

Forced outage assumptions – 2020 ESOO

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Timeline

Date	Stage of process
Apr 20	<ul style="list-style-type: none">FOR data collected
May 20	<ul style="list-style-type: none">AEMO analysis of data
Today	<ul style="list-style-type: none">FOR Results
Ongoing	<ul style="list-style-type: none">Adjustments and forward projections provided by generators
Aug 20	<ul style="list-style-type: none">ESOO released

Agenda

- Analysis process
- Results
- Forward-looking projections
- Discussion

The 2020 FOR analysis process

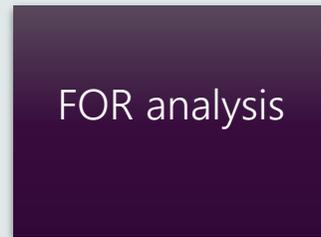
- Analysis process
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Inputs

- Annual (Apr-Mar) FOR Data
- Equal weight sample of previous 4 years

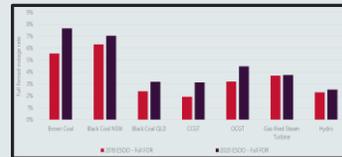
Assumptions

- No seasonal variation
- Uses P10 and typical summer ratings to reflect temperature deratings



Calculations

- Calculated at station level



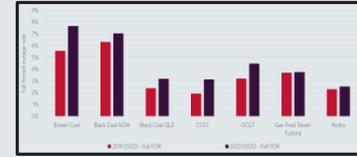
Presentation

Summarised at technology level to address confidentiality



Inputs

- Forward-looking projections for some generators



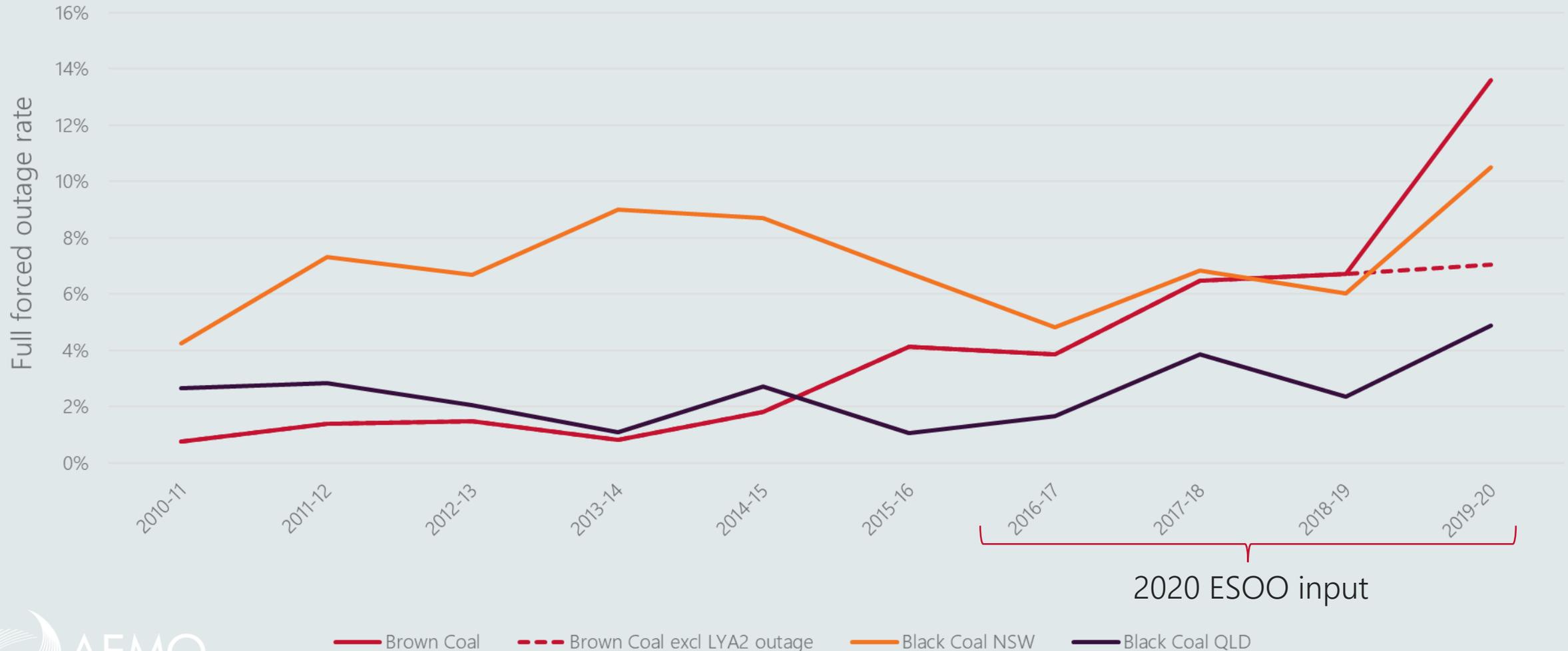
Rates for 2020 ES00 to vary by year

Today

Key:
Change from 2019

Reliability deteriorates: 12 of 16 coal stations increase outages in 2019-20 relative to prior year

- Analysis process
- **Results**
- Forward-looking projections
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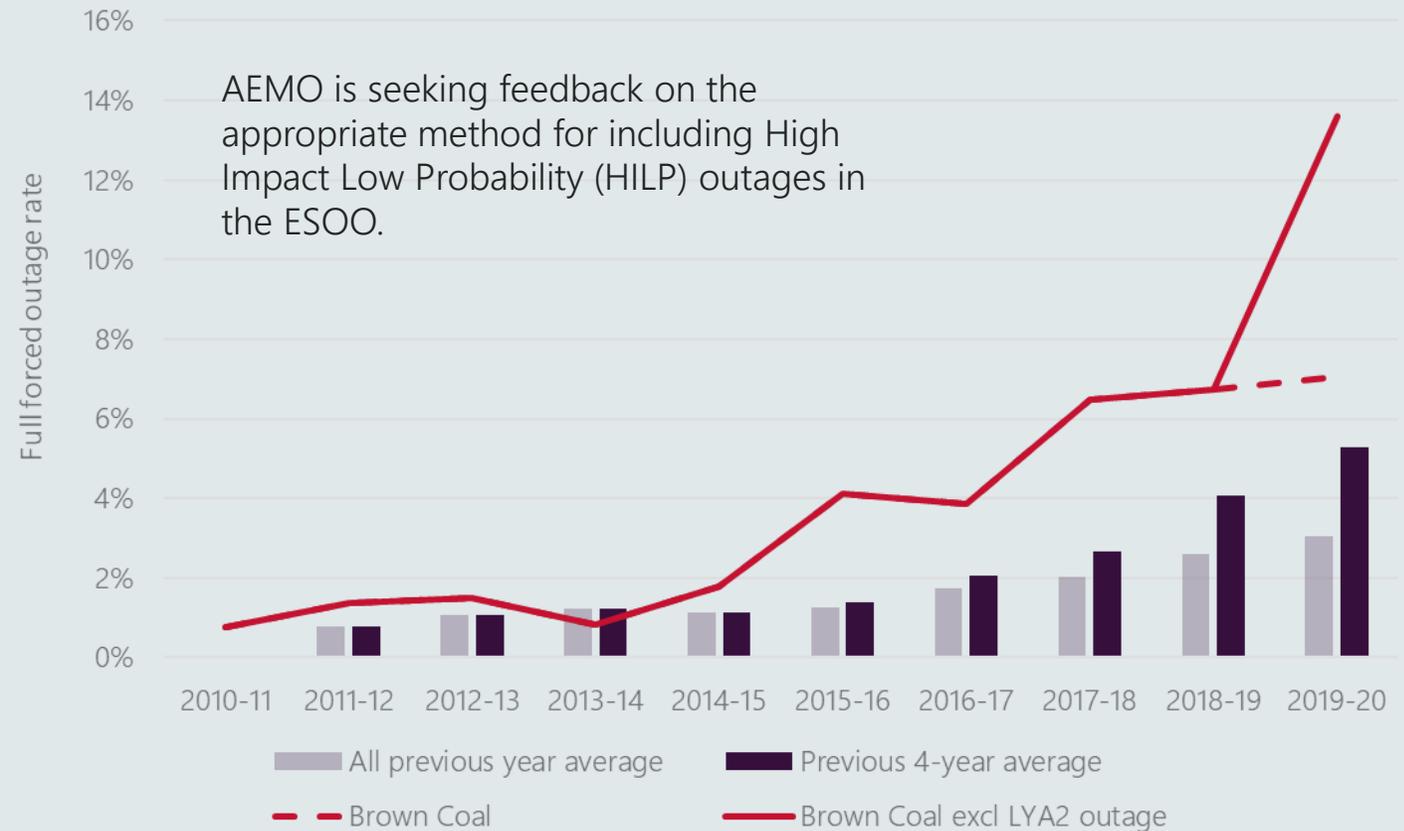


