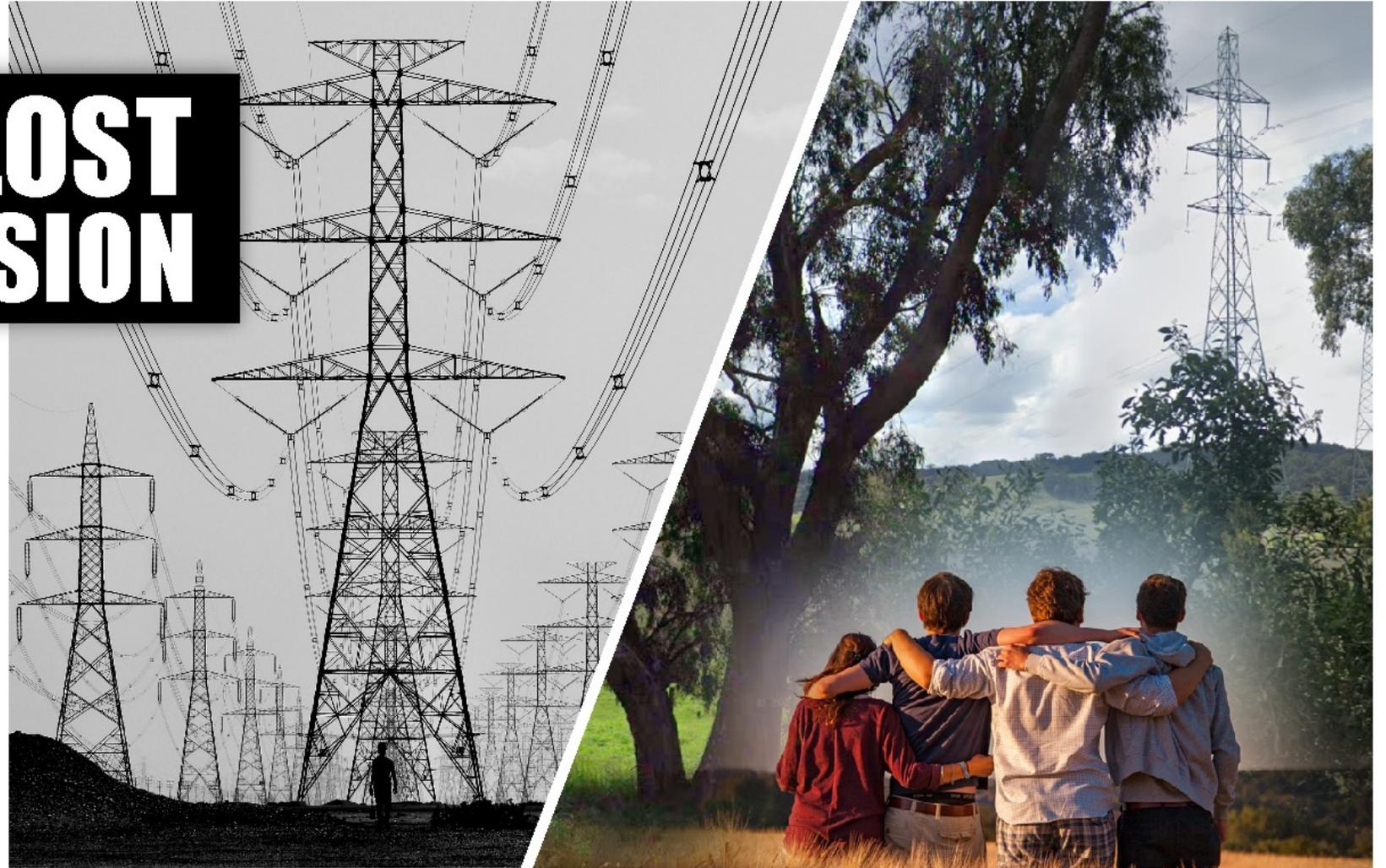


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Expanding transmission need not be at the expense of land-holders, renewables investors, communities, consumers and the environment.



**Victoria
Energy Policy
Centre**

Bruce Mountain, Simon Bartlett
and Darren Edwards
August 2023



**VICTORIA
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Outline

- Why this report?
- History
- The economics of interconnection
- Victoria's renewables policy and VRE hosting requirement
- Plan B
- Extended VNI-West
- Comparison
- Prices impacts, governance and recommendations
- Q & A

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Why this report?

- AEMO says by end 2023 Victoria will have ~5,000 MW Renewable Energy (RE) (~43% of Vic grid demand) but 29% wind curtailment in Western Victoria and 25% solar curtailment in Murray River REZs.
- 95% RE by 2035 requires ~15 GW of wind & solar; ~\$20bn needed in generation alone.
- AEMO says only VNI-West and 1,500 MW augmentation in South West REZ are needed until 2047.
- We disagree: much more Victorian RE hosting capacity is needed; AEMO's plan imposes huge costs on landholders & communities.
- So, we must do better.

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A deeply troubled history

- “VNI-West” is first mentioned in the 2018 ISP; but originated in 2010 “NEMlink” (500 kV AC supergrid from Tasmania to Queensland)
- Western Victoria Transmission Network Project (first leg of VNI-West from Melbourne to North Ballarat) justified in 2019 mainly on basis of prospect of more export from Vic brown coal (until 2075!).
- Second leg of VNI-West assessed (draft) July 2022. This time all Victorian coal assumed to close soon (even sooner if VNI-West is not built). Most of the cost of North Ballarat substation excluded from first leg and second leg of VNI-West. VNI-West defers renewables and increases coal generation in Vic until 2034!
- Feb 2023, yet another assessment. Now main benefit of VNI-West (for Victoria) is avoiding PHES in Victoria (in 2042!) to be replaced by batteries in NSW.
- New VNI-West (500 kV from Melbourne to Wagga Wagga) proposed in Feb 2023 (both legs brought together at last, sort-of).
- Final VNI-West confirmed in June 2023 (no longer stopping at North Ballarat, out to Kerang (ish) via Bulgana
- AEMO’s proposals accompanied by two sets of ministerial orders. Now three Supreme Court challenges.
- In 2018 AEMO said whole of VNI-West would cost \$2.7bn (of which Vic about half). We suggest Victoria section alone will be \$4.9bn

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Interconnection Economics: Is it much cheaper to make electricity in NSW than Vic or vice versa ?

- Using CSIRO & AEMO's numbers:
 - The cheapest wind farm in NSW can produce electricity for \$0.24 million per MW per year
 - The most expensive wind farm in Vic can produce electricity for \$0.28 million per MW per year
 - The difference is \$0.047 million per MW per year
- VNI-West (Victoria only) will cost \$0.17 million per MW per year.
- Generation cost savings available from interconnection are just 25% of cost of interconnection
- For solar the picture is even worse: savings available are just 12% of the cost.
- And we assume cheapest generation in one states displaces most expensive in other and exclude the interconnector costs on the other side of the border!

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What about the value of regional supply diversification achieved through interconnection?

AEMO's says: correlation of wind resource between Western Victoria and South West NSW REZs is 0.61; correlation of wind resource between Gippsland and Western Victoria is 0.51.

So, wind in Western Victoria and South West NSW is more strongly correlated than it is between Western Victoria and Gippsland.

Why look beyond Victoria's borders for diversification of renewable production?

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Renewables hosting capacity needed for Victoria's Renewable Energy Target (VRET)

Objects of the Act include:

- Support the development of projects and initiatives to encourage investment, employment, and technology development in Victoria
- Promote Victoria's transition to a clean economy
- Contribute to the security of electricity supply in Victoria

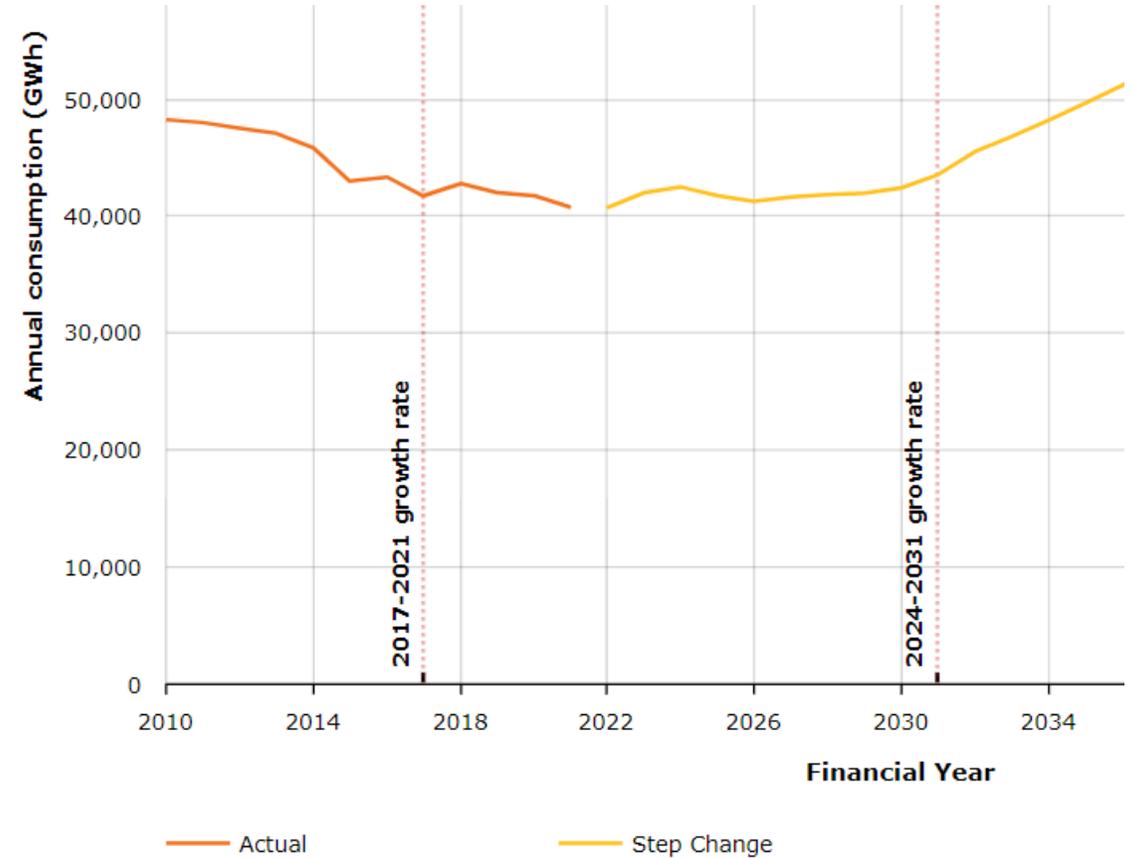
Relying on imported electricity from other states will not meet the Objects

