



# Summer Readiness 2020-21 Briefing

20 November 2020



# Summer Outlook 2020/21

AEMO - NOVEMBER 2020

Josh Fisher

weatherzone°

# Overview



## Analysis of Summer 2019/2020

State of the climate

Outlook

SUMMER MEAN  
Temperature



↑ **1.88°**  
Above Average

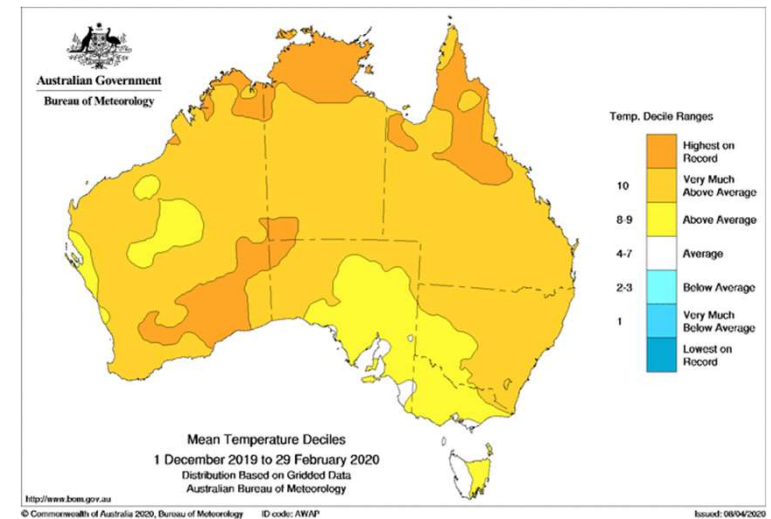
# Summer 2019/2020

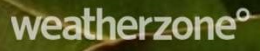
- Second-warmest summer on record for Australia after 2018/2019
- Second-warmest for max and min, not just mean

📍 **Max Temperature** 2.11 Deg

📍 **Min Temperature** 1.64 Deg

- Second-warmest for Qld, WA and the NT, fourth-warmest for NSW and sixth-warmest for SA

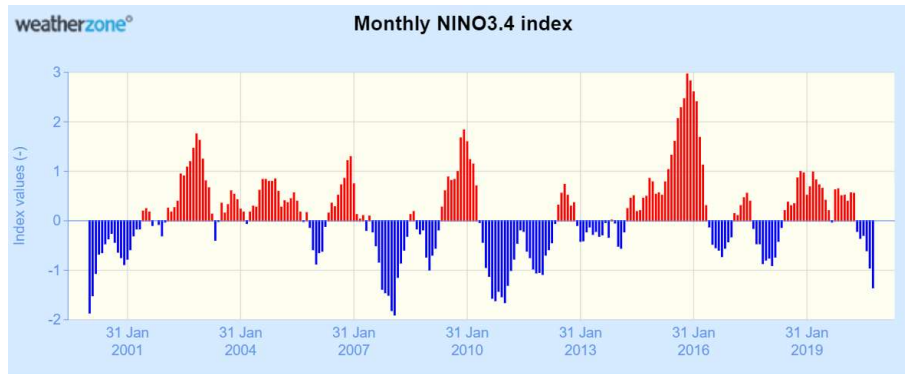
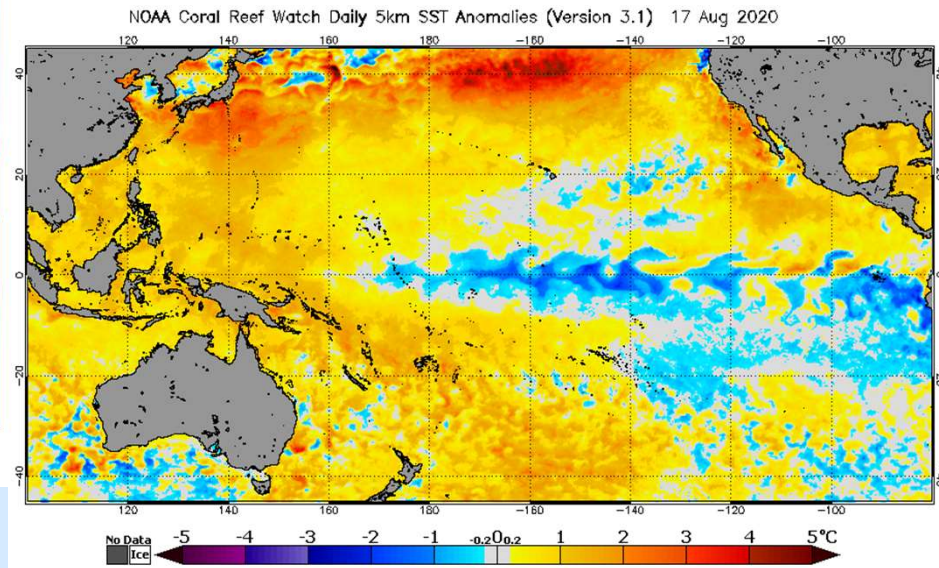
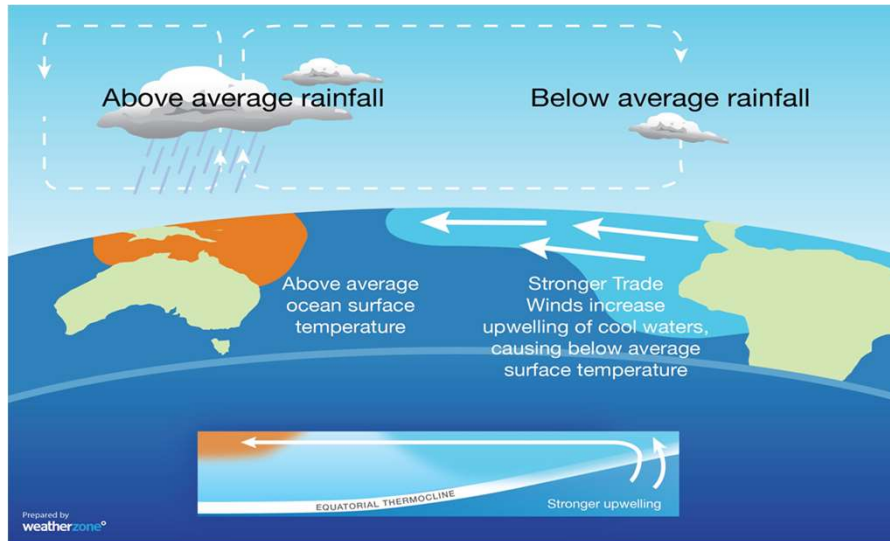


The logo for weatherzone, featuring the word "weatherzone" in a lowercase, sans-serif font with a degree symbol (°) at the end. The logo is positioned in the top left corner of the slide, overlaid on a background image of green leaves.

# State of the Climate

**Driving our weather**

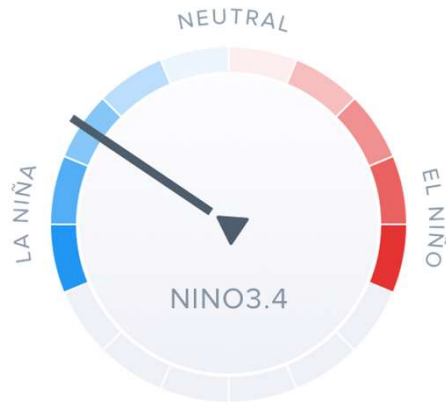
# El Nino-Southern Oscillation



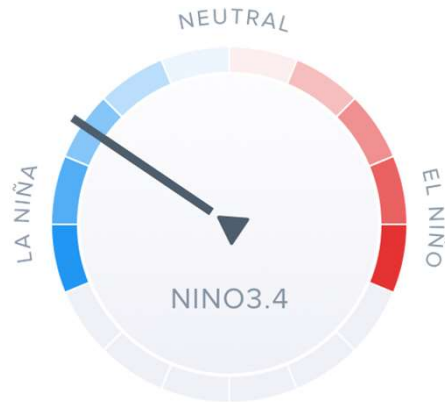
“ La Niña thresholds have been reached after continued cooling of sea surface temperatures (SSTs) across the equatorial Pacific.

# ENSO Outlook - NINO3.4 Index

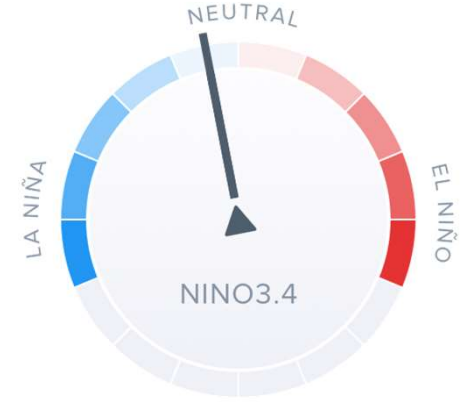
Current International Consensus



DECEMBER  
-1.6 Index



FEBRUARY  
-1.6 Index



APRIL  
-0.9 Index



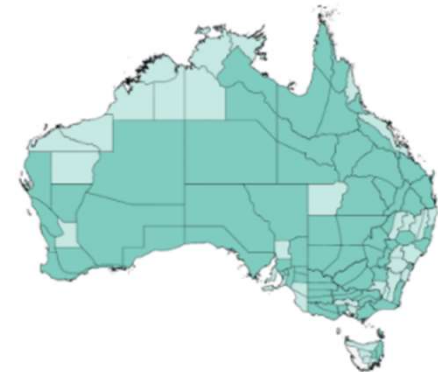
For a **La Niña** (-0.8) or **El Niño** (+0.8) to be declared, thresholds need to be met for at least 3 consecutive months.

# La Nina typical impacts

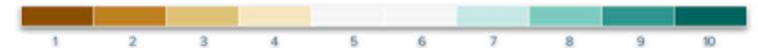
- Increased rainfall over much of AUS and an earlier onset of the monsoon.
- Below normal daytime temperatures.
- Above normal nighttime temperatures.
- Increased risk of prolonged warm spells across southern AUS.
- Reduced risk of extreme temperatures.

## National Outlook - DJF

Rainfall

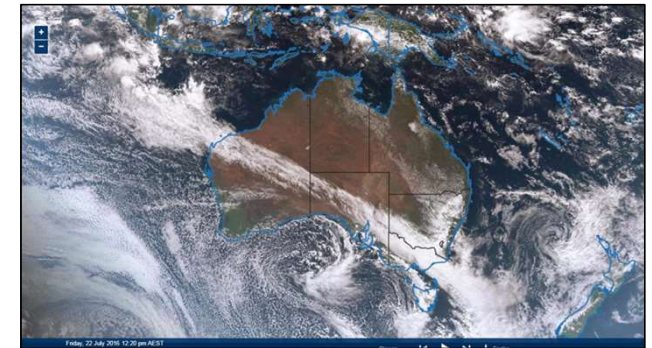
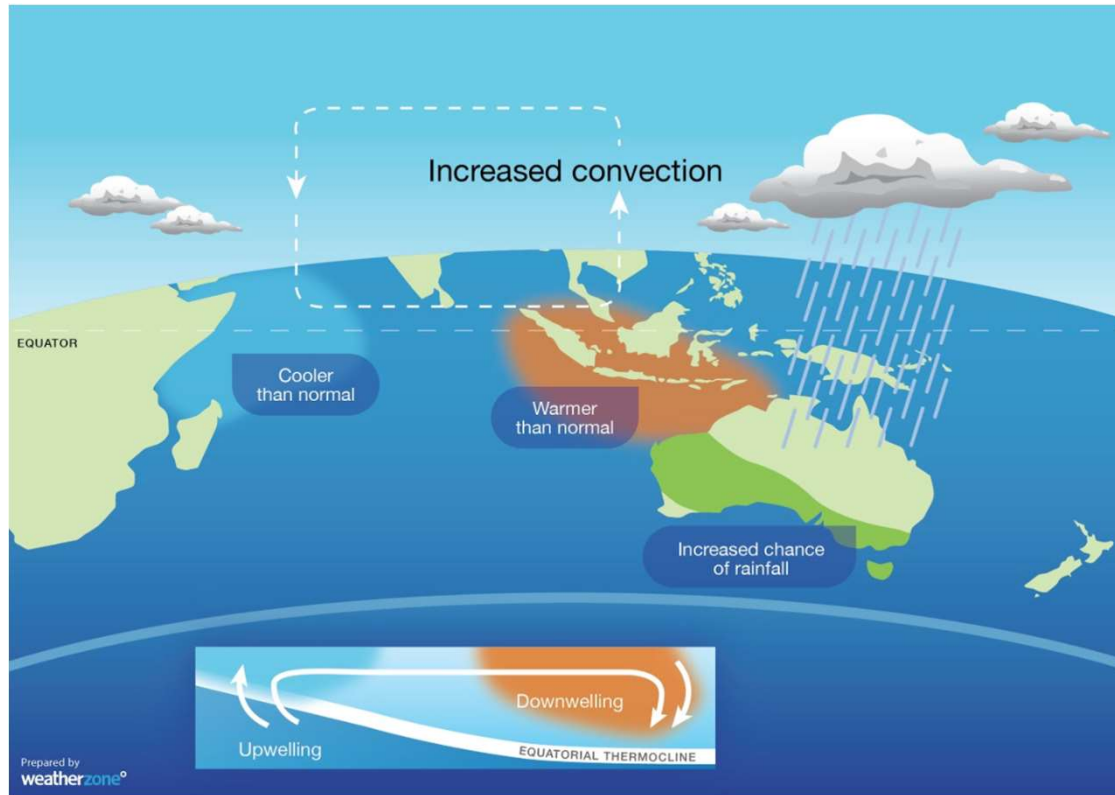


DECILES





# Indian Ocean Dipole (IOD)

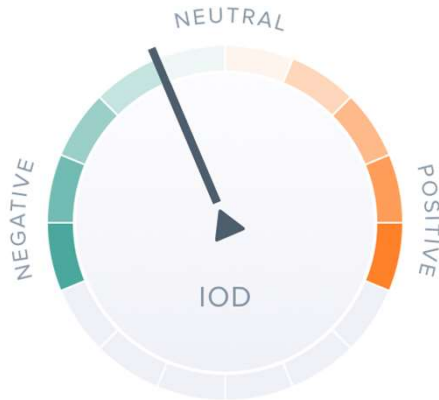


## Negative IOD:

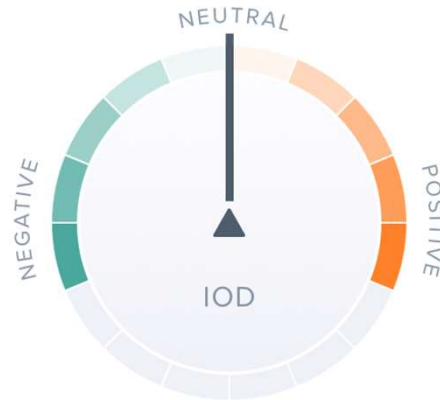
- SST gradient across the Indian Ocean
- More moisture in the NW
- Increased rainfall across central and southeast AUS
- Increased numbers of NW cloudbands