Backward-looking approaches consistently underestimating brown coal forced outages

- Analysis process
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- The red lines indicate actual yearly outage rates (from previous slide)
- The bar values indicate averaging of 4 or all prior years.
- Although the 4-year average approach has been much more accurate than using all prior years, both options consistently underestimate the actual outage rates.
- Backward-looking approaches are failing to capture deteriorating reliability in the brown coal fleet.

Comparison of outage rate methods – Brown coal



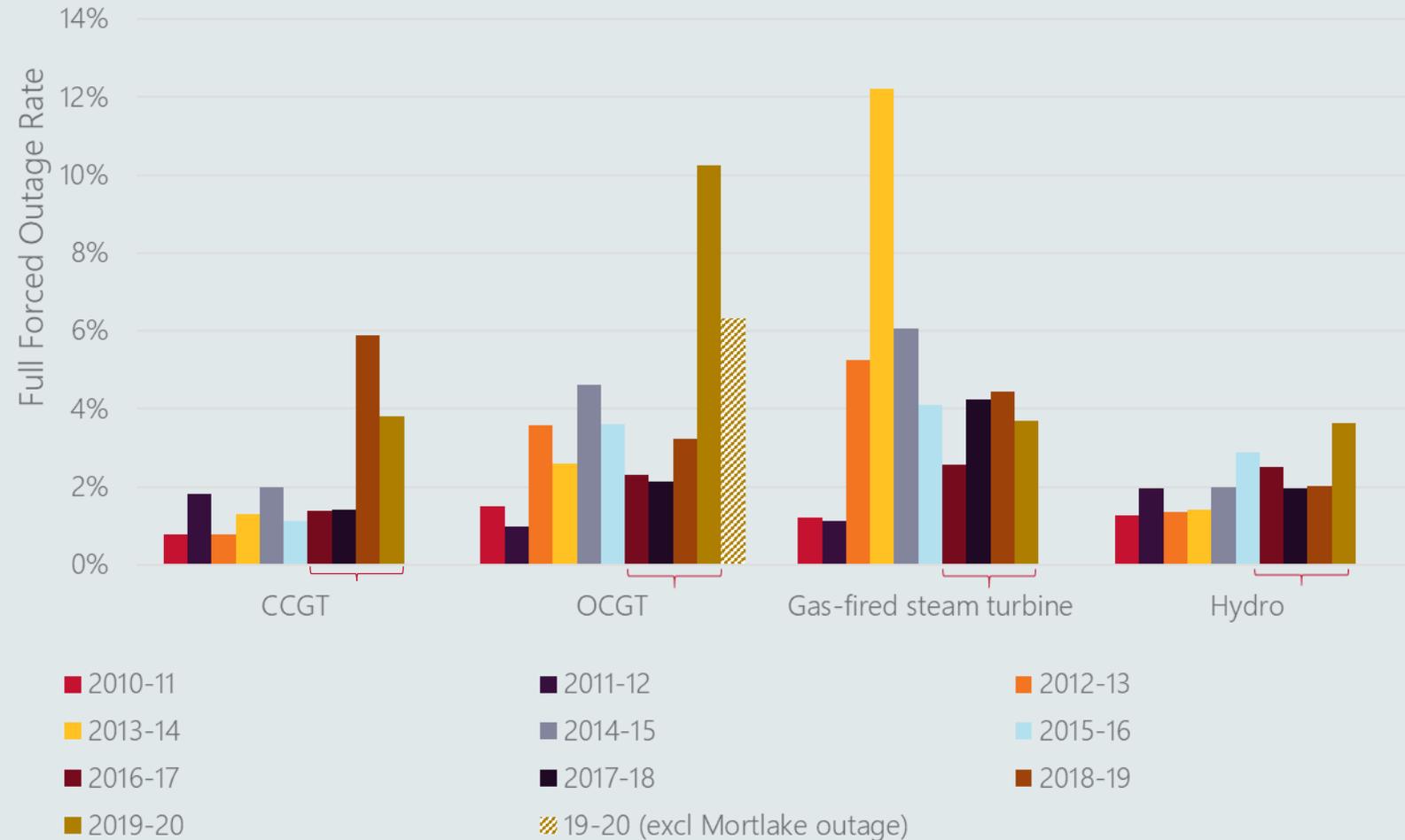
Need for forward-looking reliability projections

