WESTERN VICTORIA RENEWABLE INTEGRATION

Project Assessment Draft Report

Industry Consultation Forum - 19 December 2018

Agenda

1. Context and overview
2. Market benefits assessment
3. Credible options
4. Preferred option
5. Next steps

Western Victoria Renewable Integration RIT-T

- AEMO is responsible for planning and procuring augmentations to the Victorian electricity transmission network.
- There is currently insufficient thermal capacity within existing transmission infrastructure to enable the amount of proposed renewable generation in Western Victoria.
- AEMO is undertaking a Regulatory Investment Test for Transmission (RIT-T) to assess the viability of increasing transmission network capacity in the Western Victoria region, to facilitate the efficient connection and operation of new and existing generation in the region. This investment aims to lower costs to consumer in the long term.
- The RIT-T is a cost-benefit test applied to new larger transmission investment and includes publication of three reports for consultation.
- The proposed project is consistent with the 2018 Integrated System Plan (ISP).
- **AEMO has now published the 2nd Report i.e. Project Assessment Draft Report (PADR) which identifies and seeks feedback on the proposed preferred option.**

Renewable integration in Western Victoria

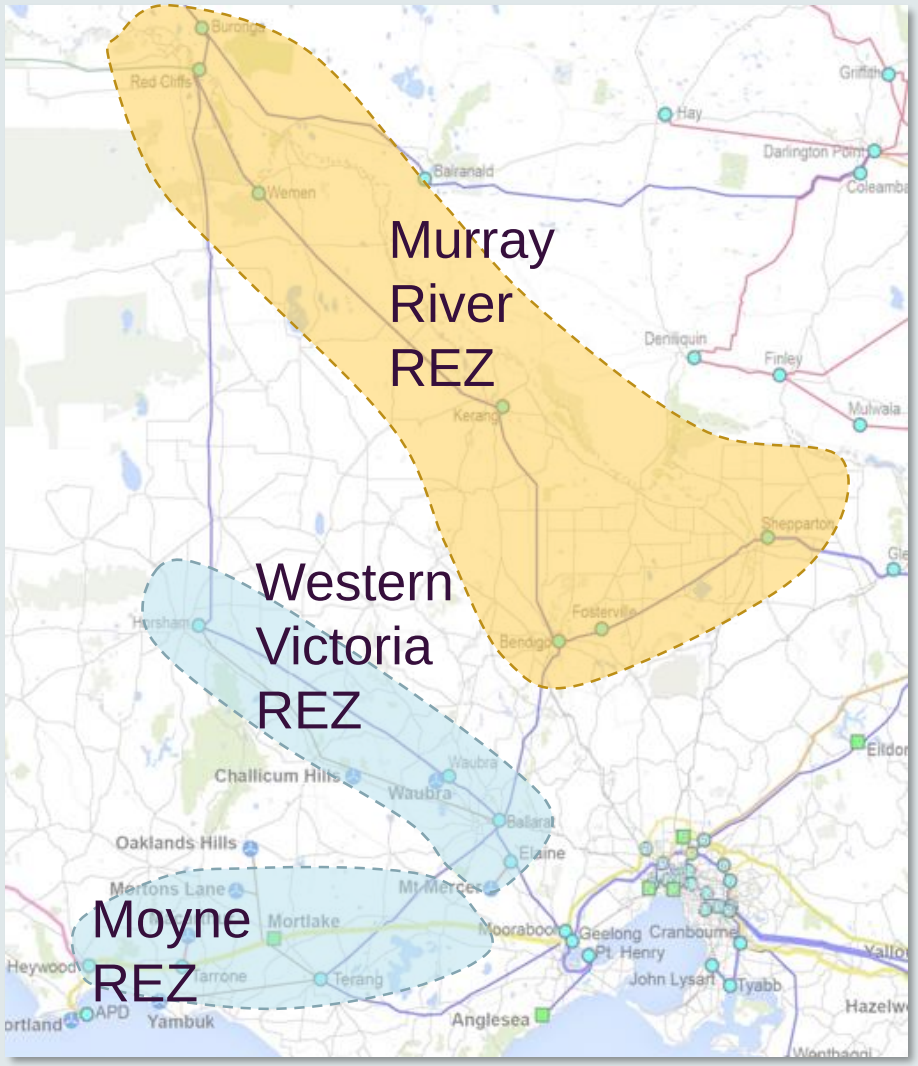
Figure 1 – Western Victoria transmission network as at November 2018