# IOD Outlook - DMI Index

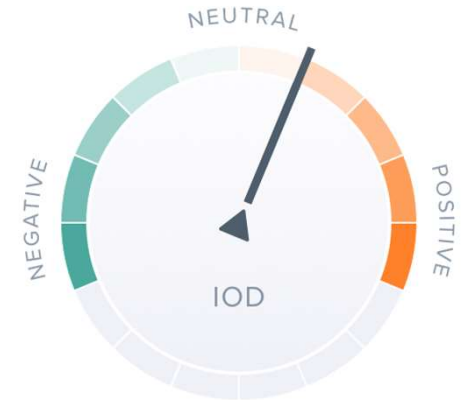
Current International Consensus



NOVEMBER  
-0.3 Index



JANUARY  
0.0 Index

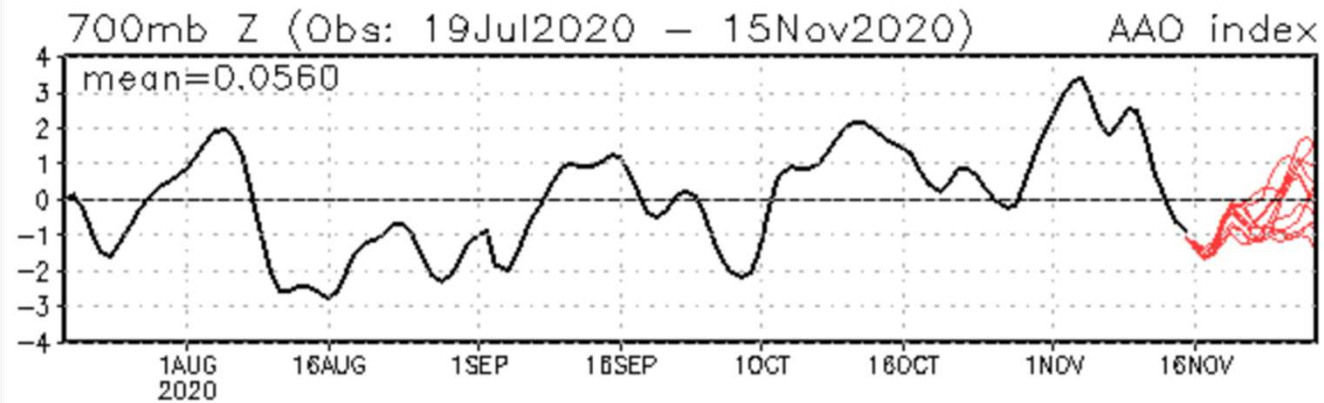
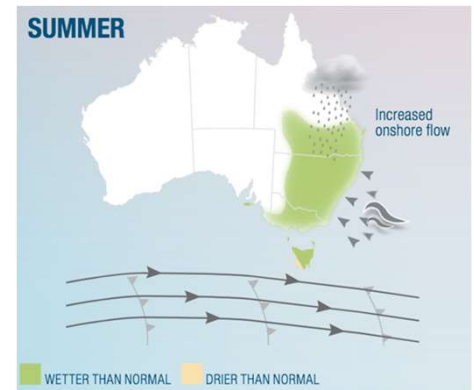


MARCH  
+0.2 Index



For a **Negative** (-0.4) / **Positive** (+0.4) to be declared, thresholds need to be met for at least 3 consecutive months.

# Southern Annular Mode (SAM)



SAM was mostly negative through August 2020, but with a positive tendency in September and October.

# Climate Summary

**ENSO** = La Niña

**SAM** = Negative although a positive trend this summer

**SSTs** = Significantly warmer in the north.

**IOD** = Neutral

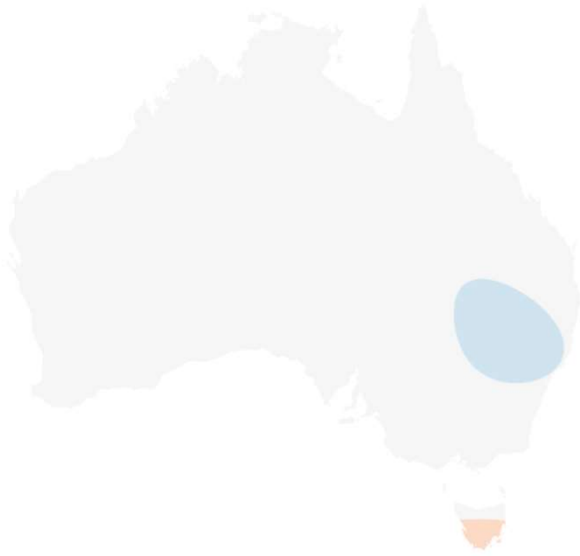
The logo for weatherzone, featuring the word "weatherzone" in a lowercase, sans-serif font with a small degree symbol (°) at the end. The logo is positioned in the top left corner of the slide, overlaid on a background image of green leaves.

# Outlook

The text "Spring/Summer" is displayed in a bold, blue, sans-serif font. To the left of the text is a vertical blue bar that is slightly taller than the text, creating a bullet point effect. The text is positioned below the "Outlook" header.

# National Outlook - DJF

Maximums



Minimums

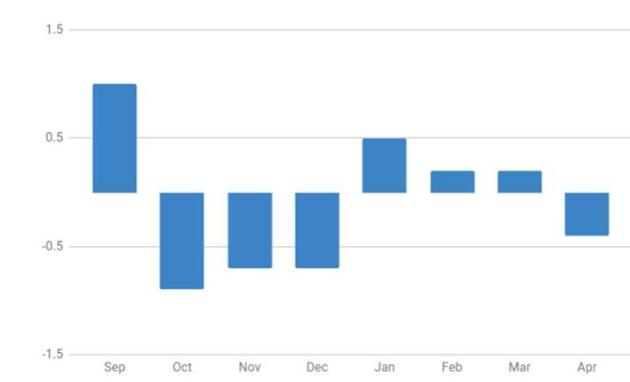
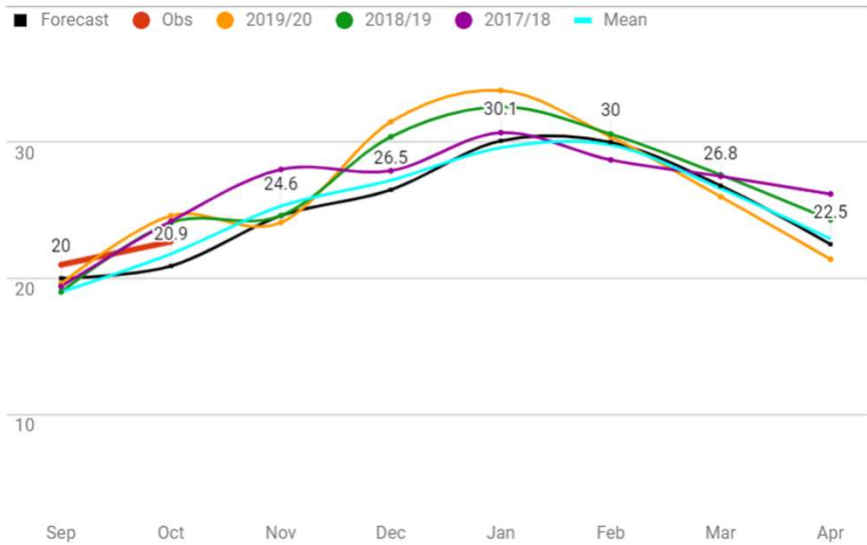


DECILES



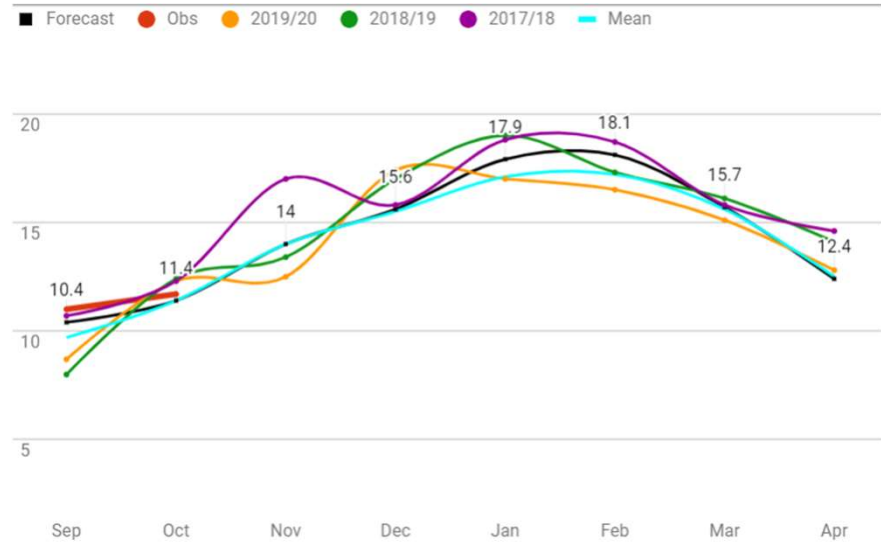
# Adelaide

## Maximums

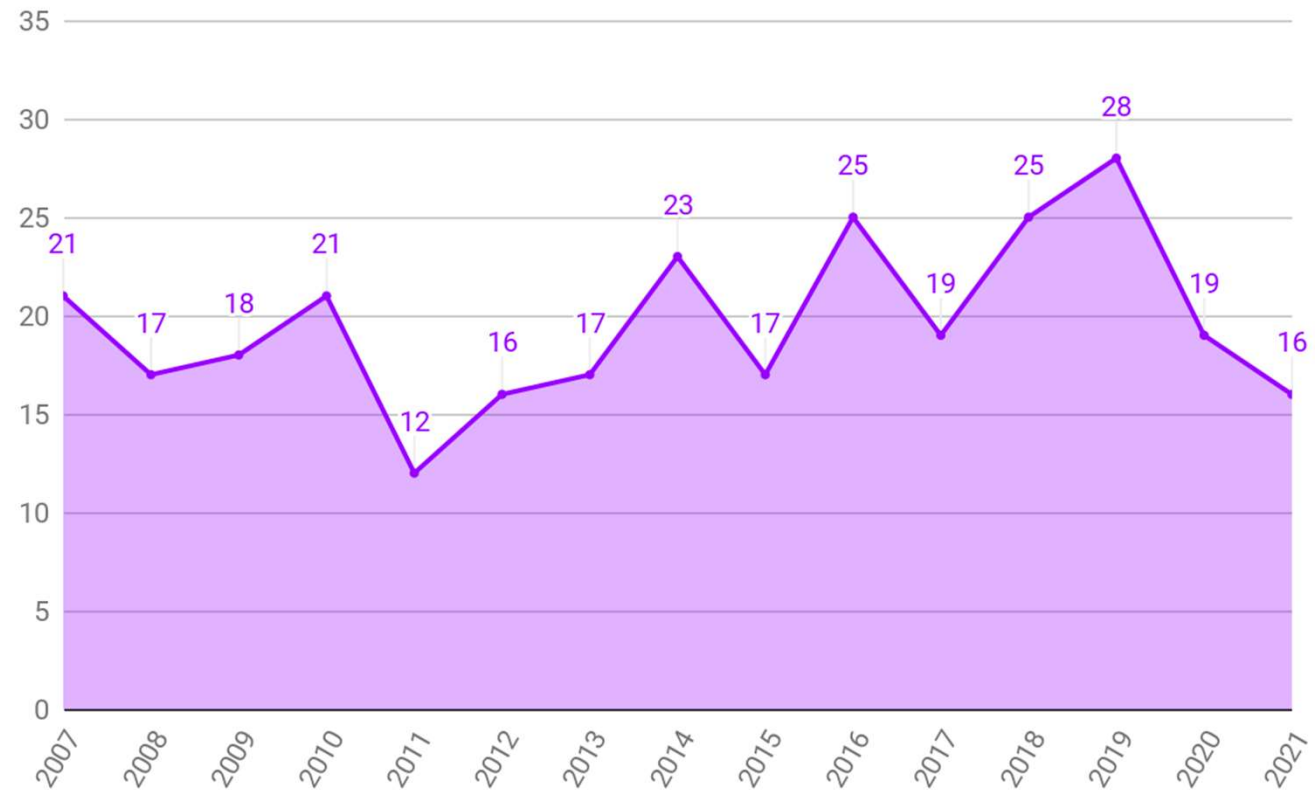


Forecast Anomaly (1981-2010 mean)

## Minimums



# Adelaide - Days above 35 Deg (DJF)

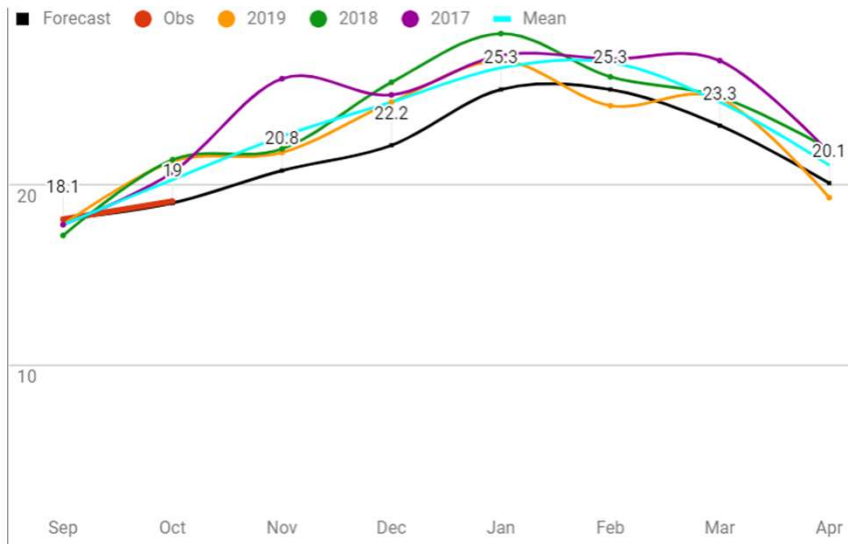


Southern coastal locations such as Adelaide and Melbourne experience **fewer individual daily heat extremes during La Niña years** but an **increased frequency of prolonged warm spells**. Of the 32 Victorian heatwaves between 1989 and 2009, 17 occurred during La Niña years while only 6 occurred during El Niño.

