Quarterly Energy Dynamics
Q4 2019
Market Insights
Extreme heat, outages and bushfires test system

Most December days above 38°C on record

Weather
December was Australia’s warmest on record with mean max temperature >4°C above average. 2019 was also the warmest year with mean max temperatures >2°C above average and it was the driest on record.

Demand
Despite the holiday season max demands Vic hit 9,249 MW on 20th December (43.5°C) and 12,502 MW (excl ~800 MW of demand response) in NSW on 4th Jan (Penrith 48.9°C).

Outages and bushfires challenge operations
- Loy Yang A2 delayed RTS to 24 Jan.
- Heat led to de-rating of generation output whilst bushfires tripped transmission lines
- Actual LOR2 conditions on two separate days in NSW & VIC
- RERT activated on 30 Dec in Vic & 4 Jan in NSW, resulting in ~$11m in cost.
4th Jan – bushfires lead to Vic-NSW separation

- Bushfires impacted multiple transmission lines during the day.
- At 1510 hrs the Victoria and New South Wales regions separated at Murray and Lower Tumut Substation removing ~2,600 MW of supply to NSW (Snowy + Uranquinty + others)
- AGL called Tomago pot line
- AEMO activated RERT – 368 MW pre-activated and 232 MWh activated

Source: Snowy Hydro
VIC impacted by heat, deratings & trips

20 Dec 2019 – Loss of wind on extreme day

Extreme Victorian heat (45°C) contributed to a sharp reduction in wind farm output

30 Dec 2019 – Interconnector trip triggers RERT use

RERT activated and AGL uses Alcoa DR

Demand (MW)

VIC price ($/MWh)
Heat and rooftop PV shape NEM demand

- Large increase in rooftop PV output due to new capacity (almost 2 GW in 2019) & sunny Q4 conditions
- New minimum demand records in SA (458 MW) & WA, occurring in the middle of the day
- Hot conditions increase cooling requirements in all regions except NSW

Rooftop PV output shaping NEM demand

Change in NEM-average operational demand by region and time of day (Q4 2019 versus Q4 2018)

Heating and cooling needs increase

Change in NEM-average operational demand by region and time of day (Q4 2019 versus Q4 2018)
Q4 saw 25% fall in gas prices

Lowest gas prices in two years

Continuation of more gas offered at lower prices, coinciding with:
1. Comparatively low international gas prices (despite approaching the northern hemisphere winter)
2. Lower NEM spot and contract prices
3. Increase in QLD supply in 2019

International gas prices have fallen
ACCC netback price – historical and forward

Low international gas prices expected into 2020
Large QLD gas production increase

Change in east coast gas supply
Q4 2019 versus Q4 2018

QLD exporting more gas to other states in 2019
Flows on the South West Queensland Pipeline at Moomba
Sharp drop in wholesale electricity prices

Lowest NEM spot prices since 2016...

Drivers:
1. Increased renewable supply
2. GPG running harder at lower prices to offset impact of coal outages

Quarterly average spot price

Drivers:
1. Increased renewable supply
2. Fewer coal generator outages expected
3. Continuation of lower gas prices

flowing through to future expectations

Cal2021 Swap price

QLD NSW VIC SA TAS

Average price ($/MWh)

0 20 40 60 80 100 120 140 160 180

Q4 2018 Q1 2019 Q2 2019 Q3 2019 Q4 2019

$/MWh


NSW VIC QLD SA
Record renewables growth in 2019

2019: record renewables growth

- ~6 TWh grid-scale renewable output added in 2019
- Similar amounts expected in 2020

Large reductions in black coal-fired output

Change in supply – Q4 2019 versus Q4 2018

-1,200 -800 -400 0 400 800
Rooftop PV  Wind  Grid solar  Gas  Brown coal  Hydro  Black coal

Average change (MW)
High levels of renewables curtailment in Q4

VIC and NSW solar constraint drives increasing VRE curtailment

Average VRE curtailed by curtailment type

Record amount of South Australian VRE output curtailed on 11 November 2019

SA VRE output and curtailment – 5012 Nov 2019
**SA price volatility & system interventions**

**Record impact of negative spot prices**

- Trend of increasing SA spot price volatility: negative spot prices offset the impact of high spot prices (> $300/MWh)

**Record direction cost**

- Changes to intervention pricing framework introduced Dec 19 likely to lead to:
  1. More negative prices
  2. Higher direction costs
  3. More VRE curtailed
Frequency markets drive battery profitability

Battery revenue reaches record levels

Revenue/cost ($million)

- Energy
- Regulation FCAS
- Contingency FCAS
- Energy cost
- Net revenue

Change in FCAS supply – Q4 2019 versus Q4 2018

Lake Bonney BESS commenced operation during the quarter

AEMO progressively increased its FCAS requirements during 2019 to maintain system security

Batteries capture a larger share of FCAS market

Frequency markets drive battery profitability

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