- Cannot be sure the electricity came from renewable generation
- The renewable projects and initiatives will not benefit Victoria
- Will not promote Victoria's transition or contribute to security of supply

Calculate as % of consumption to avoid this confusion

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Forecast consumption and required renewables for VRET



Categories	2023/24	2024/25	2029/30	2034/35
Total electricity consumption	42,103	42,601	42,625	50,439
Renewables target	37% ¹	40%	65%	95%
Required renewable energy	15,578	17,040	27,706	47,832

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PACR forecast of Victorian Renewable Energy compared with VRET requirement

Source	2023/24	2024/25	2029/30	2034/35
Hydro	2,748	3,336	3,418	3,405
Wind (after curtailment)	10,177	12,813	20,737	29,132
Large-scale PV (after curtailment)	2,205	1,888	1,850	5,154
Rooftop PV (after curtailment)	3,872	4,128	5,100	5,460
Total Victorian renewables (after curtailment)	19,002	22,165	31,105	42,691
Required renewable generation	15,578	17,040	27,706	47,832
Shortfall in renewable generation compliance (GWh) (negative is shortfall)	0	0	0	5,141
Shortfall in renewable capacity (MW)	0	0	0	2,130

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Minimum Renewable Generation Hosting Capacity in MW required to comply with VRET

	2023/24	2029/30	2034/35
Option 5A: wind	4,122 MW	8,141 MW	9,881 MW
Option 5A: large scale PV	1,082 MW	1,082 MW	2,892 MW
Option 5A: Total VRE	5,204 MW	9,223 MW	12,773 MW
Shortfall (row 10 of Table 2)	0	0	2,130 MW
Plan B required minimum hosting capacity	5,204 MW	9,223 MW	14,903 MW

Additional Hosting Capacity by 2035 = 9,700 MW

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Objectives of Plan B

- Support VRET to achieve 65% renewables by 2030 and 95% by 2035
- Avoid major blackouts by having no Single Points of Failure (SPoF) on new transmission lines defined as Systems of National Significance under the Security Legislation
- Slash wastage of existing renewables at Murray River V2 and Western Victoria V3 REZ by cutting spills from 40% to 13% and increasing m.l.f.'s from 0.80 to 0.93
- Minimise the amount of new land required for transmission by making use of existing transmission networks and easements
- Minimise public opposition (which has been a material source of delay for transmission projects)
- Diversify large scale supply around the state

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Plan B : Overview

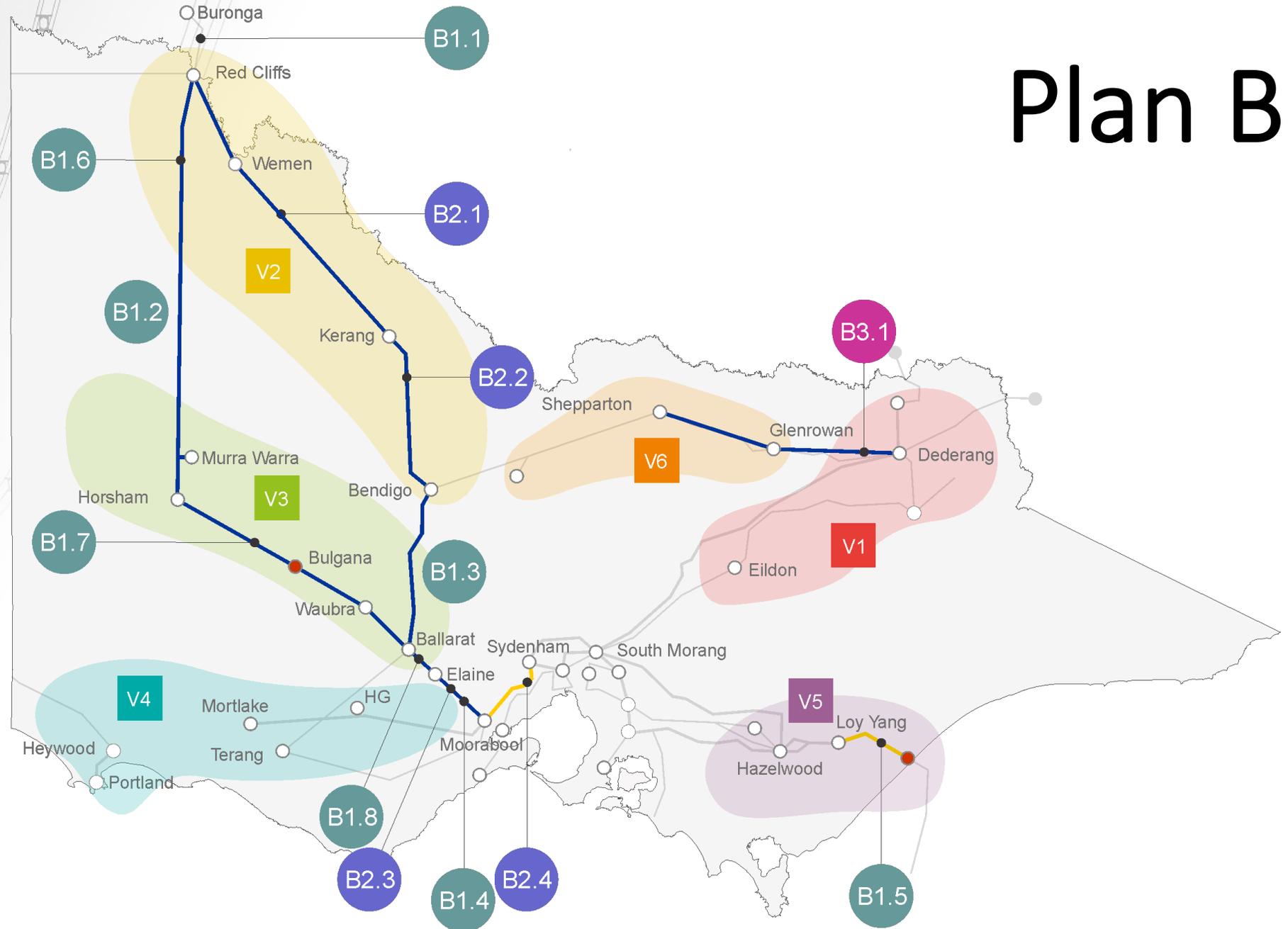
- Rebuild the weak, overloaded 220 kV lines (400 MW rating) that support V2 and V3 REZ's with high capacity 220 kV lines (2 x 957 MW) on their existing easements
- Build new line alongside, ~10-15m away from existing line. Shift easement sideways, demolish existing line when completed. Rehabilitate and relinquish surplus easement
- No need for WRL or VNI-West and their 80m high towers, Replaced by ~38m high towers on existing easements. Much stronger, resilient 220 kV network
- Two new 500 kV lines in Plan B however these use 48m high towers single circuit 500 kV lines on existing easement alongside existing lines. The other is a pair of new 500kV lines from Loy Yang substation to new Giffard substation in Gippsland

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Plan B

KEY

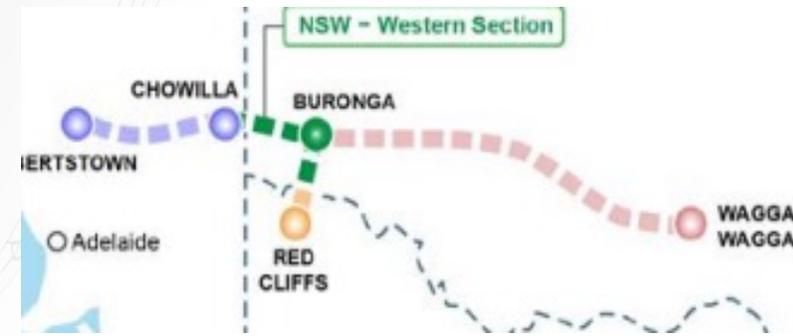
- New 500kV Transmission Line
- New 220kV Transmission Line
- Existing Transmission Line
- Existing Terminal Station
- New Terminal Station
- B1.1 Development Phase 1: 2023 – 2027
- B2.1 Development Phase 2: 2027 - 2031
- B3.1 Development Phase 3: 2031 - 2035