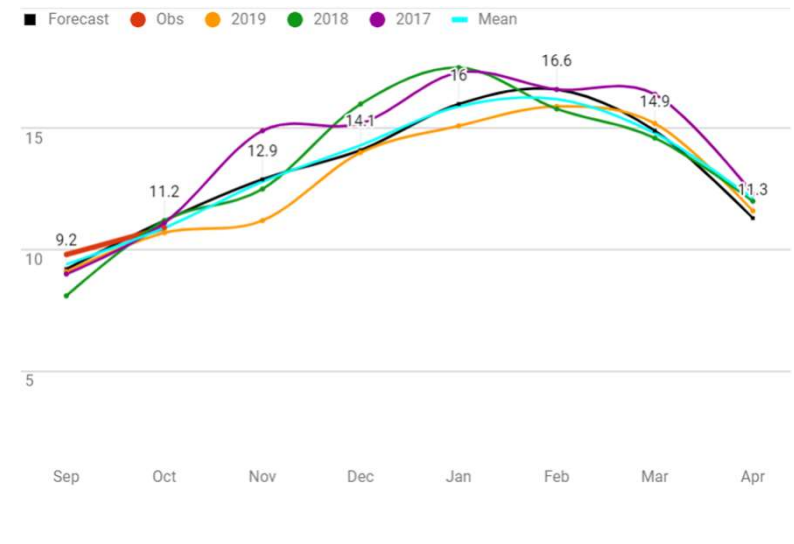


# Melbourne

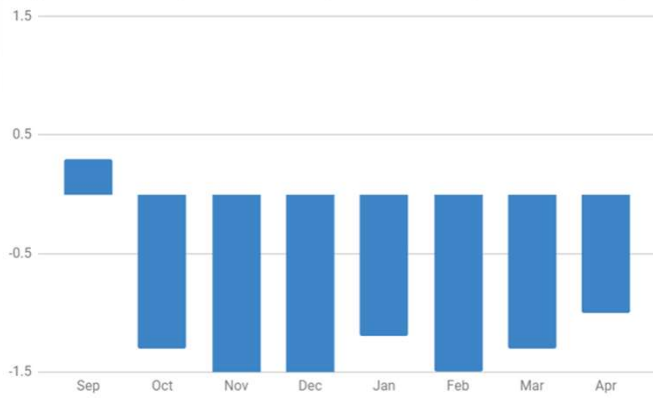
## Maximums



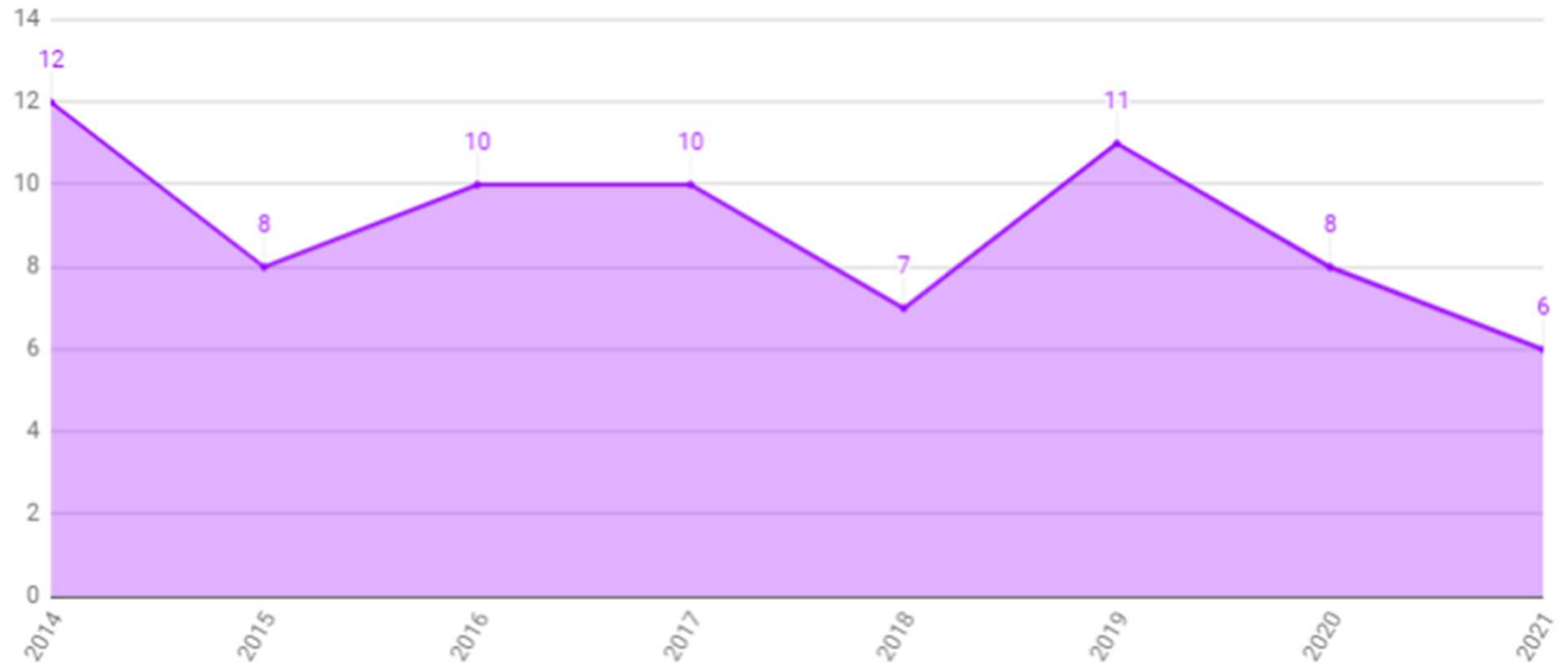
## Minimums



Forecast Anomaly (1981-2010 mean)



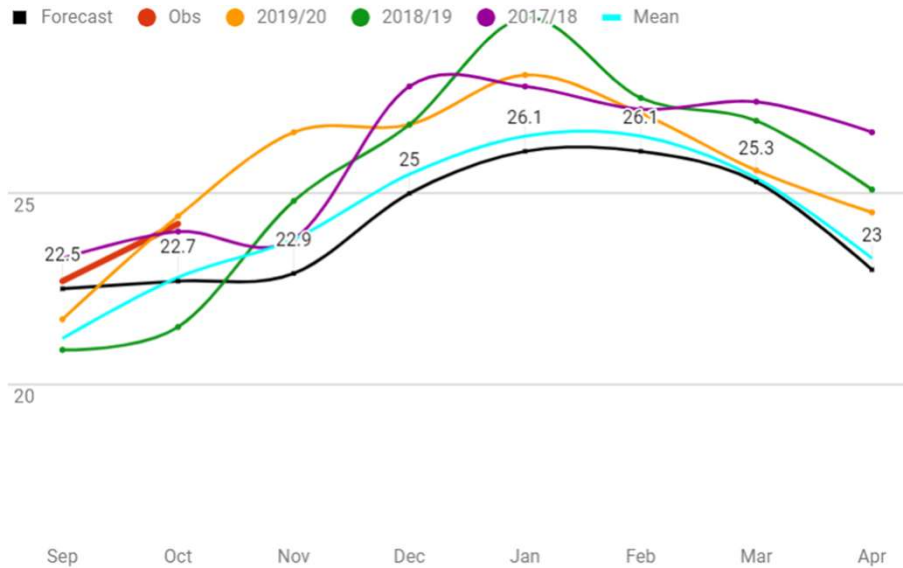
# Melbourne - Days above 35 Deg (DJF)



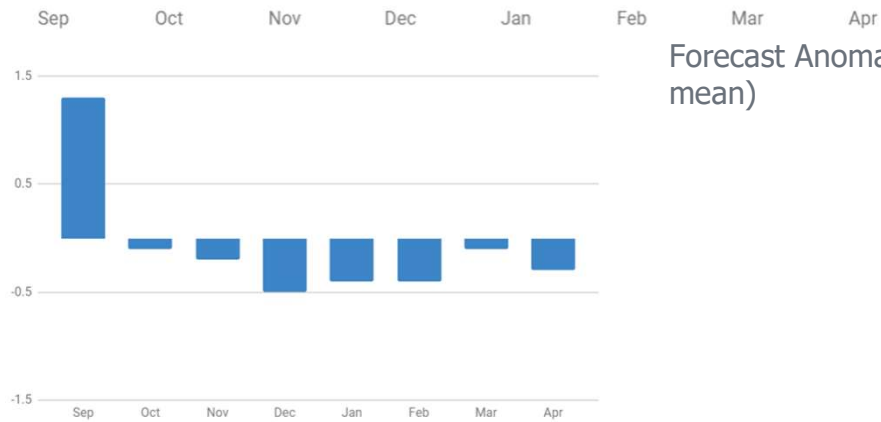
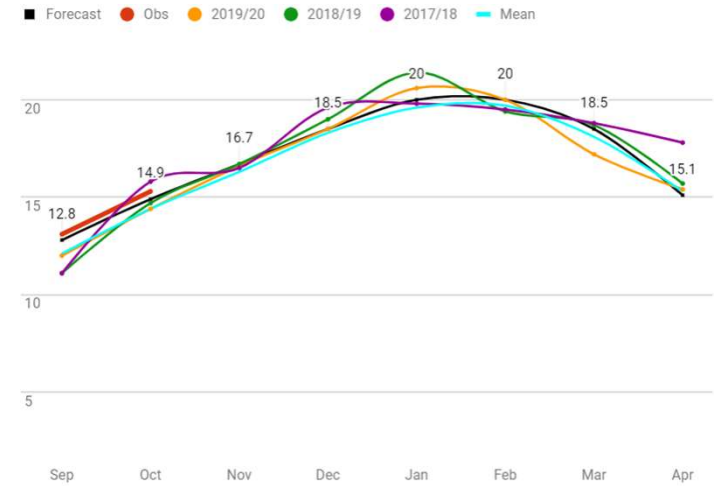
Southern coastal locations such as Adelaide and Melbourne experience **fewer individual daily heat extremes during La Niña years** but an **increased frequency of prolonged warm spells**. Of the 32 Victorian heatwaves between 1989 and 2009, 17 occurred during La Niña years while only 6 occurred during El Niño.

# Sydney

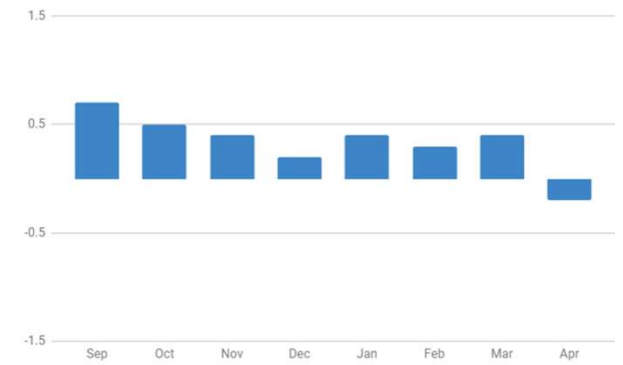
## Maximums



## Minimums

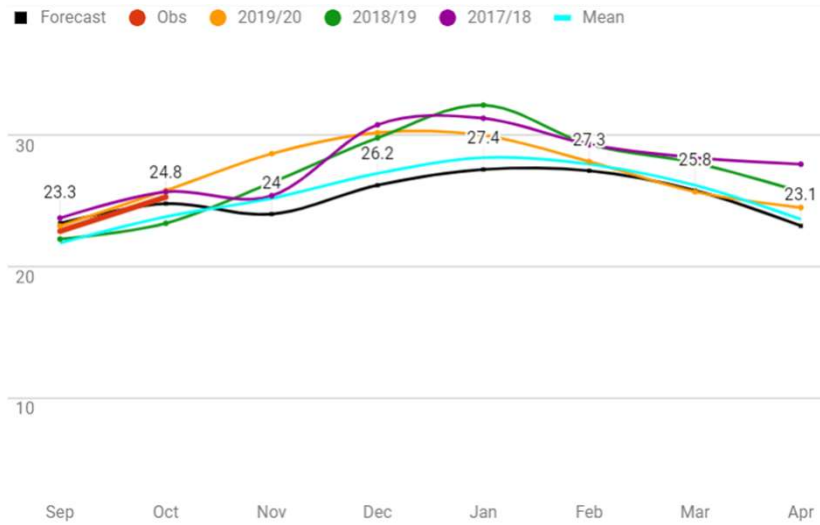


Forecast Anomaly (1981-2010 mean)

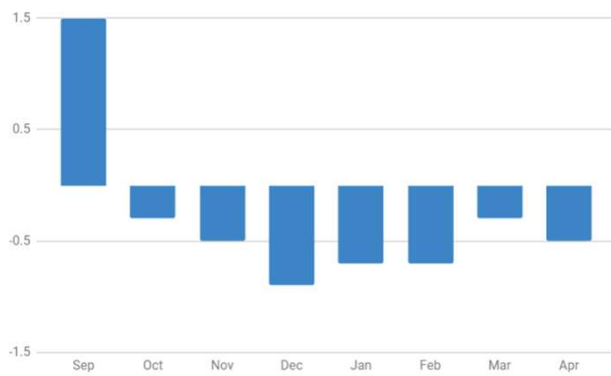
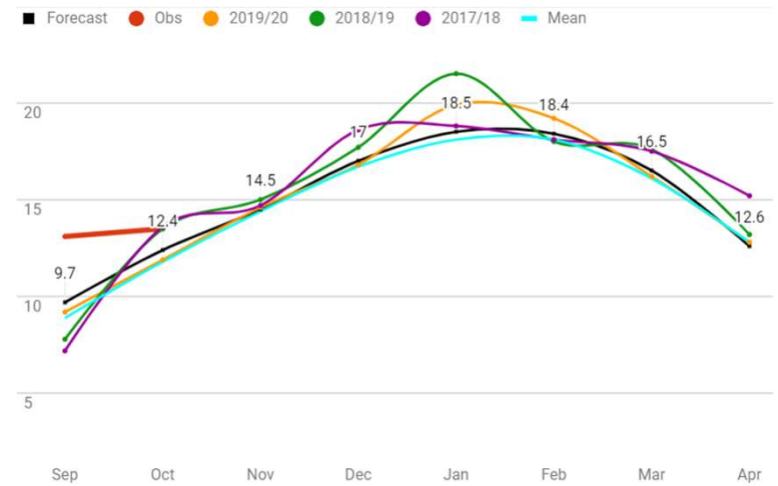


# Bankstown

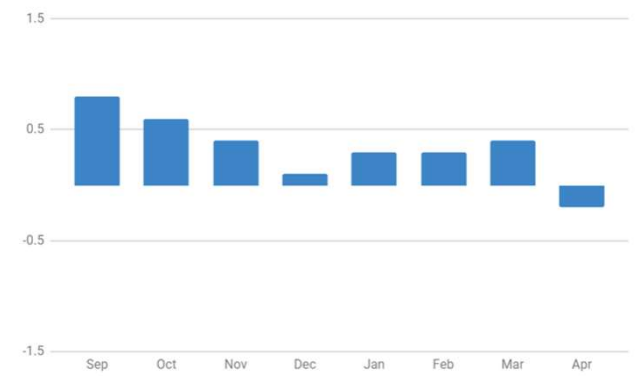
## Maximums



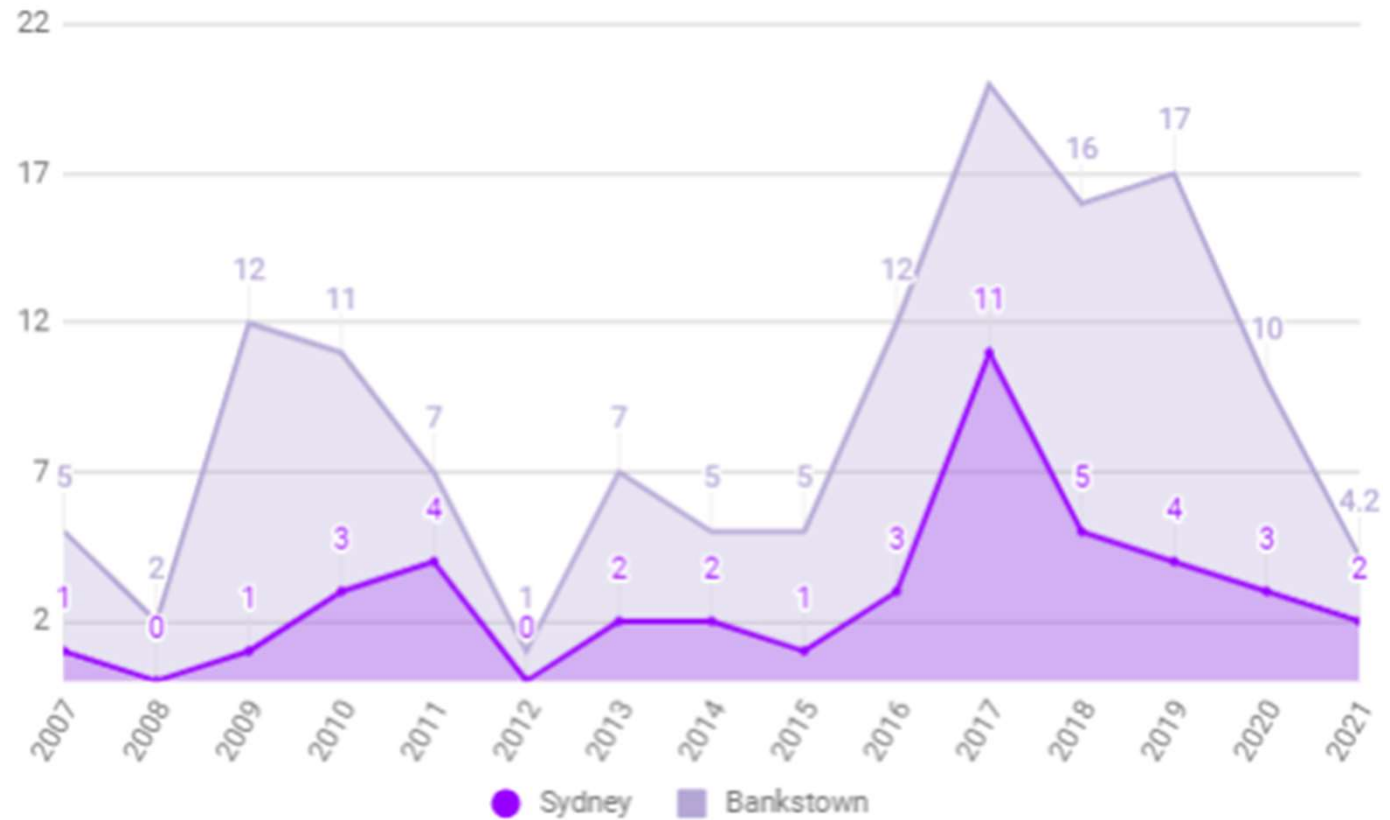
## Minimums



Forecast Anomaly (1981-2010 mean)

