AEMO
AUSTRALIAN ENERGY MARKET OPERATOR
Victorian Planning

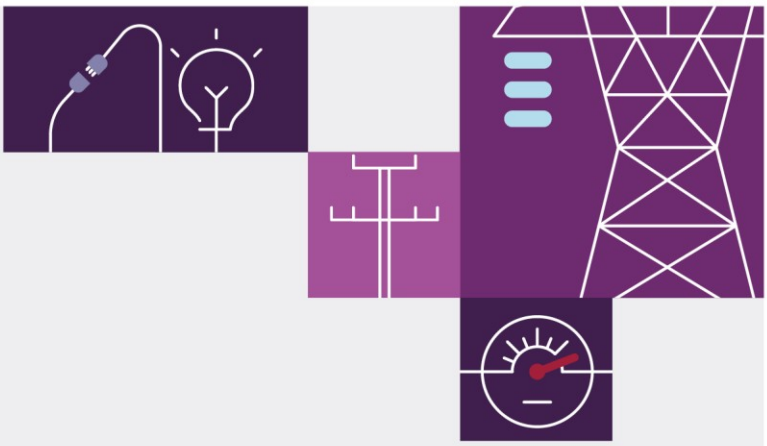
Transgrid

VNI West PADR Submissions

February 2023

Regulatory Investment Test for Transmission

Summary of stakeholder feedback on the PADR



Important notice

Purpose

The Australian Energy Market Operator Limited (AEMO) in its Victorian transmission planning role under the declared network functions in the National Electricity Law (NEL) and NSW Electricity Networks Operations Pty Limited as trustee for NSW Electricity Networks Operations Trust trading as Transgrid (Transgrid) have prepared this document to support the consultation requirements of clauses 5.16A.4(c) – (h) of the National Electricity Rules and, in relation to AEMO and the Victorian section of the VNI West, to comply with functions conferred on AEMO under the order made on 20 February 2023 by the Victorian Minister for Energy and Resources pursuant to section 16Y the National Electricity (Victoria) Act 2005 (NEVA)(the NEVA Order).

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This document or the information in it may be subsequently updated or amended.

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Locations

Descriptions and visual representations of geographic locations in this document are indicative only. Locations will be determined after the conclusion of the RIT-T process, as required during detailed design, route assessment, planning and community engagement phase.

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AEMO and Transgrid acknowledge the many First Nations that host Australia's electricity grids and pay respect to Elders past, present and emerging. We respect the Indigenous history of the lands in which we currently and plan to operate, being conscious of the landscape-scale impacts of the energy transition. We wish to emphasise the importance of early and continued engagement, working closely with Traditional Owners, as the grid seeks to expand.

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1 Introduction

This report follows the Project Assessment Draft Report (PADR), released in July 2022, in relation to the Victoria – New South Wales Interconnector (VNI) West Regulatory Investment Test for Transmission (RIT-T)[1]. It has been prepared in response to feedback from stakeholders, to summarise all points raised in submissions to the PADR and how they have been taken into account in the RIT-T.

The PADR for this RIT-T was published on 29 July 2022, with several communications and engagement activities delivered by AEMO Victorian Planning (AVP) and Transgrid to both promote and advise stakeholders of the PADR publication and the six-week public feedback period. Specifically:

- On the day the PADR was published:
  - AVP and Transgrid issued media releases and posted information on social media to advise of the PADR availability and the six-week submission period. Subsequently, AVP and Transgrid posted reminders regarding the submission close date on social media over the six-week period.
  - AVP and Transgrid emailed the VNI West stakeholder contact data base regarding the publication of the PADR and the six-week consultation period.
- In the week commencing Monday 1 August 2022, an advertisement promoting the PADR publication and online information sessions was published in 10 regional and agricultural newspapers covering the project area[2].
- On 10 August 2022, AVP and Transgrid hosted an online Information Session on the PADR (attended by 33 external stakeholders, with the split of participants being approximately 80% industry / 20% non-industry[3]).
- In the week commencing Monday 15 August 2022, the advertisement appeared a second time in the same 10 regional and agricultural newspapers covering the project area.
- On 30 June 2022, AVP held its first Council Stakeholder roundtable, attended by representatives from six Local Government Areas (LGSs) in Victoria, and a related local government group. This meeting provided an overview and context on the project.
- On 18 August 2022, AVP held its second Council Stakeholder roundtable, attended by representatives from six Local Government Areas (LGAs) in Victoria, and a related local government group. This meeting shared information on the PADR with the Councils.
- In July and August, the Transgrid Advisory Council and Energy Transition Working Group were provided with information about the PADR and the opportunity to provide feedback.

[1] This project is identified as an 'actionable ISP project' in the 2022 *Integrated System Plan* (ISP). See https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp.

[2] Specifically, Bendigo Advertiser (VIC); Castlemaine Mail (VIC); Deniliquin Pastoral Times (NSW); Echuca Riverine Herald (NSW / VIC); Finley Southern Riverina News (NSW); Kerang Gannawarra Times (VIC); Koondrook & Barham Bridge (NSW / VIC); Stock and Land (Agricultural); The Land (Agricultural); The Weekly Times (Agricultural).

[3] 'Industry' stakeholders describes Information Session participants from business, consultancy, supplier or industry representative bodies recognised as being involved in the energy industry. 'Non-industry' includes individuals from local communities or representatives of government agencies.

- On 25 August 2022, AVP and Transgrid held a second online Information Session on the PADR (attended by 79 external stakeholders, with the split of participants again approximately 80% industry / 20% non-industry).
- On 5 September 2022, AVP held an Energy Consumer Submission Forum, which was attended by 11 organisations, to enable comments and questions tabled at the Forum to also be considered as verbal submissions to the PADR.

Submissions to the PADR closed on 9 September 2022. In total, 26 submissions[4] were received, 22 of which have been published on AEMO's website (four submitters requested confidentiality)[5]. Verbal submissions were made by three organisations at the Energy Consumer Submission Forum, with the key themes of these verbal submissions documented and published alongside the public written submissions. Table 1 below lists the 22 non-confidential submitters to the PADR (the 19 non-confidential written submissions and the three verbal submissions).

Table 1 Public submissions to the PADR

Submitters to the PADR	
AiGroup (verbal)	Norman Walker
AusNet Services	Pacific Hydro
Central Victorian Greenhouse Alliance (CVGA)	Public Interest Advocacy Centre (PIAC) (verbal)
City of Greater Bendigo	Queensland Electricity Users Network (QUEN) (verbal)
Energy Grid Alliance (EGA) (2 submissions)	RWE Renewables
Energy Users Association of Australia (EUAA)	SmartWires
ENGIE Australia & New Zealand (ENGIE)	Snowy Hydro
Grampians New Energy Taskforce (GNET)	Swan Hill Rural City Council
Hepburn Shire Council	Ted Woodley
Moorabool and Central Highlands Power Alliance	Victoria Energy Policy Centre (VEPC)
Mount Alexander Shire Council	Victorian Farmers Federation (VFF)

While submissions covered a range of topics, the 10 broad themes most commented on were:

- Support for increased interconnection between Victoria and New South Wales and the potential to accelerate delivery and expand capacity.
- The importance of considering social licence issues, including the impact of options on visual amenity, biodiversity, land use, culture, heritage, tourism and bushfire risk.
- The importance of transparency and meaningful consultation with stakeholders.
- Support for consideration of alternative interconnection corridors, further west.
- The accuracy of the cost estimates used.
- Interaction with the Western Renewables Link (WRL) project.
- Interaction with other major projects in the National Electricity Market (NEM).

[4] Two submissions were received from one party (Energy Grid Alliance), which have been counted as one submission for this purpose.

[5] See https://aemo.com.au/initiatives/major-programs/vni-west/stakeholder-consultation.

- Concern about the consistency of the assessment with government policies relating to emissions and renewable generation.
- Comments on the wholesale market modelling.
- Specific queries regarding the methodologies applied for the net present value (NPV) modelling.

On 1 December 2022, AVP and Transgrid held an in-depth session with consumer and community representatives who had made submissions to the PADR related to cost estimations, market modelling and credible options. This session responded to points made in submissions, and included AVP and Transgrid presenting the additional network options being considered. Stakeholders encouraged AVP and Transgrid to undertake an additional consultation step, prior to publishing the PACR, focusing on the new options considered.

Additionally, on 20 February 2023, the Victorian Minister for Energy and Resources used powers under the National Electricity (Victoria) Act 2005 (NEVA) to issue an order pursuant to section 16Y of the NEVA (NEVA Order). The Neva Order confers upon AVP functions which include the assessment of alternate options to the preferred options to expedite the development and delivery of those projects.

AVP and Transgrid have consequently undertaken this additional consultation step to provide stakeholders the opportunity to review and comment on the additional options developed (see the separately released additional consultation report (Consultation Report) on the options assessed).

At the 1 December 2022 meeting, stakeholders also requested that AVP and Transgrid release a summary of the points raised in PADR submissions ahead of the PACR. This report does this, and outlines how all matters raised have been taken into consideration in the RIT-T, including in the recent options assessment, and/or will be considered in the preparation of the forthcoming PACR.

Following the 1 December 2022 meeting, several attendees raised further matters for consideration that have, to the extent possible in the time available, also been noted in this report and taken into account. Many of these matters were summarised in the submission made by Simon Bartlett dated 6 February 2023 that has now been published alongside the PADR submissions.

The main issues raised in non-confidential submissions and stakeholder feedback sessions to the RIT-T assessment are discussed in Section 2 of this report. In that section AVP and Transgrid explain how these matters have been addressed and reflected in the assessment. Section 2.11 provides a full summary of all non-confidential points raised in submissions to the PADR, and the response from AVP and Transgrid to each point. This includes other issues not discussed earlier in Section 2, including perceived shortcomings of the RIT-T process generally as well as issues wider than the RIT-T (such as the need for a whole-of-system plan for NEM transmission, and current cost recovery arrangements).

2 Summary of the PADR consultation

Twenty-six submissions were received in response to the PADR, including verbal submissions by three organisations at the AEMO Energy Consumer Submission Forum held on the PADR in early September 2022[6]. Each submission received has been considered and responded to as part of this report.

AVP and Transgrid have also held meetings with interested parties to further discuss the RIT-T assessment following publication of the PADR. These meetings have played a pivotal role in the options assessment and RIT-T assessment more generally.

2.1 Support for VNI West and the timeframe for construction

Several submissions noted their support for VNI West, including its potential to reduce congestion on the transmission network and improve interconnection between New South Wales and Victoria. Submissions also pointed to VNI West's role of supporting investment in renewable energy generation in the region and facilitating the transition to clean energy[7].

There was support from some submitters for accelerating the delivery of VNI West to open up capacity, enable earlier connection of new renewables, and accelerate the realisation of market benefits generally from the project[8].

On 19 October 2022, the Federal Government announced its Rewiring the Nation plan, stating that the agreement between Victoria and the Commonwealth will, through the Clean Energy Finance Corporation, provide a concessional loan of $750 million for VNI West to ensure it is completed by 2028[9].

The February 2023 NEVA Order from the Victorian Minister also aims to help facilitate earlier delivery by enabling AEMO to commence early works in parallel with completing the RIT-T. The NEVA Order also confers on AVP functions which include assessment of alternate project options to expedite development and delivery of both projects. The NEVA Order also removes certain obligations under the National Electricity Rules (NER), including the obligation to assess whether material changes mean that the preferred project option is no longer the preferred option.

If further actions are taken by Federal or State Governments to accelerate VNI West delivery, AVP and Transgrid will provide updates to stakeholders through our project communication channels. In the meantime, AVP and Transgrid continue to target the 2022 ISP optimal timeframe of July 2031 under the *Step Change* scenario.

Other parties raised concerns about whether the timeframe for the project is realistic, including the time needed to secure land, easements and environmental approvals, potential supply chain constraints, as well as concern

[6] The key themes of the verbal submissions have been documented and published alongside the public written submissions.

[7] For example, see Snowy Hydro, p 1 and 4. Pacific Hydro, p 1. ENGIE, pp. 1-3.

[8] CVGA, p. 4. Pacific Hydro, p. 2. ENGIE, p. 2.

[9] See https://www.pm.gov.au/media/rewiring-nation-supercharge-victorian-renewables.

about 'overambitious' timeframes for some other projects[10]. AVP and Transgrid recognise that considerable time is required to undertake all the necessary aspects of the project, including analysis and consultation regarding the preferred route, environmental approvals, securing easements, and managing construction. AVP and Transgrid's delivery estimates build on experience on recent projects, including adopting independent recommendations on best practice consultation and engagement. AVP and Transgrid are also addressing supply chain concerns more broadly by engaging with suppliers at an earlier stage and using suppliers with multiple supply and production options to mitigate any delivery constraints.

Some submissions suggested that the line capacity of VNI West should be increased. For example, ENGIE proposed that the infrastructure should have scope for further expansion, and that it could support alternatives to other more expensive renewable supply options[11]. Swan Hill Rural City Council suggested additional capacity is likely required to maximise the potential of the Swan Hill region and wider Murray River Renewable Energy Zone (REZ)[12].

AVP and Transgrid note that all options assessed are designed to consist of a 500 kilovolts (kV) double-circuit line; 500 kV is the highest voltage level, and provides the highest power carrying capacity, currently used in the NEM. Designing and delivering VNI West at a higher capacity, higher voltage level, is not considered practicable given the delivery risk of introducing a new voltage level into Australia, the lack of available ultra-high-voltage expertise, and the urgency to deliver VNI West as soon as possible to facilitate the energy transition. Nonetheless, in response to feedback suggesting that increased network capacity is likely required to maximise potential renewable generation connections, AVP and Transgrid have considered additional options and option variants, including uprating the 220 kV spur lines of the WRL to 500 kV, that aim to further increase REZ transmission limits beyond the PADR proposed preferred option – Option 1 – to allow greater levels of renewable energy to be harnessed.

AVP and Transgrid acknowledge that it is important that investment now provides the flexibility to enhance capacity as warranted by future NEM developments. The design of new terminal stations in the options assessed includes appropriate provision for future expansion in the longer term, consistent with standard AVP and Transgrid design criterion and planning approaches (as well as the 2022 ISP scope). However, to manage the immediate cost on consumers, this provision for future expansion is generally limited to terminal station site procurement rather than being expanded to procurement of future easements, and so involves only minor costs.

2.2 Importance of addressing social licence issues

Several submissions to the PADR raised concerns about the impact of the VNI West (via Kerang) option on local communities, including on the productive capacity of farmland, visual amenity, biodiversity, and on social, cultural and tourism values. These concerns highlight the importance of building 'social licence' for the project, which can be described as the co-existence between transmission infrastructure and community through efforts to mitigate negative impacts and prioritise shared value from the transition in the energy sector. AVP and Transgrid are committed to engaging with local communities to understand the existing environment, stakeholders and community to identify the potential positive and negative impacts for consideration in VNI West planning. Through

[10] For example, see QUEN and PIAC, Energy Consumer Submission Forum, p 3. AiGroup, Energy Consumer Submission Forum, p. 2.
[11] ENGIE, p. 2.
[12] Swan Hill Rural City Council, p. 3.

a commitment to generate social license, the goal is to avoid or minimise any potential harm and maximise any potential benefits through the project.

For example, Hepburn Shire Council noted that VNI West (via Kerang) will traverse highly productive farmland in proximity to areas with high visual landscape significance[13]. Similarly, the Victorian Farmers Federation (VFF) stated that VNI West (via Kerang) will traverse highly productive land that supports thousands of regional jobs and outlined a range of potential negative impacts of transmission infrastructure on agriculture[14].

Concerns were also raised about the potential loss of ecologically important trees, as well as whether a biodiversity offset strategy has been developed[15]. A further issue raised was the vulnerability of the area to bushfires, and the interaction of bushfires with transmission infrastructure[16]. Other submissions focused on the potential impact of the project on culture heritage and tourism, including the Victorian Goldfields region[17]. Submitters emphasised that failing to take adequate account of these issues would have potential adverse impacts to project timelines and costs[18].

Section 2.11 below provides responses to the individual issues raised in submissions relating to these impacts.

More generally, submissions highlighted the importance of infrastructure proponents working with stakeholders including Traditional Owners, landholders and the community, to understand the impact of their infrastructure on communities and country, and to minimise negative impacts, as part of developing social licence for the project. For example, the Central Victorian Greenhouse Alliance (CVGA) stated that meaningful engagement with communities is critical for the timely and effective delivery of the project and to build social licence[19]. AVP and Transgrid are committed to the principles set out in the Energy Charter 'Better Practice Guide to Landholder and Community Engagement'[20] to build social license by facilitating the 'co-existence between transmission infrastructure and agricultural communities to mitigate negative impacts and prioritise shared value through the energy transition'[21].

AVP and Transgrid recognise the importance of meaningful engagement with the community and stakeholders to ensure that necessary infrastructure is built in a way that minimises negative impacts on the community. AVP and Transgrid have and are continuing to respond to the concerns highlighted in submissions by:

- Reviewing opportunities to seek the input of stakeholders and continue engaging with communities as part of the ongoing development and assessment of the project (this is discussed in Section 2.3 below).
- Undertaking further analysis considering options traversing further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic in submissions (this is discussed in Section 2.4 below).

[13] Hepburn Shire Council, pp. 2 and 12.

[14] VFF, p 3, 4, 5 and 6. VFF's concerns include the impact on digital agriculture such as GPS-enabled tractors and drones; and that planes, helicopters and drones would be impeded in the vicinity of the transmission infrastructure.

[15] Norman Walker, p 1. Hepburn Shire Council, p. 6.

[16] See for example VFF, p 4. Hepburn Shire Council, pp. 10-12.

[17] See for example Hepburn Shire Council, pp. 3 and 15-16.

[18] See for example, AusNet p. 5.

[19] CVGA, p. 2.

[20] See https://www.theenergycharter.com.au/wp-content/uploads/2021/09/Better-Practice-Landholder-and-Community-Engagement-Guide-Final-September-2021.pdf.

[21] See https://www.theenergycharter.com.au/landholder-and-community-engagement/.

- Including a more detailed assessment of land, planning, environment, cultural and social constraints associated with each option through use of a multi-criteria analysis (MCA) in recognition of the potential for these factors to impact project timelines and costs[22].

In addition, it is important to note that at this early stage of the investment process the specific route, design and location of any new infrastructure required to deliver VNI West has not been determined. To identify a specific route, a detailed route selection study must be completed that considers all technical, environmental, social and cultural constraints including landholder, community, Traditional Owner and stakeholder feedback. This detailed route selection study and future detailed field surveys are part of the approvals processes after this RIT-T and will allow for, not only the identification of potential impacts, but opportunities to avoid, minimise, mitigate or offset those impacts.

At this stage, the primary aim is to identify a general corridor that warrants further development for the VNI West project. This corridor recognises and takes account, at a high level, of the community, social and environmental impacts, which will be investigated in greater detail as the project corridor is refined and a transmission route alignment is ultimately developed following this RIT-T.

Submissions also raised the potential for benefit sharing with local communities as part of securing social licence and community support for the project[23]. Suggestions included training for future employment in the renewable energy sector, grant programs, or other investments in local energy projects to reduce power bills, improve reliability, address local energy needs and enhance community resilience[24].

AVP and Transgrid are committed to working closely with stakeholders, local government agencies and communities throughout the project area to understand how benefits can be maximised across the board.

Through the proposed Victorian Transmission Investment Framework (VTIF) currently under consultation, VicGrid is aiming to deliver social and economic benefits in ways that are fair, meaningful and participatory. This includes '*opportunities for earlier and deeper engagement with local communities to help better manage impacts and to make the most of regional development opportunities for host communities*'[25]. Although VNI West will not be delivered under the VTIF, AVP and Transgrid anticipate that the principles detailed within the framework will be incorporated into the various phases of the project where possible.

Additionally, benefit sharing and the prospect of payments to landholders for hosting transmission infrastructure is something AVP and Transgrid understand is under active consideration by jurisdictional governments and, in the case of New South Wales, recently became a requirement for projects like VNI West[26]. AVP and Transgrid will be guided by any government policy developments in this area, noting that there is a need to balance the benefits to those hosting the infrastructure with the costs that are borne by the wider customer group. For example, AVP and Transgrid have reviewed and revised the costs of each option in New South Wales following the recent New South Wales requirement to make strategic benefit payments to landholders, as outlined in the Consultation Report covering the options.

[22] A summary of the MCA process and discussion of its findings are captured within the VNI West Additional Consultation Report.

[23] For example, Swan Hill Rural City Council, p. 2. City of Greater Bendigo, p. 2.

[24] CVGA, pp 4-5.

[25] See https://engage.vic.gov.au/victorian-transmission-investment-framework.

[26] New South Wales Government, Strategic Benefit Payments Scheme – for private landowners hosting major new transmission infrastructure projects in NSW, October 2022.

Several submissions suggested that the negative impacts of transmission infrastructure could be reduced by being co-located with existing infrastructure, or being built underground[27].

As noted above, a detailed route selection study is yet to be undertaken. However, areas that have previously been disturbed within the broad geographical area (such as existing transmission lines, roads and tracks, and utility easements), where potential impacts on existing and future land use may potentially be minimised through co-locating with existing linear infrastructure, have been identified as part of costing the options. The full potential for co-location will form part of the more detailed future route determination exercise.

2.2.1 Undergrounding to assist with social licence issues

Several submissions proposed undergrounding part or all of VNI West to reduce negative impacts such as visual amenity, land use restrictions, flora and fauna and bushfire risk. For example, Hepburn Shire Council stated that undergrounding is the preferred and possibly only acceptable option[28].

Some parties also maintained that the PADR overstated the cost of undergrounding, and queried whether the PADR had correctly reflected its technical features such as cable life[29]. Conversely, Snowy Hydro submitted that undergrounding could lead to significant delays and may be up to three times more costly[30].

AVP and Transgrid note that a significant study into undergrounding for HumeLink was released in August 2022, which was commissioned by a collaborative Steering Committee and involved consumer representatives as part of the progression of the study. The study found that undergrounding the line would increase the cost by at least three times and would add a further five years to the build time[31]. AVP and Transgrid consider that, similarly, the cost of undergrounding VNI West would also be orders of magnitude greater than using overhead lines, without adding commensurately to the expected market benefits, and would add significantly to the construction timetable.

Moreover, undergrounding is not void of social licence issues and these also need to be considered. For example, disturbance to flora and fauna, land use and archaeological sites must be assessed for underground lines as they must be for overhead lines (and it is generally considered that overhead lines are less disruptive than underground cables in these regards).

Given the timeframe and cost implications, AVP and Transgrid do not consider undergrounding VNI West is a realistic option. In exceptional circumstances, short sections of undergrounding may be considered as part of the ultimate route design, having considered all technical, environmental, social and cultural constraints, together with stakeholder and community feedback. However, AVP and Transgrid do not expect any such sections to be material in length. The PACR will provide further detail on the consideration of undergrounding transmission lines as part of VNI West over the course of this RIT-T.

In relation to concerns around bushfire risk, it is one of the measures that has been included in the MCA applied to rank the alternate options assessed in the Consultation Report. Options that avoid intersecting areas within the bushfire overlay are rated more favourably on the Engineering objective than others.

[27] For example, CVGA, p. 5. City of Greater Bendigo, p. 3. VFF, p. 3. Hepburn Shire Council, pp 7 and 9-10.

[28] Hepburn Shire Council, p. 10.

[29] For example, VFF, pp 2 and 3. Norman Walker, p. 1. Hepburn Shore Council, pp. 7 and 9-10.

[30] Snowy Hydro, p. 6.

[31] GHD, *Concept Design and Cost Estimate, HumeLink Project – Underground*, 22 August 2022, at https://www.transgrid.com.au/projects-innovation/humelink#Resources.

2.3 Need for transparency and community consultation

As noted in the previous section, the need for meaningful community consultation was an important theme raised in submissions. This included:[32]

- Being clear on what principles and decisions can be influenced by the community (what are the negotiables and non-negotiables).
- The need for adequate timeframes and resourcing to enable meaningful Traditional Owner, local government and community engagement.
- Active engagement with Traditional Owners, councils and regional communities at all stages of the process.
- Concern that the route alignment has been locked in before appropriate consultation with the community.

Many of the issues highlighted in submissions related to concerns that the corridor proposed for the VNI West (via Kerang) option traverses the area between Bendigo and Ballarat where communities and stakeholders have raised substantive concerns. As outlined in the Consultation Report released alongside this report, AVP and Transgrid have developed five new options, differing with respect to where VNI West connects into WRL. All new options adopt a pathway on the Victorian side that is further west than the indicative corridor proposed in the PADR, in line with suggestions made in several submissions[33], to avoid the Bendigo–Ballarat corridor that has been highlighted as particularly problematic.