- Around 2,000 megawatts (MW) of committed new renewable generation will be built in the Western Victoria region by 2020.
- A further 3,000 MW will be constructed in the region by 2025, based on proposed renewable generation in the region and VRET.
- Generators connecting to 220 kilovolt (kV) system are expected to be heavily constrained by emerging thermal limitations which if not addressed, may result in:
  - Inefficient generation dispatch
  - Inefficient development of new generation
- These inefficiencies are expected to lead to higher costs to consumers.

Source: AEMO Fact Sheet – Energy Integration in Western Victoria – 2018 and beyond

Renewable Energy Zones (REZs) in Western Victoria

- The 2018 ISP identified three priority REZs) in Western Victoria and confirmed the need for this RIT-T as a Group 1 project requiring immediate action.
- The scope of the 2nd RIT-T report is now focused on identification of preferred Group 1 investment options within each of the REZs identified in the ISP.



Reports and project updates

Previously published:

- Project Specification Consultation Report - April 2017
- Project update – July 2018
- Western Vic RIT-T Fact Sheet

Published on 14 December 2018:

- Project Assessment Draft Report (PADR)
- PADR supporting documentation
- Project update – Dec 2018

All information is available at http://aemo.com.au/

Project Assessment Draft Report

Market benefits assessment, credible options and the preferred option

Scenarios assessed

Scenarios (based on 2018 ISP)

