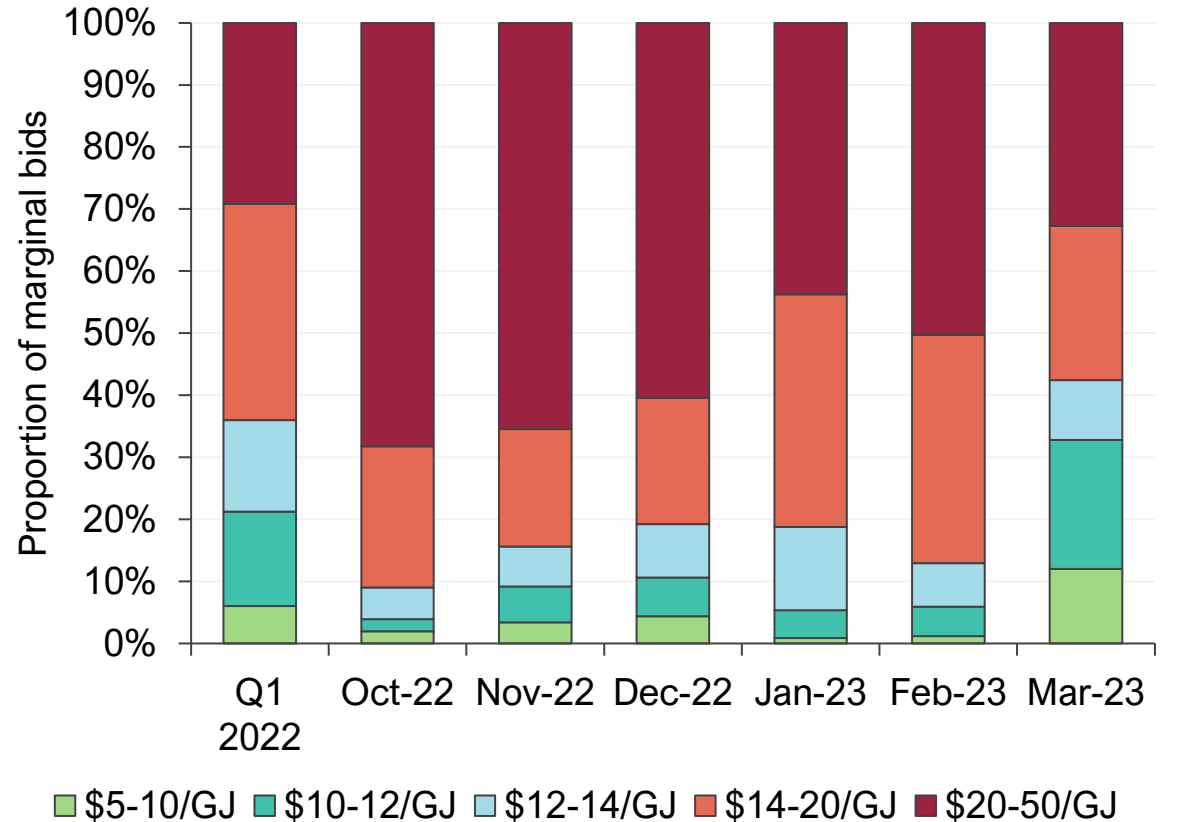
East coast gas prices up 19% from Q1 2022