Stakeholders also raised concerns about the general transparency of the RIT-T process and associated analysis. For example, AiGroup noted that the environment in which this process runs will continue to change rapidly, and maximum transparency about the analytical process of the cost benefit analysis is essential to gain consumer confidence that the RIT-T is undertaken in good faith[34]. Similarly, AusNet submitted that there needs to be greater transparency around the benefits, costs and risks to communities hosting energy infrastructure, and how local communities are likely to benefit from the development of major transmission infrastructure[35].

AVP and Transgrid are committed to working with stakeholders with honesty and integrity in a meaningful, responsive and equitable way, through transparent and inclusive practices, and seek to minimise the social, environmental and cultural impacts of our projects and operations. Both organisations will do this by engaging regularly with all stakeholders to understand what matters most, and to build trust, positive relationships and the genuine involvement of stakeholders.

The Consultation Report published alongside this report demonstrates this commitment to consult in an open and transparent way by providing information on the new analysis for further feedback before concluding the RIT-T.

AVP and Transgrid have provided extensive detail relating to both the results of the cost benefit assessment undertaken, as well as the inputs and methodological approaches taken over the course of this RIT-T. Where further clarifications were sought by stakeholders, AVP and Transgrid have sought to provide that information in the Consultation Report and accompanying materials. In particular, more detail has now been provided on:

- How certain benefits have been estimated and are expected to arise.

[32] See for example, Mount Alexander Shire Council, p. 1. Swan Hill Rural City Council, p. 2. Hepburn Shire Council, pp 4-5, 7,13. CVGA, pp. 1-3.

[33] See for example GNET, p. 1. Hepburn Shore Council, p. 6. RWE, pp. 1 and 2. Discussed further in Section 2.4.

[34] AiGroup, Energy Consumer Submission, p. 2.

[35] AusNet, p. 9.

- The use of terminal values (and additional information on the payback period).
- Market modelling constraints.
- Cost estimates.
- The interaction with the WRL (as well as other major projects in the NEM).
- The consistency with government policies relating to emissions and renewable generation.

AVP and Transgrid have also held stakeholder engagement sessions to allow stakeholders to understand, as best as possible, the assessment that has been undertaken and for the assessment itself to reflect ideas and suggestions put forward by stakeholders. AVP and Transgrid have updated the assessment in a number of areas in response to points raised in consultation on the PADR – for example:

- Considering five new options that connect VNI West to WRL further west than originally proposed, and taking account of a wider range of factors that may impair social licence.
- Updating the market modelling representation of carbon budgets to better match the 2022 ISP parameters, by progressively tightening the carbon budgets over time to avoid trading emission between the early years and later years of study period.
- Applying 2022 ISP coal retirements outcomes in the same manner across the base case and all VNI West options to improve consistency with the 2022 ISP parameters (updated with the most recent retirement announcements including Loy Yang A retirement in 2035 and Torrens Island B Power Station retirement in 2026).
- Extending the modelling horizon until 2049-50.
- Updating the option costs for the New South Wales portion of investment to reflect the New South Wales Government Strategic Benefits Payment Scheme for landowners announced in October 2022.
- Expanding the scope of the sensitivity analysis and boundary testing conducted, including assessing the impact of changes in transmission costs, and the Victorian Government's announced (but not yet legislated) offshore wind policy.

As part of initial work activities being progressed in parallel with finalising the RIT-T, AVP and Transgrid will commence engagement on route selection, initially focused on identifying opportunities, constraints and community values in context of placing transmission infrastructure. Through this process, stakeholder and community input will be sought to help shape and refine the proposed transmission corridor. Further development and refinement – including engagement – would result in a proposed route being identified, which is then subject to assessment under the relevant state and federal regulatory approvals.

In response to the concerns raised around ensuring that the outcome of this RIT-T remains current as the broader environment changes, AVP and Transgrid note that as part of the CPA process Transgrid will seek 'feedback loop' confirmation from AEMO that the project remains on the ISP optimal development path and delivers positive market benefits in the 'most likely' scenario. The feedback loop will consider the inputs and assumptions in the most recent ISP at the time of each CPA, so will provide confidence to stakeholders that the project will still provide a positive benefit to consumers.

2.4 Consideration of new options

Several submitters expressed concerns that the PADR had not considered a sufficient number of options[36].

As noted above, a number of submissions also suggested alternate options should be considered to alleviate concerns raised about the social impacts of the VNI West (via Kerang) option in the PADR, particularly for the proposed section between Bendigo and Ballarat in Victoria.

These submissions suggested that the proposed corridor on the Victorian side should be moved further west, or along a Bulgana to Kerang corridor[37]. For example, RWE suggested a route further west would involve lower density dwellings, increased wind resources, larger agriculture properties, less native vegetation and ecological constraints, fewer regions of cultural heritage sensitivity, and reduced flood risk. Similarly, Hepburn Shire Council stated that a route alignment along a Bulgana to Kerang corridor would impact fewer properties, communities and valuable natural resources. GNET also suggested that a route alignment further west would provide greater opportunity for renewable generation and a higher degree of social acceptance[38].

AVP and Transgrid note that throughout the process of considering additional interconnection between Victoria and New South Wales, many options have been considered and assessed. The PADR summarised the options that had been considered through the earlier ISP assessments and the reasons why the ISP candidate option had been narrowed down to VNI West (via Kerang) with the RIT-T also considering a non-network option alongside the network development. The options that were considered at earlier stages of this process are also summarised in the Consultation Report on the options released alongside this report (see Appendix A1 of that report).

With the pace of the transition accelerating, AVP and Transgrid do not consider that circumstances have changed in a way which would warrant re-examination of any of these earlier options. In most instances, the alternate options did not perform as well as VNI West (via Kerang) due to being under-sized and/or costing more without delivering any greater benefit. However, building on feedback provided by stakeholders, five new options are now included in the assessment. Specifically, the five new options represent three options that are further west than VNI West (via Kerang) ('Option 1' in the PADR), and avoid the Bendigo to Ballarat area that submitters suggested is problematic, and two additional spur line options investigate upgrading the 220 kV component of WRL to harness additional renewable generation in Western Victoria.

All seven options assessed (that is, the two original options and the five new options):

- Involve a 500 kV double-circuit transmission line.
- Originate at Dinawan, in New South Wales, with connection to EnergyConnect.
- Include new terminal stations near Kerang, in Victoria, with a connection to the existing 220 kV line to Kerang.

The differences in the options relate to the Victorian scope and can be summarised as:

- **Option 1 (to north of Ballarat),** per the PADR – connects from Dinawan, via the new terminal station near Kerang, to WRL at the proposed terminal station north of Ballarat, and routes via Bendigo.
  - **Option 1A (to north of Ballarat with spur uprate to 500 kV)** – is the same as Option 1 but with the additional spur involving uprate of WRL from the proposed terminal station north of Ballarat to Bulgana from

[36] See for example AusNet, pp. 6-7, Moorabool and Central Highlands Power Alliance, p. 13, Hepburn Shire Council, p. 6.
[37] RWE, pp. 1 and 2. Hepburn Shore Council, p. 6. GNET, p.1.
[38] RWI, pp. 1 and 2.

220 kV to 500 kV following the same WRL route for much of the length except for a slight variation around Waubra.

- **Option 2 (to north of Ballarat plus non-network**), per the PADR – is the same as Option 1 but with a virtual transmission line (VTL) involving batteries at South Morang and Sydney West commissioned in 2026-27.
- **Option 3 (to Waubra/Lexton)** – connects from Dinawan, via the new terminal station near Kerang, to WRL at a new terminal station in the Waubra /Lexton area (Djaara Country), and routes via Bendigo. This option requires relocation of the WRL proposed terminal station north of Ballarat to near Waubra/Lexton and uprate of the proposed WRL transmission line from north of Ballarat to Waubra/Lexton from 220 kV to 500 kV.
  - **Option 3A (to Waubra/Lexton with spur uprate to 500kV)** – same as Option 3 but with the additional spur involving uprate of WRL from the proposed terminal station in Waubra/Lexton (Djaara Country) to Bulgana (Wotjobaluk Country) from 220 kV to 500 kV following the same WRL route for much of the length except for a slight variation around Waubra.
- **Option 4 (to Bulgana via Bendigo)** – connects from Dinawan, via the new terminal station near Kerang, to WRL at a new terminal station near Bulgana (Wotjobaluk Country), and routes via Bendigo. This option requires relocation of the WRL proposed terminal station from north of Ballarat to Bulgana (Wotjobaluk Country) and the uprate of the proposed WRL transmission line from north of Ballarat to Bulgana from 220 kV to 500 kV.
- **Option 5 (to Bulgana)** – connects from Dinawan, via the new terminal station near Kerang, directly to WRL at a new terminal station near Bulgana (Wotjobaluk Country). This option requires relocation of the WRL proposed terminal station from north of Ballarat to Bulgana and the uprate of the proposed WRL transmission line from north of Ballarat to Bulgana from 220 kV to 500 kV following the same WRL route for much of the length except for a slight variation around Waubra.

The five new options have been assessed to the same level of detail as the two PADR options, including in terms of their impact on the transmission network, and estimated cost.

2.5 The accuracy of the cost estimates used

Submissions raised concerns regarding the completeness and accuracy of the costs included in the cost benefit analysis, and requested further information on the methodologies adopted.

For example, EUAA raised a number of queries including:[39]

- What AVP and Transgrid mean by ‘Class 4 estimates’, and the basis for symmetrical cost accuracy, with reference to the Association for the Advancement of Cost Engineering (AACE) guidelines.
- Whether the PADR cost estimates utilised cost data from EnergyConnect and HumeLink.
- Whether the potential to achieve efficiencies across ISP projects (as announced in Transgrid’s 2022 Transmission Annual Planning Report [TAPR]) is captured in Transgrid’s cost estimates.

AVP and Transgrid note that the cost estimates used are considered to have an accuracy of +/-30%. This is consistent with AACE guidelines for the expected accuracy of a ‘Class 4 estimate’, which state that the typical variation in the low and high ranges at an 80% confidence interval should be:

[39] EUAA, pp. 8 and 9. Further queries raised by EUAA in relation to cost estimates are responded to in Appendix A4.

- -15% to -30% for the variation in the low range; and
- +20% to +50% for the variation in the high range[40].

The estimate class is determined by the level of maturity of the project definition deliverables, which in the case of VNI West was determined to be Class 4.

EUAA also noted that the AEMO transmission cost database report suggests that AACE Class 3 or 4 estimates should be used for the PADR/PACR stages. AACE Class 3 estimates state that the typical variation in the low and high ranges at an 80% confidence interval for Class 3 should be -10% to -20% for the low range and +10% to +30% for the high.

AVP and Transgrid consider that it is too premature to develop reliable Class 3 estimates at this stage of the investment process (namely due to the difficulty in accounting for or realising reductions in allowances and contingencies since most technical details are still too high level and identified risks still unmitigated), and note that cost estimates are broadly consistent with Class 3 estimates anyway. Specifically, AVP and Transgrid's high estimates align with the Class 3 +30% upper limit, while the low estimates are 10% lower than the Class 3 lower limit of -20%.

As outlined in the Consultation Report on the options released alongside this report, the analysis finds that the central estimates of network capital costs would need to increase by around 72% for Option 3A to have negative net benefits, or 81% for Option 5 to have negative net benefits. AVP and Transgrid consider this unlikely given the cost estimates have been estimated at a +/-30% level of accuracy at this stage. The analysis also finds that there is no upper boundary to capital costs that would change the conclusion that Options 3A and Option 1A are preferred over the third-ranked option (Option 1A) and that network capital costs would need to decrease by at least 21% for Option 1A to be preferred over Option 5 (which AVP and Transgrid consider unlikely given it is close to the -30% lower limit).

In response to the second query, the Transgrid cost estimation database is updated annually in July (at the start of a new financial year) to reflect the most recent market pricing received by Transgrid. EnergyConnect pricing has been incorporated into the latest Transgrid cost estimation database, so the cost estimates utilise cost data from this project. AVP and Transgrid have not yet received pricing from the market for HumeLink, so the cost estimates do not utilise cost data from HumeLink.

Regarding the potential to achieve efficiencies, each major project identified within the ISP and Transgrid's TAPR is developed and estimated on its own merit. Opportunities for synergies, optimisation and cost savings between projects are considered through each subsequent phase (such as development, delivery and commissioning). It is premature to account for or realise reductions in allowances and contingencies at the PACR stage, since most technical details are still too high level and identified risks still unmitigated (hence the use of a Class 4 estimate). The initial development phase of the project, which occurs after the PACR, is usually the earliest opportunity to identify potential synergies in scope or timing that could benefit multiple projects and achieve cost and delivery efficiencies across a portfolio of work. These synergies would then be reflected in the efficient cost estimates submitted at the CPA stage (in particular the Final CPA).

Other submissions also raised concerns about the accuracy of the costs included in the PADR analysis. For example, VFF stated that the final cost of the approved project is likely to be considerably higher than the costs envisaged at this stage of the project[41]. Similarly, Mr Woodley submitted that one could expect further escalations

[40] Appendix A4 contains further details of AACE guidelines.

[41] VFF, p. 2.

in costs, given the project will not start for four years and not be completed for another nine years[42]. Mr Bartlett also raised concerns about there being major uncertainty in transmission line cost estimates.

AVP and Transgrid note that the assessment is undertaken in real terms so only real cost increases would apply to these points. Moreover, as outlined above, AVP and Transgrid have tested the results to alternate assumed network capital costs and find the key findings robust to realistic future real cost increases (as outlined in the Consultation Report on the options released alongside this report).

Further, as part of the contingent project process, Transgrid will seek a 'feedback loop' confirmation from AEMO (in its national planning role) in line with the actionable ISP framework ahead of lodging the Final CPA for investment in VNI West. This process will ensure that the investment is confirmed as being consistent with the optimal development path in the latest ISP, where any costs have increased.

AVP and Transgrid also note that, while Stage 1 of the preferred option is designed to ensure the project can be delivered by its earliest estimated commissioning date (July 2031) consistent with when the project is needed in the most likely ISP scenario, the early works activities involved will also enable the development of a more detailed cost estimate for Stage 2 as part of this process. Indeed, the scope for early works to reduce cost uncertainties, and provide greater consumer confidence that they will not be over- or under-investing in this key project, is explicitly noted in the 2022 ISP.

Both VEPC and VFF raised concerns about 'unpriced' costs of the project, including the loss of amenity, detrimental social and environmental impacts, and the cost to agriculture and tourism[43]. While these costs are not able to be captured directly in the RIT-T assessment, the assessment at this stage, as set out in the Consultation Report on the options released alongside this report, is showing that two of the new options (both of which have been designed to minimise these types of impacts) are jointly more beneficial for consumers than the PADR proposed preferred option (with one outperforming the other when the potential for negative social and environmental impacts is considered). In addition, these factors will be considered further and sought to be mitigated as part of the environmental and stakeholder consultation process that follows the RIT-T for the ultimately preferred option identified in the PACR.

Mr Bartlett also raised concerns that:

- The costs of the two new 500 kV line exits and associated 500 kV substation bays at North Ballarat substation, necessary for VNI West, do not appear to be included in the VNI West scope.
- VNI West Operation and Maintenance costs are too low.
- Incorrect incremental costs to build EnergyConnect at 500 kV instead of 330 kV between Dinawan and Gugga have been used.

AVP notes that the costs for these 500 kV substation bays and line exits are included in the VNI West terminal stations cost category (for all options, not just Option 1). Refer to Appendix A1 of the Consultation Report for further details).

In terms of Operation and Maintenance costs, this is also the value used in the *Inputs, Assumptions and Scenarios Report* (IASR). During consultation on the 2021 IASR, stakeholders also questioned the appropriateness of this value. In response, AEMO reviewed recent revenue determinations, contingent project applications and RIT-Ts, and concluded that 1% was reasonable for ISP purposes as the cost of major projects in

[42] Ted Woodley, p. 1.

[43] VEPC, p. 8. VFF, p. 3.

the ISP are dominated by transmission lines rather than substations. While the modelling applies operating expenditure (opex) costs consistently throughout the modelling horizon, opex costs are realistically expected to start low and grow as assets age. It is also noted that the Australian Energy Regulator (AER) will review and approve network expenditure from one revenue period to the next, so only the efficient and prudent project costs are expected to materialise.

The incremental uprate cost of EnergyConnect from 330 kV to 500 kV is a Class 2 estimate based on firm price variation costs included in the EnergyConnect contract. These were negotiated during the EnergyConnect tender period to ensure best market rates were obtained. This has been clarified in the Consultation Report.

2.6 Interaction with the Western Renewables Link

Several submissions queried whether the modelling underlying the PADR treated the interaction between VNI West and the WRL appropriately when determining both the costs and benefits of VNI West.

One concern expressed in submissions was whether the WRL should be considered as a sunk investment in the counterfactual base case. For example, EGA submitted that due to uncertainty around the WRL, this RIT-T should consider a counterfactual where it does not exist (which would mean the VNI West options would include additional costs, including the costs of a new terminal station north of Ballarat and construction of a new 500 kV double-circuit transmission line from Sydenham to north of Ballarat)[44].

AVP and Transgrid note that the WRL is currently progressing through the planning process, with AusNet Services currently preparing the Environment Effects Statement. In December 2019, AEMO selected AusNet Services to deliver the WRL project following a competitive tender process. AusNet Services will build, own, operate and maintain the new infrastructure[45].

The 2022 ISP considers the WRL as an 'anticipated' project (with a delivery date of July 2026) and includes it in its optimal development path[46]. The project has completed the RIT-T process and has progressed through the contestable appointment of AusNet as the developer of the new infrastructure. The WRL has therefore been assumed in both the base case and all option cases as part of this RIT-T, consistent with the actionable ISP framework and the AER's Cost Benefit Analysis Guidelines (CBA Guidelines)[47].

Several other submissions raised concerns about the potential misallocation of costs across the two projects, or that some costs have not been catered for in either this RIT-T, or the RIT-T for the WRL. For example:[48]

- Moorabool and Central Highlands Power stated that components of the WRL are only being built to facilitate VNI West and that if the status quo were to remain, neither the VNI West RIT-T nor the WRL PACR would correctly recognise the components they refer to.
- VEPC and EGA suggested that VNI West has been defined in a way that excludes a large amount of its costs and these costs are not assessed elsewhere. They contended the cost of the North Ballarat Terminal Station and the North Ballarat to Sydenham 500 kV uprate should be brought into the VNI West RIT-T assessment.

[44] EGS, p. 3.

[45] See https://www.westernrenewableslink.com.au/about/.

[46] AEMO, *2022 Integrated System Plan,* June 2022, p. 66.

[47] AER, *Cost Benefit Analysis Guidelines*, August 2020, pp. 62-63.

[48] Moorabool and Central Highlands Power Alliance, pp. 10 and 11, VEPC, p. 6 and EGA, p. 10.

In light of submissions to the PADR, AVP and Transgrid have undertaken a further sensitivity analysis which addresses the concerns raised that the net market benefits of the two projects combined have not been adequately assessed. Specifically, and as set out in the Consultation Report on the options, AVP and Transgrid constructed an alternative base case for this sensitivity that excludes not only the VNI West investment but also the WRL project; that is, the base case for this sensitivity considers a state of the world where neither VNI West nor WRL go ahead, while the option cases assume that both go ahead.

Queries were also raised in relation to the benefits assumed for VNI West (via Kerang) and whether some of these actually related to the WRL and should be deducted from the VNI West RIT-T[49].

A key principle underlying the RIT-T and the modelling undertaken is to identify the *incremental* benefits (and costs) arising from each option relative to the base case. As outlined above, the WRL is assumed in both the base case and the VNI West cases, so the modelling only calculates the *incremental* benefits (and costs) for VNI West *over and above* those accruing from the WRL. As a result, there is no double-counting of benefits across WRL and VNI West. Nonetheless, the cost benefit assessment of the two projects combined, undertaken as a sensitivity in the Consultation Report, is intended to allay concerns stakeholders may have that benefits have been double counted.

Following AVP and Transgrid's December 2022 Project Update 5[50] announcement that alternate options for connecting VNI West to WRL will be considered as part of the VNI West RIT-T analysis, Mr Bartlett raised concerns that extending the 500 kV part of the WRL project beyond Ballarat to different VNI West/WRL connection points increases the cost of WRL by different amounts which have not been justified through the WRL RIT-T.

The incremental cost impact due to any modification of WRL has been included as a direct cost attributable to the corresponding VNI West option. Specifically, each of these options involve relocating WRL terminal stations and uprating portions of the transmission line to a higher voltage to accommodate the new corridors under each option, and the incremental cost of this has been reflected in the assessment of these options. Any increase in cost associated with moving the VNI West connection location is addressed in the VNI West RIT-T. Refer to the Consultation Report for further detail on how the costs associated with changes in WRL project scope have been captured as part of the overall cost-benefit analysis for VNI West.

Mr Bartlett also contended that extending WRL is not an anticipated project and may not happen, and that any option considered involving a new VNI West/WRL connection point does not meet the identified VNI West project need as it is not technically connecting into the existing or anticipated 500 kV network in Victoria.

The 'identified need' for the VNI West project is to increase transfer capacity between New South Wales and Victoria to realise net market benefits by[51]:

- Efficiently maintaining supply reliability in Victoria following the closure of further coal-fired generation and the decline in ageing generator reliability – including mitigation of the risk that existing plant closes earlier than expected.
- Facilitating efficient development and dispatch of generation in areas with high quality renewable resources in Victoria and southern New South Wales through improved network capacity and access to demand centres.

[49] EGA, p. 4.

[50] See https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/victorian_transmission/vni-west-rit-t/project-update-5.pdf?la=en.

[51] AEMO, 2020 ISP, July 2020, p. 87.

- Enabling more efficient sharing of resources between NEM regions.

There is no reference in this description of the identified need to requiring connection into the existing or anticipated 500 kV network in Victoria. AVP and Transgrid do not agree that an option involving a new VNI West/WRL connection point does not meet the identified need for VNI West.

Several stakeholders also raised views that consideration of alternate options constitutes a material change in circumstances requiring the RIT-T to be reapplied for both VNI West and WRL. Pursuant to the NEVA Order issued on 20 February 2023, clause 5.16 of the NER does not apply to the Victorian component of VNI West or WRL project or AVP's functions under the NEVA Order.

AVP and Transgrid are confident progressing both projects, and doing so consistent with its functions under the NEVA order, will maximise net economic benefit to consumers, and allow stakeholder, community and Traditional Owner feedback to be taken into account earlier in the planning process. The net market benefits delivered from the two projects combined is significant ($1.9 billion for Option 3A/Option 5).

2.7 Interaction with other major projects in the NEM

Some submitters queried the interaction of VNI West with other major projects in the NEM. For example, EUAA submitted several queries relating to the assumptions underlying the RIT-T modelling in relation to other developments in the NEM, including:[52]

- Clarification regarding the timing assumed for EnergyConnect and HumeLink in the assessment, and a request for sensitivity testing on the impact of any delay in these timings.
- The benefits included from the connection of HumeLink to EnergyConnect.
- The impact of the connection of EnergyConnect and VNI West at Dinawan on claimed benefits for VNI West.
- The impact of delaying Snowy 2.0 beyond the assumed commissioning date of December 2026.
- The assumed timing of other major transmission augmentations in the PADR modelling (such as EnergyConnect and HumeLink).

AVP and Transgrid note that EnergyConnect and HumeLink are assumed to be commissioned between three and 12 years before VNI West (via Kerang) across the scenarios investigated. Delays to these projects would likely still result in their commissioning prior to VNI West. The impact of any delays to these two projects is considered to be minimal, because avoided/deferred capital investment is the major source of market benefits and investors would already have reflected the expectation of these investments into their plans based on the currently expected commissioning dates, and would be unlikely to alter their investment decisions in light of any delay (that is, the avoided/deferred investment benefits associated with VNI West would not be materially affected by any delay in either EnergyConnect or HumeLink). Fuel cost savings are forecast to accrue after commissioning of VNI West, so delays to EnergyConnect or HumeLink are not expected to materially affect this source of benefits either. AVP and Transgrid have therefore not included a sensitivity in relation to any such delay.

As noted above in relation to the WRL, the RIT-T modelling includes other major network projects that are included in the 2022 ISP optimal development path in both the counterfactual base case (without VNI West) and the option cases. This means that only the *incremental* costs and benefits of the VNI West options are captured in

[52] EUAA, pp 2, 9 and 16-17.

the modelling and there is no double-counting of the expected benefits between VNI West and other major projects in the NEM. None of the benefits of the other major network projects, relative to a base case where they are not assumed, have been captured as part of this RIT-T.