- Neutral
- Fast change
- Slow change
- Neutral with storage

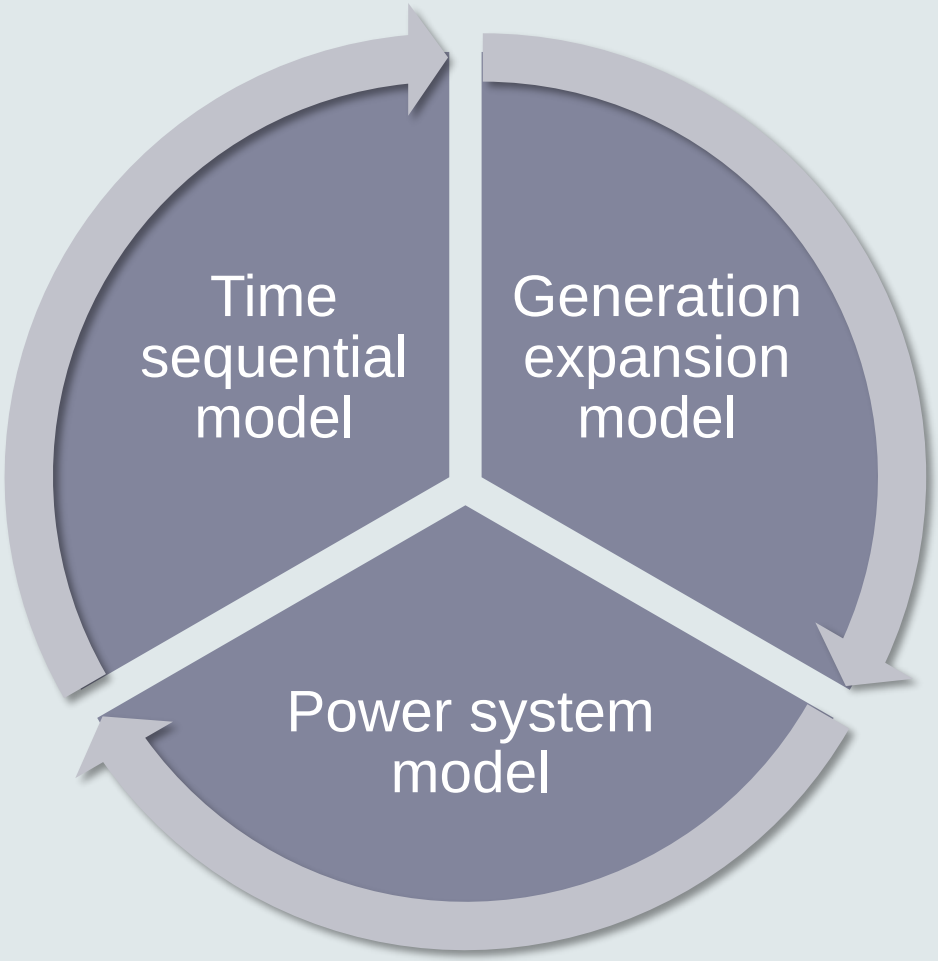
Sensitivities

- No un-committed interconnector developments
- No un-committed generator developments
- Early coal retirements