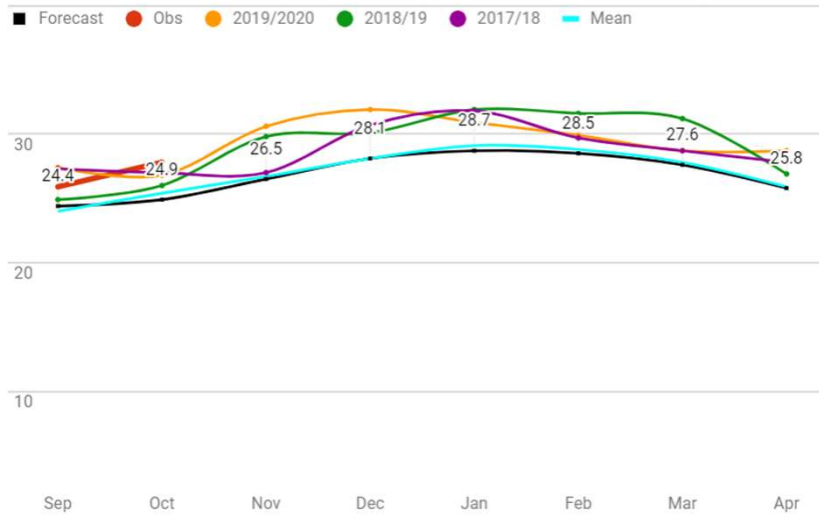


# Sydney Basin - Days above 35 Deg (DJF)

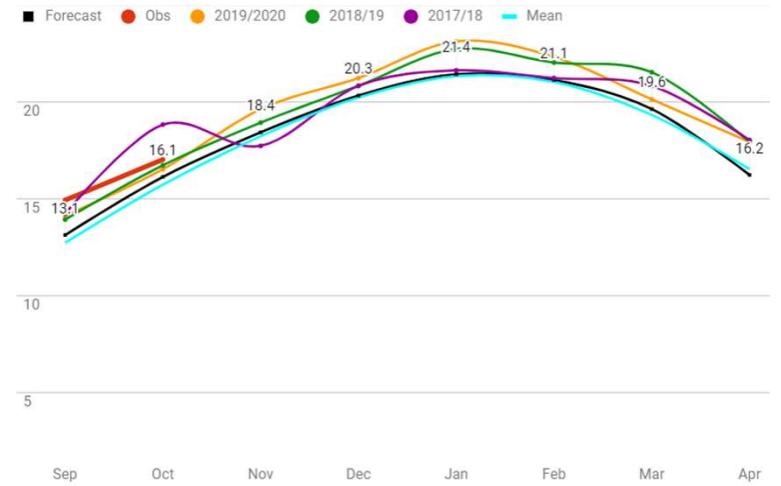


# Brisbane

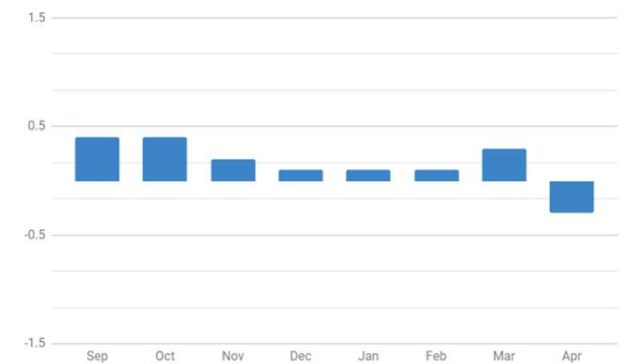
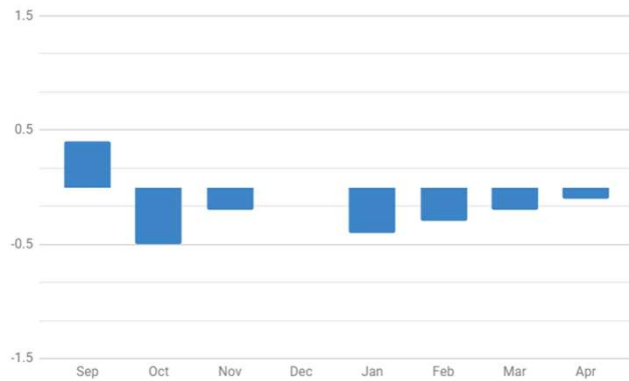
## Maximums



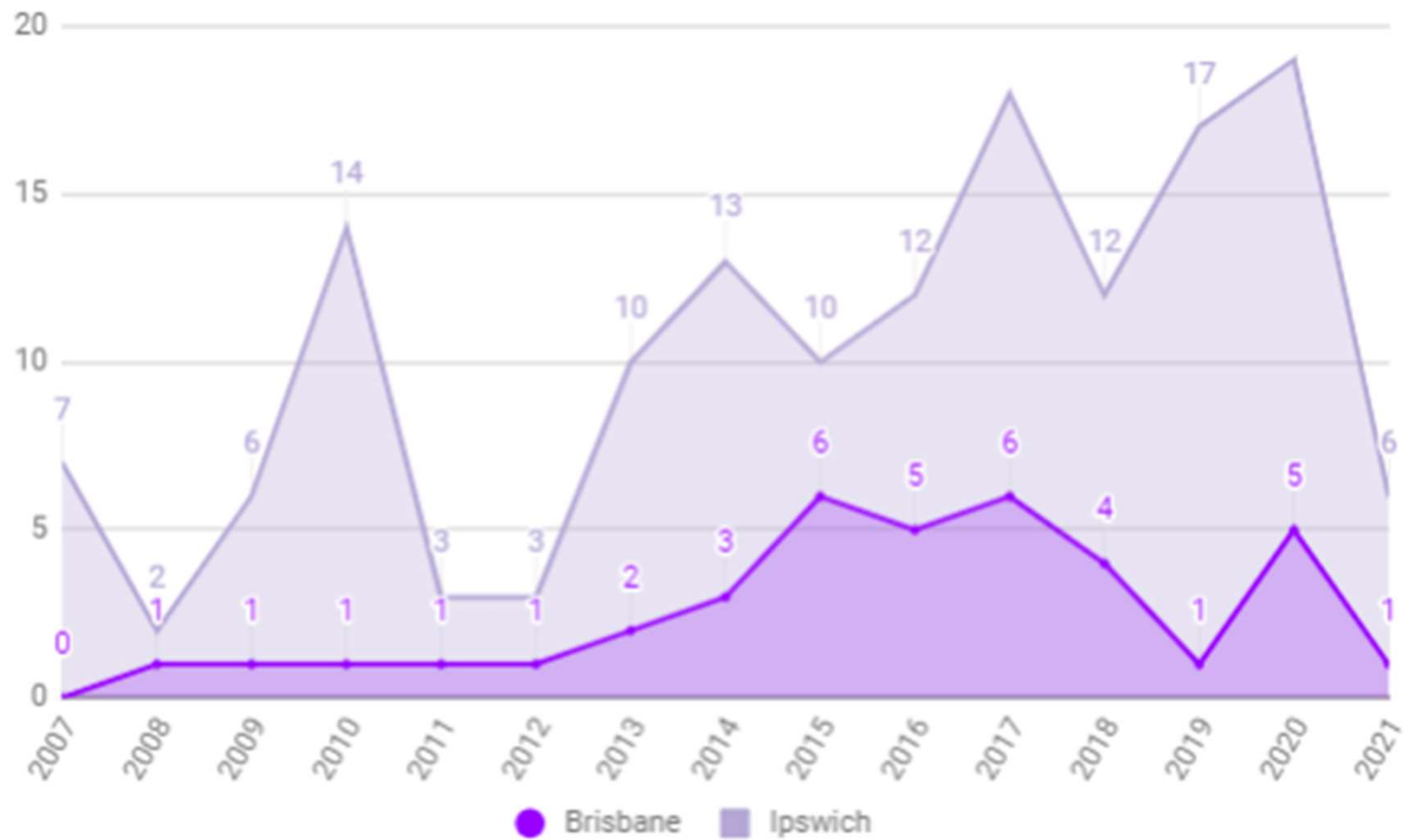
## Minimums



Forecast Anomaly (1981-2010 mean)

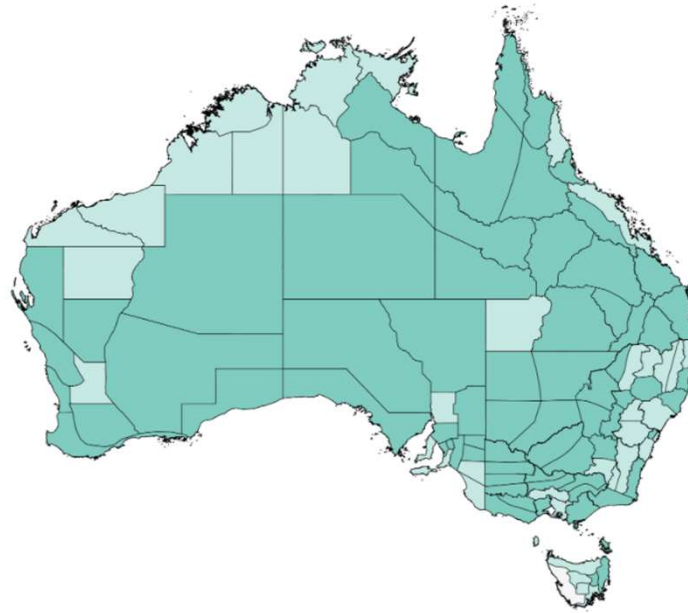


# Brisbane - Days above 35 Deg (DJF)



# National Outlook - DJF

## Rainfall



DECILES

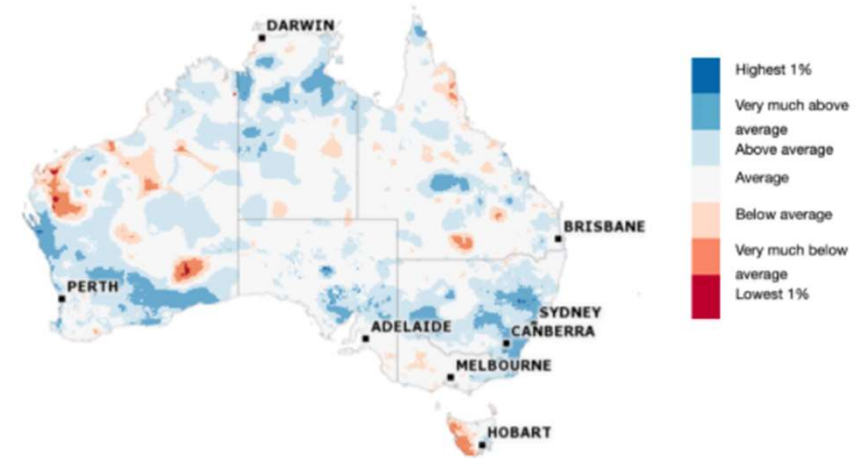
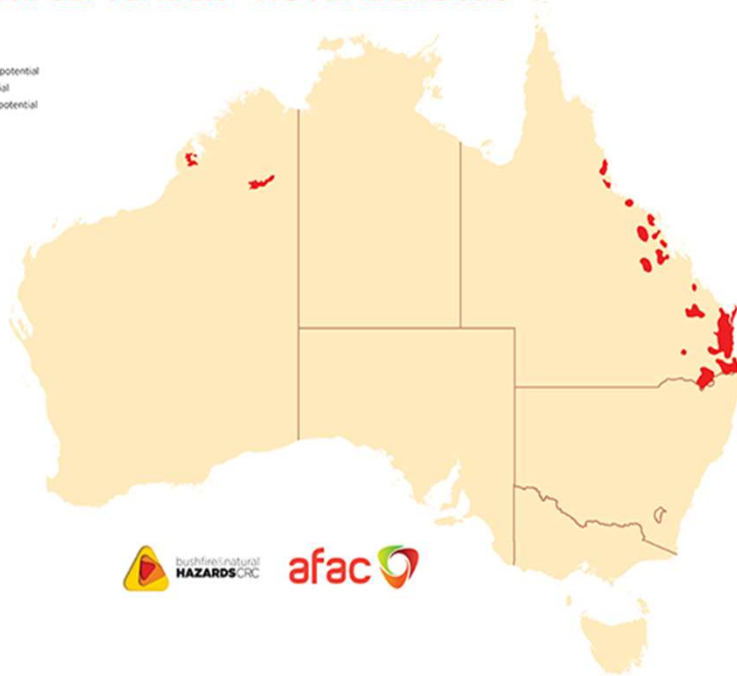




# Bushfire Risk

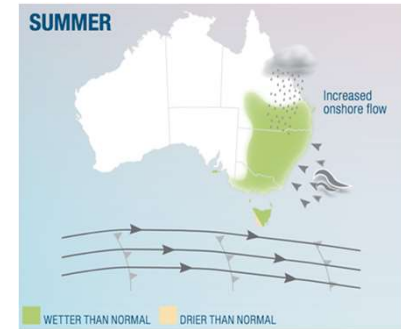
## AUSTRALIAN SEASONAL BUSHFIRE OUTLOOK: SEPTEMBER - NOVEMBER 2020

■ Above normal fire potential  
■ Normal fire potential  
■ Below normal fire potential