The assessment now estimates the impact of the connection of EnergyConnect and VNI West at Dinawan on the expected benefits for VNI West (which was not estimated part of the PADR). Specifically, the costs and benefits of this re-routing (and expanded capacity) for EnergyConnect have now explicitly been modelled as part of the assessment.

Mr Bartlett questioned the validity of market benefits calculated from avoiding/deferring other transmission investments. In particular, he noted that, as these are not actionable ISP projects, they should not be assumed to be developed in every state-of-the-world at the timing published in the ISP. In his view, VNI West should not be credited with market benefits for avoiding/deferring any future ISP project such as future REZ investments, given the uncertainty of the need and timing of future transmission projects so far in the future.

In the PADR and modelling for the additional options analysis, locked-in transmission augmentations are made in line with the CBA Guidelines which describe the RIT-T for actionable ISP projects. Committed, anticipated and actionable transmission projects from the ISP 2022 (except VNI West in the base case simulations) are locked in. Some future ISP projects are also locked in relevant scenarios in the base case and VNI West options, namely Queensland – New South Wales Interconnector (QNI) Connect and New England REZ Extension being infrastructure needed to enable the 8 GW of renewable generation capacity in this zone; a minimum objective set under the *NSW Electricity Infrastructure Investment Act 2020*. It was necessary to model these future ISP projects explicitly to ensure an appropriate representation of the Central NSW (NCEN) and Northern NSW (NNS) sub-regions in market modelling. The locked in projects are the same in each scenario's base case and with the VNI West options and there are no benefits associated with avoiding or deferring these. Other future projects including REZ transmission expansions are modelled as transmission options built at least-cost in accordance with the CBA Guidelines on "modelled projects" and are discussed further below.

- WRL is an anticipated project in the 2022 ISP and is included in all states of the world, base case and with VNI West options. There are no market benefits attributed to avoiding or deferring this project. The cost impact of any change in WRL scope attributed to a particular VNI West option is captured in the cost-benefit assessment as already discussed.
- SWNSW augmentation (Darlington Point – Dinawan 330 kV) is not included in any of the modelling as it does not yet meet the criteria of an anticipated project. Transgrid is currently progressing with an alternative non-network battery energy storage system (BESS) solution in preference to the line project to address the identified constraints.
- Other REZ transmission augmentations are not treated as actionable ISP projects. They are derived by market modelling and the size and timing of investments can and does differ between the base cases and with VNI West options according to the least-cost outlook (using REZ-related cost and limit input assumptions from the 2022 ISP). The model effectively co-optimises generation and transmission expansion and will only build REZ transmission augmentations if the quality (and cost) of the resource it would harness justifies the cost of transmission expansion. This is the source of the avoided/deferred transmission benefits calculated. The uncertainty around the need and timing of these REZ investments in the presence or absence of VNI West is why they are determined by market modelling instead of being adopted from ISP outcomes. Alternatively, if no optional REZ transmission investments were made available to the model to build at least cost, there would be

insufficient renewable energy accessible to meet demand while meeting the emissions budget, resulting in a non-credible amount of unserved energy.

Finally, in relation to the impact of any delay in Snowy 2.0, while there is some interaction between the benefits expected from VNI West and Snowy 2.0, any delay of Snowy 2.0 up until 2030-31 (the earliest commissioning date for VNI West under the ISP scenarios) is not expected to impact significantly on the modelled benefits of VNI West.

2.8 Consistency with government policies relating to emissions and renewable generation

Submissions also raised queries about the treatment of government policies relating to renewable generation in the RIT-T, as well as the consistency of the modelled outcomes of VNI West with government policies regarding renewable energy.

2.8.1 Treatment of government policies regarding renewable generation and emissions

Several parties sought clarity on how the RIT-T modelling has incorporated government policies relating to renewable generation and levels of carbon emissions. For example, AusNet sought clarity as to whether the Victorian Government's offshore wind targets, REZ Development Plan and the VTIF are inputs to the RIT-T analysis (and how they are considered to impact the costs and benefits of VNI West)[53]. Several other submissions also queried whether future Gippsland offshore wind generation has been included in the modelling (and what its impact is thought to be)[54].

The EY report accompanying the Consultation Report[55] sets out the assumptions and inputs and how they align with those developed, and consulted on, by AEMO as part of the IASR for the ISP 2022. The inputs include legislated state renewable energy targets – the Victorian Renewable Energy Target (both VRET and VRET2), Queensland Renewable Energy Target (QRET), and Tasmanian Renewable Energy Target (TRET) – as well as the renewable energy set out in the New South Wales Electricity Infrastructure Roadmap.

The Victorian Government's offshore wind target was not included in the core modelling for the PADR, because the offshore wind target is not yet legislated and it does not satisfy any of the criteria required to treat it as a 'committed policy'[56]. However, it has been included as an explicit sensitivity in the Consultation Report in response to stakeholder feedback (see the Consultation Report on the options). All the emissions targets for each state that meet the 'committed policy' criteria according to the public policy clause (NER 5.2.3(b)), as well as the Federal Government emissions policy for 2030, are included in the core modelling, and are met, both in the base case for each scenario and in all VNI West option cases.

The Victorian Government's REZ Development Plan and VTIF are not explicit inputs to the RIT-T analysis (nor the 2022 ISP) and represent different frameworks. For example, the REZ Development Plan focuses on transmission

[53] AusNet, p. 9.

[54] For example, EGA, p 6 and 8.

[55] *VNI West Market Modelling report for additional options*, at https://aemo.com.au/initiatives/major-programs/vni-west/stakeholder-consultation.

[56] Offshore wind generation in the Gippsland and Portland Coast areas of Victoria is available to the model as a generation option to select, but rarely appears in the forecast generation mix as part of the least-cost solution.

network development within Victorian REZs but is currently only at the stage of considering potential projects[57], while the VTIF is a potential new framework for how transmission infrastructure is to be planned and developed but is currently only at the consultation stage[58].

However, AVP and Transgrid note the continuing support of renewables by the Victorian Government (including the REZ Development Plan and VTIF), as well as other governments. The market modelling report accompanying the Consultation Report[59] includes an assessment of forecast market outcomes against announced renewable generation and emissions policies that do not yet meet the 'committed policy' criteria. Many are met in the *Step Change* scenario, having the highest weight, as part of the least-cost outcome even when not imposed as an input assumption. As a result, inclusion in scenario input assumptions would not impact forecast outcomes. However, the Victorian Government's offshore wind policy is not met based on market forces alone, and is therefore modelled explicitly as a sensitivity, assuming that the policy will be legislated at some stage to facilitate development of this renewable generation resource.

2.8.2 Consistency of modelled outcomes with government policies

As part of their queries about consistency with government policies to increase renewable generation and reduce emissions, some submissions were concerned that the PADR modelling forecast more coal generation with VNI West in place than under the base case and a slower transition to renewables, and that some renewable generation is deferred with VNI West compared to the base case.

While the PADR modelling did find that some investment in new wind and solar capacity in Victoria in the 2030s is deferred with VNI West relative to the base case, there was still significant development of renewable capacity forecast in Victoria with VNI West (in excess of the VRET and VRET2 policies). Furthermore, cumulative carbon emissions over the full modelling period were the same in each scenario with each VNI West option and in the base case, with the total budget adopted from the ISP 2022 scenarios. This is true of the updated modelling for the additional options analysis too.

What the PADR modelling had revealed was that, without VNI West, the most cost-efficient way to manage the carbon budget to 2050 was to withdraw more coal in the next decade, rather than be forced to build significant volumes of relatively low quality solar and wind resources with high levels of spill in the last decade. However, while this may be the most efficient outcome in the absence of VNI West if investors and generators had perfect foresight, the reality is that investment and divestment decisions are normally made based on nearer-term considerations, risks and opportunities, and perfect foresight is seldom assumed.

For this reason, AVP and Transgrid anticipate that a forecast delay in coal retirements with VNI West in place (relative to a base case without VNI West ever built) may remain contrary to stakeholder expectations.

To address these concerns raised in submissions, the modelling of the carbon budget has been updated since the PADR and now assumes a discrete carbon budget applies in each decade to limit the transfer of emissions savings between early and late model years. Discrete budgets were crafted from the 2022 ISP outcomes.

[57] The State of Victoria Department of Environment, Land, Water and Planning, *Victorian Renewable Energy Zones Development Plan - Directions Paper*, February 2021, p. 7. See https://www.energy.vic.gov.au/__data/assets/pdf_file/0016/512422/DELWP_REZ-Development-Plan-Directions-Paper_Feb23-updated.pdf.

[58] The State of Victoria Department of Environment, Land, Water and Planning, *Victorian Transmission Investment Framework Preliminary Design Consultation Paper*, July 2022. See https://engage.vic.gov.au/victorian-transmission-investment-framework.

[59] *VNI West Market Modelling report for additional options*, at https://aemo.com.au/initiatives/major-programs/vni-west/stakeholder-consultation.

Some parties queried whether the modelling should include a 'time value' for emissions to reflect a view that emissions avoided earlier are not equivalent to emissions avoided later in terms of their impact on climate change[60]. AVP and Transgrid note that the time value of emissions does not feature in the RIT-T (or ISP), so has not been assessed. Instead, a cumulative carbon budget is modelled as a constraint, as defined in the ISP for each scenario, and the model meets the specified carbon budget in each scenario at least cost, which may be by either building new lower emissions plant or by reducing the operation of higher emissions plant (or both).

The Australian Energy Market Commission (AEMC) recently noted, as part of its draft report for Stage 3 of the Transmission Planning and Investment review, that it will continue to monitor developments with respect to climate legislation and the commitment to include an emissions objective in the National Electricity Objective (NEO) to ensure that emissions abatement continues to be appropriately factored into transmission planning in the future. The AEMC stated that, depending on the form of the emissions objective and how it is applied in practice, it may be appropriate for emissions abatement to be explicitly valued in the ISP/RIT-T, even if there is no legislative mechanism that sets a formal price on emissions[61]. AVP and Transgrid note that any such change in the future is not relevant to this current RIT-T.

2.9 Comments on the wholesale market modelling

This section summarises several points raised in relation to the wholesale market modelling undertaken (that have not been covered elsewhere in this section).

Submitters also raised a range of specific questions regarding observations from the wholesale market modelling. Each of these points has been summarised and responded to in Section 2.11 below.

2.9.1 Benefits that arise ahead of commissioning

Both EUAA and Mr Woodley queried the benefits that accrue before VNI West is commissioned[62]. They further queried whether it would be beneficial to defer VNI West beyond the 2031-32 commissioning date and accrue additional benefits (given VNI West results in benefits as a result of deferred investment in renewable generation and storage)[63].

The wholesale market modelling assumes perfect foresight (consistent with the ISP), which means that parties may make changes to their investment and operating decisions *in anticipation* of VNI West being commissioned, including deferring investment in renewable generation and storage. In the PADR modelling, the observed impacts prior to commissioning represented wholesale market entities (current and prospective generators and storage) changing their investment and operational decisions in anticipation of the new interconnector being commissioned. The main driver of anticipatory benefits was the single cumulative carbon budget with perfect foresight. The change in the modelling of the carbon budget to successive discrete windows (see Section 2.8.2) limits the anticipatory changes to a window of 5-10 years. AVP and Transgrid consider this better aligns with what is observed in reality in the NEM, for example, the observed renewable development in South-West New South Wales and South Australia in anticipation of EnergyConnect being commissioned, as well as the operation of deep storage hydroelectric plant in anticipation of policy changes.

[60] EUAA, p. 16, VEPC, p. 4 and Ted Woodley, p. 7.

[61] AEMC, *Transmission Planning and Investment – Stage 3*, Draft Report, 21 September 2022, p. 63.

[62] EUAA, p. 16 and Ted Woodley, p. 1.

[63] EUAA, p. 16 and Ted Woodley, p. 5.

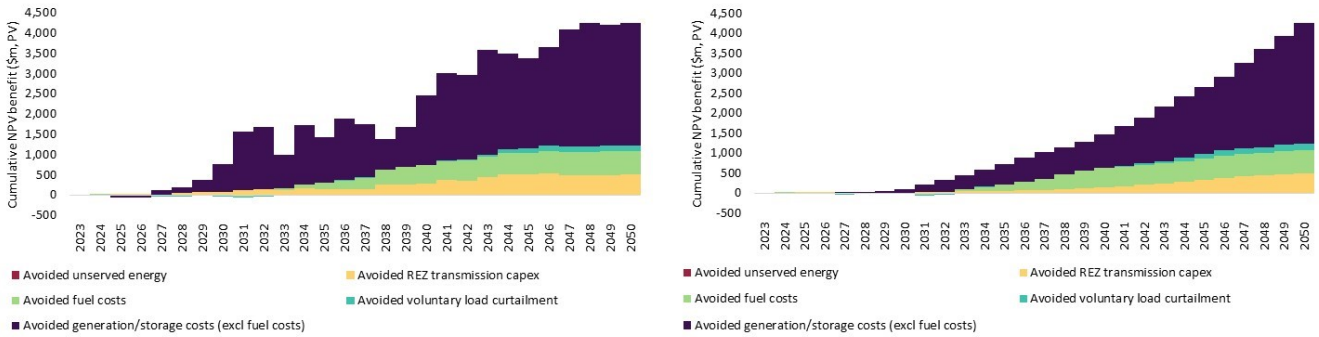
AVP and Transgrid note that there was an apparent misinterpretation of the PADR results in some points raised in submissions. Specifically, all charts in the PADR showing the breakdown of cumulative gross benefits for Option 1 presented the entire capital costs of these plant in the year avoided to highlight the timing of the expected market benefits capacity difference (despite the generator and storage capital costs actually being included in the market modelling on an annualised basis). This was purely a presentational choice to assist with relaying the timing of the expected benefits capacity difference (for example, coincident with when thermal plant retire or transmission augmentations are commissioned) and did not affect the overall estimated net benefit of the options[64]. An impact of this presentational choice, however, was that when considering cumulative benefits over the study period, it made it appear that more of these benefits were accruing earlier in the assessment period than if the results were presented on an annualised basis.

In light of this, AVP and Transgrid have revised the presentation of these types of charts to present these benefits on an annualised basis (which is also how they are presented in the ISP). This also allows a more like-for-like comparison of investments in different asset types with different economic life.

Figure 1 presents the breakdown of cumulative gross benefits for Option 3A under the *Step Change* scenario presented in the Consultation Report on the options using both the approach applied in the PADR (on the left-hand side) and the annualised approach applied now/for the PACR (on the right-hand side). It shows that:

- The pattern of avoided generation/storage costs (excluding fuel costs) differs across the two approaches, with benefits appearing to accumulate more gradually under the annualised approach.
- The choice is purely presentational and that, irrespective of the approach applied, the same cumulative gross benefits are reached by the end of the period (in present value terms).

Figure 1 PADR and PACR approaches to presenting avoided generation/storage costs (excluding fuel costs), Option 3A (*Step Change* scenario)



It is not true that forecast benefits of VNI West in advance of commissioning would continue to accrue, or accrue at the same levels, if VNI West itself was delayed. Moreover, and consistent with the actionable ISP framework requirement for RIT-T proponents to use ISP parameters unless there is a demonstrable reasoning for departing from them, AVP and Transgrid have applied the scenario-specific optimal timing for VNI West as determined in the 2022 ISP.

[64] As noted in footnote 142 of the PADR.

2.9.2 Costs associated with generation and storage

EGA queried whether there may be errors or omissions in the current regulatory cost-benefit analysis, or its application, and suggested that the net benefit of the investment should be calculated as the transmission investment cost, plus all other future generation, storage and transmission costs that will arise as a result of that investment, set against the cost of all the other investments that would occur if the transmission was not built[65].

EGA is correct that the costs of the investments that would need to occur (including generation and storage costs) should be included in the analysis. AVP and Transgrid note that this is already the case in both the PADR and the current options analysis.

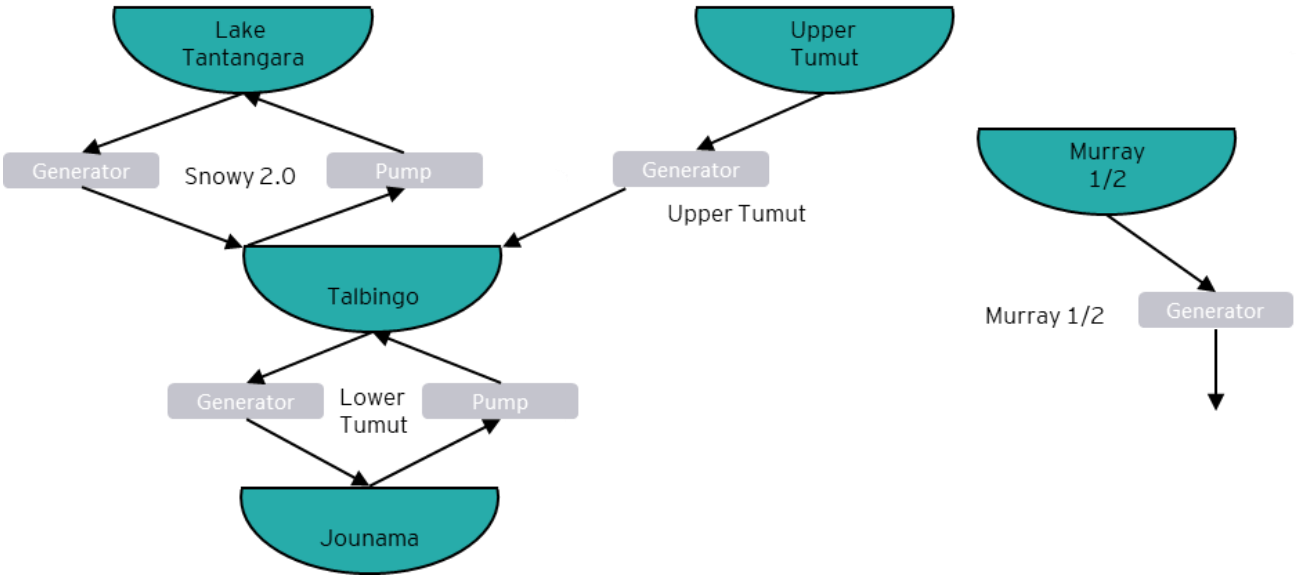
The approach used in the modelling includes all the relevant costs for both the option cases and the base case. Each case has its own cost to supply demand while maintaining constraints such as emissions reduction and renewable energy targets, and subject to assumed costs of operating new and existing capacity and the capital and operating cost of new investments (generation, storage and transmission). The difference between the costs of the base case and an option case (excluding the direct cost of the option itself) is the gross market benefits of that option and, after considering the direct cost of the option, the net benefits are calculated.

2.9.3 Treatment of Snowy 2.0

Some stakeholders expressed concern with the modelled operation of Snowy 2.0 in the PADR and the estimated benefits from VNI West to 'unlock the full potential of Snowy Hydro 2.0'. Ted Woodley, Bruce Mountain and Simon Bartlett all contended that the assumed operation of Snowy 2.0 is substantially overstated in the PADR analysis and hence so is the associated benefit of VNI West.

Figure 2 below shows the modelled Snowy Hydro scheme in the market modelling, which is the same as the 2021 IASR representation.

Figure 2 Snowy Hydro scheme topology



[65] EGA, p. 10.

In this RIT-T modelling, the storage level of Talbingo reservoir factors in and tracks all the following:

- Inflows from Snowy Hydro T1/T2 (Upper Tumut) hydro scheme,
- Inflows from Tantangara reservoir due to Snowy 2.0 generation,
- Inflows from Jounama reservoir due to Tumut 3 pumping,
- Outflows to Tantangara reservoir for Snowy 2.0 pumping, and
- Outflows from Tumut 3 generation to Jounama reservoir.

The methodology used to simulate operation of all water storages in the NEM is the same, and the operation of Snowy 2.0 is an example of how the storages are used to most effectively deliver the least cost solution.

The storage capacity of Snowy 2.0 is approximately equivalent to seven days of continuous operation. The model assumes that the storages for the upper and lower ponds are set at the start of the modelling period to a value between maximum and minimum. Since the market modelling optimisation provides Snowy 2.0 with perfect foresight, it finds the most beneficial time to generate, typically during high fuel cost periods, which tend to coincide with lower intermittent renewable generation levels, and the most beneficial time to pump, typically in low fuel cost periods, which tend to coincide with higher intermittent renewable generation levels. To create a closed loop (no water losses), the methodology then offsets each MWh of generation by an equivalent amount of pumping, taking into account the cyclic efficiency of Snowy 2.0, which is assumed as 76%, based on the IASR. The methodology allocates matching amounts of generation and pumping to Snowy 2.0, until the benefit of another MWh of Snowy 2.0 generation matches the cost of fuel to pump to balance that generation. Any additional cycling operation for which the costs exceed the benefits is prevented. The model also accounts for the upper and lower pond minimum and maximum levels and prevents these being breached, even if the market signal favours more cycling if possible.

Since the model can look ahead in time, equivalent to factoring in weather forecasts up to seven days, the breakeven point for the marginal cost of generating and pumping may rise or fall over time, by day, week or season. In times of relative scarcity in cheap resources, typically when wind, solar or thermal resources are not plentiful, the marginal cost at which Snowy 2.0 generates will increase to conserve water. Conversely, if there is low marginal cost generation available to pump, the marginal cost of generation from Snowy 2.0 will also reduce.

In addition to the Snowy scheme, market modelling captures the network limitations in the Snowy area by modelling a nodal model as well as imposing several cut-set constraints, as detailed in the market modelling report[66].

PADR modelling forecast a marginal increase of Snowy 2.0 capacity factor with VNI West. In the additional options modelling, with the changes in the methodology including treatment of carbon budget, the annual capacity factor of Snowy 2.0 in the base case, Option 3A and Option 5 is more similar than in the PADR.

For example, Figure 3 shows the annual capacity factor of Snowy 2.0 in the *Step Change* scenario undertaken as part of the additional options analysis. In the years after VNI West commissioning (2031) the average capacity factor of Snowy 2.0 in all three states of world is around 20% for generation. In this updated modelling, market benefits of VNI West associated with Snowy 2.0 are related to more efficient utilisation rather than increased utilisation of Snowy 2.0. However, these benefits have not been isolated and quantified separately.

[66] *VNI West Market Modelling report for additional options*, at https://aemo.com.au/initiatives/major-programs/vni-west/stakeholder-consultation.

Figure 3 Snowy 2.0 annual capacity factor in the *Step Change* scenario

2.9.4 Modelling of network limits

EGA questioned the assumed transfer capacity between Victoria and New South Wales and suggested that only the 'net' transfer capacity, stated as the difference in the indicative increases on transfer capacity between the states, should be used in the modelling to ensure benefits are not overstated[67].

Mr Bartlett also questioned the transmission limits in the EY report, expressing concerns that they were too high. For example, he highlighted that Dinawan to Gugga is modelled at 2,700 megawatts (MW)/3,000 MW whereas the increased VNI limits from VNI West are stated in the PADR as being 1,800 MW/1,930 MW. Transgrid identified that 2,700 MW/3,000 MW in the EY report refers to transfer limits between SWNSW and Wagga Wagga area; those transfer limits include the power flow from the double circuit 500 kV Dinawan to Gugga lines, the 330 kV Darlington Point to Wagga Wagga line, and parallel 132 kV lines between Darlington Point and Wagga Wagga after VNI West. Therefore, SNSW to Wagga Wagga transfer limit and VNI limit increases are reasonable.

AVP and Transgrid note that the increases in transfer capability between the states quoted in the PADR and the Consultation Report are only indicative and provided to illustrate the notional differences between maximum flows in each direction with each option. The actual wholesale market modelling is conducted on an hourly basis, and the transfer limits between Victoria and New South Wales and on intra-regional links in Victoria and Southern New South Wales are considered for each hourly interval. In each interval, the VNI West and other link flows can be only in one direction, but limited within the bounds of the available transfer limit, meaning that the annual net flow is different depending on the flow in each hour (and net flow could even be close to zero for some years if electricity is flowing north just as frequently as flowing south).

In the market modelling, Victorian and southern New South Wales networks are represented by several nodes. Major high-voltage substations in Victoria and southern New South Wales are modelled as nodes with the equivalenced lines linking between them. The only exception in Victoria is the "Southern VIC" node which represents the areas of southern Victoria from the Latrobe Valley in the south-east to Portland in the south-west. The lines are derived by equivalencing the network connecting the given nodes in the subregion. Demand

[67] EGA, p. 5

components are split across the nodes based on their half-hourly proportion of the overall NSW load in 2017-18. Furthermore, generators within each subregion are mapped to the nearest node. The model considers the flows and losses for this network using Direct Current Load Flow (DCLF) equations. DCLF is a simplified alternating current (AC) load flow which neglects reactive power flows.