Additional sensitivities

- ± 30% Augmentation cost
- ± 2.5% Discount rate
- Scenario weightings

Market modelling methodology

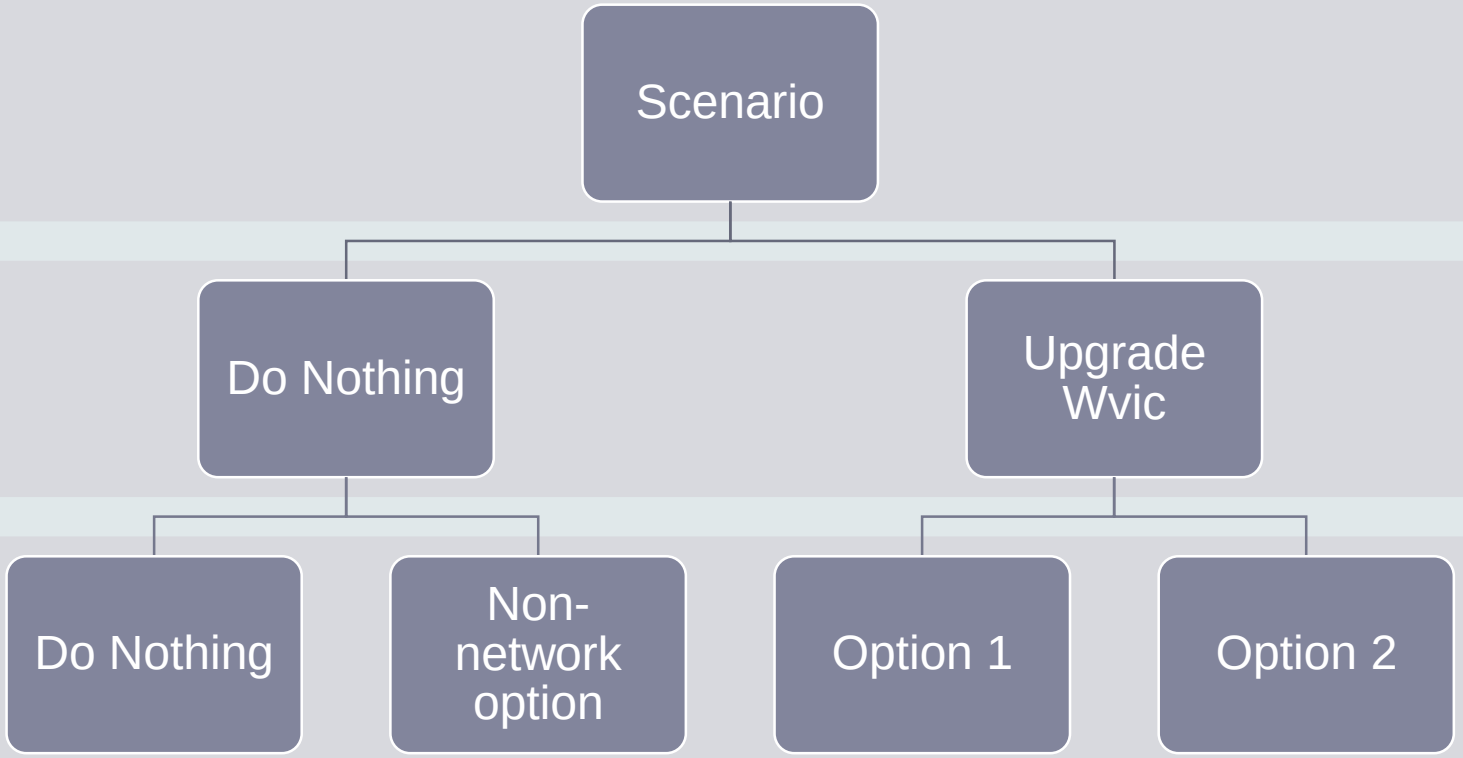


Market modelling methodology

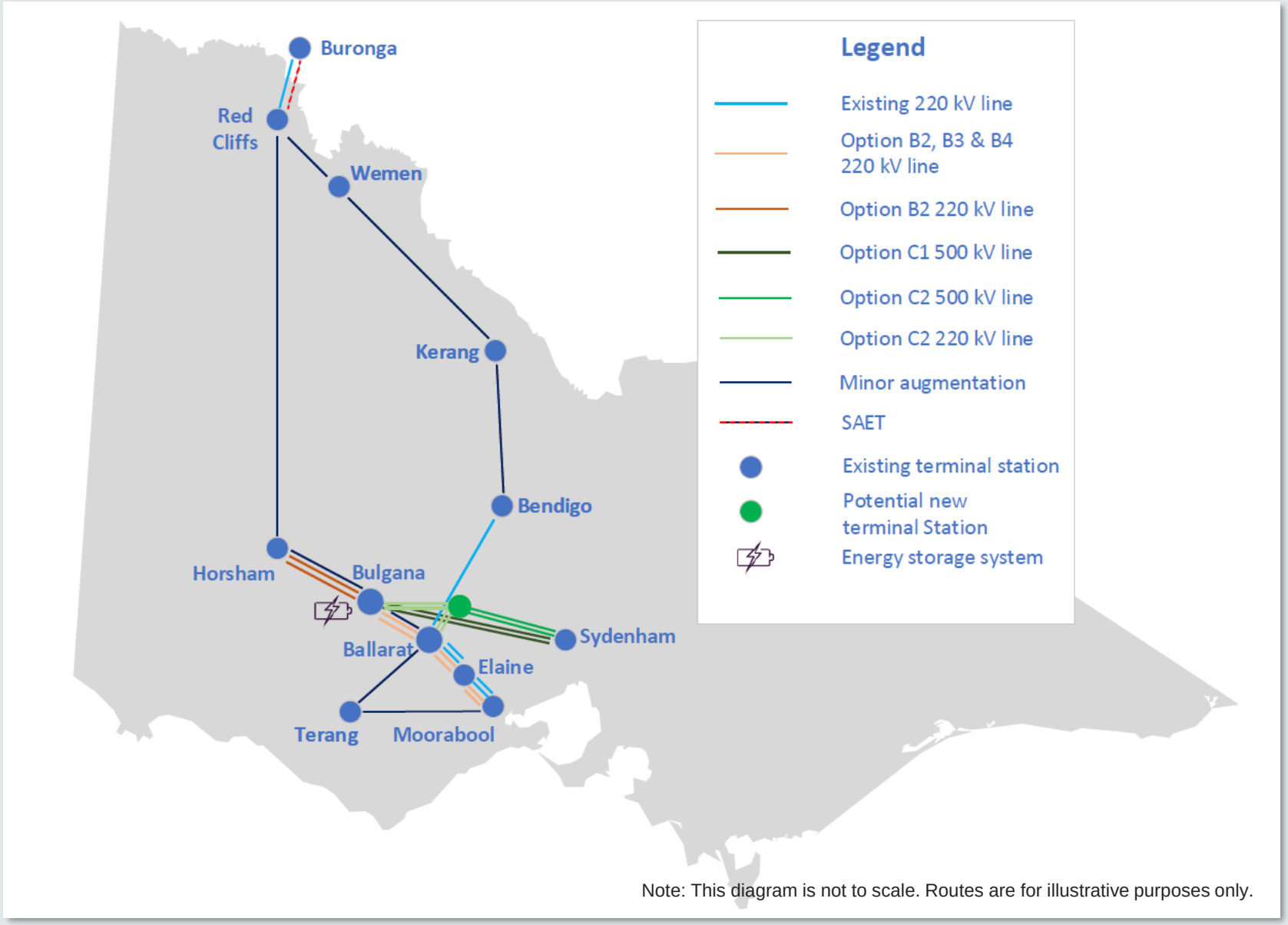
Capacity expansion modelling

Capital cost savings

Operational cost savings



Credible options



Note: This diagram is not to scale. Routes are for illustrative purposes only.