- Given the deterioration observed for some generators, AEMO is seeking to complement historical analysis with information participants may have on the future performance of their own generators.
- AEMO made a request for information under 3.13.3A(d) of the NER to request participants provide their best expectation of future outage rates. The information supplements the historical outage analysis and reliability projections provided by engineering experts. AEMO has also engaged in discussion with a number of participants on the factors that may affect generator reliability.

Higher variability for other generation technologies

- Analysis process
- Results
- Forward-looking projections
- Discussion

- Higher variability across years, particularly for generators with low utilisation.
- OCGT outage rates for 2019-20 heavily impacted by the Mortlake outage.



High Impact Low Probability (HILP) outages

- Analysis process
- Results
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- 2019-20 outage rates for brown coal and OCGT heavily influenced by HILP outages.
- Using these in the 2019-20 outage set may overstate the probability of these outages. But HILP outages do happen and can't be excluded.
- Possible option: Remove HILP outages from the yearly outage rates, and calculate a HILP outage rate using all 10 years of available data.

- Method is still under investigation, preliminary analysis of HILP outage rates:

Technology	HILP outage rate
Brown Coal	0.65%
Black Coal NSW	0.84%
Black Coal QLD	0.23%
OCGT	0.20%

2020 ESOO outage rates summary

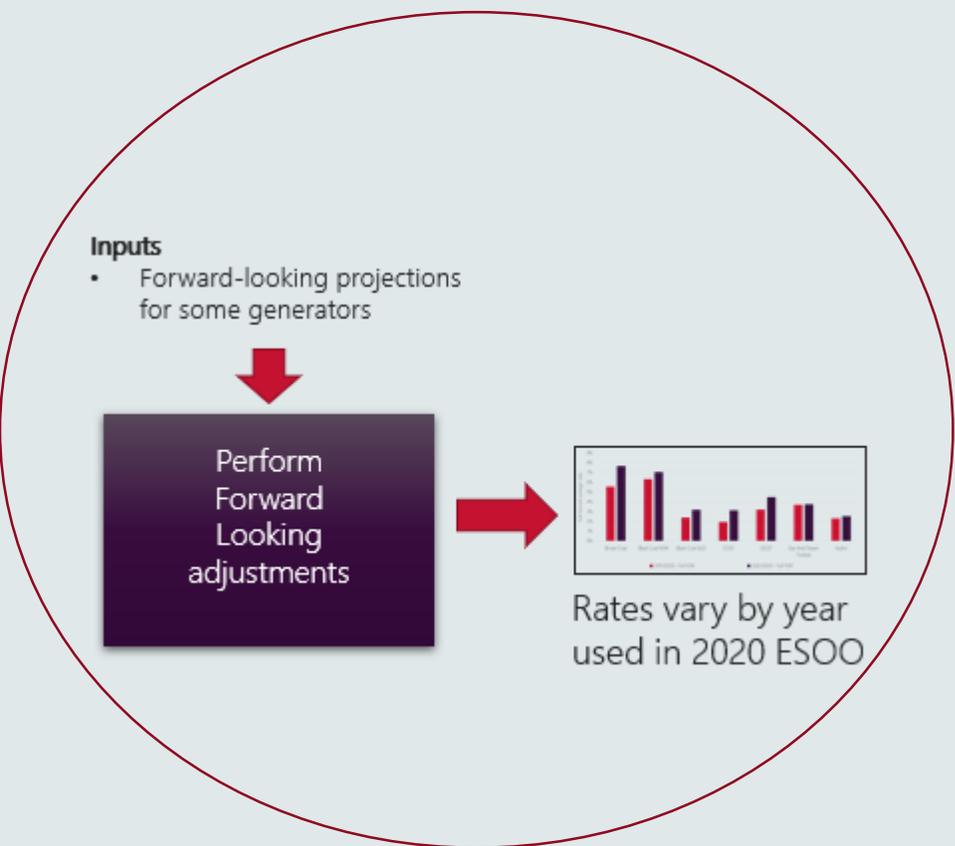
- Analysis process
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* Before adjustments for Forward Looking projections, and data amendments from participants