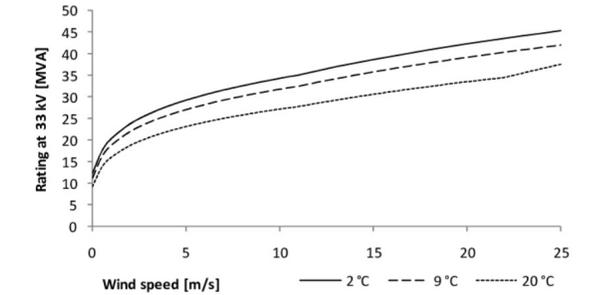
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Phase 1 – immediate measures

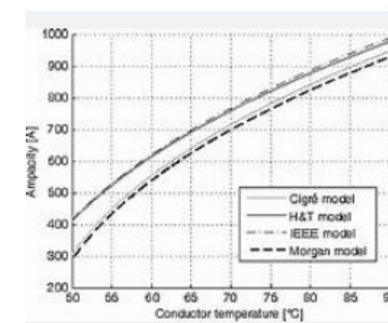
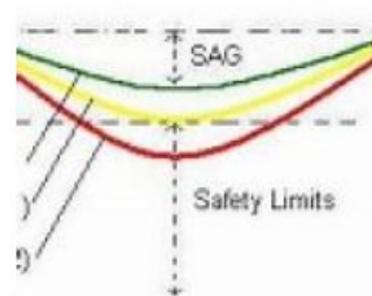
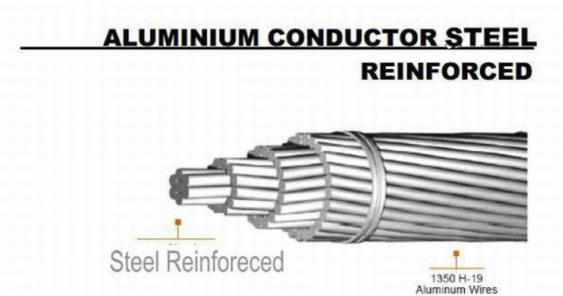
B1.1 Open-circuit Buronga to Red Cliffs in daytime



B1.3 Weather Monitors & real-time ratings for key easements / lines



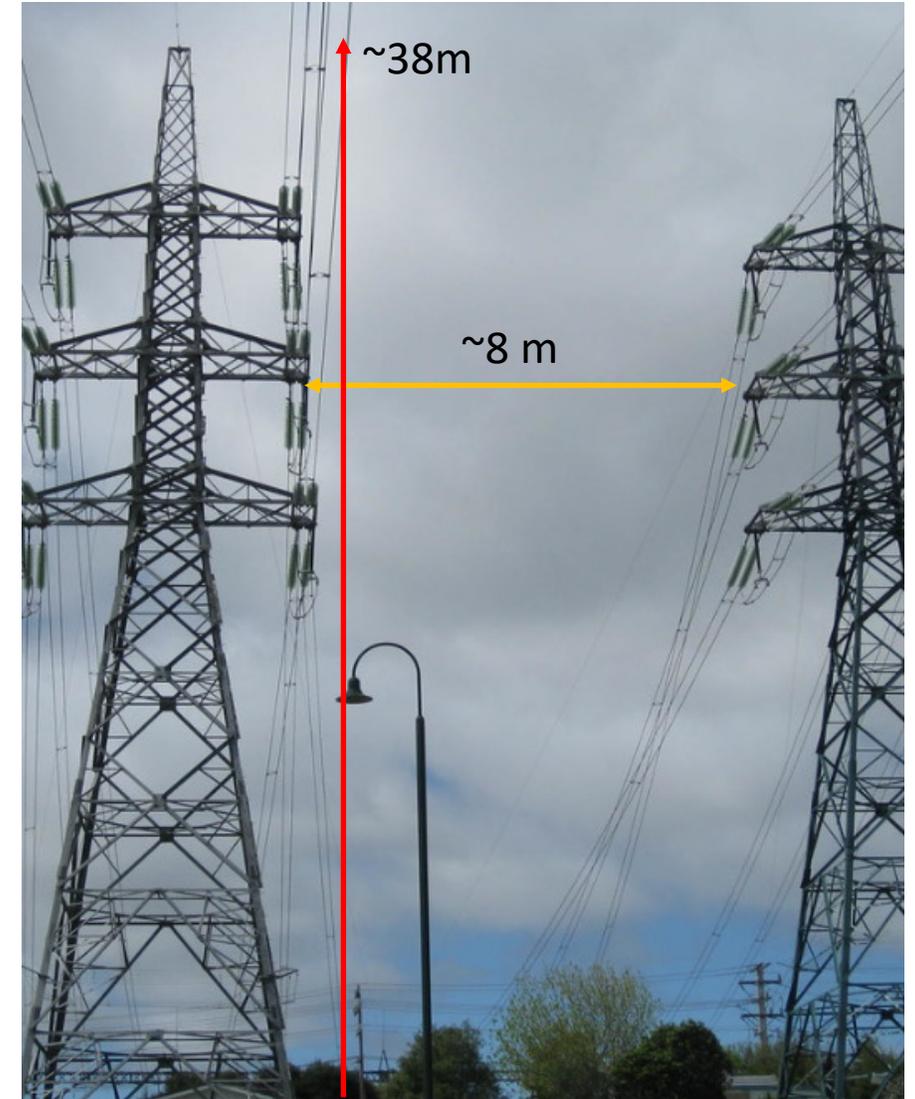
B1.2 Operate V2 & V3 lines at 90 degrees



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Replace V2, V3 220 kV lines on existing easements

- 400MW  2 x 957 MW
- On same easement: shift ~10-15m across
- Tower height ~ 38 m
- Pull down existing line when finished
- Relinquish unused easement to landowner



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Plan B : cost estimates and specifications

	Project	Details of project scope of works	Cost (\$million, 2023) including IDC	Cost (\$million, 2022) excluding Interest During Construction (IDC)	Easement	Length (km)
1.1	Open-circuit Buronga – Red Cliffs 220 kV line	Daytime - open Buronga - Red Cliffs circuit to avoid overloading V2 & V3 lines			n/a	-
1.2	Increase maximum conductor temperature on some 220 kV lines	Field measurements of conductor clearances by AusNet Services			n/a	-
1.3	On-line dynamic rating Red Cliffs-Ballarad-Moorabool-Sydenham	Weather monitors and telecommunications - installed on some easements.			n/a	-
1.4	Elaine to Moorabool	Elaine - Moorabool, 220 kV D/C, twin Peach conductors, could extend to Ballarat	204	175	Spare easement	43
1.5	Gippsland REZ - 500kV Loy Yang to near Basslink transition point	Loy Yang - Giffard, two 500 kV S/C lines, Giffard 500 kV/220 kV substation	842	691	AusNet Services initiated project	130
1.6	V2 220kV network upgrade: Red Cliffs to Murra-Warra	Red Cliffs - Murra Warra, 220 kV D/C, twin Peach conductors	1,003	823	Existing easement, ~10-15 m shift	263
1.7	V3 220 kV network upgrade: Murra-Warra to Ballarat	Murra-Warra - Ballarat, 220 kV D/C, twin Peach conductors	873	716	Existing easement, ~10-15 m shift	229
1.8	V3-V4 220 kV network upgrade Ballarat – Moorabool (line 1)	Ballarat - Moorabool (1), 220 kV D/C, twin Peach conductors, 500 kV/220 kV trans	289	248	Existing easement, ~10-15 m shift	64
2.1	V2 220 kV network upgrade: Red Cliffs to Kerang	Red Cliffs - Kerang, 220 kV D/C, twin Peach conductor	878	720	Existing easement, ~10-15 m shift	230
2.2	V2-V3 220 kV network upgrade Kerang-Bendigo-Ballarad lines	Kerang-Bendigo-Ballarad, 220 kV D/C, Pearl conductors	725	595	Existing easement, ~10-15 m shift	190
2.3	V3-V4 220 kV network upgrade Ballarat-Moorabool (line 2)	Ballarat - Moorabool (2), 220 kV D/C, twin Peach conductors, 500/220 kV transformer	289	248	Existing easement, ~10-15 m shift	64
2.4	V4 500 kV S/C Sydenham to Moorabool	Sydenham - Moorabool, 500kV S/C, quad conductor	316	271	Spare easement	63
3.1	V6-V1 220 kV line Shepparton-Glenrowan-Dedarang	Shepparton - Glenrowan - Ballaratt, 220 kV, Peach conductor	542	465	Spare easement	175
	TOTAL		5,962	4,952		1,451