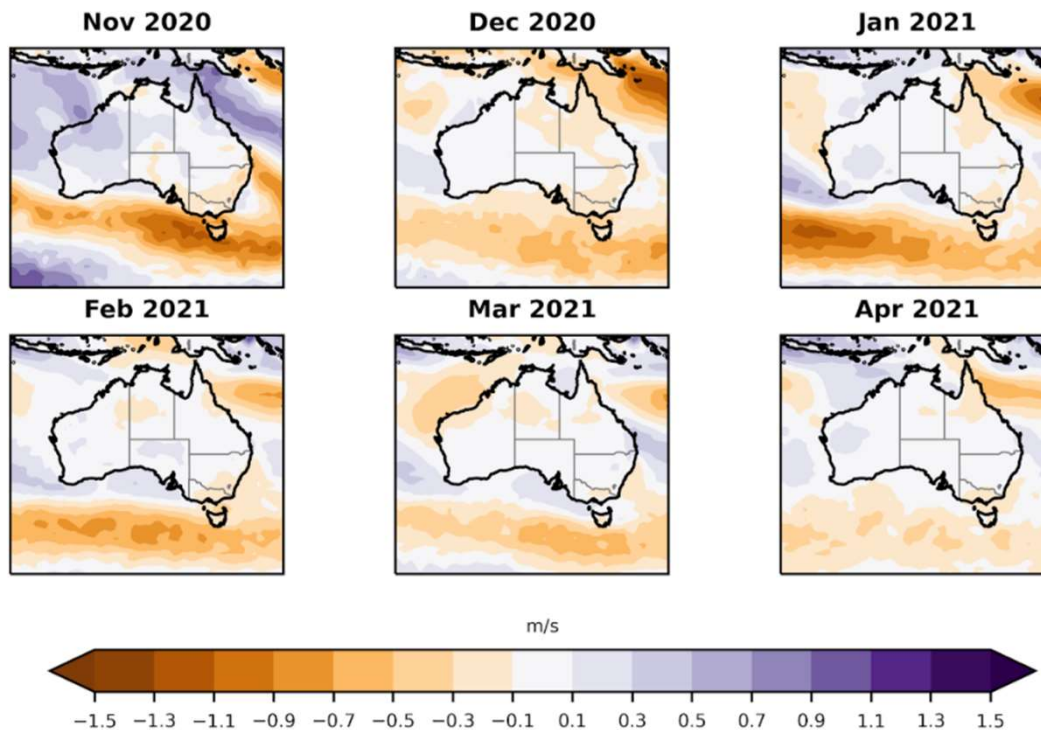


- Increased soil moisture.
- Reduced risk of extreme temperatures - La Niña
- Increased heat wave risk for SA and VIC.
- Grass fire risk is higher than normal due to increased rainfall and growth.

# Wind Generation



## Forecast of Wind Speed Anomalies










→ Positive SAM is linked to La Niña, resulting in cold fronts generally passing further south than normal.

→ Can lead to prolonged warmth in southern coastal areas of Australia and less wind

# Climate Summary

- Overall normal to below normal maximums with above average minimums.
- Prolonged heat events are a higher risk in SA & VIC, though less extreme than recent years.
- Humidity levels higher across much of Australia.
- Normal bushfire potential, with increased grass fire risk

WEATHER IMPACT		LIKELIHOOD (COMPARED TO MOST YEARS)
	Bushfire activity	▶ <b>Normal bushfire potential</b>
	Heatwave	▲ <b>Increased chance for SA &amp; VIC (Less extreme)</b>
	Widespread flooding	▲ <b>Increased chance</b>
	Severe storms	▼ <b>Normal-to-below</b>
	Drought	▼ <b>Less likely</b>
	Strong Wind Events	▼ <b>Reduced Risk</b>
	Tropical cyclones	▲ <b>Increased</b>

The logo for weatherzone, featuring the word "weatherzone" in a lowercase, sans-serif font with a small degree symbol (°) at the end. The logo is positioned in the top left corner of the slide, overlaid on a vertical image strip that shows a close-up of green leaves and a blue sky with a white cloud.

weatherzone°

weatherzone°  
**Josh Fisher**

Level 5, 8 West Street  
North Sydney NSW 2065

E: [jfisher@weatherzone.com.au](mailto:jfisher@weatherzone.com.au)



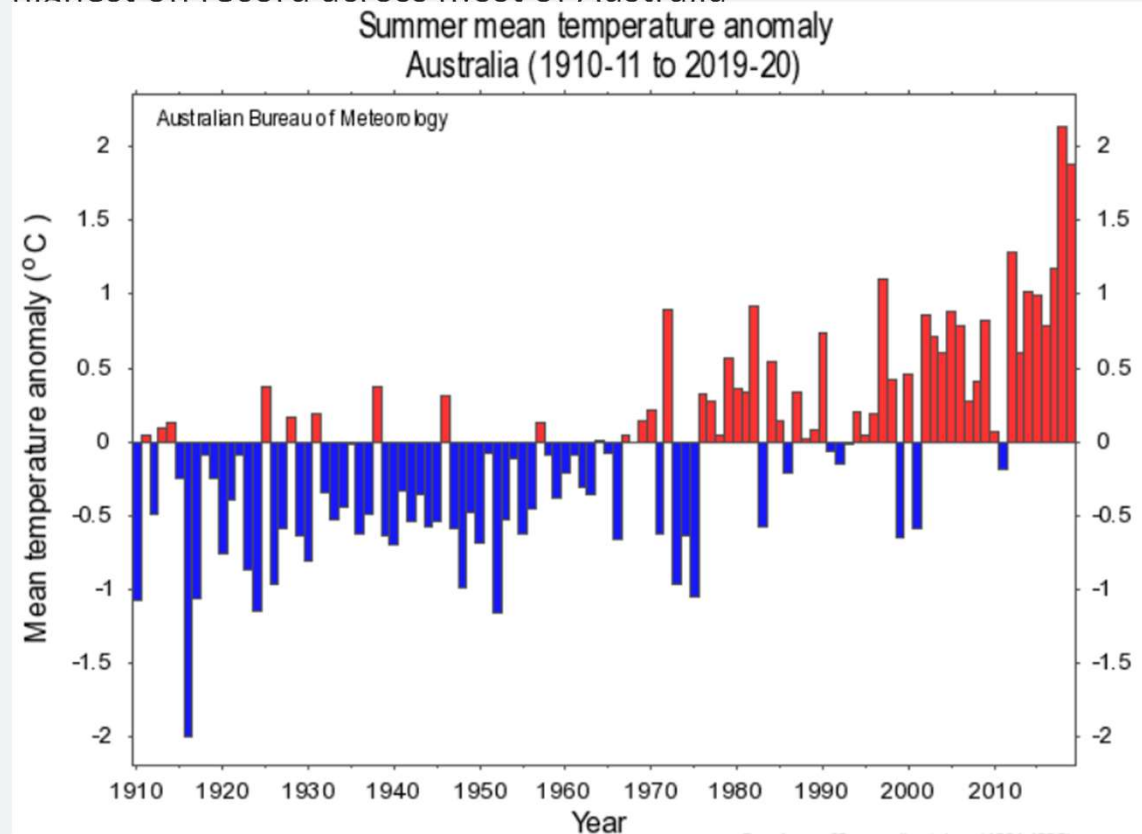
# AEMO Summer Readiness 2020-21

# Weather last summer – the new norm

- Maximum and minimum temperatures second warmest on record

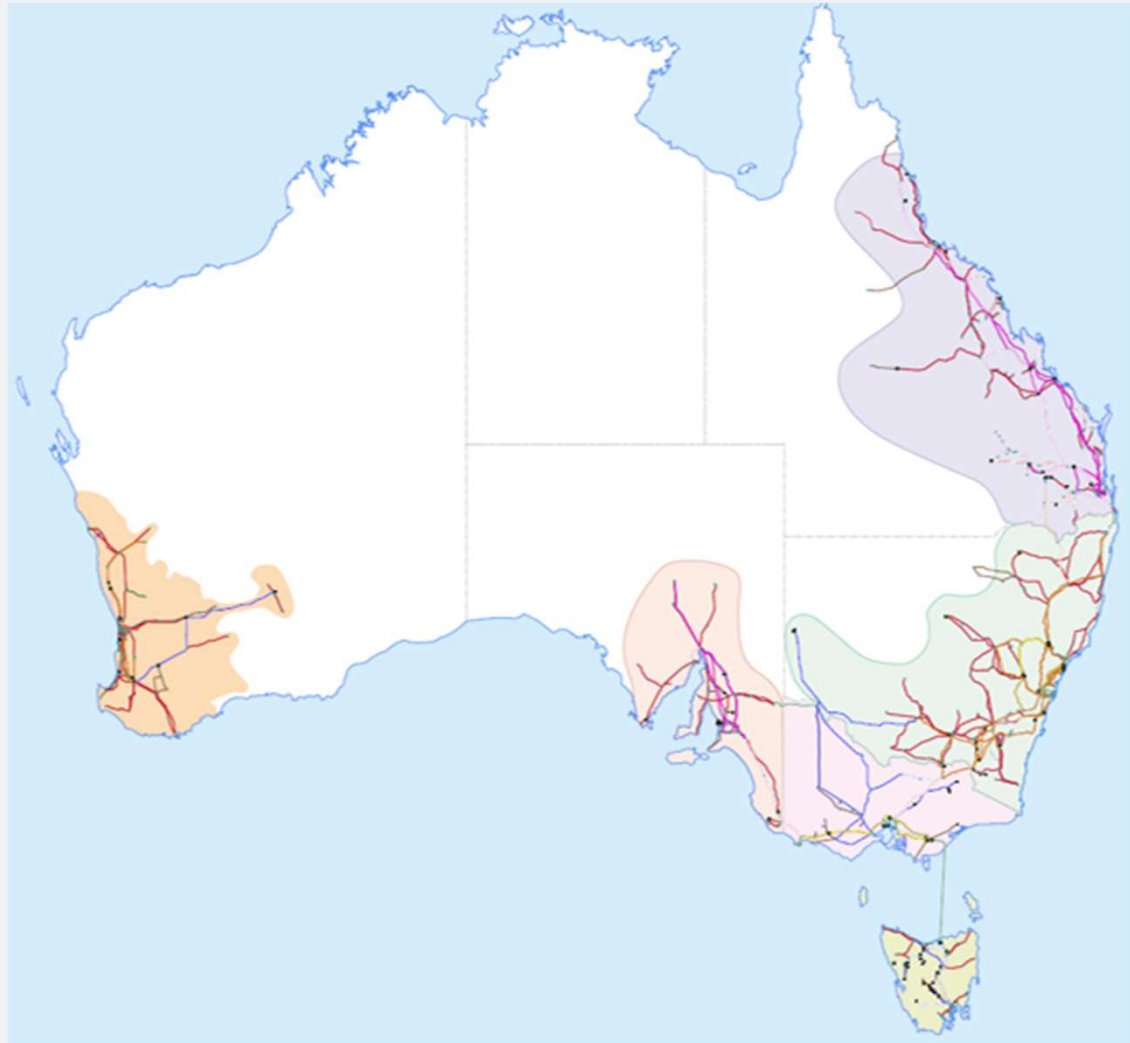
**2019/20 was the second hottest on record with December 2019 being warmest December on record for Australia**

- Two consecutive days in December set records for Australia's hottest day with 41.9°C setting new record on 18 Dec.
- December accumulated Forest Fire Danger Index values highest on record across most of Australia



# 4 January 2020

- Conditions
  - Major bushfires across NSW and Victoria
  - 47 degrees in Bankstown, Sydney
- Power System Impacts
  - Multiple transmission line trips
  - Regional separation
  - RERT used