Forward looking outage rates to improve ESOO accuracy

- Analysis process
- Results
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AEMO has requested some generators provide outage rate projections to be considered in the ESOO.

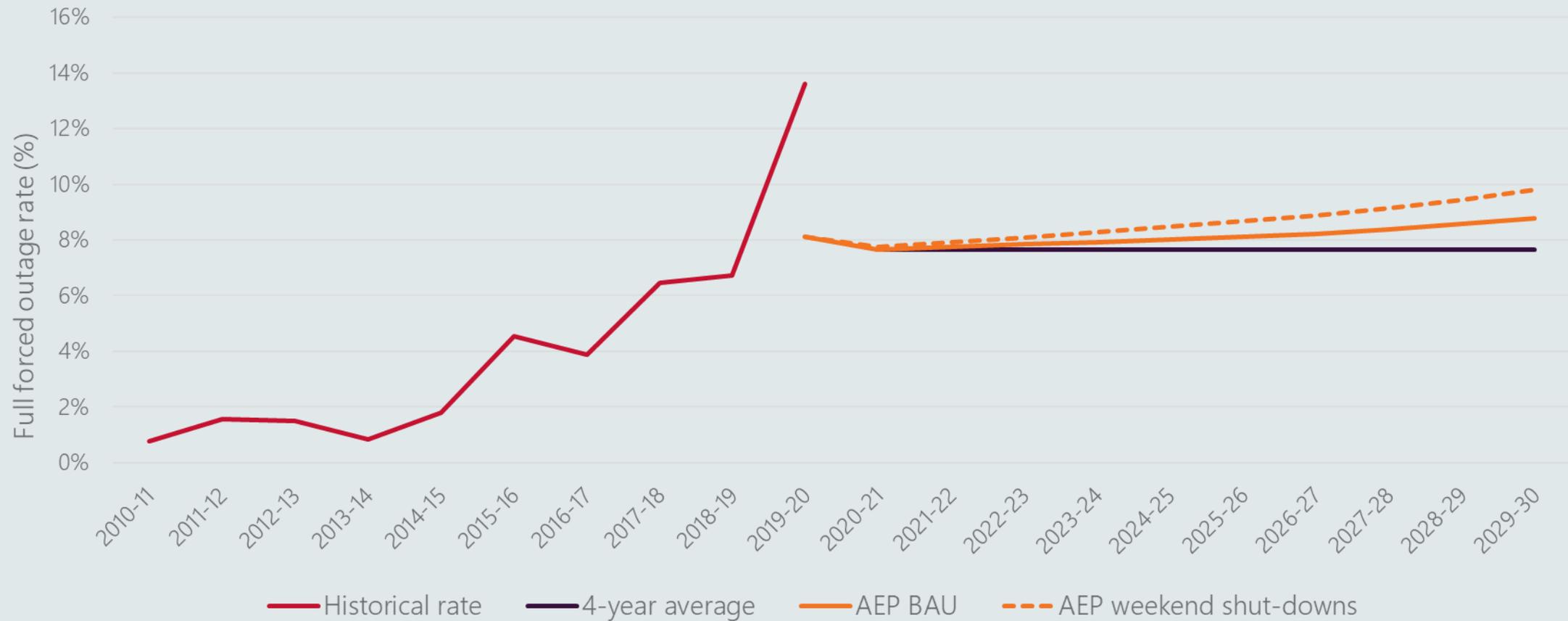
The projections are intended to capture:

- future deterioration due to age / changing operating regimes
- improvements due to remediation, increased investments

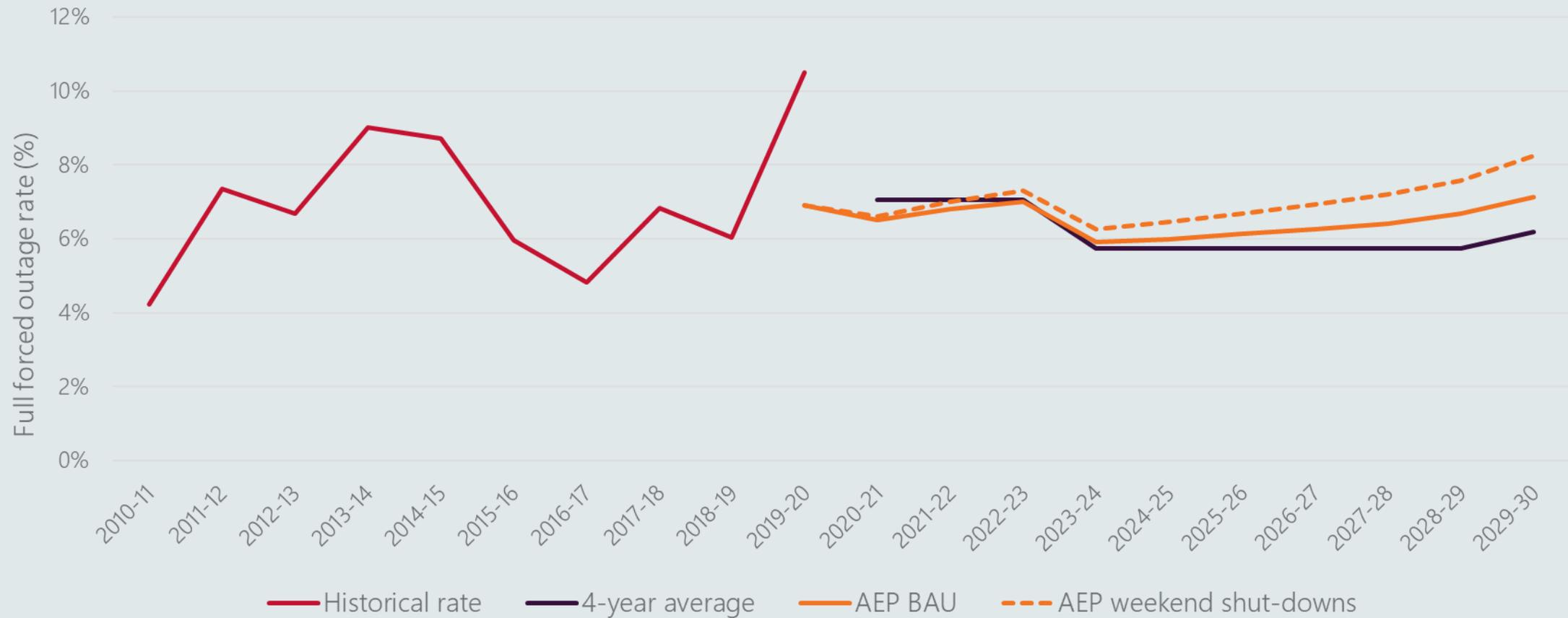
Currently in progress, with some generators granted extensions. Information will help inform decision on appropriateness of using AEP Elical assessment as part of the reliability forecast.