Economic assessment

Option	Description	Cost ($M)	Weighted net market benefit ($M)
Option A1	• Minor augmentations for the Red Cliffs to Wemen to Kerang to Bendigo; and Moorabool to Terang to Ballarat 220 kV transmission lines.	5.2	1
Option B2	• Construction of a new 220 kV double circuit line from Moorabool to Elaine to Ballarat to Bulgana to Horsham.	314	14
Option B3	• Construction of a new 220 kV double circuit line from Moorabool to Elaine to Ballarat to Bulgana.	263	67
Option B4	• Rebuild existing Moorabool to Elaine to Ballarat to Bulgana single circuit 220 kV transmission line as a 220 kV double circuit transmission line.	275	57
Option C1	• Construction of a new 500 kV double circuit line from Sydenham to Ararat.	323	64
Option C2	• Construction of a new 500 kV double circuit line from Sydenham to Ballarat*. • Construction of a new 220 kV double circuit line from Ballarat* to Bulgana.	364	79
Option E1	• Battery at Ararat Terminal Station	117	-76

* Initial assessment has indicated that there may be insufficient space in Ballarat Terminal Station for the proposed new plant. AEMO has assumed that a new terminal station will be established close to Ballarat with connections back to the existing Ballarat Terminal Station in its assessments.

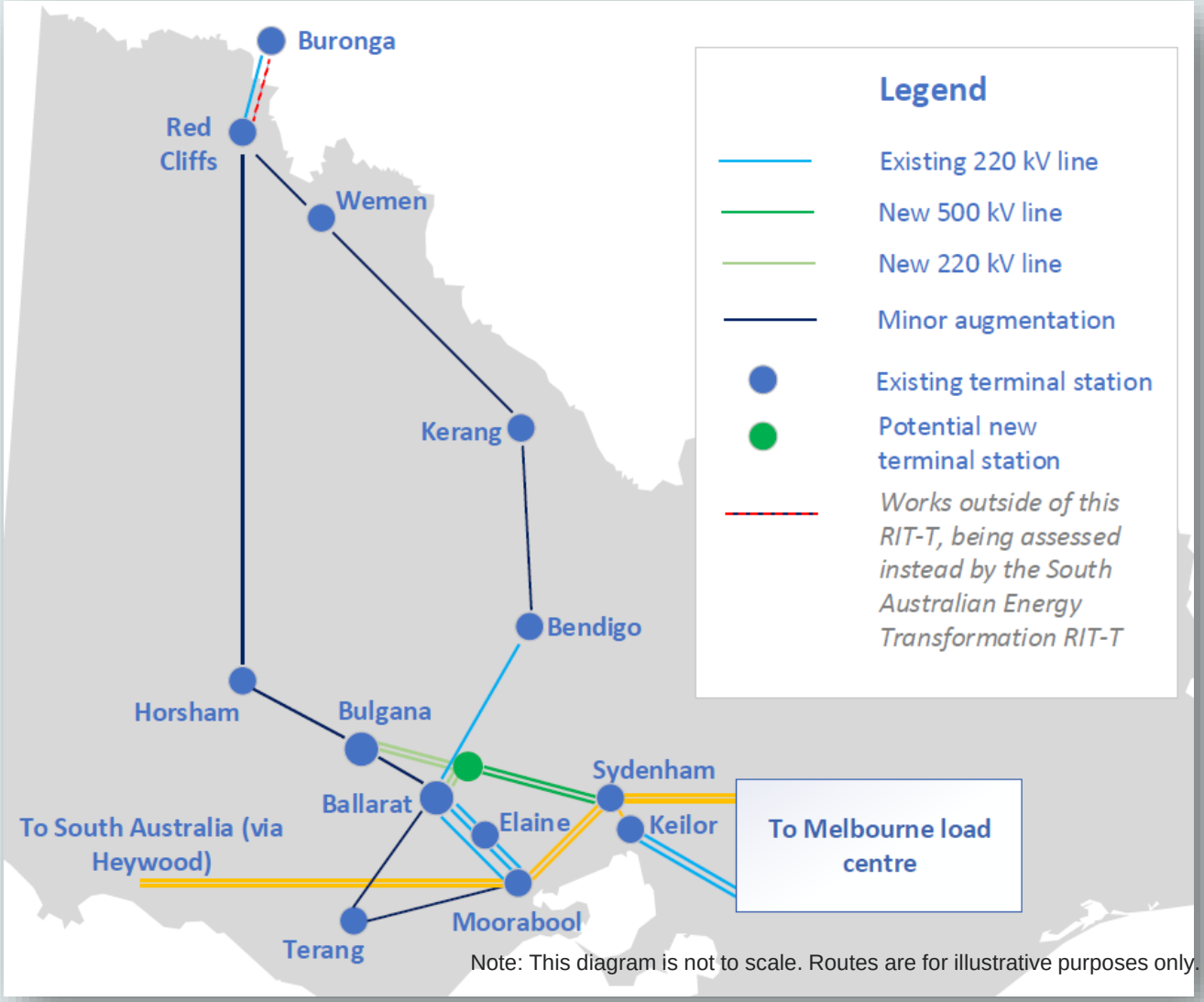
Comparison of top 2 major augmentation options