Australian Bureau of Meteorology

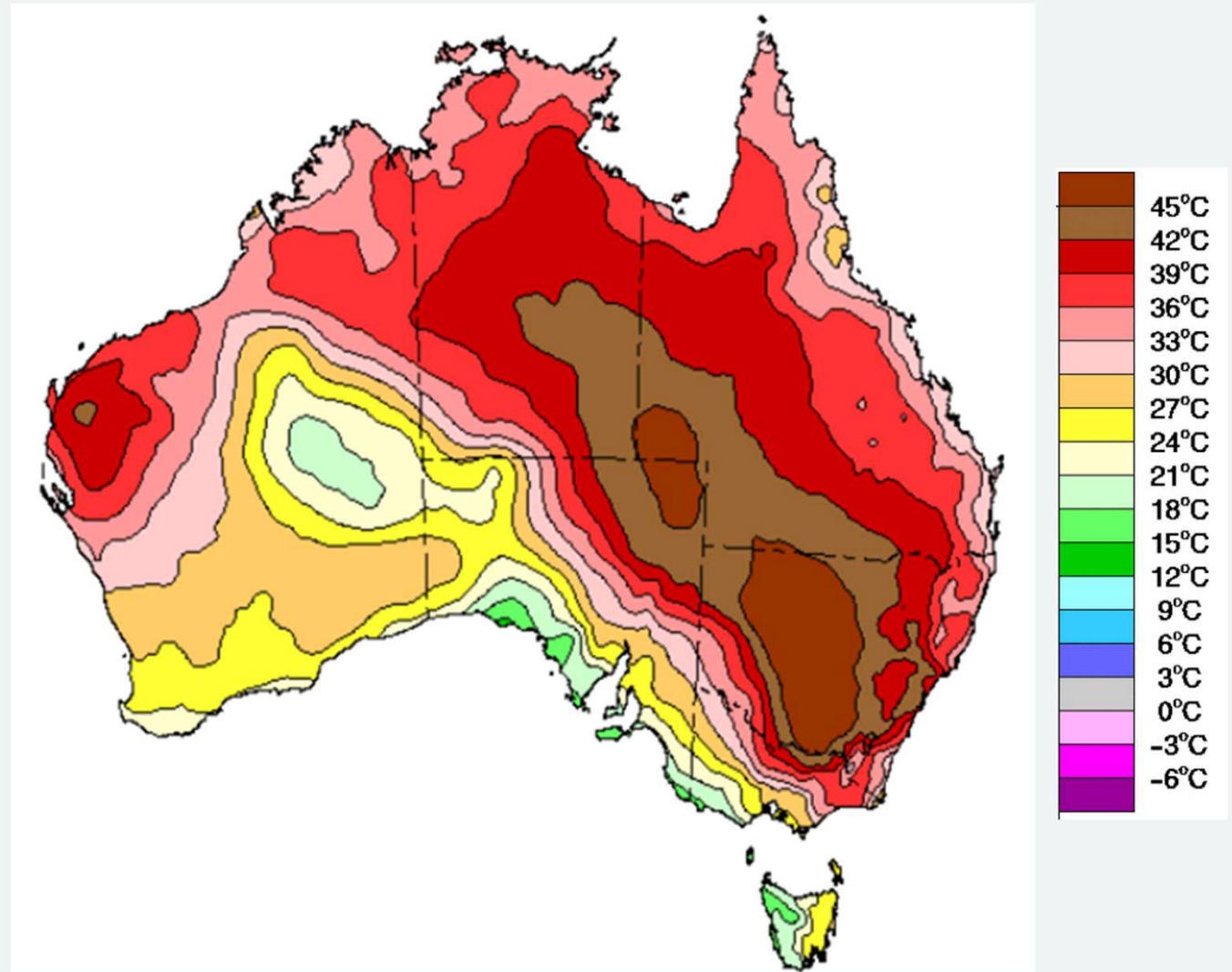
# 4 January 2020

- Conditions

- Major bushfires across NSW and Victoria
- 47 degrees in Bankstown, Sydney

- Power System Impacts

- Multiple transmission line trips
- Regional separation
- RERT used










Australian Bureau of Meteorology

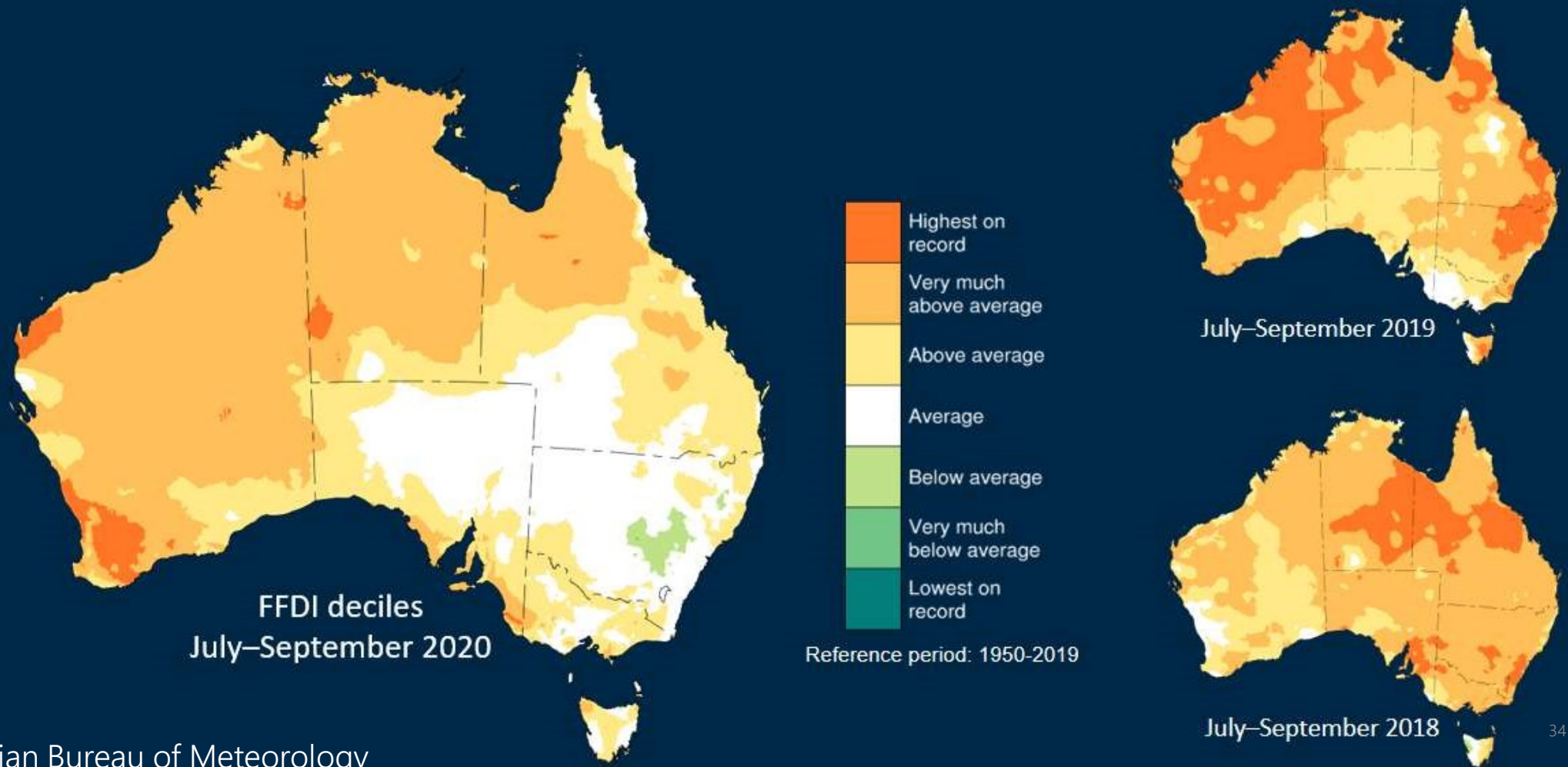


# Weather outlook

- Overall normal to below normal maximums with above average minimums.
- Prolonged heat events are a higher risk in SA & VIC, though less extreme than recent years.
- Humidity levels higher across much of Australia.
- Normal bushfire potential, with increased grass fire risk

WEATHER IMPACT	LIKELIHOOD (COMPARED TO MOST YEARS)
 Bushfire activity	<b>▲ Normal bushfire potential</b>
 Heatwave	<b>▲ Increased chance for SA &amp; VIC (Less extreme)</b>
 Widespread flooding	<b>▲ Increased chance</b>
 Severe storms	<b>▼ Normal-to-below</b>
 Drought	<b>▼ Less likely</b>
 Strong Wind Events	<b>▼ Reduced Risk</b>
 Tropical cyclones	<b>▲ Increased</b>

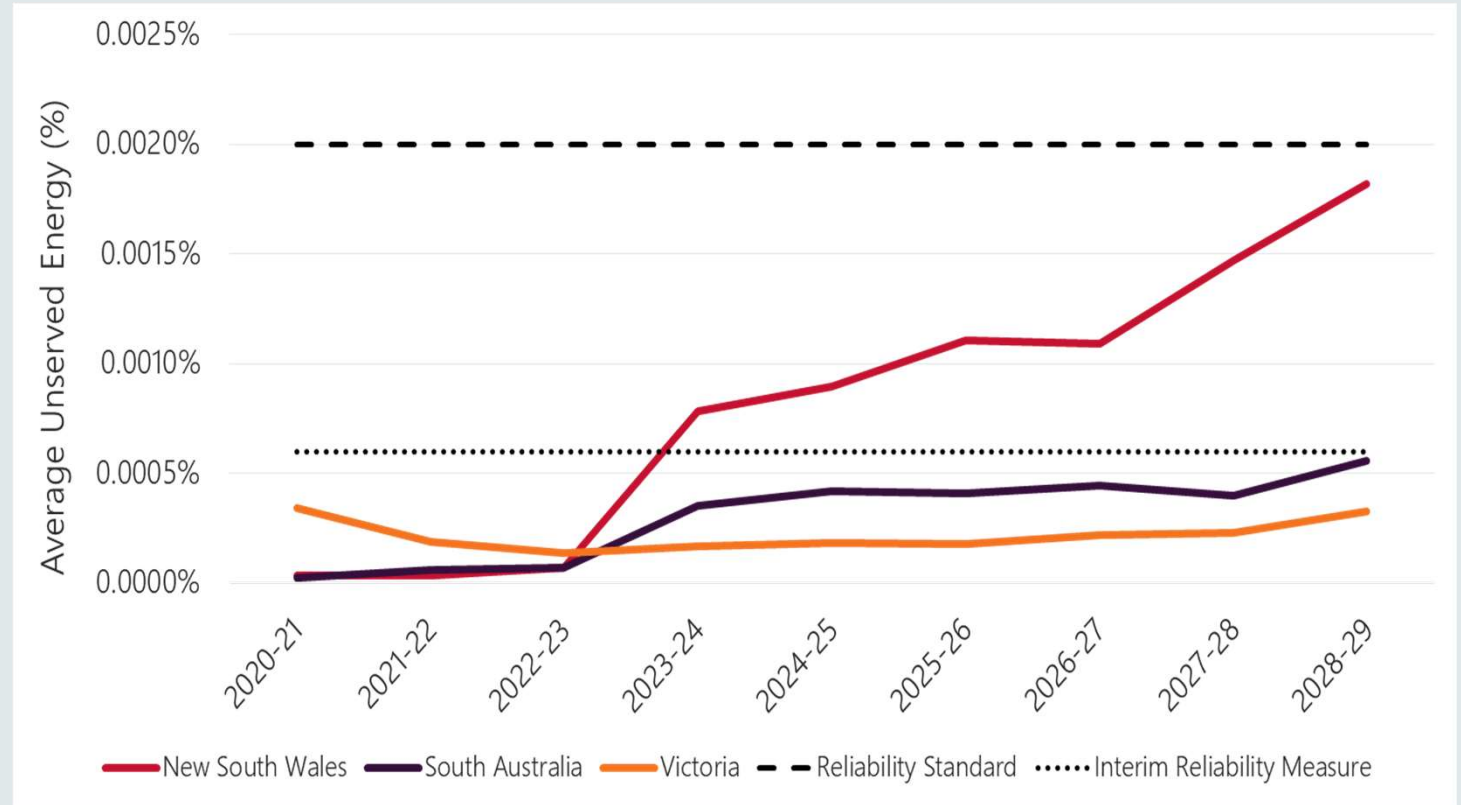
# Forest Fire Danger Index (FFDI)



# NEM Unserved Energy projections

## 2020 ES00

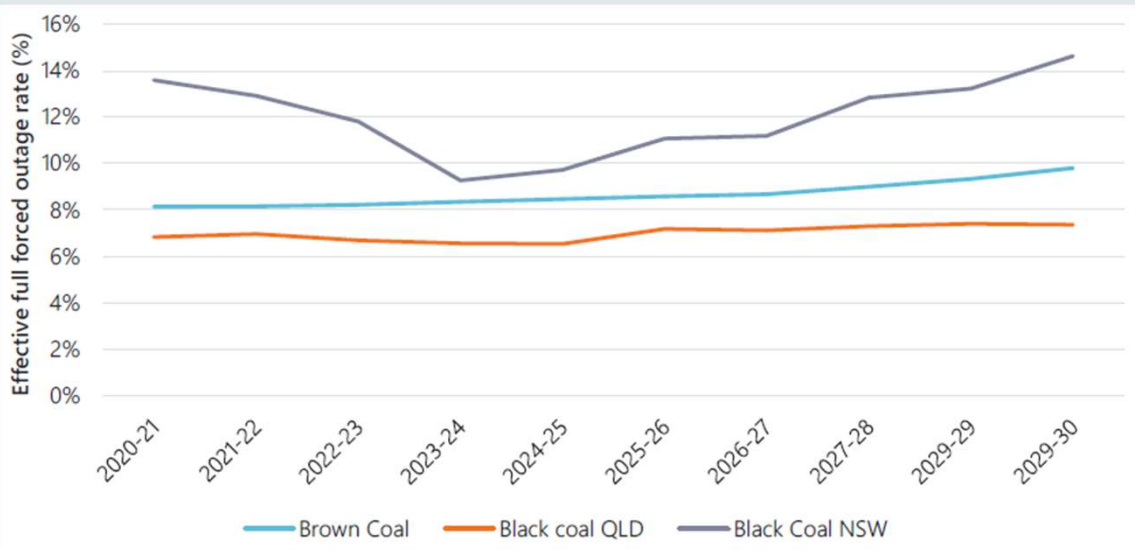
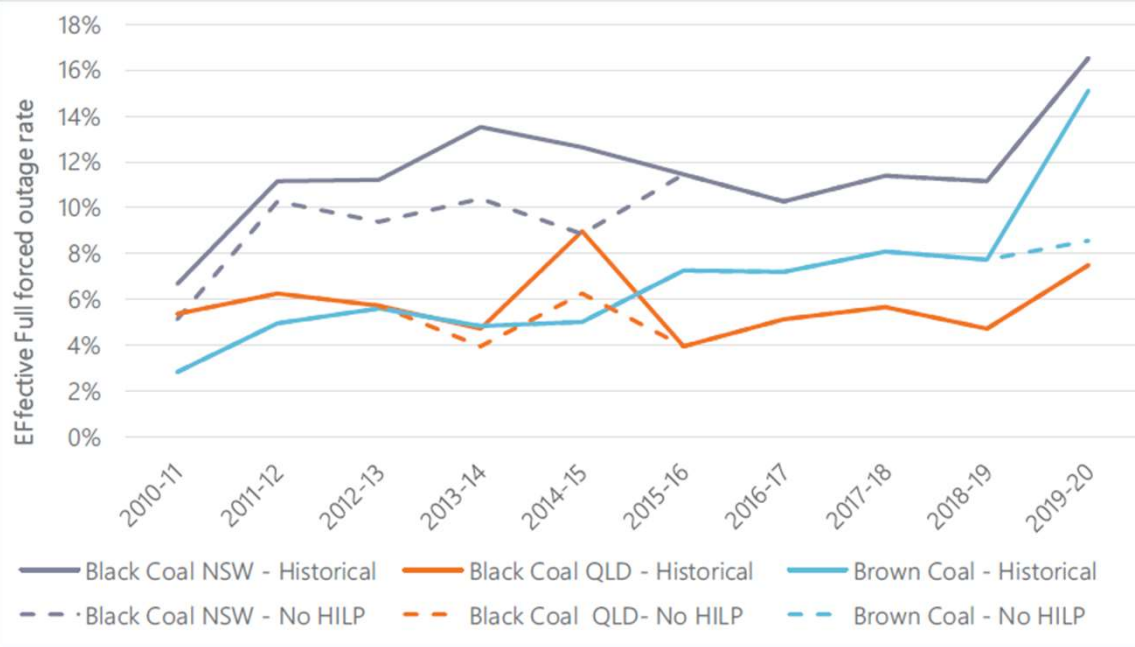
- Expected unserved energy forecast to be below standard for 2020-21
- Risk of load shedding remains if high demand and outages coincide



# NEM forced outage rates

Reliability of thermal generation fell to historical low in 2019-20

Trend continues into future years

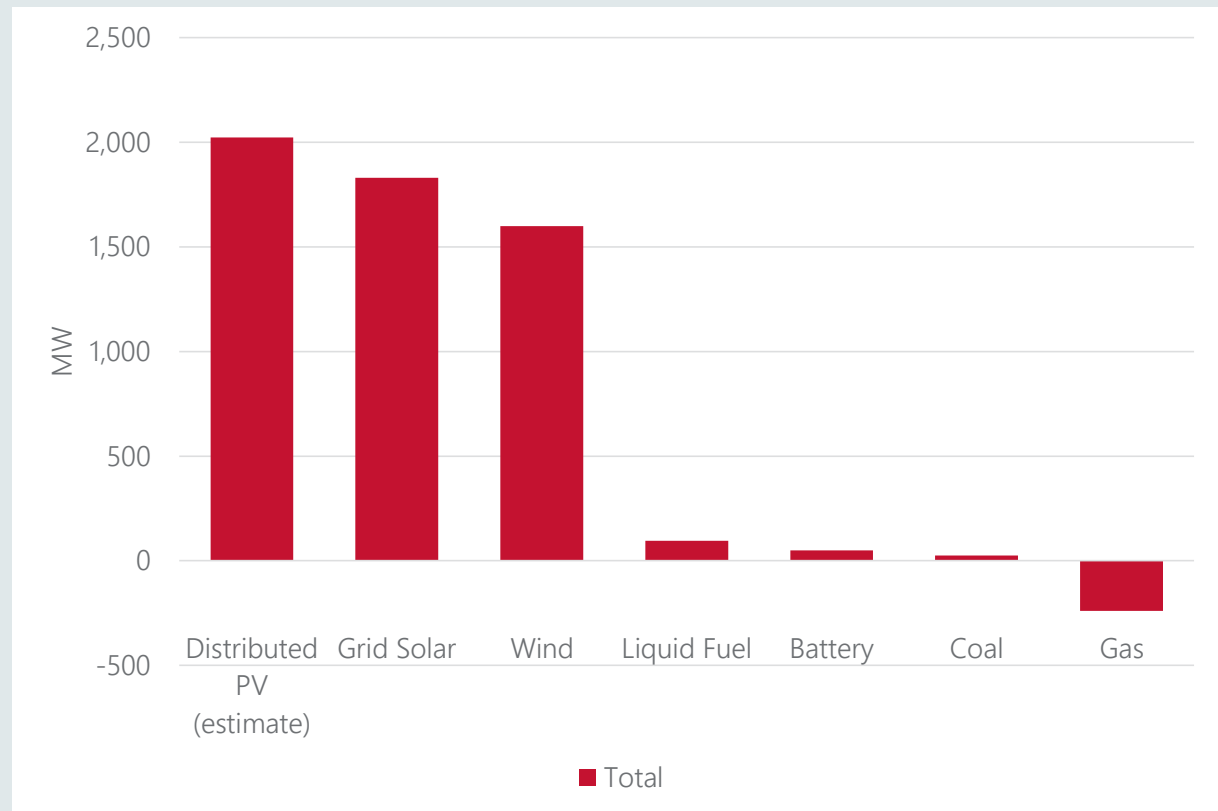


# Supply/Demand changes since last year

## New supply entering the market since last year

- The net new committed supply totals 5,400 MW (full capacity), comprising 3,400 MW VRE and 2,000 MW distributed PV
- As reported by project participants
- Available capacity of solar significantly reduced during evening peak

**All NEM Regions have a 0-2% reduction in 10% POE forecast operational demand**



# RERT Strategy – Summer 2020/21

- AEMO does not forecast any Unserved Energy exceedance of the reliability standard or the interim reliability measure.
- Measures have been taken to mitigate any potential USE risks.