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Plan B : Hosting Capacity

		V1 Ovens Murray	V2 Murray River	V3 Western Victoria	V4 South West Victoria	V5 Gippsland	V6 Central North	TOTAL
1.1	Open-circuit Buronga – Red Cliffs 220 kV line							
1.2	Increase maximum conductor temperature on some 220 kV lines		160	160				320
1.3	On-line dynamic rating Red Cliffs -Ballarat-Moorabool-Sydenham							
1.4	V3-220 kV Elaine to Moorabool			1,914				
1.5	Gippsland REZ - 500 kV Loy Yang to near Basslink transition point					3,000		3,000
1.6	V2 220kV network upgrade: Red Cliffs to Murra-Warra		957					957
1.7	V3 220 kV network upgrade: Murra-Warra to Ballarat							-
1.8	V3-V4 220 kV network upgrade Ballarat – Moorabool (line 1)							
	Total Phase 1 additional hosting capacity (completed by mid-2027)	-	957	1,914	-	3,000	-	5,871
2.1	Minor works at Loy Yang and Hazelwood 500 kV substations							
2.2	V2 220 kV network upgrade: Red Cliffs to Kerang		1,514					1,514
2.3	V2-V3 220 kV network upgrade Kerang-Bendigo-Ballarat lines							
2.4	V3-V4 220 kV network upgrade Ballarat-Moorabool (line 2)							-
2.5	V4 500 kV S/C Sydenham to Moorabool				3,000			
	Total Phase 2 additional hosting capacity (completed by mid-2031)	-	1,514	-	3,000	-	-	4,514
3.1	V6-V1 220 kV line Shepparton-Glenrowan-Dedarang						1,100	1,100
	Total Phase 3 additional hosting capacity (completed by mid-2035)	-	-	-	-	-	1,100	1,100
	Total Plan B additional hosting capacity by mid-2035	-	2,471	1,914	3,000	3,000	1,100	11,485

**Exceeds minimum additional 9,700 MW Hosting by 1,785 MW
This will reduce spills, increase m.l.f.'s and provide flexibility**

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Extended VNI-West Plan

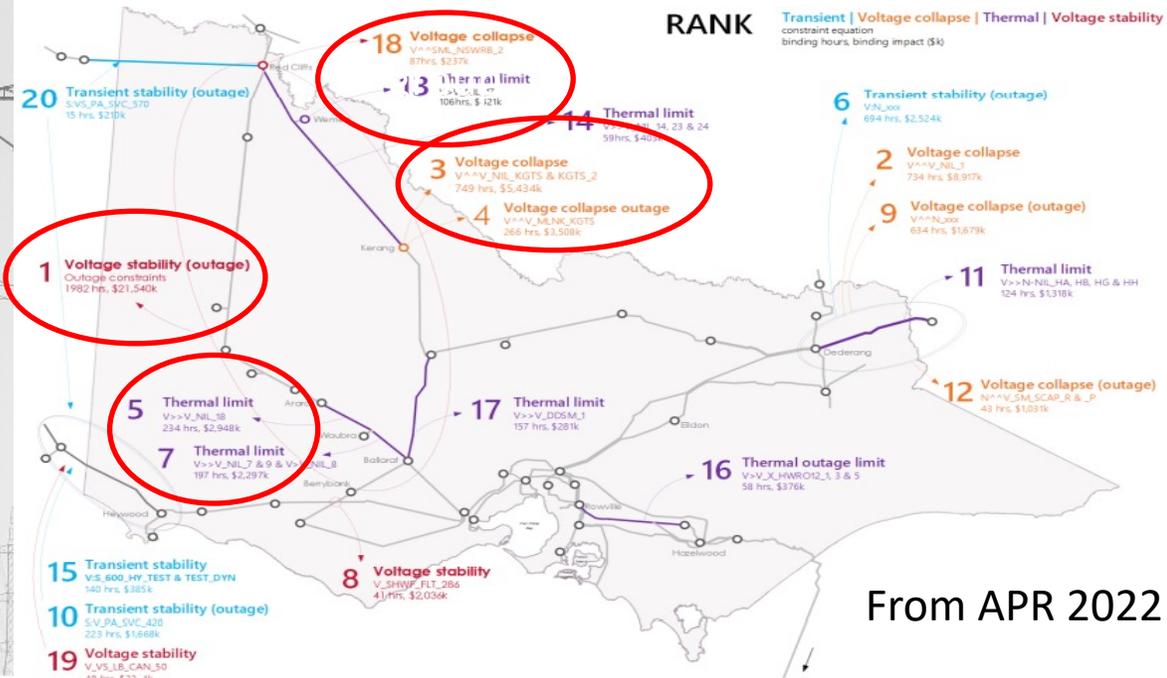


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Must extend VNI-West for additional hosting

Does not address V2 & V3 REZ's
Severe transmission constraints



From APR 2022



Location	Type of constraint	Hours
1	Voltage stability, outage	1,982
3	Thermal limit	749
4	Voltage collapse, outage	266
5	Thermal limit	234
7	Thermal limit	197
17	Thermal limit	137
13	Thermal limit	106
18	Voltage collapse	87
14	Thermal limit	59
8	Voltage stability	41
Total		3,858 hr 44% of year

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Causing extreme curtailment in V2 and V3 even with WRL and VNI-West

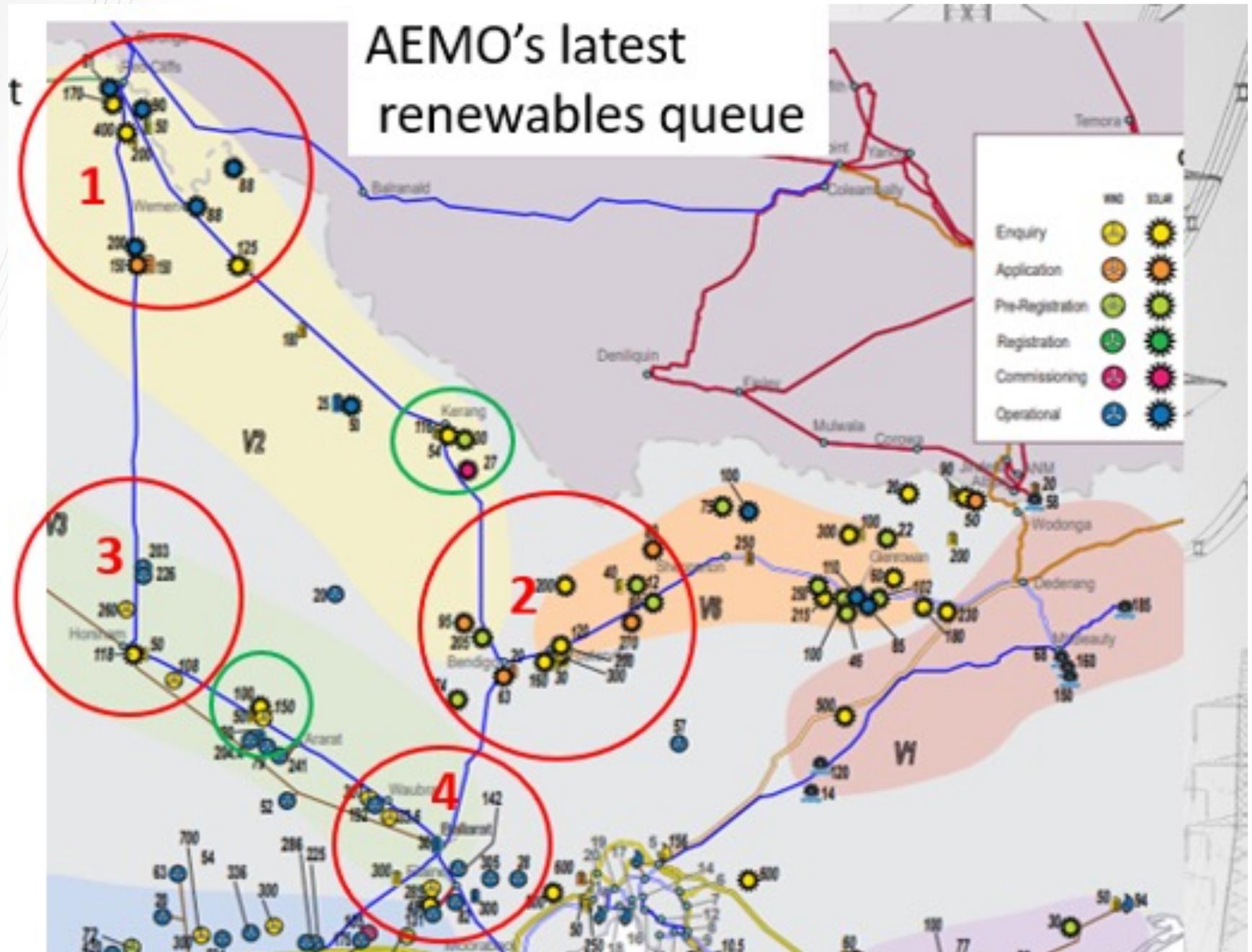
Curtailment			
	Average 2023-2030	Average 2031-2040	Average 2041-2050
Murray River (solar)	36%	25%	35%
Western Victoria (solar)	25%	19%	24%
Western Victoria (wind)	33%	19%	22%

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**AND will
prevent new
renewables in
V2 and V3**

 Serviced by WRL-VNI-West

 Stranded by WRL-VNI-West



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Must extend 220kv Network to service V2 and V3

Only services 172 MW Kerang and 300 MW Buronga

Strands 1,683 MW in V2 and 1,616 MW in V3:

1. 1,045 MW around Red Cliffs — lines congested
2. 638 MW near Bendigo — now bypassed
3. 506 MW near Horsham — line to Bulgana congested
4. 340 MW near Waubra — line congested
5. 770 MW near Elaine — North Ballarat now bypassed

Must build ~550 km (V2) and 230 km V3 of 800 MW 220kV networks,
east/west of New Kerang and Bulgana

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Other projects needed for Extended VNI-West to meet the minimum hosting requirements for VRET

Project 1.2 - Gippsland REZ V4: Loy Yang to Basslink transition point. The PACR builds 2,000 MW of wind farms in Gippsland REZ by 2029 so will need to extend the 500 kV grid from Loy Yang to the coast, say at Giffard (credited 3,000 MW)

Project 1.5 - South West Victoria REZ V4: The PACR admits it reinforces South West Victoria REZ by 2033 for 1,500 MW hosting, and the ISP's preferred option is a third 500 kV line from Sydenham to Moorabool to Mortlake (credited 3,000 MW).