The model also captures the losses for the given lines through piecewise linear functions using the equivalent resistance of those lines. Furthermore, several cut set constraints, representing N-1 thermal and stability constraints are modelled. A detailed description of the network model and limitations is provided in the market modelling report published alongside Consultation Report[68].

The market modelling report also provides the flow duration curves for the major cut set constraints along the VNI flow path, namely VNI and SWNSW to Wagga. Mr Bartlett also mentioned that a recent AEMO report on the expected increase in South Australia's import/export limits post the completion of EnergyConnect indicated that the South Australian interconnector limits in the VNI West PADR may be optimistic and that there may be considerable issues with "loop flows" with the parallel operation of VNI West, EnergyConnect, Heywood and the existing VNI. Mr Bartlett also noted that this could incorrectly increase the benefits of VNI West compared with the benefits actually delivered.

AVP and Transgrid acknowledge that implementation of EnergyConnect introduces the first AC transmission 'loop' across regulated interconnectors in the NEM, where loop flow issues could arise between South Australia, New South Wales and Victoria, as outlined in AEMO's Project EnergyConnect Implementation Paper[69]. AVP and Transgrid do not consider that this is material to the VNI West RIT-T analysis as each of the lines and major substations in SNSW and Victoria have been physically represented in the market modelling model, albeit in a simplified equivalenced form. The market model is also overlaid with a DC powerflow, which ensures that the power flow in the model follows the laws of physics.

Furthermore, losses between nodes are accounted for using equivalent resistances or calculated piece-wise loss equations, and the transfer capabilities between Victoria and New South Wales, and the SWNSW and Wagga Wagga area, have been calculated using detailed AC power system studies that include a variety of contingency events and stability limits under a range of network configurations and operating conditions.

Overall, AVP and Transgrid consider the calculated limits that form an input to the market modelling, and the market model itself, sufficiently account for the impacts of the transmission 'loop' such that the network capabilities are achievable and the VNI West benefits arising from improved efficiencies are appropriately captured.

2.10 Specific issues relating to the NPV modelling

Consultation on the PADR raised specific queries with respect to how the NPV modelling has been undertaken as part of this RIT-T. AVP and Transgrid outline and respond to key issues raised in the subsections below, and note also that all issues (and responses) are included in Section 2.11.

[68] *VNI West Market Modelling report for additional options*, at https://aemo.com.au/initiatives/major-programs/vni-west/stakeholder-consultation.

[69] AEMO, *Project Energy Connect Implementation Paper*, 15 November 2022.

2.10.1 Relevance of the *Hydrogen Superpower* scenario

PIAC was of the view that there is no credibility for an 18% weighting for the *Hydrogen Superpower* scenario in any project where costs are partly socialised among consumers. They stated that the *Hydrogen Superpower* scenario should be excluded unless a different cost recovery mechanism is proposed.

AVP and Transgrid note that under the actionable ISP framework, stakeholder consultation on the ISP scenarios and the weighting that should be applied to them occurs as part of the development of the IASR. The RIT-T assessment is then required to adopt the specific scenarios and weightings for a particular ISP project specified in the ISP[70].

AEMO specified in the 2022 ISP that the scenario weighting to be applied to the *Hydrogen Superpower* scenario in the RIT-T for VNI West should be 18%.

While the 18% weighting (and the corresponding 2022 ISP weights for the other two scenarios) was applied to weight the estimated market benefits and identify the preferred option across scenarios, AVP and Transgrid have also carefully considered the results in each scenario in the Consultation Report on the options to better understand how differences in the future 'states of the world' can impact the benefits of the options assessed.

In addition, as part of the Consultation Report, AVP and Transgrid investigated a sensitivity that removes the *Hydrogen Superpower* scenario from the assessment. This sensitivity shows that it has no bearing on the ranking of the options, and the top ranking options still provide positive net market benefits.

2.10.2 Treatment of benefits expected beyond the end of the assessment period

Several parties questioned the significance of benefits beyond the end of the PADR assessment period (2047-48) and particularly what assumptions had been made regarding fossil fuel cost savings for this period[71]. For example, Mr Woodley commented that by 2050 there should be no fossil fuel generation with or without VNI West, and therefore no fuel costs to avoid.

AVP and Transgrid note that no assumptions have been made with respect to fuel cost savings beyond the end of the assessment period.

AVP and Transgrid note that it is also helpful to consider the materiality of any benefits beyond the end of the assessment period in conjunction with the payback period for the investment. Specifically, and as outlined in the Consultation Report, the analysis finds that the cumulative benefits in present value terms of Option 3A and Option 5 are expected to exceed the full costs (including operating costs) in present value terms (that is, without subtracting the terminal value) before the end of the assessment period in all scenarios as well as on a weighted basis. This reduces the relevance of any benefits beyond the end of the assessment period since the investment has already recovered more benefits than it has costs well before then.

Section 3.5 of the Consultation Report provides a discussion of the materiality of benefits beyond the assessment period, as well as the use of terminal values, in response to points raised by stakeholders.

EUAA queried the stranded asset risk of the investment. AVP and Transgrid do not consider there to be a significant risk of asset stranding for the preferred option in light of the costs being expected to have been fully paid back before the end of the assessment period.

[70] AER, *Regulatory investment test for transmission*, 25 August 2020, p. 7 and 9.

[71] For example, EUAA, p. 11 and Ted Woodley, p. 1.

2.10.3 The commercial discount rate assumed

EUAA queried whether a central commercial discount rate of 5.5% (real, pre-tax) is appropriate given credit market developments since the 2021 IASR.

Under the NER, the RIT-T specifies that the RIT-T proponent must adopt the most recent ISP parameters in undertaking its cost benefit assessment, or identify and provide demonstrable reasons for why an addition, omission or to the ISP parameters is necessary. The AER CBA Guidelines require that 'demonstrable reasons' for departing from ISP parameters be limited to where there has been a material change that AEMO would, but is yet to, reflect in a subsequent IASR, ISP or ISP update.

Since the 2021 IASR, used for this RIT-T, estimates have increased, as a result of strong inflationary pressures with an associated sharp increase in the risk-free rate (government long-term bond yields) and a higher debt premium. This is evidenced in the current Draft 2023 IASR currently out for consultation that has a suggested central rate of 7%[72].

While credit markets have changed recently, the sensitivity testing undertaken on the assumed commercial discount rate as part of the Consultation Report tests both a higher (7.50%) and lower (2.30%) assumed discount rate and finds that Option 5 would continue to yield positive net market benefits even if the discount rate were to reach the upper bound of the rates proposed in the Draft 2023 IASR.

AVP and Transgrid note that it is also helpful to consider the materiality of any benefits beyond the end of the assessment period in conjunction with the payback period for the investment. Specifically, and as outlined in the additional consultation report, the analysis finds that the cumulative benefits in present value terms of Option 3A and Option 5 are expected to exceed the full costs (including operating costs) in present value terms (that is, without subtracting the terminal value) before the end of the assessment period in all scenarios as well as on a weighted basis. This reduces the relevance of any benefits beyond the end of the assessment period since the investment has already recovered more benefits than it has costs well before then.

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[72] AEMO, *Draft 2023 Inputs, Assumptions and Scenarios Report*, December 2022, p. 110.

2.10.5 Length of the assessment period

Some submitters questioned why the NPV analysis ended in 2047-48, noting that this is 16 years after commissioning of VNI West (via Kerang) in the *Step Change* scenario and two years before the end of ISP modelling[73].

The 25-year modelling period adopted in the PADR is in line with other RIT-T assessments and provides a reasonable period over which to assess the costs and benefits associated with the options, noting that both costs and benefits accrue ahead of the commissioning of VNI West.

In light of submitter comments, AVP and Transgrid have extended the market modelling period by two years (to 2049-50) based on the inputs available from the 2022 ISP. Extending the modelling period beyond 2049-50 would substantially increase the complexity of the modelling and run-time, require development of new input assumptions beyond what is available in the latest IASR, and is not expected to affect the relativities of the options assessed. Further, the payback period analysis (outlined above) shows that benefits are expected to exceed the full investment cost (without deducting terminal value) during the assessment period.

[73] For example, EUAA, p. 16 and Ted Woodley, p. 8.

2.11 Detailed summary of consultation on the PADR

This section provides a summary of all non-confidential points raised by stakeholders during the PADR consultation process. The points raised are grouped by topic together with a response. Key themes arising from submissions, and how they have been (or will be) addressed, are discussed earlier in Section 2. All section references are to this report, unless otherwise stated.

Table 2 Summary of points raised in consultation on the PADR

Summary of comment(s)	Submitter(s)	Response
Support for VNI West (via Kerang) and the potential to accelerate delivery and expand capacity		
General support		
The preferred option in the PADR is best placed to unlock investment in cheap, clean energy and reduce reliance on fossil fuel technologies while addressing precarious reliability and security concerns. Transmission capacity between Victoria and New South Wales is currently inadequate with flows between states increasing affected by transmission constraints and resulting in an energy price differential between the states.	Snowy Hydro, p 1 and 4.	This support for the VNI West (via Kerang) option and greater interconnection generally is noted.
VNI West (via Kerang) is a strategic and critical infrastructure investment needed to reduce congestion, improve interconnection and facilitate energy transfers between Victoria and New South Wales. The project will allow timely investment in generation in renewable resources enabling further benefits to the economy and local communities. The project will relieve current and future capacity constraints on the 220 kV network in Victoria.	Pacific Hydro, p 1.	
The existing infrastructure does not have capacity to accommodate existing or new solar generation.	Swan Hill Rural City Council, p 1.	
Supports the project in principle, which will strengthen the national electricity grid, unlock opportunity for renewable energy generation in the region, facilitate the region's transition to clean energy and provide opportunities for local jobs and investment.	City of Greater Bendigo, p 2.	
VNI West (via Kerang) is a useful transmission investment that will facilitate interregional transfer between New South Wales and Victoria and serve as the backbone of one or more REZs in a region with quality solar and wind resources. The single program proposal will also result in cost savings related to environmental	ENGIE, p 1, 2 and 3.	

Summary of comment(s)	Submitter(s)	Response
resources and materials costs. The modelled benefits are relatively conservative given the large volume of prospective renewable development in the region that will rely on the investment to get to market.		
Support for increasing the capacity of the interconnector		
The infrastructure should be designed to have scope for further expansion given there could be demand for greater capacity in the future. Further expansion could create a compelling alternative to more expensive renewable supply options such as Marinus Link/Battery of the Nation and offshore wind development. The optionality provided by the preferred option should be recognised as a qualitative benefit in the RIT-T.	ENGIE, p 2.	The 2022 ISP has identified an optimal development path that not only includes VNI West (via Kerang) but also other key projects such as Marinus Link, HumeLink and EnergyConnect. The ISP analysis takes into account alternative renewable supply options. Given the rate of the energy transition, AVP and Transgrid acknowledge the ISP analysis demonstrates that all actionable projects add much needed access to energy resource and location diversity. Notwithstanding the capacity currently considered for the interconnection options, it is important that investment now provides the flexibility to enhance that capacity as warranted by future NEM developments. The design of new terminal stations in the options assessed includes appropriate provision for future expansion in the longer term, consistent with the standard AEMO design criteria and approach (as well as the 2022 ISP scope). However, to manage the immediate cost to consumers, this provision for future expansion is generally limited to terminal station site procurement rather than being expanded to procurement of future easements and so involves only minor costs. VNI West is an approximately $3 billion augmentation that will increase generation hosting capacity in the Murray River REZ by 1,600MW in all the options proposed in the Consultation Report except for Option 5 which provides an increase of 850MW for this REZ. When combined with EnergyConnect, which will include a double circuit 220kV line connecting NSW to Victoria at Red Cliffs Terminal Station, the hosting capacity in north-west Victoria will be significantly uplifted. While there are existing 220 kV lines in the region that will retain lower capacity to facilitate generator connections, augmenting these additional spur lines in north-west Victoria was considered and discounted in various ISP options on the basis that they do not currently maximise net economic benefits compared to the proposed preferred option. While inclusion of these additional spur lines are not currently considered economic, future and lower-cost investments to harness more renewable generation over the next 10 years are assessed as part of the normal electricity supply planning practices and presented in AVP's and Transgrid's annual planning reports.
VNI West (via Kerang) is only a minimum augmentation option and additional capacity is likely to be required to accommodate and maximise the potential of the Swan Hill region and wider Murray River REZ.	Swan Hill Rural City Council, p 3.	
Support for an accelerated delivery		
The PACR should consider earlier project delivery timeframes. VNI West (via Kerang) should be completed in 2028-30 via underwriting from the Federal Government. Delays in the project could lead to higher average wholesale prices due to reduced access to supply from New South Wales during evening peak periods.	Snowy Hydro, p 2 and 6.	While AVP and Transgrid have aligned the option timings with the 2022 ISP, consistent with the actionable ISP framework, AVP and Transgrid acknowledge that there is a strong commitment from Commonwealth, New South Wales and Victorian Governments to accelerate VNI West delivery. To date, this has been demonstrated by supporting AVP (through a NEVA Order) and Transgrid (through underwriting) to commence early works in parallel with completing the RIT-T. For AVP, the NEVA Order also gives the function of assessing alternate

Summary of comment(s)	Submitter(s)	Response
A completion date in 2028 would accelerate realisation of market benefits and would enable earlier connection of new renewables to the NEM.	ENGIE, p 2.	project options, including associated changes to WRL, which could facilitate and expedite delivery of both projects. The NEVA Order also removes certain obligations under the NER including the obligation to assess whether material changes mean that the preferred project option is no longer the preferred option. See Section 2.1.
The project should be brought forward to enable development of new solar generation projects.	Pacific Hydro, p 2.	
There is a need to open up capacity before the expected project completion date of 2031.	CVGA, p 4.	
The importance of considering social licence issues		
Visual amenity concerns, biodiversity and land-use		
There is early evidence emerging that there is vocal community and media opposition to the project.	AusNet, p. 5.	AVP and Transgrid have worked extensively with communities and other stakeholders over the course of this RIT-T to understand their concerns and incorporate relevant feedback within the scope of the RIT-T process. This has included assessing five new options following the PADR, four of which run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders. In collaboration with AECOM, AVP has also developed an MCA methodology in an attempt to take important social, environmental and land-use considerations into account as early in the planning process as possible. It is hoped that this will help avoid selecting project options that may ultimately face significant cost or schedule impacts due to difficulty securing land, easements and environmental approvals. Following PACR publication, the general approach to engagement activity will focus on a methodology that narrows a broad project study area into a proposed route. Engagement activity will be set out in detail in the PACR, with AVP and Transgrid committed to advising how stakeholder, community and landholder feedback will inform the route selection and refinement process. In addition, it is important to note that at this early stage of the investment process, the specific route, design and location of any new infrastructure required to deliver VNI West has not been determined. To identify a specific route, a detailed route selection study must be completed that considers all technical, environmental, social and cultural constraints including community and stakeholder feedback. This study and future detailed field surveys are part of the approvals processes following the RIT-T and will allow not only for the identification of potential impacts but the identification of the ability to avoid, minimise or offset those impacts. At this stage, the primary aim is to identify a general corridor that warrants further development for the VNI West project. This corridor recognises and takes account, at a high level, of the community, social and environmental impacts, which will be investigated in greater detail as the project corridor is refined and a transmission route alignment is ultimately developed following this RIT-T. AVP and Transgrid note that the need to secure land/easements and undertake the required environmental approval processes does require a significant amount of time. However, the need for these tasks is largely independent of where the final corridor is located and AVP and
Potential adverse impacts to project timelines and costs, and the success of the overall project, may result from difficulty to secure land, easements and environmental approvals.		
Electricity infrastructure will be constructed on some of the highest value agricultural land in Australia and in close proximity to areas with high visual landscape significance. VNI West (via Kerang) will pass over "Class 1" land, the highest level of productive land in the Agricultural Land Capability Assessment produced by Agricultural Victoria.	Hepburn Shire Council, p 2 and 12.	

Summary of comment(s)	Submitter(s)	Response
		Transgrid note that the time required to ensure these tasks are completed satisfactorily has been included in the estimated option timeframes (that is, operational by July 2031 under the *Step Change* scenario). AVP and Transgrid note that the cost estimates used differ from those presented in the 2022 ISP by approximately $300 million for the Victorian component due to contingency cost additions made in anticipation of some level of route diversion, tower redesign, or screening beyond that considered in the 2022 ISP cost estimate.
Due to high land costs, land use constraints, and community opposition, new renewable generation is unlikely to choose to connect along the Ballarat to Bendigo alignment. Longer connection assets may also be needed for those to choose to connect.	AusNet, p.5.	AVP and Transgrid have developed and assessed five new options, four of which run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders.
Concern that a biodiversity offset strategy cannot have been developed if no route has been determined or an Environmental Effects Statement (EES) prepared.	Hepburn Shire Council, p 6.	The PADR refers to a 'biodiversity strategy' in the context that it may form part of the 'early works' undertaken (which have not yet been completed but are now underway and scheduled for completion in 2025-26). AVP and Transgrid have included biodiversity offset costs in the cost estimates used that are based on a desktop estimation of such costs based on our experience with these types of projects. Specific biodiversity offset requirements will form part of the detailed route determination process and the environmental assessment processes that follow the PACR since they are location-specific and cannot yet be determined.
Concerns around red-gum population on residential property given a widening of existing easement.	Norman Walker, p 1.	The specific route is not yet determined and location specific considerations (such as the impact on red-gum populations) will form part of the detailed route determination and environmental assessment processes that follow the PACR.
Mount Alexander Shire Council stated that infrastructure must be designed and built to minimise negative local amenity and environmental impacts. Local environment, cultural heritage, amenity and community wellbeing must be treated as higher order objectives than the financial and construction constraints.	Mount Alexander Shire Council, p 1.	The specific route is not yet determined and location specific considerations will form part of the detailed route determination and environmental assessment processes that follow the PACR. The MCA that has been developed as part of the new options assessment acknowledges the importance of taking these factors into account as early as possible.
Planes or helicopters used for the control of weeds, fertilising or mustering would not be able to operate in the vicinity of transmission infrastructure. It is also likely that drones would not be able to operate.	VFF, p 4.	AVP and Transgrid note the concerns raised. Impacts to the land use of properties that the transmission infrastructure is to traverse will be assessed and considered within the easement compensation to be paid the owners of these properties.
VNI West will traverse highly productive farmland that support thousands of regional jobs. Digital agriculture is considered essential to the future growth and sustainability of the farming industry however this technology will be impeded by transmission infrastructure that interferes with GPS enabled tractors and drones. Victorian Planning Policy seeks to protect agricultural land from unplanned losses.	VFF, p 3, 5, and 6.	In addition, the detailed route selection study following the PACR will consider all technical, environmental, social and cultural constraints including community and stakeholder feedback. It will also consider how these impacts are able to be mitigated. Following the selection of a preferred route for the line, AVP and Transgrid will work closely with landowners to refine tower locations and further minimise any impact to land use. The economic impacts that accrue to parties other than those who produce, consume and transport electricity in the market are treated as externalities and excluded from the

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The RIT-T focuses on energy access rather than ensuring fair compensation and land access arrangements (rehabilitations) so that no landowner is worse off. Landowners should be compensated for the annual impact on farm operations, and landowners should be able to receive reasonable costs towards legal and technical advice for transmission infrastructure on their land.		determination of net economic benefits under the RIT-T. However, the MCA methodology adopted for the new options assessment attempts to take important social, environmental and land-use considerations into account as early in the planning process as possible. Impacts to the land use of properties that the transmission infrastructure is to traverse will be considered within the easement compensation payable to the owners of these properties, subject to the respective land acquisition and compensation legislation and any other applicable government payment schemes in place at that location. For example, the NSW Government Strategic Benefit Scheme will benefit private landowners in NSW, who will receive $200,000 per km of new transmission infrastructure hosted on their land, paid out in annual instalments over 20 years, indexed to CPI.
Unpriced detriments including the sterilisation of large tracts of land, the loss of amenity and detrimental social and environmental impacts by communities affected by VNI West should be explicitly included in the evaluation.	VEPC, p 8.	
Neither the RIT-T or the ESS consider the cost to agriculture and tourism values, which are considered key elements of the regional economies along the route.	VFF, p 3.	
CVGA submitted that councils should be actively engaged as valued partners throughout the project particularly with respect to community consultation, route selection, engineering design, land use planning, biodiversity offset strategies and environmental approvals. Meaningful engagement with communities is critical for the timely and effective delivery of the project to build social licence and maximise positive social, environmental and economic outcomes throughout the project. Transgrid and AEMO should incorporate principles from the Victorian Transmission Investment Framework in strengthening the consultation process through the use of strategic land use assessment tools and multi-criteria analysis. Hepburn Shire Council also conveyed a similar position and stressed the importance of strategic planning to ensure the appropriate placement of key infrastructure to ensure potential conflicts in land use can be avoided.	CVGA, p 1,2 3. Hepburn Shire Council, p 13.	AVP and Transgrid welcome involvement from councils in the RIT-T process and agree that meaningful and transparent engagement with communities is critical for the timely and effective delivery of any project to build social licence and maximise positive social, environmental and economic outcomes throughout the project. In response to the PADR, AVP and Transgrid note that three councils made formal submissions (Swan Hill Rural City Council, Hepburn Shire Council and Mount Alexander Shire Council). AVP and Transgrid have actively engaged with councils in Victoria and New South Wales respectively, welcoming their participation in stakeholder roundtables and in update briefings that kept councils informed on the RIT-T process and sought high-level feedback on the project and ongoing engagement opportunities. Going forward, councils will continue to be actively engaged by AVP and Transgrid as valued partners which provide a voice of local knowledge and advisory to project planning and delivery (including inputs into route selection, environmental assessments and construction activity). The nature of the engagement activity may change, but the intent to actively engage will continue. Through the proposed VTIF recently consulted on[74], VicGrid is aiming to deliver social and economic benefits in ways that are fair, meaningful and participatory. This includes 'opportunities for earlier and deeper engagement with local communities to help better manage impacts and to make the most of regional development opportunities for host communities'[75]. Although VNI West will not be delivered under the VTIF, AVP and Transgrid anticipate that the principles detailed within the framework will be incorporated into the various phases of the project where possible.

[74] Currently at Preliminary Design Consultation Paper stage undergoing consultation, access at https://engage.vic.gov.au/victorian-transmission-investment-framework.

[75] See https://engage.vic.gov.au/victorian-transmission-investment-framework.