## Supply and Demand

- AEMO's 2020 Electricity Statement of Opportunities (ESOO) does not forecast any Unserved Energy (USE) exceedance of the reliability standard.
- To mitigate any potential USE risks AEMO has conducted an EOI for the procurement of Short Notice RERT Reserve. Estimated reserve volumes to manage USE risks in the NEM:
  - Queensland – 25 MW
  - New South Wales – 881 MW
  - Victoria – 811 MW
  - South Australia – 201 MW
- Short Notice RERT (no availability costs) will be used to address the identified risk.
- AEMO will not enter into any agreements where the costs exceeds the value of customer reliability

# Summer plan 2020-21

Lessons Learnt  
driving  
Improvements

1. Prepared resources
  - Generation availability, including Fuel
  - Transmission availability
  - Reliability Emergency Reserve Trader (RERT)
2. Operational improvements
  - Training
  - Processes
3. Contingency planning and Emergency Management
4. Communications and stakeholder engagement

# Summer 2019-20

## Lessons Learnt > Mitigations



Source: ABC

- Challenges contacting new intermittent generating units
  - Participants providing current contact details
- Difficulties operating South Australia as an island for extended period
  - Reviewed operational processes
- Unusual system configuration
  - Improved tools
- Impact of demand side response on supply



# Summer 2019-20

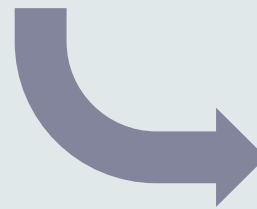
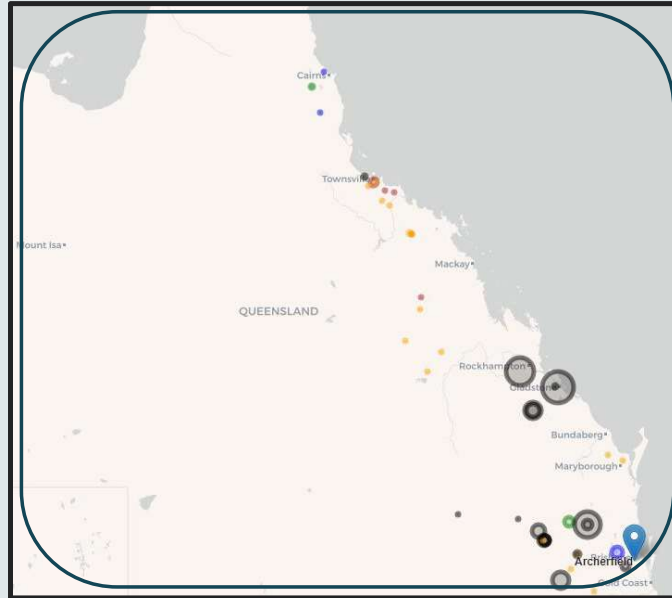
## Lessons Learnt > Mitigations



- Impact of extreme conditions on wind/solar output
  - Discuss solutions with Participants
- Participant need for timely incident info
  - Review reporting processes
- Record maximum and minimum demands
  - Review voltage management strategy
- Forecasting challenges
  - Self-forecasting
  - Collaboration with weather forecasting industry
- Impact of ash and dust on network

# Local Temperature Alerts

- Change from one reference temperature per region to more location-specific temperature alerts
- Assist generators in provide better indication of supply availability



# Risks And Issues

Risks	Mitigations
Network and generation forced outages exceeding limits historically observed	RERT panel
Covid-19 may lead to longer than expected planned outages, and delays in returning unplanned outages	Coordination with Generators, TNSPs, Governments under ACCC Authorisation
Bushfires impacting fuel supplies (coal or gas production), generation or network assets (less impact than 2019-20)	Monitoring risk with asset owner advice
Increased storm and flooding likelihood, may impact fuel supplies and network infrastructure	Monitor coal generation and transmission availability
Unplanned high impact network outages coinciding with very low demand periods may result in NS wind or Rooftop PV generation disconnection	Contingency plans in place

Issues	Impact
Limit on SA to VIC transfer due to (SA) Para SVC outage	Constraint on Heywood interconnector
(VIC) Tower Restoration Work	Network limitations during outage

# Cross-sector Engagement

Communication and coordination essential

- ACCC Coordination
  - QLD, VIC
  - Essential to mitigating COVID Impact and Risks
- Jurisdictional Engagement
  - Briefings
  - Exercises
  - Weekly NEMEMF Briefings from 5 Nov
- Emergency Management Services
  - Briefings to Critical Infrastructure Centre, regional forums
- Industry
  - Briefings to industry groups

# NEM Summer Readiness

20 November 2020

Joanna Gall

Director – Compliance and Enforcement Branch

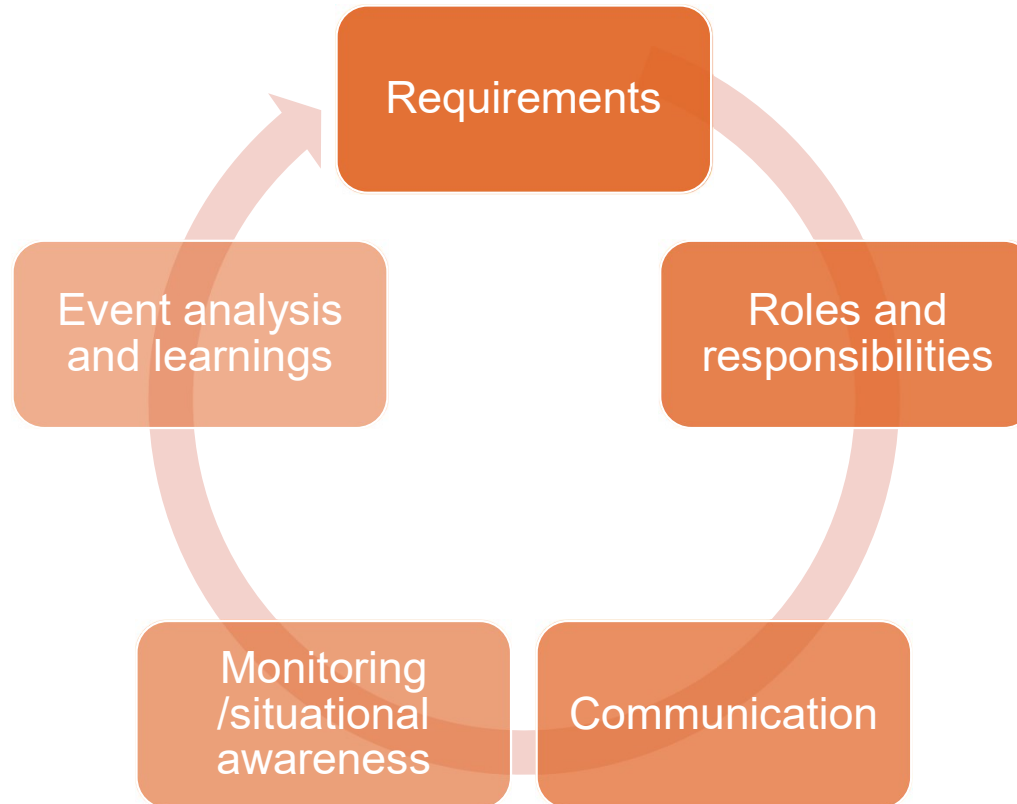
# Introduction

- AER's role
- Conditions predicted for summer
  - AEMO's 2020 *Electricity Statement of Opportunities* notes expected unserved energy is not forecast to exceed the reliability standard or the Interim Reliability Measure, in any NEM region during summer 2020/21
  - BOM has forecast La Niña conditions

# Identifying and managing risks

- What is a risk to power system security is constantly changing
- Maintain situational awareness to proactively identify risks
  - Monitor plant performance
  - Consider AEMO Market Notices
- Communicate risks promptly
  - Within the business
  - To AEMO

# Robust systems and processes





# Information provision to AEMO

- This continues to be an AER compliance and enforcement priority for 2020/21
- It is critical that AEMO has timely, accurate and complete information to perform its functions
- Participants have a range of obligations under Chapters 3 and 4
  - Time horizons – 3 years out, day ahead, pre-dispatch to real time
  - Information requirements – availability, offer requirements, plant status

## **NER clause 4.8.1 – Registered Participants' advice**

*A Registered Participant must promptly advise AEMO or a relevant System Operator at the time that the Registered Participant becomes aware, of any circumstance which could be expected to adversely affect the secure operation of the power system or any equipment owned or under the control of the Registered Participant or a Network Service Provider.*

# Maintaining contact with AEMO

- AEMO must be able to contact plant operators at all times
  - Participants must ensure AEMO has current contact details for plant operators
  - Contacts must be reachable 24 hours a day
- Nominated contact must be able to act on AEMO's instructions
  - Participants must ensure the contact is familiar with the relevant plant

# Other critical NER obligations

- Key operational requirements
  - Submission of availability data
  - Honouring latest offer (3.8.22A)
  - Plant must be capable of complying with offer
  - Following dispatch instructions
  - Notifying AEMO of plant changes, defects or failures
- The AER's Summer Readiness compliance bulletin outlines our expectations in relation to key obligations
  - Supporting checklist to assist participants to achieve compliance
  - Released December 2019 and available on AER website

# Contacting the AER

- Over summer, the AER will continue to monitor the market closely and liaise with AEMO regarding market operation and risks
- For compliance queries, or to self-report a compliance issue, please email [AERCompliance@aer.gov.au](mailto:AERCompliance@aer.gov.au)

# Case Study – Generation Loss under High Demand

# Case Study

1. Principals of supply shortfall situations
2. How an event unfolds
3. Communication to participants
4. Management of event

# Reserve Levels

Within ST and PD PASA timeframes market notices are sent out notifying of LOR conditions

On an LOR 2 & 3 conditions AEMO request for tender for SN RERT

## Explanation of reserve levels

- Reserve levels are described in clause 4.8.4 of the National Electricity Rules.

## Lack of reserve level 1 (LOR 1)

- 2 Largest input contingencies will cause supply deficit

## Lack of reserve level 2 (LOR 2)

- Largest input contingency will cause supply deficit or
- Current reserve level below forecasting uncertainty measure (FUM) level

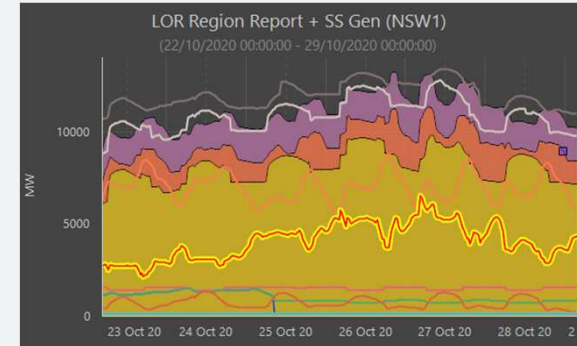
## Lack of reserve level 3 (LOR 3)

- Load shedding expected to take place or already taking place.

# Management mechanisms

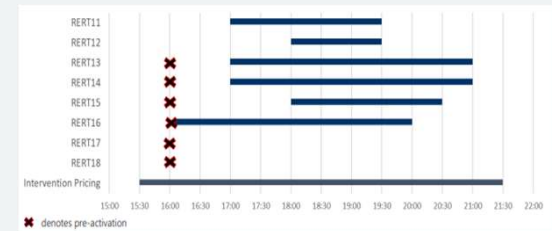
## Normal market operation

- Projected Assessment Of Supply Adequacy (PASA)
- Forecast Lack Of Reserve Market Notices



## Possible Actions

- Market outcome
- Constraint relaxation
- Transmission outage recall
- Generator directions
- RERT
- Load Shedding

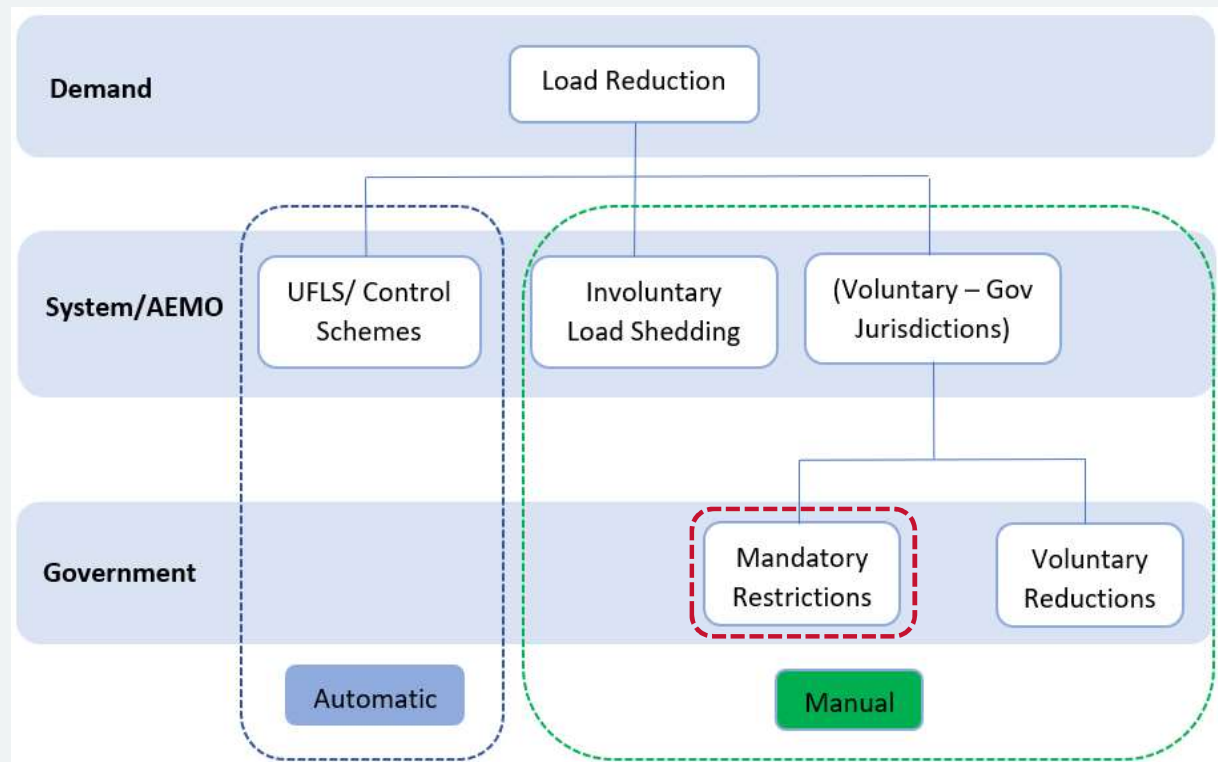




# Load Shedding

## What is load shedding?

- Controlled involuntary load shedding (disconnection of customer supply)
- May be implemented when there is a shortage of electricity supply or avoid overloading transmission and distribution lines
- Can occur automatically in response to faults on the power system