Project 1.8 - Central North Victoria REZ V1: The PACR installs 400 MW of solar farms in Central North Victoria REZ by 2030 and the ISP's preferred option is a 220 kV line from Shepparton to Dederang via Glenrowan (credited 400 MW)

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Full list of Extended VNI-West Projects

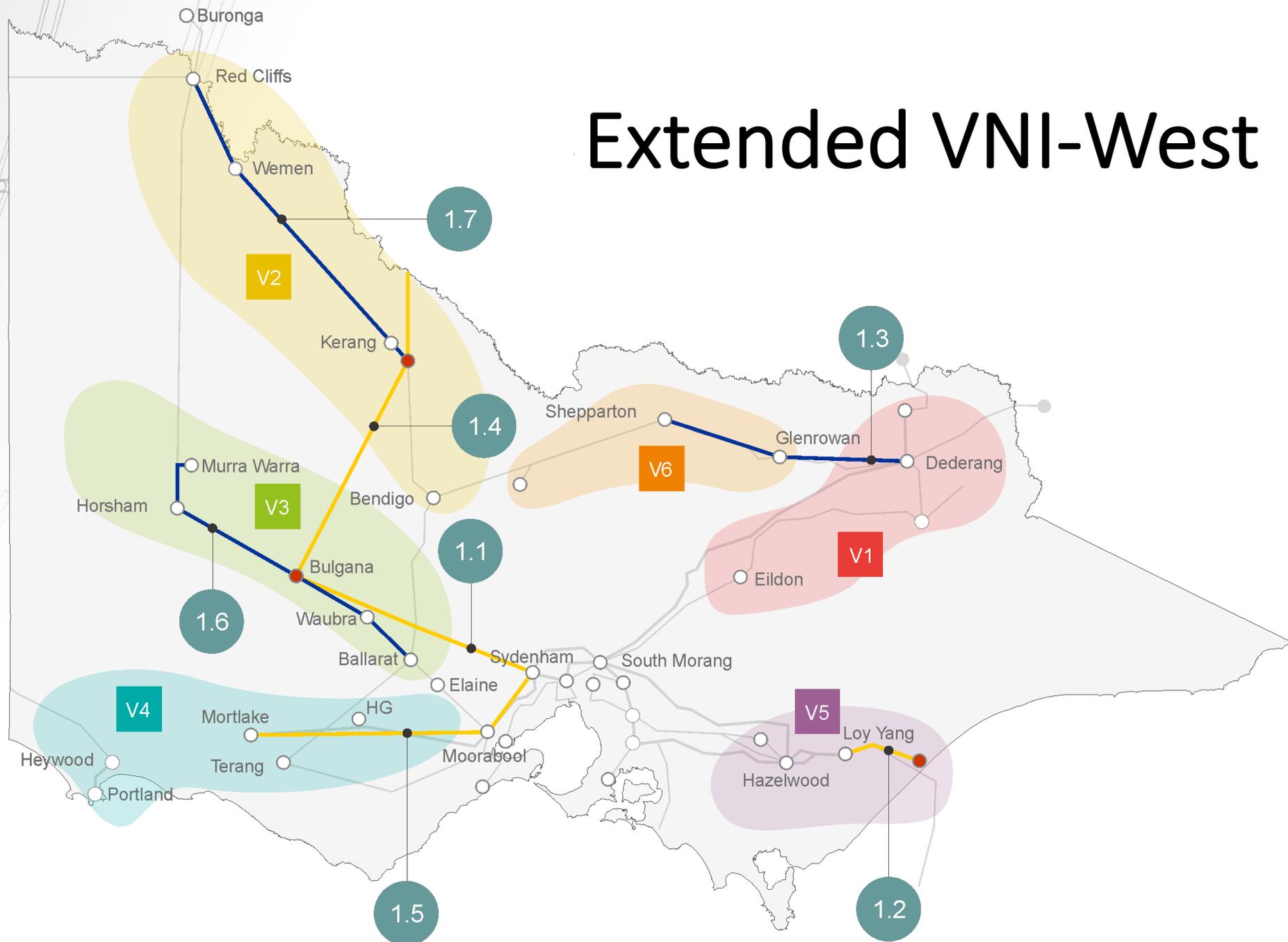
Project	Necessary completion date
VNI-West 500 kV dual circuit line from Sydenham to Bulgana (WRL)	mid 2027
500 kV dual circuit line from Loy Yang to near Basslink transition station + 500 kV/220 kV substation	mid 2029
220 kV single circuit line from Shepparton to Dedarang via Glenrowan	mid 2030
VNI-West Option 5A 500 kV dual circuit line & New Kerang 500 kV/220 kV substation	mid 2031
500 kV single circuit line from Sydenham to Moorabool to Mortlake	mid 2033
220 kV dual circuit line from Murra-Warra to Bulgana; and Bulgana to Ballarat	end 2026 (pre WRL)
220 kV dual circuit line Red Cliffs to Wemen to New Kerang	end 2030 (pre VNI-West)

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Extended VNI-West

KEY

- New 500kV Transmission Line
- New 220kV Transmission Line
- Existing Transmission Line
- Existing Terminal Station
- NEW Terminal Station
- Development Phase: 2026 – 2035



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Estimated cost and specifications Extended VNI-West Projects

	Project	Details of project scope of works	Cost (\$million, 2023) including IDC	Cost (\$million, 2022) excluding Interest During Construction (IDC)	Easement	Length (km)
1.1	VNI-West 500 kV Sydenham to Bulgana (WRL)	Sydenham to Bulgana option 5A D/C 500kV towers, quad conductors	1,861	1,525	New, parallel existing line part-way	190
1.2	500 kV D/C Loy Yang to Basslink Transition	Loy Yang to new Giffard substation, 500kV D/C line, quad conductors	1,040	853	New green field easement	65
1.3	220kV S/C Shepparton to Dedarang via Glenrowan	Shepparton - Glenrowan - Dedarang, 220 kV S/C, twin Lemon conductors	370	317	Spare easement	175
1.4	VNI-West Option 5A 500 kV Bulgana to NSW border	Bulgana - New Kerang - near Swan Hill, option 5A, 500 kV D/C, quad conductors	3,057	2,506	New green field easement	236
1.5	500 kV S/C Sydenham to Mortlake	Sydenham - Moorabool - Haunted Gully - Mortlake, 500 kV S/C, quad conductor	1,425	1,102	Spare easement to Moorabool	214
1.6	220 kV network for V3 (Western Vic REZ)	Murra Warra to Horsham to Ballarat, 220 kV D/C, twin Lemon conductors	907	744	New green field easement	229
1.7	220 kV network for V2 (Murray River REZ) - 2 D/C lines	Two lines Red Cliffs - Wemen - New Kerang or equivalent, 220 kV D/C, twin Lemon conductors	2,312	1,788	New green field easement	550
	TOTAL		10,972	8,835		1,659

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Hosting Capacity Extended VNI-West Plan

Extended VNI-West Plan	V1 Ovens Murray	V2 Murray River	V3 Western Victoria	V4 South West Victoria	V5 Gippsland	V6 Central North	TOTAL
VNI-West 500 kV Sydenham to Bulgana (WRL)			1,460				1,460
500 kV D/C Loy Yang to Basslink Transition					3,000		3,000
220 kV S/C Shepparton to Dedarang via Glenrowan						400	400
VNI West option 5A 500kV Bulgana to NSW border		1,580	200				1,780
500 kV S/C Sydenham to Mortlake				3,000			3,000
220 kV network for V3 (Western Vic REZ) - for WRL							-
220 kV network for V2 (Murray River REZ) - for VNI-West							-
Total additional Hosting capacity by 2035		1,580	1,660	3,000	3,000	400	9,640

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Comparison of Plan B with Extended VNI-West

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Extended VNI-West vs. Plan B

	Extended VNI-West	Plan B
Total length new lines	1,659 km	1,451 km
Requires new easements.	1,270 km	130 km
Located on existing easements.	386 km	281 km
Require minor (~10) widening		1,040 km
Area of new easements	733 ha	169 ha
Multi-Criteria Analysis (the lower the better)		
1. Cost	15	10
2. Socio-economic & Environmental	32	7
3. Visual	20	3
4. Cultural & Heritage	12	4
Total	79	23
Capital cost (2023 dollars)	\$11 billion	\$6 billion
Renewables hosting capacity by 2035 (MW)	14,830	16,675
Curtailment (REZs affected by VNI-West)	20% to 40%	13%
Marginal loss factors (REZs affected by VNI-West)	0.80	0.93
Single Points of Failure	~ 1000	0
Increase in annual electricity bills relative to Plan B.	\$1,124 million	0

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Multi Criteria Analysis (MCA) of options

February 2023 NEVA Order 102 requires consideration of economic, environmental, cultural heritage, land-use, and technical impacts when evaluating options

AEMO's MCA described in the VNI-West PACR is not credible as:

- It assigns 70% weighting to the economic impacts making all other impacts inconsequential
- AEMO has applied its own rating system in reverse order for the economic impact measure. The rating system allocates 1 as the highest score and 5 as the lowest score, but AEMO has used the net benefits from its RIT-T assessment as the economic measure – This means the options delivering the highest net benefits scores the worst in their MCA .