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Impact on culture, heritage and tourism		
The PADR has not genuinely considered the economic impact of VNI West (via Kerang) on cultural landscapes, tourism and heritage such as the impact of the project on the ongoing Victorian Goldfields' UNESCO World Heritage bid. Regional tourism would be adversely impacted by the erection of transmission towers due to the loss of 'diverse natural landscapes' and gold era heritage. The impact of a successful UNESCO bid is up to $25 million per year for the Victorian Goldfields region.	Hepburn Shire Council, p 3, 15 and 16.	AVP and Transgrid note the concerns raised. The economic impacts that accrue to parties other than those who produce, consume and transport electricity in the market are treated as externalities and excluded from the determination of net economic benefits under the RIT-T. The MCA methodology adopted for the new options assessment takes into consideration significant landscape overlays as well as Aboriginal and non-Aboriginal cultural heritage. AVP and Transgrid also note that the detailed route selection study following the PACR will consider all technical, environmental, social and cultural constraints including community and stakeholder feedback. It will also consider how these impacts are able to be mitigated.
Machinery used to construct transmission infrastructure has been known to spread invasive species between farms and is a significant risk that must be minimised.	VFF, p 3.	AVP and Transgrid note these potential environmental concerns which will be considered further and risks mitigated as part of the detailed delivery of the project.
There is a need to engage early with regional communities with a stronger focus on traditional owner engagement throughout all stages of the process. Advocates for communicating the changes to the project that communities can reasonably expect to influence or inform.	Hepburn Shire Council, p 4 and 7.	Transgrid and AVP recognise the importance of early engagement with regional communities, Traditional Owners and landholders to understand potential social impacts associated with building this linear infrastructure. AVP and Transgrid have sought to engage with a range of key stakeholders on the PADR to ensure the rationale for, and benefits of, the project are clearly understood, and to facilitate early community and Traditional Owner input on potential social and cultural considerations of the preferred proposed option at this stage. Going forward, we will continue to develop an extensive engagement program as we progress into the more detailed route selection process. Working closely with our stakeholders, including Traditional Owners, and directly impacted communities and landowners is important for us to better understand what is important to them, ensure they are well informed and that they have input in the decision-making process where appropriate.
There is a need for adequate timeframes and resourcing to enable meaningful local government and community engagement in the next phase of VNI West.	Swan Hill Rural City Council, p 2.	The estimated delivery timeframes for each option assessed involve an estimate of the time required to adequately undertake meaningful local government and community engagement. As the project progresses from network option to more detailed route selection an extensive engagement program will be implemented. We understand working closely with our stakeholders, including Traditional Owners and directly impacted communities and landowners is important for us to better understand what is important to them, ensure they are well informed and that they have input in the decision-making process where appropriate.
Transgrid/AEMO must be clear on what principles and decisions can be influenced by council and community.	Mount Alexander Shire Council, p 1.	AVP and Transgrid consider local council and community can provide indispensable 'on the ground' views regarding the expected impact of any investment. All points raised by stakeholders have been considered and responded to as part of the PACR, and will continue to be as part of the investment process that follows the PACR.
EGA attached a paper to its submission that contains observations and a recommendation relating to community participation and	EGA, p 13.	AVP and Transgrid thank EGA for providing this paper. Social and environmental concerns and the importance of involving communities were key considerations raised by stakeholders on the PADR and these have been taken into account as part of the new options analysis, to

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social licence that are important to consider for all future transmission projects.		the extent possible at this stage of the process. Work continues in parallel to this process to understand how best to address any concerns and create opportunities for regional communities to benefit from VNI West. AVP and Transgrid note also that these issues will be consulted on further as part of the detailed route study to follow the PACR.
EGA recommend that proponents visit and engage with potentially impacted communities in a town hall style forum to help landholders and communities better understand the need for, benefits of, and likely impacts of VNI West, including the steps that will be taken to avoid any impacts in project development.	EGA, p 13.	Engagement on the Consultation Report will include community drop in sessions, briefings and online webinars to provide stakeholders with a detailed understanding of the project assessment process and how to make a submission. All feedback will be carefully considered in the preparation of the PACR and all non-confidential written submissions will be published online, along with a summary of how feedback has been taken into account.
Benefit sharing with impacted communities		
The Loddon Mallee Renewable Energy Roadmap developed by Central Victorian Greenhouse Alliance demonstrates the strong social licence for renewable energy development in north-west Victoria, with strong levels of community support for large-scale solar farms.	Swan Hill Rural City Council, p 2.	AVP and Transgrid note this finding and consider is consistent with the two top-ranked options identified in the Consultation Report covering the options.
Swan Hill Rural City Council highlighted the importance of benefit sharing for regional communities in ensuring that investment in new transmission infrastructure supports generation in in those regions. The City of Greater Bendigo expressed similar sentiments. The Council is keen to ensure the Greater Bendigo community benefits from the new infrastructure and the renewable energy projects that follow in tangible ways.	Swan Hill Rural City Council, p 2. City of Greater Bendigo, p 2.	The current RIT-T process is relatively limited in its ability to explore benefit sharing options. AVP and Transgrid are supportive of the current efforts being undertaken by a number of bodies to find new ways to better share the benefits of projects such as VNI West with the communities that they impact. AVP and Transgrid recognise that there are opportunities for co-existence that enable better outcomes for local communities by understanding their needs and working collaboratively with them to minimise impacts and seek mutual value opportunities. Through the proposed VTIF recently consulted on, VicGrid is aiming to deliver social and economic benefits in ways that are fair, meaningful and participatory. This includes 'opportunities for earlier and deeper engagement with local communities to help better manage impacts and to make the most of regional development opportunities for host communities'[76]. Although VNI West will not be delivered under the VTIF, AVP and Transgrid anticipate that the principles detailed within the framework will be incorporated into the various phases of the project where possible. AVP and Transgrid also support the Energy Charter's work to develop the 'Social Licence guidelines for landholder and community co-existence with energy transition infrastructure'. The aim is to develop 'practical guidelines for co-existence between transmission infrastructure and agriculture to mitigate negative impacts and prioritise shared value through the energy transition'.
Benefit sharing models that deliver ongoing economic, social and environmental outcomes for regional communities will boost social licence. This may include training for future employment in the renewable energy sector, grant programs, or other investment in local energy project that reduce power bills, improve reliability, address local energy needs and enhance community resilience. Also, it's important to ensure that local distribution networks are upgraded in parallel with new transmission infrastructure.	CVGA, p 4, 5.	
The local environment, cultural heritage, amenity and community wellbeing must be treated as higher order objectives than the financial and construction constraints. Benefits should not come at the expense of the local community and environment.	Mount Alexander Shire Council, p 2.	AVP and Transgrid note this view, but are required to apply the RIT-T as it currently stands (which does not allow for unquantified externalities relating to environment, cultural heritage, amenity and community wellbeing to be captured in the cost benefit assessment).

[76] https://engage.vic.gov.au/victorian-transmission-investment-framework

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		The MCA methodology adopted for the new options assessment attempts to take important social, environmental and land-use considerations into account as early in the planning process as possible. However, the detailed route selection study following the PACR will consider these constraints in more detail, including community and stakeholder feedback. It will also consider how these impacts are able to be mitigated.
Working with DNSPs		
AVP should work with Powercor to ensure local distribution networks are suitably upgraded before or concurrent with the transmission upgrades to enable local communities to benefit from the high voltage powerlines. Ensuring sufficient connections are available for new generation across the alignment is also important to enable smaller-scale renewable energy and community energy projects to connect into transmission networks.	City of Greater Bendigo, p 2. CVGA, p 5.	This RIT-T does not assume any downstream upgrades to distribution networks and any net benefits from relieving distribution constraints would be in addition to those estimated for VNI West as part of this RIT-T. Additionally, AVP will continue to monitor electricity demand and generation growth in the Bendigo area as part of normal electricity supply planning practices. AVP will also continue to liaise with the local council and local distribution network service providers, through normal joint planning activities, to understand local developments which need to be considered for electricity supply arrangements to the area. Any new transmission infrastructure would have the same access provisions for new generation as the current transmission network.
Local communities should be able to access the new transmission infrastructure through the completion of local distribution works. Existing and new renewable generation along VNI West should be able to connect to transmission infrastructure outside of the REZs.	Mount Alexander Shire Council, p 2.	
Bush fire and weather risk		
VNI West (via Kerang) would pass through one of the highest bushfire risk municipalities in the state. The risk posed by convective downbursts and other extreme weather events must be fully assessed. Hepburn Shire Council called for evidence in relation to the failure rate of transmission towers due to convective downbursts, tornados, and other extreme weather events. Hepburn Shire Council noted Pacific Gas and Electric's intention to underground power lines in high fire risk areas to reduce risk and reduce the need for public safety power shutoffs.	Hepburn Shire Council, p 10, 11 and 12.	Bushfire risk is one of the measures that has been included in the MCA applied to rank the alternate options assessed in the Consultation Report. Options that avoid intersecting areas within the bushfire overlay are rated more favourably on the Engineering objective than others. A detailed route for the VNI West line is yet to be identified. The route selection process will take into consideration technical, environmental, social and cultural constraints including bush fire risk. Following the selection of a preferred option in the PACR expected to be published Q2 2023, assessment of bush fire risk would be undertaken. Where areas of higher bushfire risk cannot be avoided, mitigation measures would be implemented to ensure any potential impacts are reduced as far as reasonably practical. The PACR will outline how undergrounding of transmission lines has been considered over the course of the RIT-T. Regardless of the final selected route, the transmission line will be designed to all appropriate standards with regards to potential wind and storm actions, which will take into account the line security level and required design life that are then used to select the appropriate wind return periods/design wind speeds for the line's specific location. AVP and Transgrid also note that in Victoria, the Australian Energy Infrastructure Commissioner (AEIC) has been working with the CFA and EnergySafe Victoria to develop a universal fact sheet on bushfires and transmission[77] that is due to be published soon.
Hepburn, Mt Alexander and Greater Bendigo are some of the most vulnerable localities for bushfires in Victoria. This risk is likely to only increase due to climate change. In the instance where fires do arise, the presence of transmission lines is likely to hinder firefighting response as appliances are unable to access under transmission lines and permission must be sought to operate helitankers from transmission line owners. These factors increase the likelihood that a small fire may develop into a significant bushfire event.	VFF, p 4.	

[77] See https://www.aeic.gov.au/sites/default/files/documents/2023-02/presentation-energy-minister-meeting-28-october-2022.pdf.

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Hepburn and Mt Alexander Shires have historically experienced large wind and thunderstorms that will increase the risk of damage to overhead transmission lines.	VFF, p 4.	The options assessed and presented in the Consultation Report cover a wide area of interest such that each option has unique terrain and topology conditions that have been factored into the MCA ranking.
The need for transparency and meaningful consultation with stakeholders		
Stakeholders consider transparency in the RIT-T process and analysis to be critical		
AiGroup noted that the environment in which this process runs will continue to change rapidly, with announcement of relevant policy positions and market developments. This will complicate efforts to complete an accurate assessment. Maximum transparency about the analytical process of the cost benefit assessment is essential in gaining consumer confidence that the RIT-T cost-benefit assessment is undertaken in good faith. The City of Greater Bendigo encouraged proponents to ensure community engagement throughout the process is thorough, transparent, inclusive and honest.	AiGroup, Energy Consumer Submission Forum, p 2. City of Greater Bendigo, p 3.	AVP and Transgrid are committed to working with stakeholders with honesty and integrity in a meaningful, responsive and equitable way, through transparent and inclusive practices, and to seek to minimise the social, environmental and cultural impacts of our projects and operations. Both organisations will do this by engaging regularly with our stakeholders to understand what matters most, and to build trust and positive relationships. AVP and Transgrid have provided extensive detail relating to both the results of the cost benefit assessment undertaken over the course of this RIT-T, as well as the inputs and methodological approaches. AVP and Transgrid have also held several engagement sessions to allow stakeholders to understand and ask questions about the assessment that has been undertaken, and have reflected ideas and suggestions put forward by stakeholders in the assessment itself. Going forward, we will continue to develop an extensive engagement program as we progress into the more detailed route selection process. Working closely with stakeholders throughout all project stages, including Traditional Owners and directly impacted communities and landowners is important for us to better understand what is important to them, ensure they are well informed and that they have input in the decision-making process, where appropriate. In response to the concerns raised around ensuring that the outcome of this RIT-T remains current as the broader environment changes, Transgrid and AVP note that as part of the contingent project application (CPA) process Transgrid will seek 'feedback loop' confirmation from AEMO (in its role as national transmission planner) that the project remains on the ISP optimal development path and delivers positive market benefits in the 'most likely' scenario. The feedback loop will take into account the input and assumptions in the most recent ISP at the time of each CPA as well as the latest estimate of project costs, and so will provide confidence to stakeholders that the project will still provide a positive benefit to consumers in light of any further market developments. See Section 2.3.
Provide greater transparency around the benefits, costs and risks to communities hosting energy infrastructure. The PACR should give detailed consideration to social, cultural and environmental factors through a multicriteria analysis and strategic land use assessment, and outline how local communities are likely to benefit from the development of major transmission infrastructure (for example, economic output, jobs, benefit sharing activities).	AusNet, p 9.	A detailed multi-criteria analysis process has been undertaken to assist with differentiating between the options (as is set out in the Consultation Report on the options).

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Consumer confidence in big transmission projects has been undermined by issues arising from earlier projects like EnergyConnect and HumeLink (for example, underestimation of network costs, unrealistic final assessment of benefits and overambitious project timeframes), where the main beneficiaries were not the consumers who are burdened with the costs. VNI West must address these issues by dealing more appropriately with uncertainty, having credible and transparent benefits assessments and realistic timing, including any social licence related delays.	AiGroup, Energy Consumer Submission Forum, p 2.	While network costs are difficult to accurately estimate at this early stage of the investment process, AVP and Transgrid consider the cost estimates to be at an accuracy of ±30% (which AVP and Transgrid consider to be 'Class 4' estimates), and shortly prior to the PADR publication included an additional $300 million made in anticipation of some level of route diversion, tower redesign, or screening beyond that considered in the 2022 ISP cost estimate. This level of accuracy is consistent with current industry practice for this stage of the investment process. The cost estimates used are at a higher level of accuracy than estimates developed using the AEMO Transmission Cost Database's cost estimating tool, since they reflect additional detailed costing undertaken by AVP and Transgrid in the context of this project. Section 2.5 above, and the Consultation Report, provide additional detail on the accuracy of the cost estimates. In relation to timeframes, Transgrid and AVP have used actual timeframes for recent projects, adjusted for any key differences between them in terms of expected timelines. The estimates used currently have approximately 18 months contingency/float that is supported by Hollmann model simulation[78]. Additionally, pursuant to its functions under the NEVA Order, AVP has undertaken a multi-criteria analysis which includes the assessment of alternative options to facilitate and expedite the development and delivery of VNI West, while also working to minimise the risk of future cost escalations through earlier identification of a range of key potential risks and opportunities.
Concerns that the route alignment has been locked in before appropriate consultation with the community. The RIT-T identifies the project that must proceed to deliver net market benefits to the NEM as a whole before assessing how the interests of local communities that bear the burden of infrastructure are affected. Social and environmental impacts of the project are only assessed when an EES is prepared in later stages, which is late in the planning process.	Hepburn Shire Council, p 4,5 and 7.	It is important to note that at this early stage of the investment process, the specific route, design and location of any new infrastructure required to deliver VNI West has not been determined. To identify a specific route, a detailed route selection study must be completed that considers all technical, environmental, social and cultural constraints including community and stakeholder feedback. This study and future detailed field surveys are part of the approvals processes subsequent to this RIT-T and will allow not only for the identification of potential impacts but the identification of the ability to avoid, minimise or offset those impacts. In addition, AVP and Transgrid note that new options have now been assessed that run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders. Further, two of these options are emerging as jointly preferred. AVP's use of an MCA to assess these options is in response to the types of concern raised by Hepburn Shire Council, and aims to consider social and environmental impacts earlier in the planning process.
The Department of Environment, Land, Water and Planning (DELWP) should organise a meeting with AIEC and VFF to discuss the learnings from existing transmission projects to ensure that the transition to renewable energy is fair, efficient and	VFF, p 7.	AVP is collaborating with the AEIC and other key representative organisations to inform and guide engagement activities and to build broader community awareness of the project. To support the identification of a preferred network solution, AVP, along with its external consultant, AECOM, has undertaken an MCA. The MCA involved identifying indicative routes for each network option and evaluating each against social, environmental and engineering

[78] The Hollmann model uses parametric modelling and analysis of data to quantify systemic risk from projects delivered by the system in the past and is based on industry data and aligned to relevant AACE Recommended Practices. The Hollmann model is a parametric tool that provides a distribution (optimistic (P10), most likely (P50), pessimistic (P90)) for systemic risk contingency based on the project team's assessment of a number of pre-defined system attributes. Transgrid have used the Hollmann model to quantify the cost contingency required.

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effective. Data should also be collected in relation to energy infrastructure on land used for farming.		aspects. The criteria used for the MCA has been developed based on learnings from other transmission projects and includes consideration of land use and agricultural potential.
The preferred option and route are essentially the same as the transmission interconnector proposed in the inaugural 2018 ISP with part of VNI West's (via Kerang) infrastructure already integrated into the preferred option in WRL. This application of the RIT-T is inappropriate as the RIT-T process has been used to confirm the preference of a RIT-T proponent's preferred option rather as a result of cost benefit analysis as required under the NER. The stacking of projects together shows an ideological determination by AEMO to connect Snowy 2.0, a project plagued by time delays and cost blowouts. The preferred option has not changed for over four years, despite key developments to generation of energy in both states over this period.	Moorabool and Central Highlands Power Alliance, p 1,2,3,6, 7 and 16.	AVP and Transgrid do not agree that this RIT-T has focused on a pre-determined option. A number of options and option variants have been considered for VNI West over the course of both the RIT-T process and the various ISP analyses conducted over the same period. The Consultation Report on the options outlines the various options that have been considered, and the reasons they have not been further progressed (including where they involve higher costs with no offsetting additional benefits). The explicit interaction with the WRL is outlined in Section 2.6.
Principles of good governance have not been met in relation to this project.	VFF, p 2	AVP and Transgrid consider that this RIT-T has been undertaken in line with industry best practices, both generally (including in relation to stakeholder engagement) and specifically in relation to the application of the RIT-T and the MCA developed in response to feedback received.
Additional information required to inform opinion		
The land, planning and environmental feasibility analysis undertaken to minimise the impact on communities and the environment (referenced in the PADR) should be provided for examination.	Hepburn Shire Council, p 5.	Detailed land, planning and environment assessments will be undertaken following this RIT-T to identify and a preferred route for VNI-W with the findings of these assessments to be shared with external stakeholders. AVP's use of a MCA to assess new alternate options is in response to the types of concern raised by Hepburn Shire Council, and aims to consider social and environmental impacts earlier in the planning process.
Questioned whether the proposed 500 kV interconnector is to supplement or replace the existing 220 kV line and queries the dimensions of the new overhead lines. Queries the proposed route alignment and whether construction will occur on an existing easement.	Norman Walker, p 1.	The primary purpose of the new interconnector is to expand capacity between Victoria and New South Wales. The primary purpose of the existing 220 kV lines is to supply electricity to regional Western Victoria. Thus the interconnector does not replace the existing 220 kV lines, however it does supplement them in some capacity. Land and easement acquisition has not occurred at this stage but will follow the detailed route selection study subsequent to the RIT-T process (that is, once a preferred option has been identified and detailed route has been decided on). This will consider the use of new versus existing land and easements.

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Support for consideration of alternative interconnection options and corridors		
An insufficient number of options have been considered		
The options considered in the PADR are narrow and may compromise stakeholder confidence in the transmission planning and delivery process. There is no precedent for considering only two credible options for actionable ISP RIT-Ts. Further, the two options considered are essentially the same. Under NER 5.15A.3(b)(9) Transgrid and AEMO are able to consider options already considered in the ISP.	AusNet, p 6-7.	This is the first RIT-T prepared under the actionable ISP framework and AVP and Transgrid note that a significant number of options have been considered over the course of the RIT-T and regulatory transmission planning process, including as part of the separate ISP processes over the same period. AVP and Transgrid have not revisited these options on the basis that they have already been shown to demonstrate lower net economic benefits than the proposed preferred option, and AVP and Transgrid note that, under the current ISP rules, RIT-T proponents are not required to re-evaluate options considered and rejected by AEMO in the ISP. AVP and Transgrid have however included additional new options following the PADR in response to consultation undertaken on the PADR, to further refine the area of interest AVP and Transgrid note that the AEMC recently commented that future RIT-T proponents may consider fewer options and that doing so may be more conducive to investigation of social licence issues in the process, which may not be feasible with numerous or widely different options[79].
Considering a broader range of credible options in the RIT-T also promotes efficiency by imposing transparency and accountability on major network investment decisions. It can allow communities and other key stakeholders to identify potential impacts, and proponents to adopt appropriate modifications earlier in the project when cost and time impacts may be able to be better managed.	AusNet, p 7.	The ISP and RIT-T are intended to be complementary processes under the actionable ISP framework, to streamline the overall economic assessment process with the RIT-T not needing to re-examine options that have been assessed as part of the ISP. AVP and Transgrid have included additional new options following the PADR in response to consultation undertaken on the PADR. Specifically, these new options respond directly to points raised by stakeholders in submissions to the PADR regarding social licence.
Any time savings achieved from excluding additional credible options in the RIT-T will be completely outweighed by the scope for revisions and delays in the delivery phase. The jurisdictional planning and environmental approval processes (such as the EES in Victoria) requires identification and analysis of feasible alternatives, such as the options dismissed in Section 6.5 of the PADR.	AusNet, p 7.	The assessment has expanded the number of options assessed since the PADR (as outlined above), building on information received through submissions.
AEMO has not assessed the credible options properly, or other possible options in the context of all recent key developments in energy generation and the rapidly changing state of the NEM.	Moorabool and Central Highlands Power Alliance, p 13.	The ISP is a whole-of-system plan that provides an integrated roadmap for the efficient development of the NEM over the next 20 years and beyond taking into account all recent key developments in the market. It is designed to assess a range of potential futures through the scenarios that are developed and consulted on. Option 1, 'VNI West (via Kerang)' is the actionable ISP project and ISP candidate option included in the 2022 ISP. In identifying VNI West (via Kerang) as part of the 2022 ISP, AEMO also assessed a large number of other potential options (as outlined in Appendix A1 of the Consultation Report covering the options).

[79] AEMC, *Transmission Planning and Investment – Stage 3*, Draft Report, 21 September 2022, pp. 34-35.

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Other viable options to VNI West (via Kerang) were not considered, such as the options included in the PSCR.	Hepburn Shire Council, p 6.	Appendix A1 of the Consultation Report outlines why certain options considered in the PSCR have not been assessed further. In many cases these options were further assessed by AEMO as part of the ISP, subsequent to the PSCR. AVP and Transgrid have also included additional new options following the PADR in response to consultation undertaken on the PADR. Specifically, these new options respond directly to points raised by stakeholders in submissions to the PADR regarding social licence.
Support for alternative route alignments (additional options)		
There are other credible options to VNI West (via Kerang) that should be considered, including variants to the VNI 6 option considered in the PSCR. By moving the southernmost section of VNI West away from Bendigo, VNI West can unlock wind resources further west of the current area of interest or further east in Central North REZ. There are alternative points of connection that could unlock the solar capacity in the Murray River REZ but avoid the Ballarat and Bendigo alignment. EGA also suggested that VNI 6 should be reconsidered.	AusNet, p 8. EGA, p 12.	The VNI 6 option put forward in the PSCR and the 2020 ISP was further assessed and ruled out in the 2022 ISP. It has therefore no longer been considered in this RIT-T. Specifically, VNI 6 was considered but not progressed in the 2022 ISP due to the scope of EnergyConnect having changed since the publication of the 2021 IASR, where it now involves building double-circuit lines from Dinawan to Wagga Wagga at 500 kV and operating them initially at 330 kV. This reduced the cost estimate for the VNI West options assessed in the PADR and provides increased connection to the South-West NSW, Murray River and Western Victorian REZs. Consequently, the VNI 6 alternative has a similar cost to VNI West but lower market benefits due to unlocking less REZ hosting capacity compared to going via a new station near Kerang and so was not progressed as an option in the 2022 ISP and the PADR. Additionally, a number of submitters to the PSCR raised social impacts and concerns with topologies running through north-eastern Victoria (like VNI 6 in the PSCR). Submitters commented that this topology runs through high value agricultural farmland including a high concentration of irrigation infrastructure investment and related agricultural production (in a region that has already demonstrated local concerns regarding planning approval). This would likely impact timing and cost of construction as well as limiting development of new renewable generation in the area. Submitters suggested that VNI West (via Kerang) has a preferable topology and the submitters believed that it would receive more community support. The new options assessment now under consultation considers alternative locations for connecting VNI West into WRL that avoid the Ballarat and Bendigo alignment while still providing similar benefits to consumers.
Future consideration should be given to the criticality of the Sydenham to Ballarat transmission element and how this will be assessed in future transmission contingency planning scenarios. A loss of this line would result in the majority of generation in Western Victoria and imports from New South Wales being reduced by about 3,000 MW, which would severely impact system security.	AusNet, p 8.	The Sydenham to Ballarat segment of the WRL project is proposed to be built as a 500 kV double-circuit line, with each circuit being rated at approximately 3,000 MW. The power system analysis performed studies of single contingency events (loss of one 3,000 MW circuit, or other circuits in the area) to ensure the system can remain in operation with one circuit out of service at any time. The loss of both circuits is considered a non-credible contingency event, and maintaining network security for non-credible contingencies is typically managed through development of special protection schemes, the need for which will be considered in the later stages of detailed design.
A route alignment along the Bulgana to Kerang corridor is likely to impact on far fewer properties, communities and valuable natural resources than the proposed link via Bendigo.	Hepburn Shire Council, p 6	AVP and Transgrid have included additional new options in response to consultation undertaken on the PADR. Specifically, most of these new options run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders.