AEP presentation

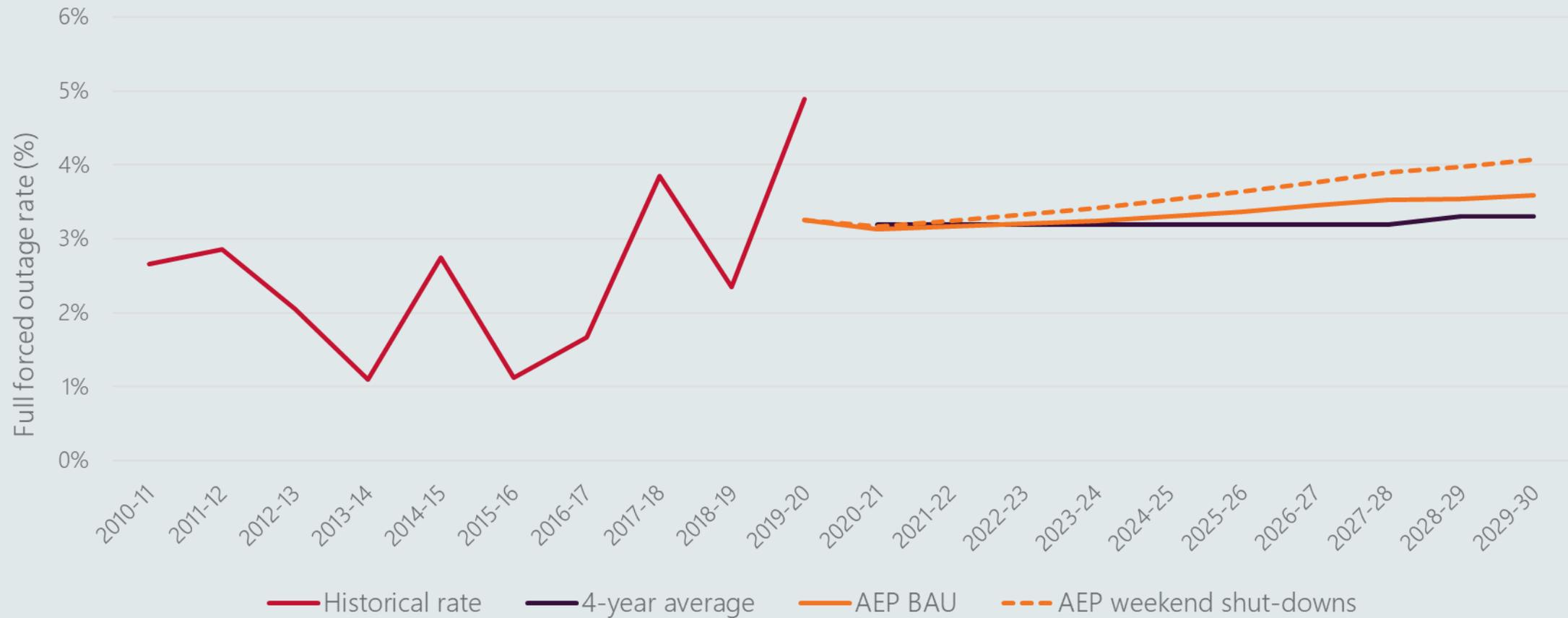
Comparison – brown coal (before HILP adjustments)



Comparison – NSW black coal (before HILP adjustments)



Comparison – QLD black coal (before HILP adjustments)



Discussion points

- Analysis process
- Results
- Forward-looking projections
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- How reasonable do you consider the AEP forward-looking trajectories for use in the ES00?
- How else may High Impact Low Probability outages be captured?

Appendix

Comparison of outage rate methods – NSW black coal

Minimal difference between the two approaches



Comparison of outage rate methods – NSW black coal

Minimal difference between the two approaches