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We have applied our own MCA based on extensive experience over scores of socio-economic-environmental-assessments

Consumer impact: This indicator is based on capital cost per kilometre. Projects are all weighted relative to VNI-West (Bulgana to Kerang) which gets a score of 30. The aggregate score is the weighted average of individual projects (weighting by kilometres).

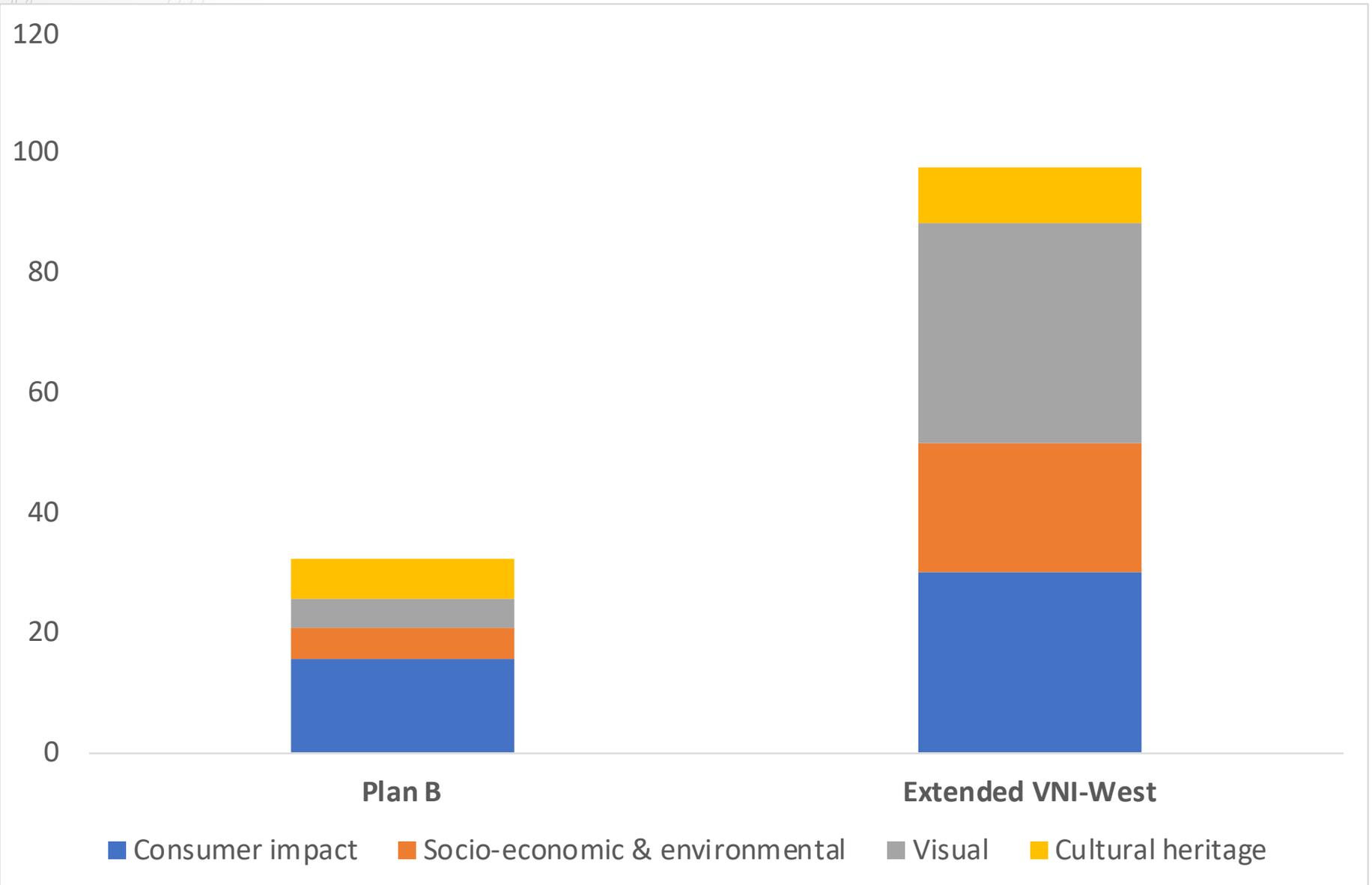
Socio-economic & environmental impact: transmissions lines that require new easements (or expanded) easements impose costs on landowners and cause environmental damage (on flora, fauna and ecosystems) caused by the clearing, construction and maintenance of new transmission lines. This is measured by the area of new/expanded easements required to host new or expanded transmission lines all weighted relative to VNI-West (Bulgana to Kerang) which gets a score of 30. The aggregate score is the weighted average of individual projects (weighting by hectares of new or expanded easement).

Visual impacts: Transmission towers, insulators and conductors are unsightly. This measure scores the square of the height of the towers (visibility rises as the square of height) multiplied by the number of wires strung between them, and adjusted for whether they are built alongside existing transmission lines or if they are sited on new land all weighted relative to VNI-West (Bulgana to Kerang) which gets a score of 30. The aggregate score is the weighted average of individual projects (weighting by hectares of new or expanded easement).

Cultural Heritage impacts: Cultural heritage is difficult to assess without the trust and input of the elders, being the custodians of the stories and knowledge of their Country. For this reason, these impacts can't be adequately assessed via desktop analysis for any project from a proxy-based measure used here. However, for program-level assessment, we are confident the approach we have used is realistic. We consider whether the transmission line is on existing easements, alongside or in new Country. This equally weighs cultural heritage impacts above-ground (e.g. scar trees, archaeological sites, stone tools) with below-surface impacts due to the excavation of tower footings and access tracks. Individual projects are assessed relative to VNI-West (Bulgana to Kerang) which gets a score of 10. The aggregate score is the weighted average of individual projects (weighting by hectares of new or expanded easement).

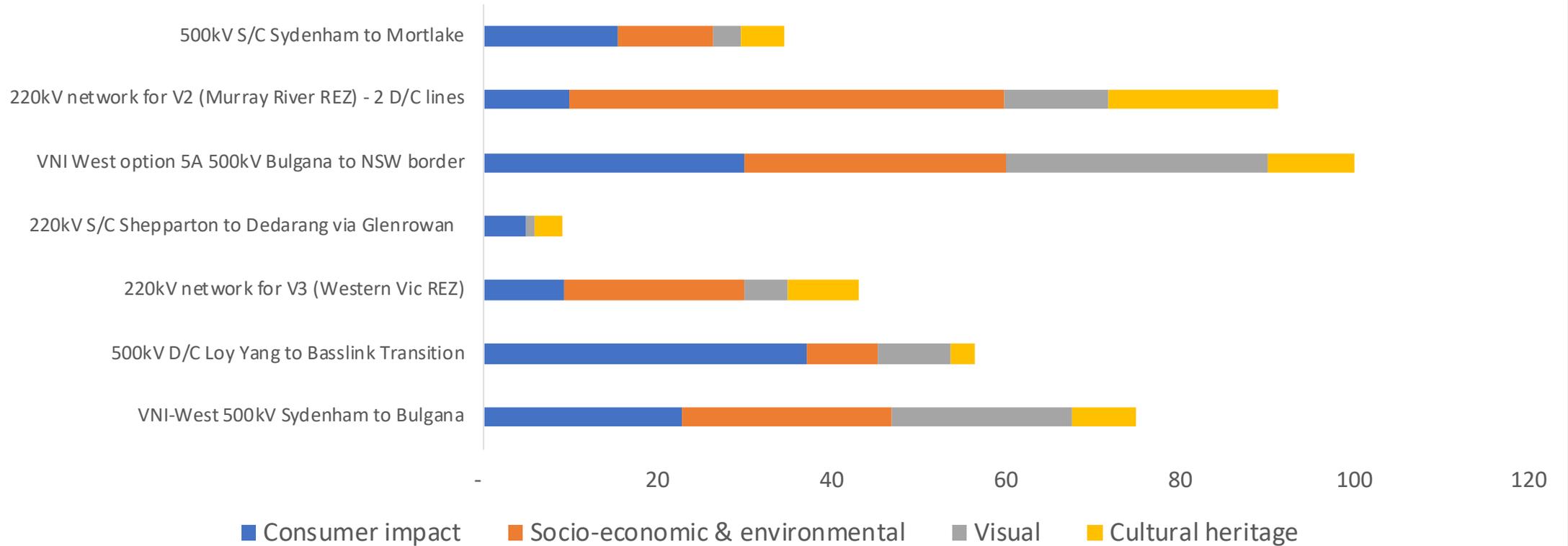
**NO LONGER
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TRANSMISSION**