# How an event unfolds

## Scenario

1. Few days of high temperatures in NEM
2. Reserves are forecast to be low
3. Unplanned generation outages further reduce reserves
4. AEMO needs to intervene to maintain system security/reliability

# Forecast extreme temperatures

## BOM weather forecast for NSW, Vic, SA and ACT grim as cold front approaches WA

ABC Weather / By Kate Doyle

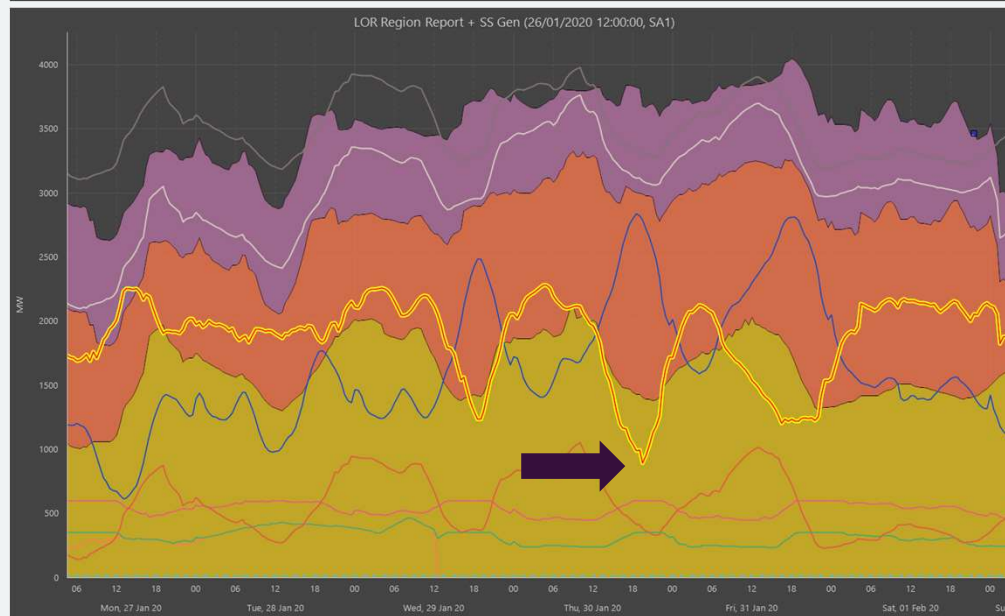
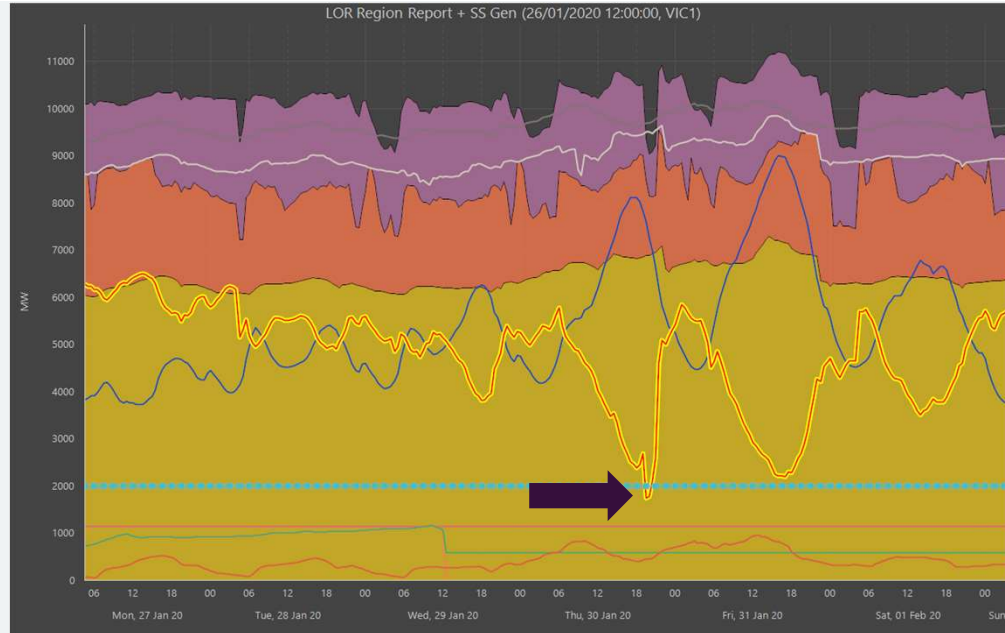
Posted Wed 1 Jan 2020 at 5:37pm, updated Thu 2 Jan 2020 at 6:52pm



	Monday		Tuesday		Wednesday		Thursday		Friday		Friday	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Brisbane	20	32	21	32	21	31	20	32	20	32	20	32
Sydney	14	18	13	24	14	34	22	29	14	18	14	18
Melbourne	20	30	20	27	20	32	20	43	20	30	20	30
Adelaide	14	24	13	33	21	31	22	42	14	24	14	24

# Reserves Low But Adequate (Monday)

Reserve in VIC and  
SA lower than  
average but above  
Lack Of Reserve  
levels on Thursday



# Reduction in Generation and Transmission capacity

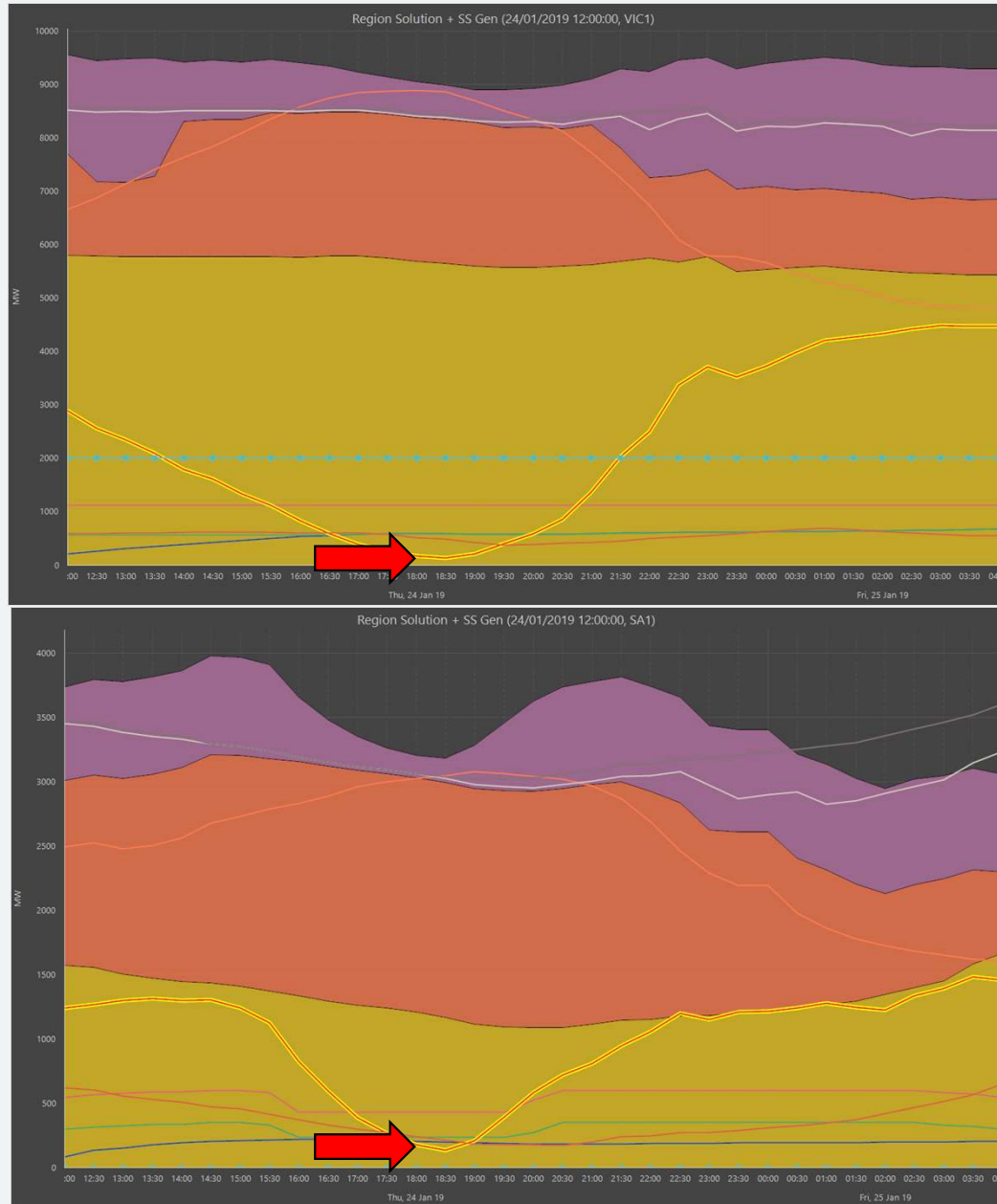
## Wednesday

- 14:15 (Victoria) Loy Yang B Unit 2 trips
  - Reduction of 500 MW. Return to service unknown
- 17:10 (Victoria) Yallourn Unit 2 will need to come offline within an hour for urgent maintenance
  - Reduction of 350 MW. Return to service unknown
- 18:00 (NSW) Bushfire near NSW-VIC interconnector. Lines reclassified resulting in reduction in transfer capacity
  - Victoria and NSW reserves reduced
- 19:15 (SA) Torrens Island B Unit 2 will need to come offline overnight
  - Reduction of 200 MW. Return to service unknown

# Lack Of Reserve (Thursday)

Forecast Lack Of Reserve in Victoria and South Australia

AEMO will intervene



# Communication with Participants

## Monday

PASA Forecast

## Wednesday

Forecast LOR2 for Friday - MN

- Call for market response
- Intention to intervene

## Thursday

- Update Forecast LOR2 - MN
  - Call for market response
  - Intention to intervene
  - Latest time to intervene
- Intention to commence RERT Negotiation
- Directions if available
- RERT ITT executed, contracts utilised as required
- Actual LOR2 - MN

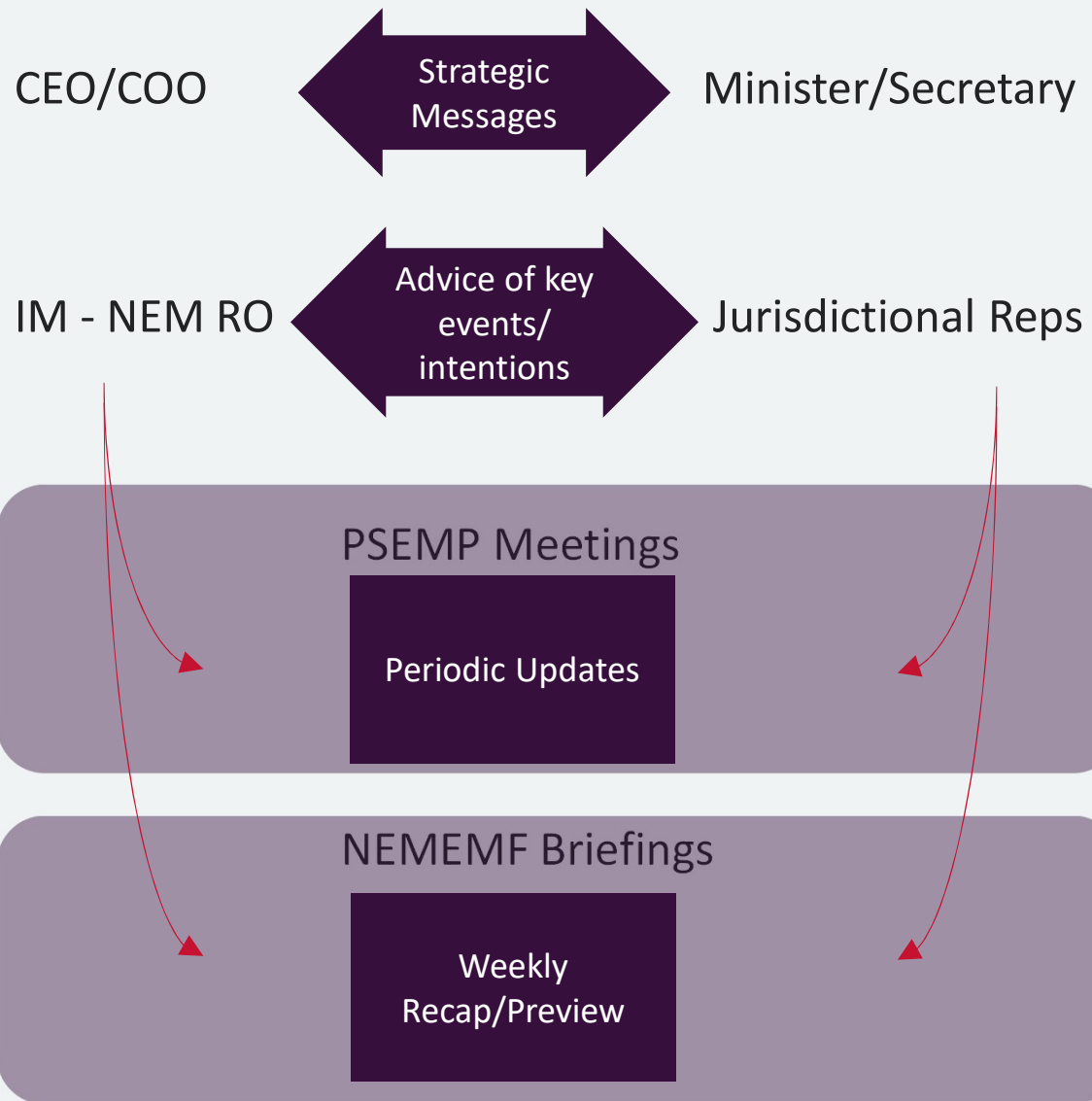
# Management of Event

AEMO will be:

1. **Monitoring** and **managing** power system security
2. **Advising** participants of events and forecasts through Market Notices and market systems
3. **Communicating** with generators and TNSPs to assess plant changes, determine responses
4. **Advising** jurisdictions of key risks to supply
5. **Convening** emergency management arrangements as required to manage power system emergencies



# Lines of Communication during Incident



# Questions?

**Email: [emergencypreparedness@aemo.com.au](mailto:emergencypreparedness@aemo.com.au)**