Sensitivity	Option C2 (preferred option) Market benefit NPV, $M	Option B3 (2nd preferred option) Market benefit NPV, $M
Base assumptions	79	67
Increase cost 30%	6	-12
Decrease cost 30%	153	146
Increase discount rate 2.5%	7	13
Decrease discount rate 2.5%	218	172
2024 Victorian brown coal retirement	163	59
No un-committed interconnector augmentations	9	110
No un-committed generation in Victoria	123	116

Preferred option

The preferred option provides for staged development:

- **Short term: present to 2021.**
  - Minor transmission line upgrades on the Red Cliffs to Wemen to Kerang to Bendigo, and Moorabool to Terang to Ballarat, 220 kV transmission lines.
- **Medium term: 2021 to 2025.**
  - The following major transmission network augmentations (staged):
    - **By 2024:** New 220 kV double circuit transmission lines from Ballarat to Bulgana.
    - **By 2025:** New 500 kV double circuit transmission lines from Sydenham to Ballarat connecting two new 1,000 MVA 500/220 kV transformers at Ballarat[1].



Note: This diagram is not to scale. Routes are for illustrative purposes only.

1. Initial assessment has indicated that there may be insufficient space in Ballarat Terminal Station for the proposed 500 kV plant. AEMO has assumed that a new terminal station will be established close to Ballarat with connections back to the existing Ballarat Terminal Station in its assessments.

Preferred option

- Consistent with recommendations of the 2018 ISP.
- Estimated to deliver **net market benefits of $80 million** (in present value terms), through significant reductions in the capital cost and dispatch cost of generation over the longer term.
- Total capital cost, through staged implementation process outlined above, is estimated at $370 million (in present value terms).
- The proposed upgrade will help to:
  - ✓ minimise network congestion;
  - ✓ facilitate more efficient generation dispatch;
  - ✓ strengthen the power system for the future; and
  - ✓ add to diversity of supply.

This in turn will help to ensure consumers do not pay more than they have to for electricity.

The preferred option identified in the PADR provides the highest net market benefits under all future scenarios assessed.

Next steps

- Industry forums: Deep-dive (late Jan 2019)
- Community information sessions: early to mid Feb 2019
- Consultation period until 28 Feb 2019
- PACR publication: mid 2019.

- All information is available at: http://aemo.com.au/
- Submissions are due by 28 February 2019.

For any further queries please e-mail:

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