DWGM and Brisbane average price compared to ACCC LNG Netback price



DWGM bids reflecting lower prices in March

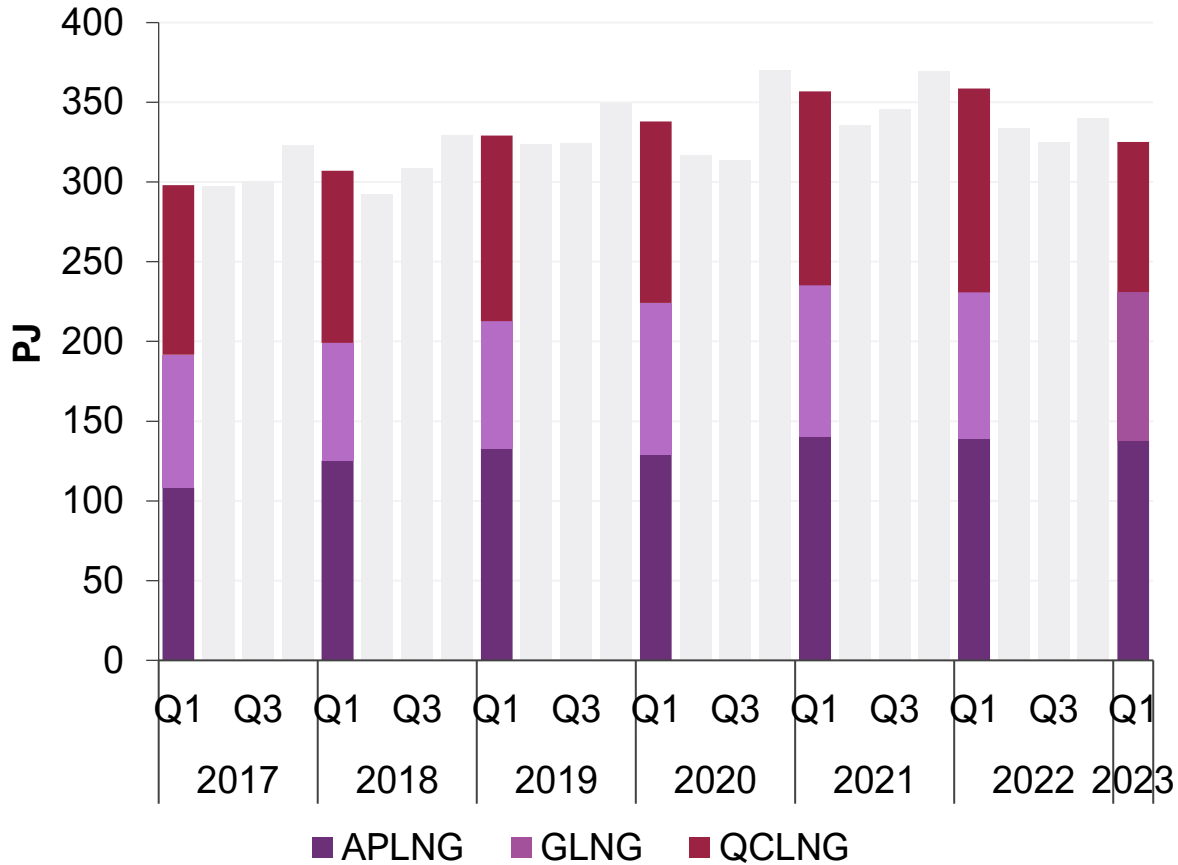
DWGM – proportion of marginal bids by price band