Aggregate MCA score for Plan B vs. Extended VNI-West



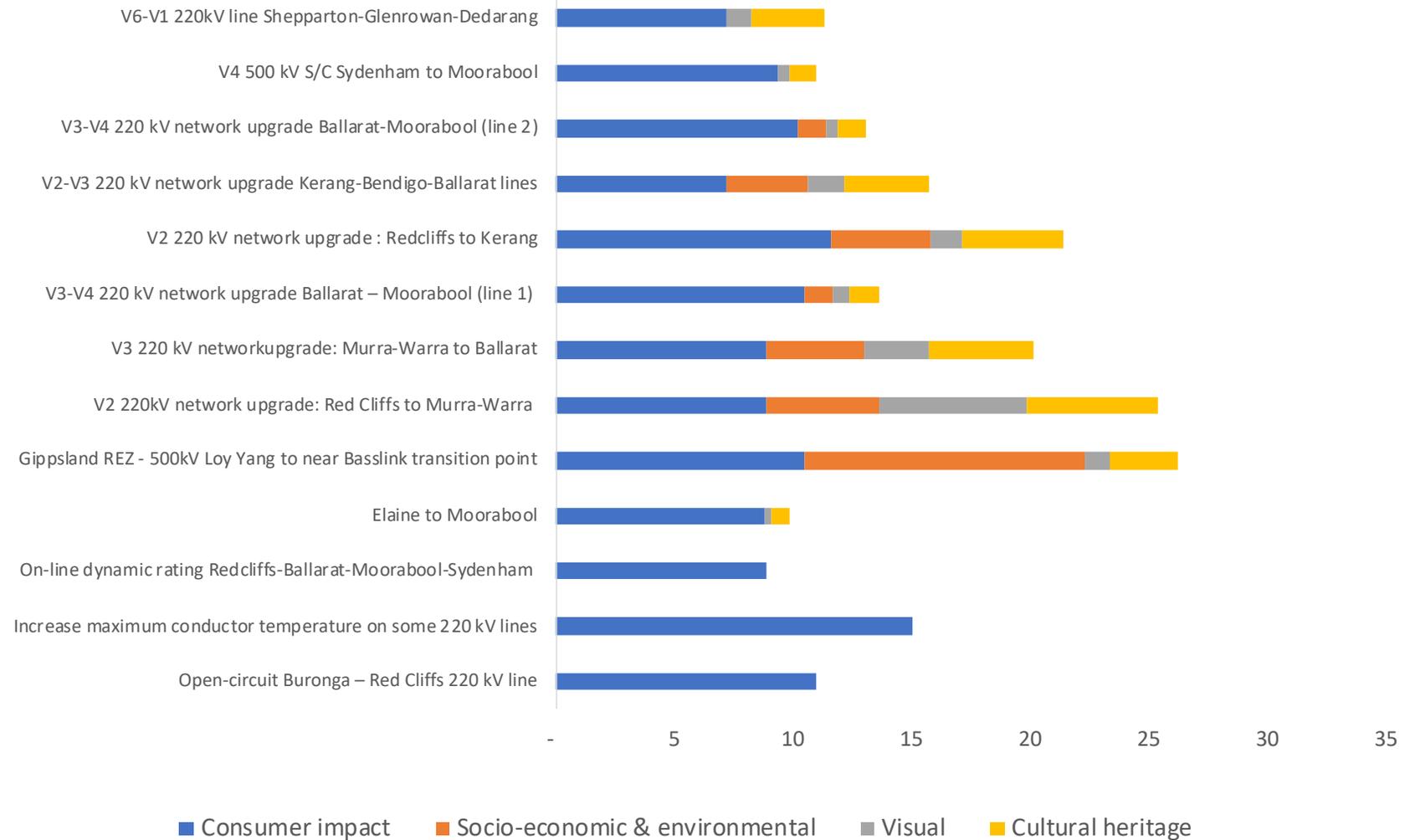
**NO LONGER
LOST IN
TRANSMISSION**

Project-by-project MCA for Extended VNI-West



**NO LONGER
LOST IN
TRANSMISSION**

Project-by-project MCA for Plan B



NO LONGER LOST IN TRANSMISSION

Transmission towers can and do fail. It is reckless to pretend otherwise.



Severe lightning



wildfires



Flood damage

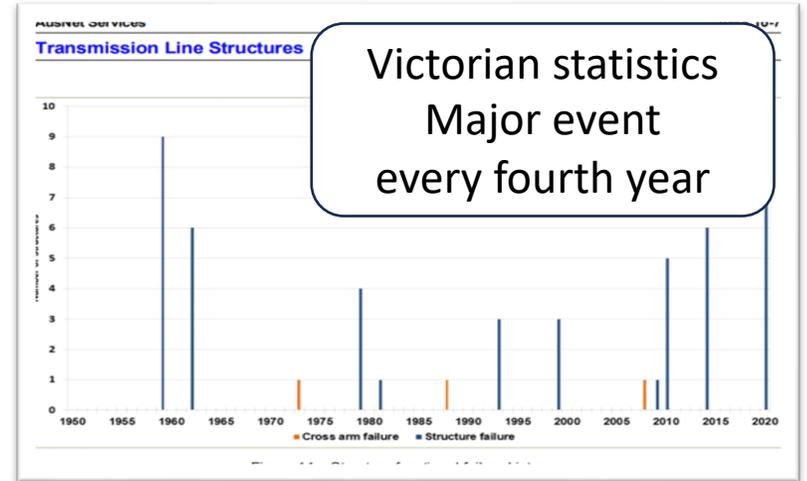


Sabotage - Perth

Police are stumped as to how, or why, someone would bring down this burn-free transmission tower in Perth's



destructive winds



**NO LONGER
LOST IN
TRANSMISSION**

Certain to Black-out Southern Victoria



**Power System
Frequency Risk
Review**
July 2022

AEMO has not planned for this but admits there would be a cascading collapse - resulting in Southern Victoria blackout

One tower, two lines
both will fail

10. Manage risks associated with non-credible loss of future North Ballarat – Sydenham 500 kV lines: north of Ballarat, and a new 500 kV double circuit line from north of Ballarat to Sydenham⁵. The non-credible loss of the proposed 500 kV lines during periods when the new 500 kV lines flow exceeds the limits of the parallel 220 kV lines, could result in multiple line losses. AEMO (as Victorian transmission planner) will consider this risk in the planning process.