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The proposed route is heavily constrained by its close proximity to residential properties, making the project Based on experience delivering renewable generation projects in northern and western Victoria, the proposed route alignment will face significant social licence and environmental issues for both transmission and new renewables projects. A route alignment further west of the proposed route would increase wind resources available and provide a higher degree of system security benefit than building near an adjacent line. This would better meet the NEO by delivering more low-cost energy and more reliably ensuring supply to customers.	RWE, p 1.	It is important to note that at this early stage, the route, design and location of any new infrastructure required to deliver VNI West has not been determined. Acknowledging the important feedback provided in multiple submissions, AVP and Transgrid have included additional new options in response to consultation undertaken on the PADR. Specifically, these new options run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders. Higher voltage lines have not been considered, since voltages beyond 500 kV have not been previously used in Australia and doing so would limit AVP and Transgrid's ability to accelerate delivery of this key project due to limited industry experience at these higher voltages and development of new functional specifications and standards for such higher voltage assets. The EnergyConnect underwriting is also specifically for 500 kV, so this uprate design would need to be revisited, potentially also delaying the delivery of EnergyConnect. Higher voltage assets would increase project costs and the lower impedance of higher voltage assets would further increase the disproportional flows between VNI West and the lower rated parallel networks of the western Victoria 220 kV network and the existing VNI 330 kV network. Managing this increased disproportionality of power flows would require additional power flow controllers, additional high-cost consequential network upgrades, and/or network reconfigurations, beyond that considered economically feasible. The amount of power flow allowed on the higher voltage, higher capacity lines would also be limited operationally to maintain network security and reliability due to the limitation in lower rated parallel network paths, thereby limiting the increased benefits comparative to the increased costs.
A more western route alignment should be considered given lower density dwellings, increased wind resources, larger agriculture properties, less native vegetation and ecological constraints, fewer regions of cultural heritage sensitivity, reduced flood risk and increased redundancy due to the addition of a new route rather than a parallel one. Consideration of a higher voltage line should also be made to further strengthen investment opportunities to increase reliability of supply to consumers at lower cost.	RWE, p. 2.	
EUAA questioned why a Ballarat – Shepparton – Dinawan option was not considered given that it is reasonable to assume it would be lower capex given the shorter distance but have similar market benefits to Option 1.	EUAA, p 4.	This option is similar to the VNI 6 option assessed in the ISP and shown to deliver lower net economic benefits than the proposed preferred solution. While this is a lower capital cost option, the benefits are also significantly reduced by the lack of connection to the resource rich and heavily constrained Murray River REZ around Kerang (as outlined above). Additionally, a number of submitters to the PSCR raised social impacts and concerns with topologies running through north-eastern Victoria (like VNI 6 in the PSCR). Submitters commented that this topology runs through high value agricultural farmland including a high concentration of irrigation infrastructure investment and related agricultural production (in a region that has already demonstrated local concerns regarding planning approval). This would likely impact timing and cost of construction as well as limiting development of new renewable generation in the area.
Significant benefits could be achieved through extending the WRL 500 kV section to Bulgana, and connecting VNI West to a terminal station at this location. A route alignment that is located to the west of the proposed route would provide a greater opportunity for renewable generation and would achieve a higher degree of social acceptance given the expected community impacts in Bendigo, Ballarat and Hepburn Shire. This route would also reduce project	GNET, p 1.	AVP and Transgrid have included new options in response to consultation feedback on the PADR. Specifically, these new options run further west in Victoria to avoid the Bendigo to Ballarat area that has been highlighted as particularly problematic by stakeholders. Some of the new options also include uprating the 220 kV component of WRL to 500 kV all the way to Bulgana. Further, the new Options 4 and 5 study the recommendation of connecting VNI West to Bulgana.

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complexity by utilising an existing corridor on the currently proposed 220 kV double circuit to Bulgana.		AVP and Transgrid have also undertaken a MCA comparing, among others, the social, environmental and cultural impacts of the options assessed.
AEMO should work closely with local government authorities to consider how transmission infrastructure may be placed to encourage generation in area away from productive farmland and built-up areas.	Swan Hill Rural City Council, p 2.	AVP and Transgrid have worked, and will continue to work, closely with LGAs as part of this RIT-T and the processes that follow it. For example, following the PADR, on 18 August 2022, AVP held its second Council Stakeholder roundtable, attended by representatives from six LGAs in Victoria, and a related local government group. The MCA, undertaken as part of the new option assessment, considers factors such as land use, agricultural potential and proximity to built-up areas at a high level.
The lack of social licence is likely to have considerable impacts on the timing of the preferred option.	Moorabool and Central Highlands Power Alliance, p. 16	Acknowledging the important feedback provided in multiple submissions, AVP and Transgrid have assessed new options in response to consultation undertaken on the PADR. Specifically, these new options run further west in Victoria to avoid the Bendigo-Ballarat corridor that has been highlighted as particularly problematic by stakeholders. In relation to timeframes, Transgrid and AVP have used actual timeframes for recent projects, adjusted for any key differences between them in terms of expected timelines. The estimates used currently have approximately 18 months contingency/float that is supported by Hollmann model simulations.
CVGA recommended transmission infrastructure should be placed away from high-value productive farmland, housing, biodiversity and ecotourism areas and instead should be located on existing easements and collocated with existing infrastructure. The City of Greater Bendigo had a preference to use the existing 220 kV easement where possible for co-location, and avoid visual and environmental impacts elsewhere. Similarly, VFF also suggested routes along road and rail corridors would be more cost-effective as it avoids the need for easements and minimise impacts on the landscape.	CVGA, p 5. City of Greater Bendigo, p 3. VFF, p 3.	At this early stage the route, design and location of any new infrastructure required to deliver VNI West has not been determined. Land and easement acquisition has not occurred at this stage but will follow the detailed route selection study subsequent to the RIT-T process (that is, once a detailed route has been decided on). This will consider the use of new versus existing land and easements. The route and area of interest is multi-faceted and requires a route selection process based not only on the factors mentioned in the submissions but also on many other land, planning and environment factors, and also on a route/area of interest of a particular option to meet the identified need from a power flow perspective. To determine a specific route, a detailed route selection study that considers all technical, environmental, social and cultural constraints including community and stakeholder feedback must be completed. To support the identification of a preferred network option, AVP, in conjunction with external consultants, AECOM, have undertaken an MCA, based on an indicative route identified for each option. The MCA has taken into consideration aspects including agricultural productivity potential of land, proximity to residences and built-up areas and potential impact to native vegetation and habitat.
Potential to put transmission underground and the use of HVDC technology		
Undergrounding could lead to significant delays in the completion of the project and may be up to three times more costly.	Snowy Hydro, p 6.	AVP and Transgrid note this comment and agree that undergrounding is expected to add significantly to project timelines and cost.

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Section 6.4.6 of the PADR makes several assertions surrounding underground cable life without any supporting data. It is counterintuitive that underground cables would have a shorter life than overhead given insulation from the elements.	Norman Walker, p 1.	Overhead transmission lines and underground cables both have ageing affects, but are obviously different. For underground cables, the ability of XLPE insulation to withstand electrical stress decays with time. The cable system designer has to demonstrate that the cable system can achieve the design life accounting for electrical stress, purity of insulation and thermal environment. Cyclical thermal and mechanical fatigue also impacts the life of other components, such as water blocking barriers and tapes. CIGRE[80] technical committee B1 recently completed a survey of service experience of HV underground and submarine cable systems (TB 815). It found that "most faults in XLPE land cable systems occur within the first 10 years of operation, with a very large number of faults occurring during the first two to three years of operation. The first 10 years are followed by 15 to 20 years with a very low number of failures. Most failures in XLPE cable systems during the first 10 years of operation are found in accessories, whereas failures in the latter years of operation occur in the cable." It should be noted that the first EHV XLPE cable was constructed in 1989 and hence representative end of life failure rates for XLPE cable are yet to be obtained. For these reasons, most utilities specify about 40 years design life, but 30-50 years is common. It is likely there is a safety margin on this but due to limited lifetime experience, utilities have yet to extend the design life requirements.
Requested transparency on calculation that underground cabling is 17 times more expensive than overhead lines.	Norman Walker, p 1.	The additional cost of undergrounding lines can be found in the ISP cost report, refer to pages 23-24[81].
Undergrounding will be critical in some areas to mitigate environmental impact and secure social licence. AEMO should build cost contingencies for undergrounding as part of route refinement.	CVGA, p 5.	AVP and Transgrid note that a significant study into undergrounding for HumeLink was released in August 2022, which was commissioned by a collaborative Steering Committee and involved consumer representatives as part of the progression of the study. The study found that undergrounding the line would increase the cost by at least three times and would add a further five years to the build time. AVP and Transgrid consider that the cost of undergrounding VNI West would also be orders of magnitude greater than using overhead lines, without adding commensurately to the expected market benefits, and would add significantly to the construction timetable. Moreover, AVP and Transgrid note that undergrounding is not void of social licence issues and these need to be considered. For example, disturbance to flora and fauna, land use and archaeological sites must be assessed for underground lines as they must be for overhead lines (and it is generally considered that overhead lines are less disruptive than underground cables in these regards). Given the timeframe and cost implications, AVP and Transgrid do not consider undergrounding VNI West is a realistic option. Nevertheless, in exceptional circumstances, short sections of undergrounding may be considered as part of the ultimate route design, having considered all technical, environmental, social and cultural constraints, together with stakeholder and

[80] CIGRE is a global community committed to the collaborative development and sharing of end-to-end power system expertise. The community features thousands of professionals from over 90 countries and 1250 member organisations, including some of the world's leading experts.

[81] The ISP cost base report can be found at https://aemo.com.au/en/consultations/current-and-closed-consultations/transmission-costs-for-the-2022-integrated-system-plan.

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		community feedback. However, AVP and Transgrid do not expect any such sections to be material in length. The PACR will explain how undergrounding transmission lines has been considered as part of VNI West over the course of this RIT-T.
By not considering undergrounding, VNI West transfers the costs to farmers and rural communities. Undergrounding transmission will be cost-effective as it will reduce the need to compensate property owners for the impact of transmission infrastructure to production and farm earnings. Undergrounding will also significantly reduce the impact of transmission on emergency response.	VFF, p 2, 3.	The Australian Energy Charter has commissioned a survey of landowners to determine impacts and opportunities experienced by farmers who conduct their farming operations under and near transmission lines. The study finding and conclusion will be shared publicly once finalised. Further, the project cost estimates include estimated easement compensation costs which are to include payments for any loss of productivity resulting from the construction and operation of the transmission line easements. Appendix A2 of the Consultation Report clarifies this.
Questioned the conclusion that HVAC is a superior technology choice for VNI West and referred to a report by Amplitude Consultants that concluded HVDC transmission lines can be cost-effective in the long run with respect to reliability, performance and reduced social and environmental impact. The report found that HVDC alternatives cost significantly less than the 10 times greater referenced by AEMO and AusNet's estimated cost of between 17 and 24 times the cost of overhead AC transmission lines was based on inaccurate information. HVDC transmission lines also reduce impacts to access (including for emergency vehicles), reduce impact to flora and fauna and minimise visual impact and land use restrictions as cables are buried underground. HVDC transmission lines also have no perceivable noise or electromagnetic field impacts.	Hepburn Shire Council, p 7 and 9.	HVAC lines have significant benefits associated with connection of renewable generation compared to HVDC lines in terms of less technical difficulty, scope of works at terminal stations and cost. The higher cost of connection associated with HVDC are more likely to undermine potential benefits of the generation connecting. AVP and Transgrid intend to cover the consideration of HVDC in more detail as part of the PACR.
Undergrounded HVDC transmission lines are not affected by bushfires and do not need to be switched off during these events.	Hepburn Shire Council, p 9 and 10.	AVP and Transgrid acknowledge that, where a fire or smoke plume is within 25 meters of transmission lines, line de-energisation may be required for fire-fighting activities[82]. However, AVP and Transgrid do not consider this to warrant the significant additional costs associated with either HVDC or HVAC underground lines. Bushfire risk is one of the measures that has been included in the MCA applied to rank the alternate options assessed in the Consultation Report. Options that avoid intersecting areas within the bushfire overlay are rated more favourably on the Engineering objective than others. Following the selection of a preferred option, a detailed assessment of bush fire risk would be undertaken within the entire area of interest. Where areas of higher bushfire risk cannot be avoided, mitigation measures would be implemented to ensure any potential impacts are reduced as far as reasonably practical. Transmission lines are managed for bushfire risk through regulatory requirements and operational procedures that minimise both risk of the lines starting bushfires and the lines being impacted by bushfires caused by other means.

[82] Energy Networks Association, *National Guidelines on Electrical Safety for Emergency Service Personnel, 2006.*

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		AVP and Transgrid also note that in Victoria, the AEIC has been working with the CFA and EnergySafe Victoria to develop a universal fact sheet on bushfires and transmission that is expected to be published Q2 2023.
Earlier/alternative implementation of MPFC technical solution		
Supported the decision to retain modular power flow controls as part of the main design with the modelling sensitivity clearly demonstrating their value.	ENGIE, p 3.	AVP and Transgrid note this point and that modular power flow controls are included in all options assessed.
Support for modular power flow controls as part of the preferred option for VNI West as a means to ensure an optimal and flexible transmission grid that is responsive to the needs of transitioning power system. Suggested that additional market benefits may arise by installed modular power flow control prior to the development of transmission infrastructure for VNI West.	SmartWires, p 2.	AVP and Transgrid appreciate SmartWires' support for the proposed modular power flow control solution for the VNI West project (and other ISP projects). AVP and Transgrid acknowledge the proposed modular power flow solution provides additional net market benefits for the VNI West network since the proposed solution balances power flow between the existing VNI flow path and the developed 500 kV transmission path around Kerang. However, there is likely to be limited benefit in bringing forward the modular power flow solution prior to the development of the new transmission lines since: • VNI flows are frequently bounded by stability constraints instead of thermal constraints. • A few transmission lines within the existing VNI corridor installed modular power flow controllers and installing the modular power flow controller on the parallel paths will have limited improvement on power flow sharing. • The modular power flow controller has limited flow sharing improvement on the lines with both system normal and contingency constraints, like Murray to Upper Tumut and Murray to Lower Tumut lines. AVP and Transgrid also consider that the consideration of such augmentation options are best managed as separate projects rather than being integrated with VNI West given the additional work involved in assessing them and the risk of delay to the wider VNI West process. Following the completion of the RIT-T process, AVP and Transgrid will carry out more detailed modelling with updated modular power flow control, VNI power flow and network information from VNI minor, EnergyConnect and HumeLink. As part of this, AVP and Transgrid will incorporate SmartWire's inputs and investigate whether earlier modular power flow controllers should be considered further.
The accuracy of cost estimates used and whether the timeframes are realistic		
Uncertainty/accuracy of cost estimates		
Recognised the work done by Transgrid and AEMO to better estimate the costs of VNI West compared to the earlier RIT-T process.	ENGIE, p 2.	AVP and Transgrid note this comment and thank ENGIE for recognising the improvements made.
The final cost of the approved project is likely to be considerably higher than costs envisaged at this stage of the project.	VFF, p 2.	

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Estimated cost of VNI West has increased 110% in the past four years, from $1.55 billion in the 2018 ISP to $3.3 billion in the PADR (for a shorter line and fewer substations). One would expect there to be further escalations, especially as the project will not start construction for another four years and not be completed for another nine years.	Ted Woodley, p 1.	As outlined in Section 2.5, the cost estimates reflect the best available estimates at this stage of the investment process. AVP and Transgrid have tested the sensitivity of the results to the assumed level of costs through both sensitivity testing and boundary testing. As part of the contingent project process, Transgrid will seek a 'feedback loop' confirmation from AEMO (as national planner) in line with the actionable ISP framework ahead of lodging a CPA for investment in VNI West. Transgrid is intending to submit two CPAs to the AER in relation to the regulatory cost recovery for the project: • The 'Initial CPA' will seek cost recovery for the Stage 1 works, based on the preferred option. • The 'Final CPA' will seek cost recovery for the Stage 2 implementation costs, including the construction costs of the project (this CPA will cover the bulk of the project cost). Transgrid will need to seek further 'feedback loop' confirmation from AEMO prior to submitting the 'Final CPA' to confirm that the project is still part of the optimal development path in the latest ISP and delivers positive market benefits in the 'most likely' scenario. The ISP feedback loop requires AEMO (in its national planning role) to confirm that the preferred option from the RIT-T remains aligned with the optimal development path in the most recent ISP. This process will ensure that the investment is confirmed as being consistent with the optimal development path in the latest ISP, where any costs have increased. AVP and Transgrid also note that, while Stage 1 of the preferred option is designed to ensure the project can be delivered by its earliest estimated commissioning date (July 2031) consistent with when the project is needed in the most likely ISP scenario, the early works activities involved will also enable the development of a more detailed cost estimate for Stage 2 as part of this process[83]. Indeed, the scope for early works to reduce cost uncertainties, and provide greater consumer confidence that they will not be over- or under-investing in this key project, is explicitly noted in the 2022 ISP.
The preferred option would see significant costs transferred to private individuals and businesses who receive no benefit from the project. AEMO has failed to internalise the external costs of the project in its cost benefit analysis.	VFF, p 2.	NER clause 5.15A.1(c) specifies that the purpose of the RIT-T is to identify the credible option that maximises the present value of net economic benefit to all those 'who produce, consume and transport electricity in the market'. Following from this purpose, the economic impacts that accrue to parties other than those who produce, consume and transport electricity in the market are treated as externalities under the RIT-T. As such, RIT-T proponents must exclude externalities in the cost benefit assessment of a credible option. However, the MCA methodology adopted for the new options assessment attempts to take important social, environmental and land-use considerations into account as early in the planning process as possible.

[83] The early works as part of Stage 1 include project initiation, stakeholder engagement, land-use planning, detailed engineering design, cost estimation and strategic network investments. See AEMO, 2022 ISP, June 2022, p. 75

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		AVP and Transgrid note that the detailed route selection study following the PACR will consider such impacts in more detail, including community and stakeholder feedback. It will also consider how these impacts are able to be mitigated.
Queried what underpins the level of confidence that sensitivity testing of an increase in capex >30% is not required.	EUAA, p 17.	Section 2.5 outlines how the cost estimates are considered to have an accuracy of +/-30% and why it is too premature to develop more accurate estimates at this stage of the investment process. AVP and Transgrid have considered increases in capex outside of this range as part of the boundary testing presented in the Consultation Report on the options.
Queried why it is considered that a sensitivity testing of a capex cost <30% is useful.	EUAA, p 17.	Section 2.5 outlined how the cost estimates used are considered to have an accuracy of +/-30%. AVP and Transgrid consider it important to include a sensitivity on cost reductions as well as cost increases to indicate to stakeholders the impact from any such reduction.
Enquired as to the methodology the proponents propose to use in the desk top exercise described in Appendix 3 of the PADR to ensure the accuracy of the risk amounts included in the PACR for social licence – land access, easements and biodiversity. EUAA also queried whether that estimate includes an assumption on the level of compulsory acquisition.	EUAA, p 4.	Transgrid has made assessments to determine likely easement and access compensation, biodiversity offset costs for the NSW portion of VNI-West. AVP has undertaken assessments to determine the likely easement compensation, land acquisition and biodiversity offset costs for the Victorian portion of the VNI West options. These likely costs have been used in the development of the PADR and new options assessment (and will be for the PACR). The assessment of likely easement compensation costs has taken into consideration along with the potential requirement for compulsory acquisition. There are no assumptions regarding compulsory acquisition in the cost estimates prepared by Transgrid for the NSW portion of the project.. Specific land and easement acquisition costing has not occurred at this stage but will follow the detailed route selection study subsequent to the RIT-T process (that is, once a detailed route has been decided on). In the new options assessment, Transgrid has included the payments to landowners expected under the NSW Strategic Benefits Payment Scheme as part of the opex costs associated with each option. This will also be accounted for in the PACR
Queried what additional level of knowledge there is on the route in the PADR, and how the proponents will give confidence to consumers that the project will have net benefits at the PACR stage when detailed route is still not determined. EUAA noted that recent projects have shown considerable increases in the costs of land access and biodiversity subsequent to the completion of the PADR.	EUAA, p 4.	See Section 2.2.
Queried what the proponents mean by 'Class 4' and what is the basis for the symmetrical cost accuracy. EUAA noted that AACE Class 4 is +/-30% and AEMO transmission database for PADR stage is AACE Class 4/3.	EUAA, p 8.	See Section 2.5.

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Queried how the proponents utilised cost data from EnergyConnect and HumeLink in the PADR cost estimates.	EUAA, p 8.	See Section 2.5.
Queried the basis for the selection of $300 million additional Victorian cost quoted in the PADR, and why the proponents consider that issue will not arise on the New South Wales portion of the route. Further, questioned if adding the $300 million to the cost changed the ±30% accuracy band, and the reason why it didn't if the accuracy band didn't change.	EUAA, p 8.	To allow for potential remediation of unknown geological, environmental and social concerns, the Victorian cost estimates presented include an approximate additional $300 million of cost contingency, compared to the VNI West cost estimate presented in the 2022 ISP. The ISP cost estimates already include a contingency cost for the New South Wales works. This contingency does not impact the original ±30% accuracy band as the accuracy band is related to the level of project definition and estimate inputs, whereas contingency is included to account for risk.
Queried what level of cost accuracy is expected in the PACR and questioned what the key features of the PACR work will be that will lead to any increase in the level of accuracy.	EUAA, p 9.	As outlined in Section 2.5, the accuracy of the cost estimates is the same as in the PADR. The early works to be undertaken by Transgrid and AVP following completion of the RIT-T will enable more accurate cost forecasts for the preferred option to be developed.
Queried the impact of the announcement in the Transgrid TAPR regarding the potential to achieve efficiencies across three ISP projects on VNI West capex, and also whether it reduces the 'allowances' or 'contingencies' at the PACR stage.	EUAA, p 9.	Each major project, as identified within the ISP and TAPR, is developed and estimated on its own merits. Opportunities for synergies, optimisation and cost savings between projects through each subsequent phase (such as development, delivery and commissioning) are assessed at the delivery stage for each project. It is premature to account for, or realise, reductions in allowances and contingencies at the PACR phase of each major project, since most technical details are still too high level and identified risks still unmitigated. This is outlined further in Section 2.5 in the context of why Class 4 cost estimates have been used. The initial development phase (post PACR) is usually the earliest opportunity to identify potential synergies in scope, timing and costs that could benefit multiple projects and achieve cost and delivery efficiencies across a portfolio of work.
Enquired as to the benefits from the Federal Government's $75.8 million underwriting agreement with Transgrid in terms of the ability to have a more accurate cost estimate in the PACR (and whether consumers will have to pay that $75.8 million if the project proceeds).	EUAA, p 9.	Transgrid's Underwriting Agreement with the Federal Government is an agreement to facilitate VNI West's early works in New South Wales. This is a form of insurance in the event of an occurrence that prevents or delays Transgrid in performing early works due to reasons beyond its control. The Federal Government is committed to supporting the VNI West project and for it to be delivered as early as possible, in line with its 'Rewiring the Nation' plan. The Agreement does not impact the cost estimates, which have been prepared by Transgrid and AVP's planning departments. Consumers are also not responsible for paying the $75.8 million as the underwriting payment is unlikely to be triggered due to Transgrid's commitment to proceed to a CPA and to deliver the project, once the RIT-T has been finalised.
Capital costs have been expressed in FY2021 dollars, and therefore NPV analysis should not discount these costs if incurred in future periods as they are already expressed as a present day cost.	Moorabool and Central Highlands Power Alliance, p 13.	All the analysis in the PADR and in this additional options analysis has been conducted in real, FY2021 terms. While this means that all costs (and benefits) are stated in FY2021 dollars, future costs and benefits still need to be discounted, using a real discount rate, to today to be compared on like-for-like terms due to the 'time value of money'.