Lower LNG demand carries over from Q4 2022

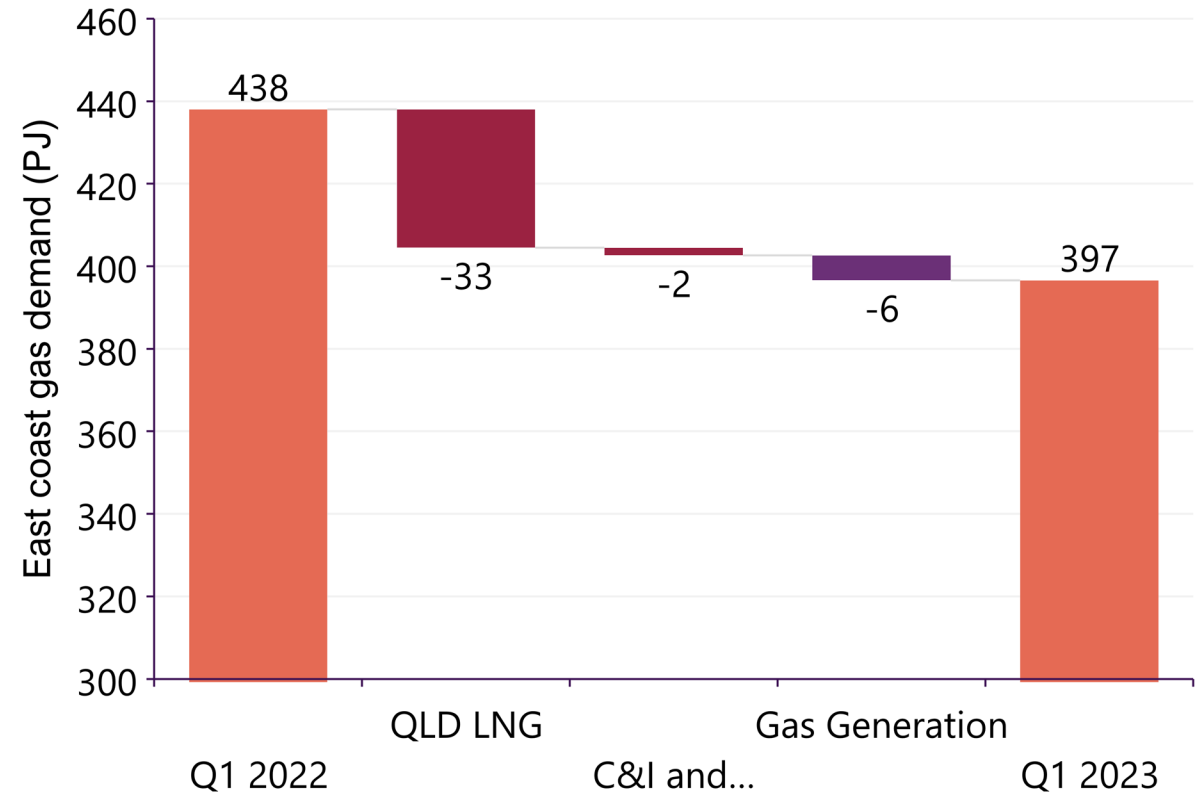
Curtis Island flows for LNG lowest for Q1 since 2018

Total quarterly pipeline flows to Curtis Island



Lowest Q1 east coast gas demand since Q1 2016

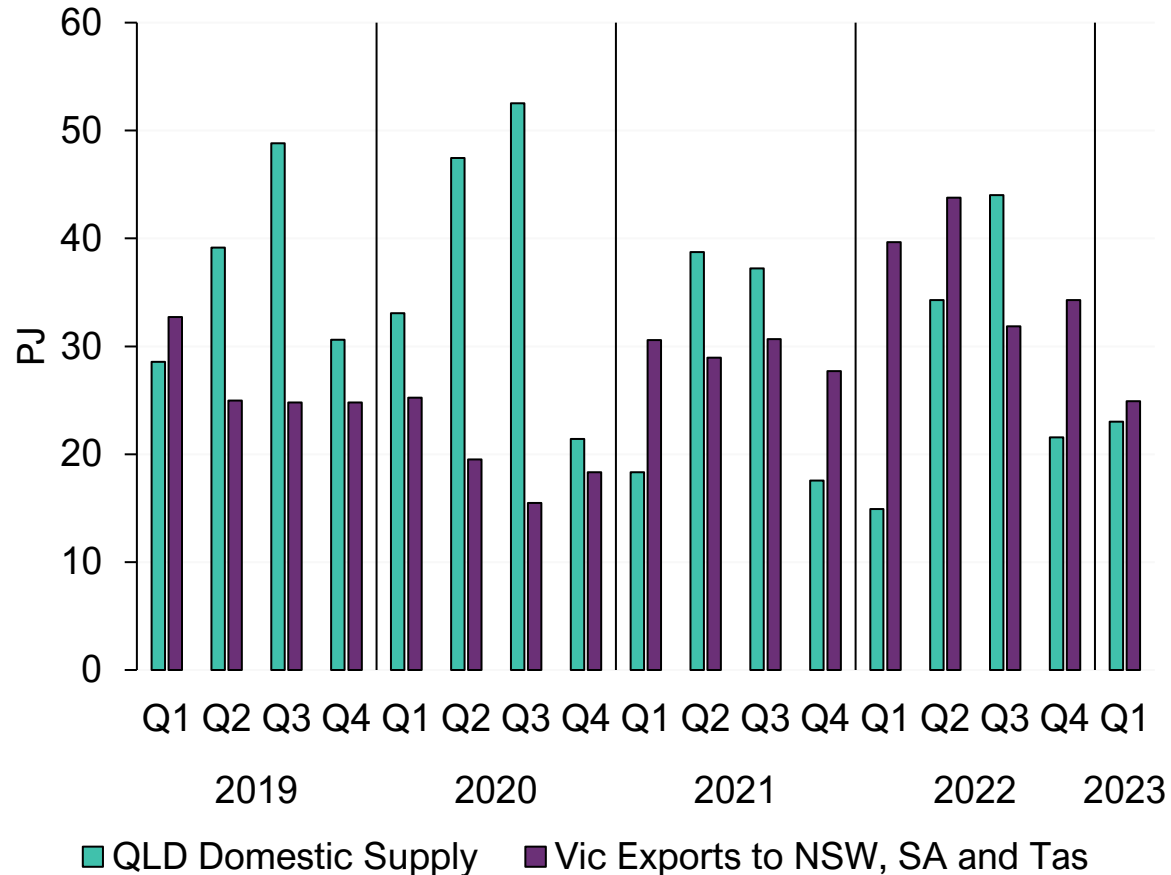
Components of east coast gas demand change – Q1 2022 to Q1 2023