**NO LONGER
LOST IN
TRANSMISSION**

The SECV never took this certain blackout risk

Like Plan B the SECV built twin single circuit 500 kV lines

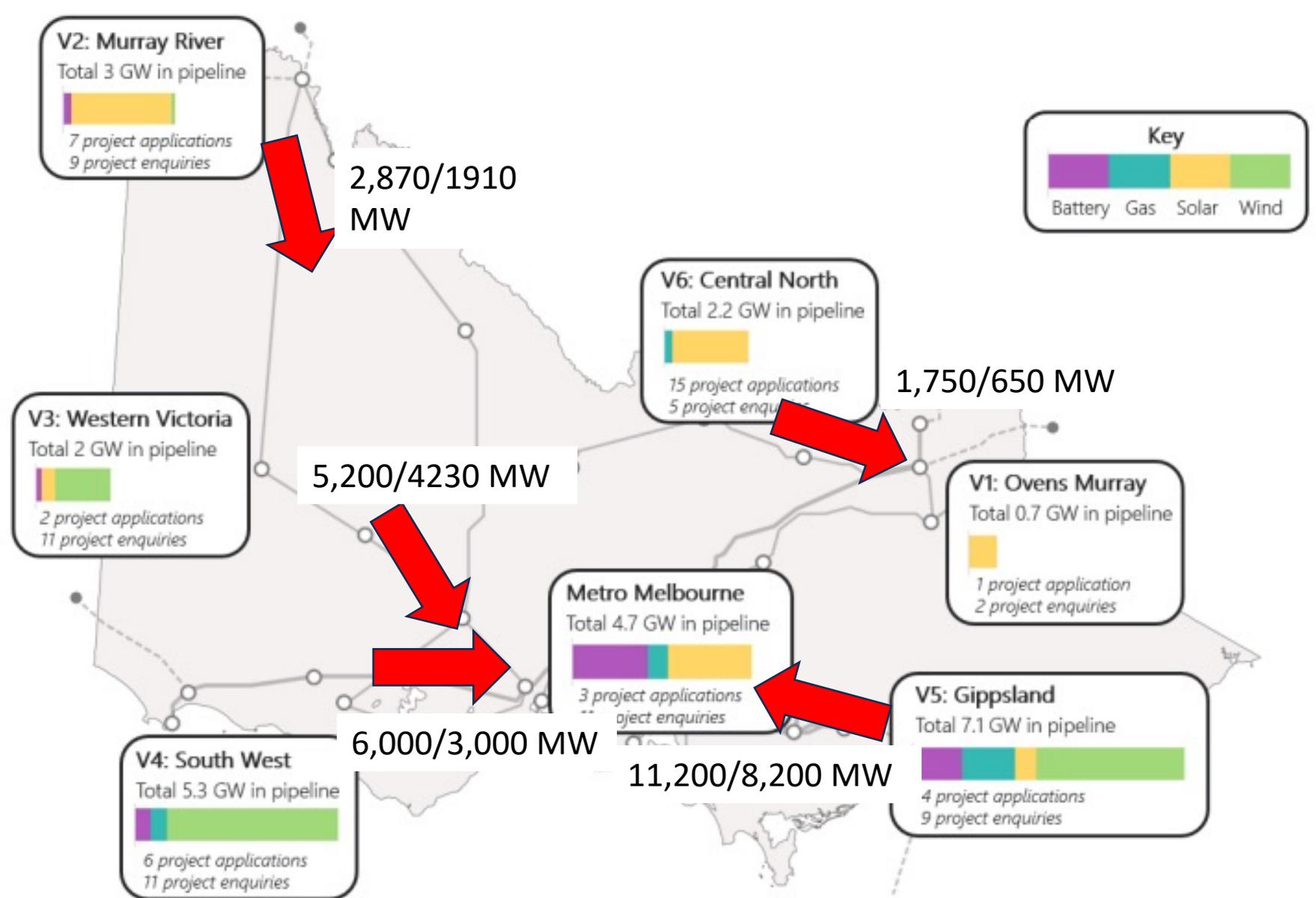


Or duplicated lower capacity, double circuit lines, preferably on separate routes

**NO LONGER
LOST IN
TRANSMISSION**

N-I/N-2 Transmission Capacity for Plan B

Total N-I / N-2
transmission
capacity



**NO LONGER
LOST IN
TRANSMISSION**

N-1/N-2 Transmission Capacity for Extended VNI-West

Total N-1 / N-2
transmission
capacity

V2: Murray River
Total 3 GW in pipeline
7 project applications
9 project enquiries

2,020/800 MW

V6: Central North
Total 2.2 GW in pipeline
15 project applications
5 project enquiries

1,040/640 MW

V3: Western Victoria
Total 2 GW in pipeline
2 project applications
11 project enquiries

3,800/1,200 MW

V1: Ovens Murray
Total 0.7 GW in pipeline
1 project application
2 project enquiries

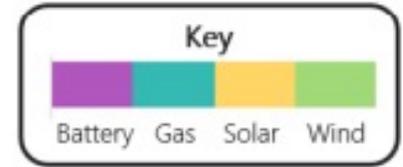
6,000/3000 MW

Metro Melbourne
Total 4.7 GW in pipeline
3 project applications
11 project enquiries

11,200/8,200 MW

V4: South West
Total 5.3 GW in pipeline
6 project applications
11 project enquiries

V5: Gippsland
Total 7.1 GW in pipeline
4 project applications
9 project enquiries



**NO LONGER
LOST IN
TRANSMISSION**

Plan B meets all 6 objectives



- Support VRET to achieve 65% renewables by 2030 and 95% by 2035



- Avoid major blackouts by having no Single Points of Failure (SPoF) on new transmission lines defined as Systems of National Significance under the Security Legislation



- Slash wastage of existing renewables at Murray River V2 and Western Victoria V3 REZ by cutting spills from 40% to 13% and increasing m.l.f.'s from 0.80 to 0.93



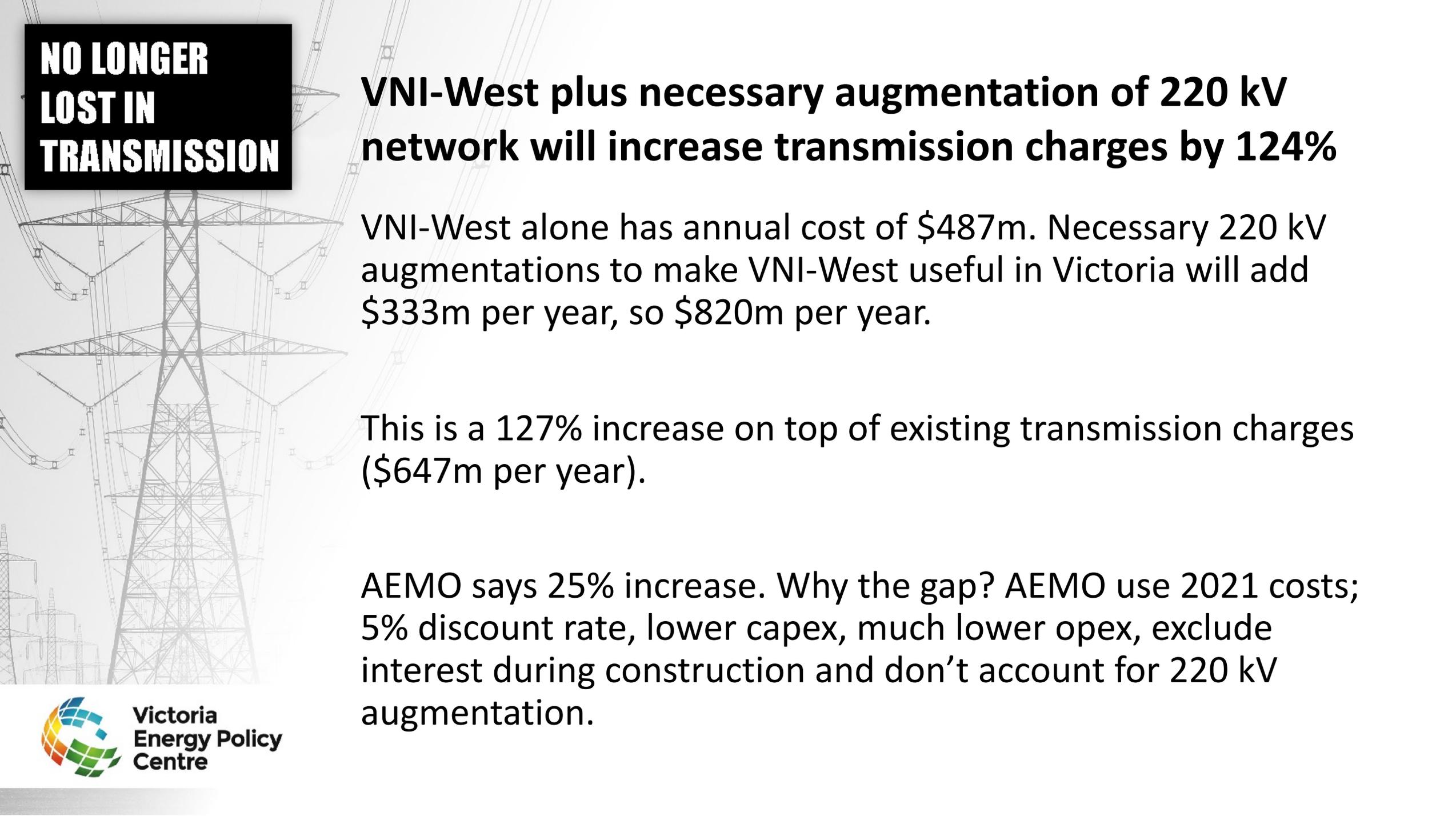
- Minimise the amount of new land required for transmission by making use of existing transmission networks and easements



- Minimise public opposition (which has been a material source of delay for transmission projects)



- Diversify large scale supply around the state



**NO LONGER
LOST IN
TRANSMISSION**

VNI-West plus necessary augmentation of 220 kV network will increase transmission charges by 124%

VNI-West alone has annual cost of \$487m. Necessary 220 kV augmentations to make VNI-West useful in Victoria will add \$333m per year, so \$820m per year.

This is a 127% increase on top of existing transmission charges (\$647m per year).

AEMO says 25% increase. Why the gap? AEMO use 2021 costs; 5% discount rate, lower capex, much lower opex, exclude interest during construction and don't account for 220 kV augmentation.

**NO LONGER
LOST IN
TRANSMISSION**

Plan B will also increase charges, but \$938 million per year less than Extended VNI-West

We estimate Plan B will increase transmission charges by \$611m per year (94%)

However, extended VNI-West will increase transmission charges more:

- \$1,124m (AEMO) vs. \$611m (Plan B)
- +\$425m to compensate renewables for curtailment (AEMO)

So, \$938m more than Plan B (\$1,124m - \$611m + \$425m)

**NO LONGER
LOST IN
TRANSMISSION**

Recommendations

1. For Government of Victoria

- a. Appoint VicGrid as jurisdictional planner immediately.
- b. Ask VicGrid to publicly advise on merits of Plan B v Extended VNI-West.
- c. Ask VicGrid to advise on implementation of B1.4, B1.6, B1.7, B1.8, B2.2, B2.3 and B2.4 *before* decision to develop two legs of VNI-West.

2. For Australian Government

Treasurer and Energy Minister ask Productivity Commission to establish guidelines for CEFC's implementation on disbursement of Rewiring the National funds.

3. Energy and Climate Change Ministerial Council

Independent Inquiry into RIT, Actionable ISP, Take-Out- One-at-a-Time methodology for Contingent Project Applications and the roles of AEMO versus state-based transmission network service providers.