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The costs of two new 500 kV line exits and associated 500 kV substation bays at the north of Ballarat substation do not appear to be included in the scope.	Simon Bartlett (late submission), p. 1.	AVP and Transgrid acknowledge that Section 6.2 of the PADR did not make it clear that the line exits and 500 kV bays at the proposed terminal station north of Ballarat were included in the cost estimates. AVP and Transgrid can confirm these costs were included in the PADR cost estimates as outlined under the Substations subsection of Appendix A3.1 of the PADR, which stated 'allowance has been made to install two new 500 kV line exits with a total of two 100 MVAr 500 kV line shunt reactors'. This has been reiterated and further clarified under the Substations of Appendix A2.1 of the Additional Consultation Report, where it is stated that 'at the new substation planned to be built as part of WRL where VNI West will connect, allowance has been made to install two new 500 kV bays and line exits with a total of two 100 MVAr 500 kV line shunt reactors'.
There is major uncertainty in the transmission line cost estimates and AVP and Transgrid must calculate the expected cost of the option under a range of different reasonable cost assumptions to reflect uncertainties like government requirements to purchase Australian made components, social licence, contractor competition, cost of components, labour shortages, COVID impacts and the impacts of Clough's administration on EnergyConnect.	Simon Bartlett (late submission), p. 1.	Section 3.6.4 of the Consultation Report investigates the sensitivity of the results to what AVP and Transgrid consider a range of reasonable capital cost assumptions (+/-30%), as well as extending this analysis to investigate key 'boundary' values for capital costs.
Mr Bartlett stated that paragraph 5(b) of the RIT-T, NER Clause 5.15.A.3(b)(6)(ii) and clause 5.22.5 of the AER Guidelines, require the RIT-T proponent to quantify opex costs for each credible option and to provide a breakdown of the opex costs in the PADR. Mr Bartlett stated that opex assumed at 1% of the capital cost totals 50% of the investment over a 50-year life. Mr Bartlett also stated that opex increases substantially as the asset ages and that the PADR makes no allowance for non-routine expenditure for ageing transmission assets beyond the modelling period when substantial non-routine expenditure is required to refurbish and replace ageing assets. Mr Bartlett suggested that at 2% per year assumed opex, the remaining 33 years could total $2 billion.	Simon Bartlett (late submission), p. 2.	AVP and Transgrid note that, while there is a requirement to quantify O&M costs under the paragraphs and clauses cited, there is no requirement to provide a breakdown of O&M costs under the RIT-T, including in either paragraph 5 of the RIT-T or NER Clause 5.15.A.3(b)(6)(ii), as suggested. Moreover, AVP and Transgrid note that the RIT-T instrument notes that 'the RIT-T proponent is not required to separately quantify each class of cost'. Notwithstanding, section 2.5 above provides additional detail on the basis for the opex assumption and notes that it is also the value used in the latest IASR. Section 2.5 also outlines why 1% is considered appropriate in the context of ageing assets. While Mr Bartlett's suggestion that 1% of the capital cost, totals 50% of the investment over a 50-year life is correct in undiscounted terms, when discounting is applied, they only total 14% of the total capital costs in present value terms over 50 years for both Option 5 and Option 3A, excluding the effect of terminal values. AVP and Transgrid have investigated a sensitivity assuming a 2% opex assumption and find that it does not change the key conclusions of the analysis, ie, that Option 3A and Option 5 are jointly top-ranked and expected to deliver positive net market benefits (on a weighted basis). AVP and Transgrid note also that 2% for Option 3A and Option 5 equals approximately $73 million/year and $65 million/year, respectively, in routine opex. Mr Bartlett is correct that the core analysis makes no allowance for non-routine opex for ageing transmission assets beyond the modelling period. However, we also note that the assessment does not include any costs or benefits beyond the end of the assessment period, as outlined in Section 3.5 of the Consultation Report. Further, the payback year assessment presented in Section 3.5 of the Consultation Report does include lifetime opex and finds that all costs

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		(including lifetime opex) are expected to be paid back within the assessment period on a weighted basis for both Option 3A and Option 5 (a conclusion that also holds if opex beyond the assessment period is assumed to be 2%).
Mr Bartlett suggests that the PADR under-estimated costs by using incorrect incremental costs to build EnergyConnect at 500kV instead of 330kV between Dinawan and Gugga. He suggests that this incremental cost is included at $182 million and refers to this as a Federal government loan to Transgrid.	Simon Bartlett (late submission), p. 2.	AVP and Transgrid have modelled the Dinawan to Wagga Wagga portion of EnergyConnect as being built and operated at 330kV under the base case (as opposed to being built to 500kV but initially operated at 330kV as in the PADR). This enables both the costs of operating this portion at 500kV and the associated benefits to be captured in the VNI West RIT-T assessment. The $182 million is not a loan and, instead, represents underwriting that Transgrid is funding itself.
Mr Bartlett suggests that incremental costs and annualised costs cannot be used in costing an option under the RIT-T. Mr Bartlett suggests that these costs are theoretical and unmeasurable concepts. Mr Bartlett states that clause 4.3.4 of the AER Guidelines, requires the present value of a credible option's direct costs and that paragraph 4 of the RIT-T requires "any cost or market benefit that cannot be measured as a cost or market benefit to those who produce, consume and/or transport electricity in the market must not be included in any analysis under the RIT–T".	Simon Bartlett (late submission), p. 3.	AVP and Transgrid note that, for options other than Option 1, the Victorian component costs of VNI West include the incremental costs of modifying the current WRL project. In this context incremental is referring to the additional costs of the project scope being assessed in this RIT-T compared to the cost of the current scope of the WRL project. AVP and Transgrid note that 'costs' and/or 'direct costs' are not defined terms in the RIT-T and there is no further guidance relating to the use of incremental costs. We consider that incremental costs, and their estimation in this context, to be consistent with the concept of 'direct cost' that Mr Bartlett is referring to (and that they are not a theoretical, unmeasurable concept as suggested). They represent the direct costs that would only be incurred as a consequence of this RIT-T investment decision. AVP and Transgrid note also that annualised costs are not relevant to the cost of the options and are only used in the wholesale market modelling (which is consistent with the ISP).
Mr Bartlett notes that Table 3 of the WRL updated cost-benefit assessment required transmission cost database (TCD) cost estimates to be increased by approximately 40% to allow for adjustments and allowances for known and unknown risks. Failing to apply these contingency allowances could further underestimate the cost of VNI West by a large amount.	Simon Bartlett (late submission), p. 3.	Section 3.6.5 of the Consultation Report covers capital cost sensitivities and boundary tests. It shows that the central estimates of network capital costs would need to increase by around 74% for Option 3A to have negative net benefits, or 82% for Option 5 to have negative net benefits. The WRL updated cost-benefit assessment acknowledged that transmission costs for WRL options have increased by more than 30% as compared to the estimated costs in the WRL PACR. It further highlighted that contingency allowances are included in any assessment of costs using the TCD. Refer to the report[84] for more information on the build-up of costs for that assessment using the TCD. It is also noted that adjustment costs are already included in the VNI West cost estimates drawing on experience from recent projects. These cost estimates are at a higher level of accuracy than estimates developed using the AEMO Transmission Cost Database's cost estimating tool since they reflect additional detailed costing undertaken by AVP and Transgrid in the context of this project.

[84] See https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/victorian_transmission/2022/aemo--clause-5164z3-analysis--wrl-project--november-2022.pdf?la=en.

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Whether the proposed construction timeframe is realistic		
QUEN expressed concern about the construction timetable for transmission, and subsequently, bringing in generation, noting that supply chains are currently well and truly constrained on generation. PIAC noted that there will aways be unexpected delays on large transmission projects and that there should be more focus on making sure there is some allowance for uncertainty, and said relying on a critical path that doesn't allow for uncertainty is unrealistic.	QEUN and PIAC, Energy Consumer Submission Forum, p 3.	The delivery program has been built from the top down using industry benchmarking for construction productivity rates in addition to our own experience in delivery of similar projects. Environmental approval timeframes are based on recent major projects approval timeframes. Transgrid and AVP has also allowed two years to procure long lead items (substation equipment, transformers, reactive plant) from the date of placing the order to the required date of delivery. Transgrid is in the process of securing supply agreements for plant at a program, rather than project, level. AVP and Transgrid are engaging with suppliers earlier than required for VNI West and looking to secure production slots as soon as AVP and Transgrid have certainty of timing of the projects, and certainty of the preferred option through the RIT-T process. Additionally, the suppliers used generally have multiple factories and supply routes, meaning flexibility to respond to supply chain issues. While AVP and Transgrid have planned to schedule early procurement of some equipment, AVP and Transgrid are cognisant of the need to balance the risks of ordering too early in the design phase. Early discussions with major equipment suppliers are advanced with production slots identified. As part of our best practice project management processes, in commencing early work activities, Transgrid and AVP will undertake detailed reviews of program, confirm productivity assumptions with potential contractors, and undertake range analysis.
PADR seems to be based on a commissioning date one year later for the *Step Change* scenario, even though it states the dates are aligned with the 2022 ISP.	Ted Woodley, p 3.	The assumed timing is scenario dependent and aligns with the optimal timings assessed in the 2022 ISP for each scenario.
EUAA queried the reason for the one-year delay in VNI West, just one month after publication of the 2022 ISP.	EUAA, p 2.	
Interaction with the Western Renewables Link		
Concern about the counterfactual base case		
Due to uncertainty around the WRL, it should not be treated as a sunk cost. The VNI West RIT-T should consider a realistic counter-factual that assumes the WRL does not exist and includes: • Construction of new North Ballarat Terminal Station, with 2 x 1,000 megavolt amperes (MVA) 500/220 kV transformers. • Construction of new 500 kV double-circuit transmission line from Sydenham to North Ballarat, with 50 megavolt amperes reactive (MVAr) reactors on each end of each circuit and associated connections.	EGA, p 3.	See Section 2.6.
VEPC raised the costs of the North Ballarat Terminal Station and the North Ballarat to Sydenham 500 kV uprate from the WRL, from	VEPC, p 6. EGA, p 10.	

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the time that VNI West is commissioned. Further VEPC stated that these costs must therefore be brought into the VNI West assessment from the time that VNI West has been commissioned, saying this means AEMO/Transgrid has understated the present cost of VNI West by around $300 million. EGA also noted that the VNI West PADR has not counted the cost of the North Ballarat Terminal Station, 500 kV dual-circuit lines from North Ballarat to Sydenham, or its uprate. These components are required for VNI West, yet costs have not been counted.		See Section 2.6 and AEMO's November 2022 WRL project analysis[85]
By already including VNI West components in the proposed WRL, AEMO has given itself a distorted incentive to deliver an assessment of VNI West that supports the preferred option in the PADR. This is not a proper application of the RIT-T process.	Moorabool and Central Highlands Power Alliance, p 7.	
The PADR treats the WRL as separate infrastructure that is not part of the VNI West scope or costs. Components of the WRL that were built only to facilitate VNI West are considered to be sunk. AEMO has consistently justified option 'C2' in the WRL PADR despite having the highest project cost as it supported the development of VNI West and therefore claimed benefits in changing the timing for transmission investment. The scope (and costs) of VNI West have therefore not been considered as the full economic assessment of costs as significant costs in WRL were required to facilitate VNI West. This constitutes a material change in circumstance for the WRL RIT-T and has significant implications for the costs and preferred options in both RIT-Ts.	Moorabool and Central Highlands Power Alliance, p 8, 9 and 10.	
The calculation of costs and market benefits between the WRL and VNI West RIT-Ts justifies a material change in circumstance for one or both projects. Neither the WRL nor VNI West RIT-Ts recognise up to $500 million costs for the VNI West components of the WRL (the additional incremental costs of connecting VNI West into the WRL). The WRL RIT-T considered these costs to benefits for the WRL in terms of differences in the timing of transmission investment, while the VNI West RIT-T does not capture these costs as they are assumed to be sunk as part of the WRL. Therefore, the costs of both transmission investments are considerably understated and invalidate the results of both the WRL and VNI West RIT-Ts.	Moorabool and Central Highlands Power Alliance, p 10 and 11.	
EGA said it is not clear in the PADR if benefits that were claimed for Kerang Link in the Western Victorian RIT-T PACR have been	EGA, p 4.	A key principle underlying the RIT-T and the modelling undertaken is to identify the *incremental* benefits (and costs) arising from each option relative to the base case. As outlined in Section

[85] https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/victorian_transmission/2022/aemo--clause-5164z3-analysis--wrl-project--november-2022.pdf?la=en

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accounted for (subtracted from) in the VNI West PADR cost-benefit test. It is also unclear if the fuel cost saving benefits from increases in exports of brown coal have been reviewed and recalculated to account for earlier than expected coal closures. EGA sought clarification on this matter as double counting benefits could materially impact cost-benefit calculations for both the WRL and VNI West.		2.6, the WRL is assumed in both the base case and the VNI West case and so the modelling only calculates the *incremental* benefits (and costs) for VNI West *over and above* those accruing from the WRL. As a result, there is no double counting of benefits across WRL and VNI West.
Whether the assumed expansion of transmission capacity from VNI West (via Kerang) is realistic		
Given the proposed WRL, which VNI West heavily relies on to unlock this capacity, will only reduce the most urgent congestion on Western Victorian generators and has already claimed the benefits of unlocking up to 900 MW in its RIT-T to supply Victoria's load centre, it is unclear how connecting VNI West to a proposed terminal station at North Ballarat increases the transfer capacity of the WRL by an additional 550 MW. The transfer capacity benefit appears to be either incorrect or has been double-counted. EGA sought clarification of this matter.	EGA, 4	WRL includes a 220 kV double-circuit line from Bulgana to north of Ballarat, and a 500 kV double-circuit line from north of Ballarat to Sydenham. The REZ limit increase of WRL is predominantly limited by congestion in the existing 220 kV parallel network between Ballarat, Waubra and through to Bulgana. Because of how the existing network would share power flow with the newly proposed 220 kV network, the existing 220 kV network will reach its capacity before the new 220 kV network of WRL can be fully utilised. If VNI West were to connect at the proposed station north of Ballarat, this electrically creates an additional, lower impedance parallel flow path along the new 500 kV interconnector that results in improved power flow sharing and an overall increased REZ limit.
At the point of project completion, the system will already be experiencing constraints that will require further transmission and distribution upgrades.	GNET, p 2.	This RIT-T does not address any wider constraints in the network(s). Benefits from relieving any such constraints would be additional to those estimated for the options and would be subject to a separate RIT-T. The design of VNI West will incorporate provisions for future Victorian projects. Specifically, new terminal stations will be designed with allowances made for future expansion for new renewable energy connections and regional load growth. The options considered in the Consultation Report vary in terms of the impact on REZ limits and the amount of renewable generation that can be harnessed as consequence. The economic benefits assessment in the Consultation Report assessed the trade-offs between the gross benefits of harnessing more renewable generation and the additional costs associated with doing so.
Mr Bartlett suggests that the interconnector limits in the EY report appear too high, e.g., Dinawan to Gugga is modelled at 2,700MW/3,000MW). The increase in the VNI limits in the PADR are stated as being 1,800MW/1930MW and the power flowing on the 500kV VNI lines is likely to be higher due to its lower reactance. A recent AEMO report on the expected increase in South Australia's import/export limits post the completion of Project Energy Connect indicated that the South Australian interconnector limits in the PADR may be optimistic. There may be considerable issues with "loop flows" with the parallel operation of VNI, PEC, Heywood and the existing VNI. This could incorrectly increase the benefits of VNI compared with the benefits actually delivered.	Simon Bartlett (late submission), p. 4.	See Section 2.9.4.

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Comments on the identified need and the need to re-apply the RIT-T		
Mr Bartlett stated that the identified need technically requires VNI West to connect to the existing or anticipated 500 kV network in Victoria, the nearest point being the anticipated north of Ballarat substation.	Simon Bartlett (late submission), p. 3.	The identified need, as set out in the ISP, is not defined in terms of specific assets or network configurations. Further any additional project scope and the associated costs to connect to the anticipated terminal station north of Ballarat are included as part of the scope of this RIT-T assessment.
Compliance with NER clause 5.16A.4(o) and 5.16A.4(n) would define a change to the option in the PADR as a material change in circumstances, requiring the RIT to be re-applied, unless otherwise determined by the AER.	Simon Bartlett (late submission), p. 3.	AVP and Transgrid note that this RIT-T is still in progress and it would therefore not be possible to reapply the RIT-T to an assessment that is not yet complete. It is also noted that the option in the PADR (Option 1) has not changed, it is still being assessed. In response to points raised in PADR submissions, the analysis has been expanded to consider five new options. Moreover, AVP and Transgrid have extended the consultation process for this RIT-T, in response to stakeholder feedback at the December meeting, to consult on the five new options that have been developed.
Compliance with NER clause 5.15.4 (Z4) and 5.15.4 (z3) defines a change to the option in the WRL PADR as a material change in circumstances, requiring the RIT to be re-applied, unless otherwise determined by the AER.		The references to NER 5.15.4(Z4) and NER clause 5.15.4(z3) should be to 5.16.4 (z3) and (z4), that is, the material change in circumstances provisions for projects that are not actionable ISP projects. The NEVA Order issued on 20 February 2023 has the effect that the material change in circumstances provisions under the rules (clause 5.16) no longer apply.
Interaction with other major projects and policies in the NEM		
EUAA queried what benefits are included from the connection of HumeLink to EnergyConnect.	EUAA, p 9.	The assumed timing of other major transmission augmentations in the modelling (such as Project EnergyConnect and HumeLink) is based on timings in the 2022 ISP consistent with the actionable ISP framework. VNI West is an actionable ISP and based on the CBA Guidelines, the committed, anticipated and other actionable ISP projects including HumeLink and Energy Connect are required to be included in all states of the world (that is, the base case and VNI West options).
EUAA queried how consumers can be confident that the impact on claimed benefits of the combined connection of EnergyConnect and VNI West at Dinawan has been modelled correctly, given the historical high output correlation of VRE generation in parts of South Australia, Victoria and New South Wales.	EUAA, p 9.	The modelling considers all anticipated and actionable network augmentations in both the base and option cases (with the exception of the VNI West options) consistent with the actionable ISP framework. The modelling also models the variability of demand and renewable generation on an hourly basis for nine weather pattern reference years for all existing and anticipated projects at their installed location and sample locations within each REZ.
EUAA queried what the impact would be if Snowy 2.0 is delayed beyond the assumed commissioning date of December 2026.	EUAA, p 16.	While there is some interaction between the benefit expected from VNI West and Snowy 2.0, any delay of Snowy 2.0 up until 2030-31 (the earliest practicable commissioning date of VNI West) is not expected to impact significantly on the modelled benefits of VNI West since investors are considered to have already reflected the expectation of Snowy 2.0 into their plans based on the currently expected commissioning date and would be unlikely to alter their investment decisions in light of any realistic delay. Further, with the recent change in approach to carbon budgets applied in the new option assessment, there are now few anticipatory benefits associated with VNI West, and therefore

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		the benefits before VNI West commissioning would be relatively insensitive to changes in Snowy 2.0 timing.
Supported the inclusion of the Dinawan to Wagga Wagga portion of EnergyConnect as part of the analysis in determining market benefits of VNI West	ENGIE, p 3.	AVP and Transgrid have modelled the Dinawan to Wagga Wagga portion of EnergyConnect as being built and operated at 330 kV under the base case (as opposed to being built to 500 kV but initially operated at 330 kV as in the PADR). This enables both the costs of operating this portion at 500 kV and the associated benefits to be captured in the VNI West RIT-T assessment.
Transgrid's TAPR proposes VNI West, HumeLink and EnergyConnect to be bundled for completion for 2028, three years earlier than proposed in the PADR and achieve cost savings. But 1) there is no point in advancing the New South Wales section of VNI West without also doing likewise for the Victorian section, and 2) the latest timing announcement warrants a revision of the PADR and its modelling.	Ted Woodley, p 10 and 11.	The RIT-T assessment assumes the same timings for these projects as the 2022 ISP, which ensures consistency between the assumptions in the RIT-T and those to be used in applying the feedback loop ahead of the initial CPA for this project. Transgrid and AVP are working together on an aligned delivery strategy and assessment of delivery time, considering PADR submissions and risk of early retirement of coal-fired generation.
Consider how VNI West will integrate with future Victorian projects, and maximise the benefits to Victorian and NEM consumers, including opportunities to lift the thermal capacity and resilience of the overall network through integrated design approaches.	AusNet, p 9.	The design of VNI West will incorporate provisions for future Victorian projects. Specifically, new terminal stations will be designed with allowances made for future expansion for new renewable energy connections and regional load growth. The thermal capacity of the new lines will also be carefully selected to balance future needs with limitations on the existing network.
Sensitivity should be conducted on different timings of full commissioning for EnergyConnect, WRL, and HumeLink, as well as impact if Snowy 2.0 is delayed beyond December 2026. EUAA wanted to understand the methodology that would be adopted for these sensitivities.	EUAA, p 16 and 17.	The assessment assumes the same timings for these projects as the 2022 ISP, which ensures consistency between the assumptions in the RIT-T and those to be used in applying the feedback loop ahead of the initial CPA for this project. This aligns with the AER's CBA Guidelines to use ISP parameters unless there is a demonstrable reason not to. The impact of any delays to other major NEM projects like EnergyConnect and HumeLink, or VNI West itself, on these early benefits is considered to be minimal, since investors are considered to have already reflected the expectation of these investments into their plans based on the currently expected commissioning dates and would be unlikely to alter their investment decisions in light of any realistic delays. Moreover, EnergyConnect and HumeLink are expected to be commissioned significantly ahead of VNI West and so any realistic delays are not expected to result in them being commissioned after VNI West. While there is some interaction between the benefit expected from VNI West and Snowy 2.0, any delay of Snowy 2.0 up until 2030-31 (the earliest practicable commissioning date of VNI West) is not expected to impact significantly on the modelled benefits of VNI West, since investors are considered to have already reflected the expectation of Snowy 2.0 into their plans based on the currently expected commissioning date and would be unlikely to alter their investment decisions in light of any realistic delay. Further, with the recent change in approach to carbon budgets applied in the new option assessment, there are now few anticipatory benefits associated with VNI West, and therefore the benefits before VNI West commissioning would be relatively insensitive to changes in Snowy 2.0 timing.

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Mr Woodley enquired as to what the claimed benefits are in the VNI West PADR from connecting Snowy 2.0, and whether the benefits have already been claimed by other transmission projects.	Ted Woodley, p 8.	The RIT-T modelling includes Snowy 2.0 and the other anticipated or actionable ISP projects that are included in the 2022 ISP optimal development path in both the counterfactual base case and the option cases. This means that only the *incremental* costs and benefits of the VNI West options are captured in the modelling. This approach has been applied in RIT-Ts for other major transmission projects such as Marinus Link and HumeLink and is consistent with the actionable ISP framework. Snowy 2.0's capacity factor with and without VNI West varies only marginally. Market benefits of VNI West associated with Snowy 2.0 are related to more efficient utilisation rather than increased utilisation of Snowy 2.0. However, these benefits have not been isolated and quantified separately.
Enquired about the confidence proponents can be provided that the benefits to New South Wales REZs are not already counted in the NSW Roadmap and Victorian REZs will only be counted as part of the VicGrid initiative.	EUAA, p 9.	Both the NSW Roadmap and VRET (including VRET2) are modelled as minimum requirements to be met in both the base case and the option cases. The benefits of each credible option are computed as the difference between these two cases, meaning that it is only the incremental impact of each option that is captured as a benefit. Put another way, the benefits of the options are incremental to any benefits from the NSW Roadmap and Victorian REZs (the benefits of which are not directly estimated as part of this RIT-T process but, instead, have been considered by the relevant state governments).
Asked what 'delivered in a timely manner' means for HumeLink and the WRL.	EUAA, p 2.	'Delivered in a timely manner' means delivered at the time stated in their respective programs.
Queried the current assumptions on full commissioning of EnergyConnect, the WRL and HumeLink.	EUAA, p 2.	The assumed timings of anticipated or actionable ISP projects are based on the timings in the 2022 ISP, with the exception of WRL. The assumed timing of WRL in the new options assessment is outlined in the Consultation Report, along with an explanation for why the timing has been varied.
AusNet suggested AVP clarify whether government policy such as the Victorian Government's Offshore Wind Targets, REZ Development Plan and VTIF have been included as inputs into the RIT-T, and how they might impact the costs and benefits of VNI West. Similarly, EGA was concerned the wholesale market modelling does not include Gippsland offshore wind in the *Step Change* scenario, and raises the issue of how VNI West can support the objectives of the Victorian Government, and what it means for Victoria's energy future, economic development, job opportunities and ability to meet legislated climate change objectives. QUEN noted VNI West RIT-T modelling does not include consideration of offshore wind. Given the social licence for undersea transmission to facilitate offshore wind might be more palatable than onshore transmission, the impact of offshore wind development on VNI West benefits should be considered.	AusNet, p 9. EGA, p 6 and 8. QEUN, Energy Consumer Submission Forum, p 3.	In light of the increased government support for Victorian offshore wind since the PADR (including the Victorian Government developing offshore wind targets and concessional finance under the Rewiring the Nation plan), as well as the various points raised in submissions to the PADR regarding these developments, in the Consultation Report AVP and Transgrid have investigated a sensitivity that assumes significant Victorian offshore wind development going forward, consistent with the Victorian Government's targets. As the policy is not yet legislated, it does not satisfy the 'policy commitment criteria' necessary for inclusion in the core RIT-T analysis. The Victorian Government's REZ Development Plan and VTIF are also not explicit inputs to the RIT-T analysis (nor to the 2022 ISP) due to them not being firm instruments at this stage. For example, the REZ Development Plan focuses on transmission network development within Victorian REZs but is currently only at the stage of considering potential projects, while the VTIF is a potential new framework for how transmission infrastructure is to be planned and developed but is currently only at the consultation stage.