Queensland domestic supply continues to increase

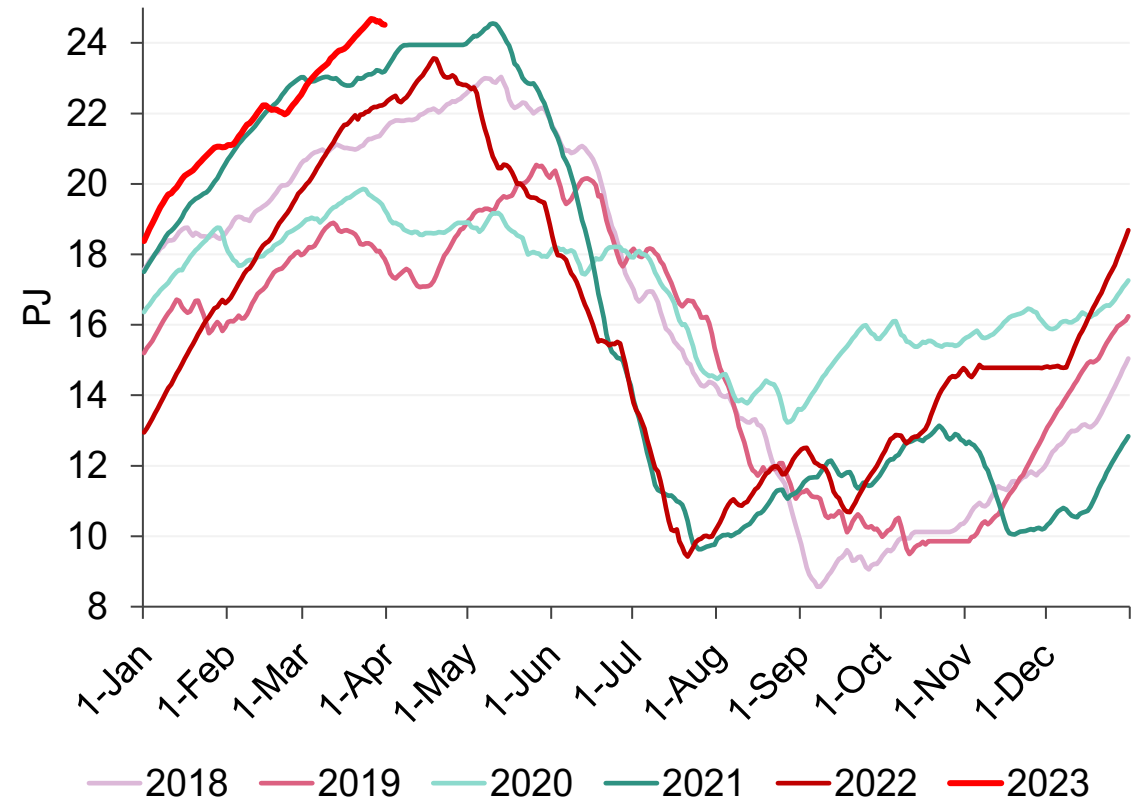
Queensland domestic supply increases to highest Q1 level since 2020

Queensland domestic supply compared to Victorian gas exports by quarter



Iona storage at highest end to Q1 balance since storage levels began reporting

Iona storage levels





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