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The identified need for VNI West is contradictory since maintaining reliability of supply in Victoria while seeking to transfer renewable energy from other states results in an increased reliance on transmission capacity rather than ensuring supply through more generation in Victorian REZ. Proposed a state network of battery storage, offshore wind, onshore wind and solar in reducing the need for interconnectors.	Hepburn Shire Council, p 6 and 7.	Increased interconnection is expected to improve the reliability and security of supply through resource sharing (including demand diversity and sharing of reserves and locational diversity of variable renewable resources). The market modelling considers many different combinations of generation, storage and transmission in a co-optimisation to determine the most efficient investment outlook. Based on current cost projections for the various technologies, as reported in the latest IASR, the modelling has determined that building VNI West as part of the future technology mix delivers a lower total system cost than the proposed alternative of local generation and storage (which is effectively the counterfactual without VNI West).
Queried how the methodology and results are consistent with Federal and State Government energy and emissions policy, including how the profile of emissions resulting from the deferral of renewables is consistent with Federal Government's 2030 emission targets and state-based renewable energy targets for 2030.	EUAA, p 16.	The modelling has adopted the carbon budget constraints, as well as the state-based renewable policies as defined by AEMO in the IASR for the scenarios specified by AEMO for use in the VNI West RIT-T. This is the RIT-T process required for actionable ISP projects. Although some renewable investment is forecast to be deferred with VNI West, there is significant build of renewables forecast in the base case and with VNI West options. Modelling outcomes show that all the emissions targets for different states as well as the new federal emission policy in 2030 are met with the VNI West options and in the base case. The market modelling report accompanying the Consultation Report includes an assessment of forecast market outcomes against announced renewable generation and emissions policies that were not committed at the time of modelling; many are met as part of the least-cost outcome even when not imposed as an input assumption in the S*tep Change* scenario. As a result, inclusion in scenario input assumptions would not impact forecast outcomes. The exception to this is the as-yet unlegislated Victorian offshore wind target of 9 gigawatts (GW) by 2040; this is modelled as a sensitivity in the Consultation Report. The change in carbon budget modelling approach for the Consultation Report also limits the deferral of investment in renewables prior to 2030. This change in carbon budget modelling approach was in response to stakeholder concerns regarding the size of anticipatory benefits determined in the PADR (see Section 2.9.1)
Queried how the methodology and results are consistent with clear state government policies to fast-track building state-based renewable generation to meet 2030 interim emission targets.	EUAA, p 16.	
It is clear the Victorian Government has made significant commitments to transition away from gas, while progressing both onshore REZ and offshore wind development, regardless of any investment in VNI West. Therefore, the VNI West RIT-T cannot claim its development will defer or avoid further investments and cannot claim the associated benefits.	EGA, p 8. VEPC, p 5.	VRET (including VRET2) is modelled as a minimum requirement to be met in both the base case and the option cases. The benefits of each credible option are computed as the difference between these two cases, meaning that it is only the incremental impact of each option that is captured as a benefit. Put another way, the benefits of the options are incremental to any benefits from these state policies, and any deferral or avoidance of investment would reflect a more cost-efficient way to utilise renewable generation (with less spill) and meet (and even overachieving) the committed policies. The modelling assumptions are based on the IASR and the modelling meets (and even exceeds) the state-based renewable energy targets in the base case simulations and VNI West simulations. New gas in the base case, some of which is avoided with the options in place, is also required to maintain the reserve requirement and with the VNI West upgrade it is forecast this requirement could be met by resource sharing with other states. The use of gas does not result in emissions exceeding the carbon budget.

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Mr Bartlett stated that section 4.3.2 of the AER RIT-T Guidelines, requires the base case to be "business as usual with no significant investment" to be consistent with NER clause 5.15A.3(b)(1) and RIT-T paragraph 7. He stated that this is to ensure that VNI West's benefits only relate to VNI West and that they are correctly assessed compared with not implementing VNI West and that benefits are not over-stated. He further stated that this prevents crediting VNI West with market benefits for avoiding/deferring any future ISP projects or future REZ transmission investments.	Simon Bartlett (late submission), p. 1.	The reference cited by Mr Bartlett relates to reliability corrective action RIT-Ts. This VNI West RIT-T assessment is being undertaken to provide net market benefits and is an actionable ISP project, and so this guidance is not applicable. The reference is therefore not relevant. Note that the market modelling, in accordance with the RIT-T instrument and AER CBA Guidelines for actionable ISP projects, adopts the committed, anticipated and actionable ISP projects from the 2022 ISP in all relevant states of the world. See Section 2.7
Mr Bartlett notes that section 8.2 of the PADR stated "in this RIT-T assessment, other major transmission projects identified in the ISP ODP are assumed to be developed in all 'states of the world', including the counterfactual". He stated that this causes the benefits of every project in the ODP to be credited to VNI West.	Simon Bartlett (late submission), pp. 1-2.	AVP and Transgrid note that, taken in isolation, the quoted sentence from the PADR is not clear as all projects from the ODP were not included in all states of the world (rather, only the committed and anticipated actionable ISP projects and two future projects). The inclusion of specific projects from the 2022 ISP was covered in the EY wholesale market modelling report.
Mr Bartlett considers that an unrealistic operation of Snowy 2.0 may have exaggerated the benefits and refers to a report submitted by Ted Woodley in December 2022 outlining his concerns with the apparent high annual capacity factors for Snowy 2.0. Mr Bartlett suggests that the inclusion of approximates of realistic bidding are required to obtain realistic dispatch in the market modelling, especially for peaking plant (OCGT's and PHES) as well as realistic forecasts of future wholesale electricity prices and to check whether investors in new generation/storage infrastructure would earn a commercial return on their investment.	Simon Bartlett (late submission), p. 4.	Operation of Snowy 2.0 including snowy scheme is discussed in section 2.9.2. Snowy 2.0's capacity factor with and without VNI West varies only marginally. Market benefits of VNI West associated with Snowy 2.0 are related to more efficient utilisation rather than increased utilisation of Snowy 2.0. However, these benefits have not been isolated and quantified separately. With respect to the capacity factors achieved by Snowy 2.0 in the modelling – these outcomes represent the most efficient dispatch within the operational constraints of the scheme, as provided by the IASR. EY also models a more granular network representation (as discussed in the EY report) in the Snowy area. Furthermore, planned and unplanned outages of all snowy scheme generators including Snowy 2.0 generator and pump are modelled, using IASR data. If there are other operational constraints not currently captured in the IASR data, these would not flow through to this analysis either. AVP and Transgrid are not aware of any specific constraints due to the design of Snowy 2.0 that are not included in the IASR, but if evidenced and confirmed by the asset owner, these could be included in future modelling. In the additional options analysis, with the changes in the methodology including treatment of carbon budget, the average capacity factor for the base case, Option 3A and Option 5 for the years after VNI West commissioning (2031 in the Step Change scenario) averaged around 20% (for generation) (see Figure 3) Regarding the use of realistic bidding in the wholesale market modelling, please see the response below to the point Mr Bartlett raised regarding the use of realistic bidding.
Increase in emissions		
The model looked for the highest value way of using a positive emissions balance between 2035 and 2048 in the immediate future and opted for additional coal generation to maintain the so-	Ted Woodley, p 7.	Following the PADR consultation, a different carbon budget approach has been adopted which is more aligned with the ISP Parameters, and stakeholders view, as detailed in Section 2.8.2

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called 'emissions constraint'. This then enables the deferral of renewables/batteries. Mr Woodley enquired how the model is operated and how it relates to the real world.		
VEPC noted the counterfactual adopted has more coal generation than in the VNI option cases, which creates more headroom for gas generators, and allows benefits from deferring generation and storage investments. Avoided fuel benefits then arise because there is more headroom for gas generators. However, the counterfactual against which VNI West's benefits are established is not consistent with governments' emission reduction policies and therefore inflates the purported benefits of its preferred option. Mr Woodley expressed similar observations that increased emissions (an extra 17.5 terawatt hours [TWh] of coal generation, 16 million tonnes of CO2 emissions) is inconsistent with government policy but is used as a justification for VNI West.	VEPC, p 3 and 4. Ted Woodley, p 6.	
Deferral of renewable generation		
Noted that VNI West would defer some renewable generation and raised the issue of whether VNI West serves to stifle immediate and future development of renewables within the state. Mr Woodley also found the slower transition from coal to renewable generation questionable and running counter to government policy, noting that "it seems incomprehensible that VNI West is being justified on the basis it will result in 14 TWh less generation from wind and solar through to the mid-2030s."	EGA, p 6 and 7. Ted Woodley, p 1.	VNI West increases interconnection between Victoria and the rest of the NEM, allowing a greater utilisation of existing and new renewable and other generation/storage resources in the NEM to supply demand while meeting all relevant network, generator and policy requirements. While the PADR modelling forecast that VNI West allows existing coal generation to be utilised more efficiently in the next decade than under the base case, the carbon budget was met under both cases in all scenarios as the upgrade was forecast to unlock existing and new renewable generation, and committed renewable energy policies were also met with VNI West. In the updated modelling for the Consultation Report, (a) a modification to the carbon budget modelling to limit the effects of perfect foresight and (b) alignment of coal retirement dates in the base and option cases means that forecast deferral of investment in renewable generation through to the mid-2030s is reduced. (see section 2.8.22.8.2 for more details) The quoted 14 TWh reduction in wind and solar generation NEM-wide to 2035-36 (PADR, *Step Change* scenario outcomes) is actually a 10.6 TWh reduction if the *increases* in wind generation that occur in some years during this period are correctly included (this represents a 0.7% decrease in wind and solar generation NEM wide relative to the base case). Put another way, the 14 TWh is just the sum of the *decreases* over this period and does not include the increases that also are modelled over this period. In the additional options analysis *Step Change* scenario, Option 3A has a 3.7 TWh decrease in wind and solar generation to 2035-36 relative to the base case. This is a 0.2% decrease in wind and solar generation NEM wide. AVP and Transgrid therefore believe that the changes to the carbon budget approach has led to results that are more intuitive, more consistent with the 2022 ISP and stakeholder expectations and more aligned with government policy intent.

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The base case renewable projects that are not built prior to 2031-32 would have been mainly located in Victoria. The model then assumes they will be replaced by higher quality projects in windier and sunnier locations in New South Wales and northern Victoria after 2031-32, once VNI West is built. Mr Woodley queried what the basis is for this assumption and how realistic is it. Further, he queried whether it is feasible to assume that the Victorian Government would support less wind and solar projects being built in Victoria prior to 2031-32, so that higher quality projects can be built in New South Wales and northern Victoria next decade.	Ted Woodley, p 7.	The model is aimed at supplying NEM demand while meeting other requirements at the least cost in each case. All legislated state-based renewable targets are met (and even exceeded) both with VNI West and in the base case – including the renewable energy targets in Victoria. This was true in the PADR forecast outcomes and is also true in the forecast outcomes in the Consultation Report. In the forecast outcomes in the Consultation Report, the changes to market modelling (using decadal emissions budgets and fixing coal withdrawal dates between base cases and options) have limited the deferral of investment in renewables in Victoria prior to 2031-32. In fact, in the *Step Change* scenario with Option 3A, there is now a slight acceleration of wind investment in Victoria to give 400 MW additional wind capacity in Victoria in 2031-32. AVP and Transgrid therefore believe that the changes to the carbon budget approach has led to results that are more intuitive, more consistent with stakeholder expectations and more aligned with government policy intent.
Mr Woodley said: "How can building VNI West be justified if it results in a net cost to consumers, a slower transition to renewables, a greater use of coal, and higher emissions? Such outcomes are the very antithesis of government policies". VEPC commented that grandiose projects like VNI West that have adverse emission impacts and make no appreciable difference to renewable electricity generation, relative to the counterfactual, should make way for transmission augmentations that will quickly deliver more renewable generation and that will quickly reduce emissions.	Ted Woodley, p 2. VEPC, p 8.	The options do not result in a net cost to consumers as stated by Mr Woodley The options are forecast to allow the NEM to meet emissions reduction constraints at lower total system cost, and in the Consultation Report, produce a net increase in renewable generation in most modelled years (*Step Change* scenario, Option 3A relative to base case). Investment in renewable capacity is lower in this option relative to the base case, but still significant and in line with or in excess of committed targets in all scenarios as well as many announced but as-yet unlegislated targets. Lower capacity generates capital cost savings because demand and policy constraints can be met at lower cost as the options give access to higher quality resources, allowing sharing diverse resources to serve diverse loads, and reduce renewable spill.
Increase in renewable generation		
VNI West will support the development of additional renewable generation in Western Victoria and Southern New South Wales.	Snowy Hydro, p 4.	This is correct and aligns with the wholesale market modelling forecast outcomes showing increased renewable capacity and generation in the South-West NSW and Western Victoria REZs as well as Murray River.
AEMO's data on solar generation in the Murray and Central North Victoria REZs does not include a number of current and future pockets with planning approval and therefore underestimates the generation capacity in this region.	CVGA, p 4.	The modelling applies the build limits as well as renewable capacity factors as provided by the 2022 ISP. Consistent with the ISP assumptions, the resource limits are able to be increased at the cost of land penalty cost. The modelling also includes all committed and anticipated generation and storage projects, as advised by the proponents through AEMO's generation information survey. The modelling shows significant build in these REZs with VNI West. While VNI West enables more build in Murray River and less in Central North Victoria, compared to the base case in all scenarios, there is still significant build in Central North Victoria in the VNI West case (for example, in the *Step Change* scenario, there is 1.5 GW of new wind forecast and 0.8 GW of new solar forecast by the end of the assessment period with Option 3A, 1.6 GW of new wind and 1.5 GW of new solar with Option 5).

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	DER / decentralisation of grids	
Queried how the PADR/RIT-T addresses a high distributed energy scenario where energy is increasingly met through local demand, thereby reducing the need to import power from further away.	CVGA, p 4.	Each ISP scenario has different demand forecast trajectories including different levels of rooftop PV, electric vehicles and domestic storage. Detailed data can be found in AEMO's forecasting portal[86]. A description of AEMO's expected uptake of distributed energy resources can be found in the ISP 2022 (Section 3.1).
Questioned how much consideration has been made to future proof VNI West given an increasing number of properties are off-grid.	Norman Walker, p 1.	Three ISP scenarios have been modelled consistent with the actionable ISP framework, the RIT-T instrument and the CBA Guidelines.
	Need to capture different emissions trajectories under the NPV analysis	
Queried why the proponents have a value of carbon emissions that is not time dependent.	EUAA, p 16.	AVP and Transgrid note that the time value of emissions does not feature in the RIT-T (or ISP) and so has not been assessed. There is also no carbon price established in Australia. In lieu of any carbon price, a carbon budget is modelled as a constraint, as defined in the ISP for each scenario, and the model meets the specified carbon budget in each scenario at least cost in each scenario's base case and with all options, which may be by either building new lower emissions plant or by reducing the operation of higher emissions plant (or both). The AEMC recently noted as part of its draft report for Stage 3 of the Transmission Planning and Investment review that it will continue to monitor developments with respect to climate legislation and the addition of an emissions objective in the NEO to ensure emissions abatement continues to be appropriately factored into transmission planning in the future. The AEMC states that, depending on the form of the emissions objective and how it is applied in practice, it may be appropriate for emissions abatement to be explicitly valued in the ISP/RIT-T, even if there is no legislative mechanism that sets a formal price on emissions[87]. However, AVP and Transgrid note that any such change in the future is not relevant to this current RIT-T. Irrespective of these points, the changes to market modelling in the Consultation Report (in particular the modification to the carbon budget modelling to limit the effects of perfect foresight and the alignment of coal retirement dates in the base and option cases) mean that the forecast emissions in the base and options cases are now more consistent and any potential impacts of time value of emissions would not be material.
AEMO/Transgrid has not accounted for the time value of emissions. Calculating a social cost of carbon, it was found there was a net emissions cost that is, detriment) because the VNIW West increases greenhouse gas emissions for the first 12 years relative to the counterfactual. Accounting for time preferences by discounting future emissions costs, the social cost of emissions ranges between $186 million and $1,975 million for the *Progressive Change* and *Step Change* scenarios. Mr Woodley also raised the issue of time value of emissions as an issue, observing that additional emissions at the start of the period have far greater impact on climate change than equivalent reduced emissions decades later, even if the net is zero.	VEPC, p 4. Ted Woodley, p 7.	
If VNI West is delayed, coal generation will need to run harder up to 2030, working against the Victorian Government's goal in reducing carbon emissions. QEUN queried the cost-benefit assessment and how environmental benefits are accounted for given possible delays and continued reliance on coal generation.	QEUN, Energy Consumer Submission Forum, p 2.	Following the PADR consultation, a different carbon budget approach has been adopted which is more aligned with the 2022 ISP Parameters, and stakeholders view, as detailed in Section 2.8.2. As a result, differences in coal generation up to 2030, with and without VNI West, are no longer significant.

[86] At http://forecasting.aemo.com.au.

[87] AEMC, *Transmission Planning and Investment – Stage 3*, Draft Report, 21 September 2022, p. 63.

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Expressed concern about the 'bogus' counterfactual in which AEMO/Transgrid assume less coal generation if VNI West is not built than if it is built (755 TWh for counterfactual versus 772 TWh if VNI West is built). Suggest this leads to a result where coal plant retires more slowly under VNI West and there is additional gas plant, which is inconsistent with government policies.	VEPC, p 6 and 7.	
Comments on the wholesale market modelling (outside of those covered elsewhere in this table)		
Concern about the counterfactual base case		
Noted the PADR has not defined a realistic counterfactual in the context of key recent developments. The counterfactual has not accounted for the likelihood of Victoria and NSW developing their own strong REZs and networks. The counterfactual has not adequately considered the Victorian State Government's progression of VicGrid and the proposed VTIF, offshore wind policies, Gippsland REZ, Jeeralang battery or the NSW Electricity Infrastructure Roadmap.	Moorabool and Central Highlands Power Alliance, p 13 and 15.	The assumptions and methodologies regarding government renewables policies in the base case align with those developed, and consulted on, by AEMO as part of the IASR for the 2022 ISP. The inputs include legislated state renewable energy targets – the Victorian Renewable Energy Target (both VRET and VRET2), Queensland Renewable Energy Target (QRET), and Tasmanian Renewable Energy Target (TRET) – as well as the renewable energy zones set out in the NSW Electricity Infrastructure Roadmap and the NEM-wide carbon budget. In light of the increased government support for Victorian offshore wind (including the Victorian Government developing offshore wind targets), as well as the various points raised in submissions to the PADR regarding these developments, AVP and Transgrid have investigated a sensitivity that assumes significant Victorian offshore wind development going forward. The Victorian Government's REZ Development Plan and VTIF are not explicit inputs to the RIT-T analysis (nor the 2022 ISP) due to them not being firm instruments at this stage. For example, the REZ Development Plan focuses on transmission network development within Victorian REZs but is currently only at the stage of considering potential projects, while the VTIF is a potential new framework for how transmission infrastructure is to be planned and developed but is currently only at the consultation stage. The Jeeralang battery has not been included in the modelling assumptions, consistent with those used for the 2022 ISP. In the new options assessment recently announced advancement of expected closure dates for Loy Yang A and Torrens Island B have been included in all states of the worlds, including the counterfactual, to maintain relevancy.
Concerned that reducing the need for renewables in Ovens Murray, Wagga Wagga, Gippsland, Fitzroy and Central Highlands REZs is not a likely outcome considering developments that are already occurring in New South Wales and Victoria that the ISP is not driving, such as the Gippsland REZ in Victoria's Latrobe Valley.	EGA, p 8.	VNI West is expected to result in higher quality (with better transmission access) renewable investments replacing lower quality REZs (which also need transmission upgrades) and reduced renewable spill. Legislated state renewable energy targets are met in all scenarios in the base case and with VNI West. Although there is a forecast reduction in renewable build in these REZs in the VNI West relative to the counterfactual base case in the PADR outcomes and modelling for the Consultation Report, the market modelling still forecasts significant build of wind and solar in all these REZs. While offshore wind is allowed as an option in the core simulations which can be built if it is least cost to do so, sensitivities have been modelled to lock in Victorian offshore wind policy in the base case and VNI West options. Refer to the market modelling report for further

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		information and outcomes for these sensitivities.
Consistency with the CBA Guidelines and the 2022 ISP		
Queried how the methodology and results are consistent with the 2022 ISP.	EUAA, p 16.	A wholesale market modelling approach similar to the approach used in the 2022 ISP has been applied to estimate the market benefits associated with each credible option included in this RIT-T assessment. The separate market modelling report outlines how the modelling methodology and results align with the 2022 ISP.
Queried how the results are consistent with the AER CBA Guidelines.	EUAA, p 16.	AVP and Transgrid are satisfied that everything has been done in accordance with the Rules, the RIT-T and the AER's CBA Guidelines and the February 2023 NEVA Order. The PACR will have a detailed compliance checklist.
How benefits arise ahead of investment in VNI West		
EUAA questioned how benefits can accrue before the project is even approved and enquired as to the evidence proponents have that renewable developers will defer their projects in anticipation of VNI West even before VNI West capex is approved by the AER. Similarly, Mr Woodley found it questionable that $0.7 billion of benefits accrued in the three years before VNI West is expected to be approved, and $1.9 billion of benefits is accrued before commissioning, and noted that pre-commissioning benefits were twice the benefits accruing over the following 16 years when VNI West is operating.	EUAA, p 16. Ted Woodley, p 1.	This was a feature of the PADR forecast outcomes and how the effect is reduced in the current modelling through changes in carbon budget modelling approach is outlined in the modelling report. Following the PADR consultation, a different carbon budget approach has been adopted which is more aligned with the ISP parameters, and stakeholders view, as detailed in (section 2.8.2). There was also an apparent misinterpretation by submitters to the PADR in terms of the avoided capital cost benefits and when they are expected to accrue. In light of this, AVP and Transgrid have revised the presentation of the results in the Consultation Report to present these benefits on an annualised basis now (which is also how they are presented in the ISP). See Section 3 of the Consultation Report and Section 2.9.1 of this report. The figures referenced by Mr Woodley have been calculated using the lump sum savings in the year the capacity is avoided rather than the savings on annualised basis. If the annualised basis was used instead, the total benefits estimated in the PADR *Step Change* scenario for Option 1 before VNI West is commissioned are only around $350 million (compared to the $1.9 billion quoted by Mr Woodley) and only represent 12.7% of the total benefits estimated over the course of the assessment period. In the modelling for the Consultation Report, the total gross market benefits for Option 5 in advance of VNI commissioning in the *Step Change* scenario are $179 million, representing 4.5% of total forecast market benefits over the course of the assessment period. Moreover, and as outlined in Section 2.9.1, the choice between the two approaches is purely presentational and has no bearing on the overall net benefits of the options, on a present value basis.
EUAA queried why VNI West is not deferred beyond the 2031-32 commissioning date if the benefits of deferral are so great. Mr Woodley also asked why, if VNI West defers renewable generation and batteries (and gives rise to avoided cost benefits), not push back VNI West's commissioning beyond 2031-32, so the benefits from avoided generation/storage costs last longer and	EUAA, p 16. Ted Woodley, p 5.	It is not true that forecast benefits of VNI West in advance of commissioning would continue to accrue, or accrue at the same levels, if VNI West itself was delayed, because the impact on investors' decisions would then also be different. Moreover, and consistent with the actionable ISP framework, AVP and Transgrid have applied the optimal timing for VNI West as determined in the 2022 ISP for each scenario.

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accumulate even more savings, noting that existing coal generation could then be run even longer and harder, further putting off the need for, and cost of, renewables.		
Questioned how the proposed building of VNI West influences the developers of renewable generators and batteries to defer their construction, what specifically will stop these developers from proceeding anyway, and whether the knowledge that VNI West was to be built be an encouragement to proceed rather than delay building renewables and storage, as there will be more interstate transmission capacity for their use.	Ted Woodley, p 5.	Even though there is some deferral of renewable investment in the states of the world with VNI West, there is significant investment in renewables in the base case and with the VNI West options. For example, in Option 3A in the Step Change scenario the modelling for the consultation report forecasts that Victoria requires up to around 30 GW of non-committed/new capacity, including 11.5 GW of solar, 11.2 GW of wind and 3.7 GW of storage (both large-scale battery and PHES). In addition, the modelling outcomes forecast that all the recent announced Victorian emissions targets by 2030 and 2035 are overachieved in the base case and VNI options. For details, refer to the market modelling report. The proposed construction of VNI West is expected to influence the decisions of the developers of renewable generators and batteries on where to build and, in some cases, to defer or avoid their construction. Specifically, it is expected to result in higher quality (with better transmission access) renewable investments replacing lower quality REZs (which also need transmission upgrades) to meet overall state and federal emissions targets. The model forecasts an increase in renewable capacity in REZs directly benefitting from improved transmission access with VNI West. AVP and Transgrid note that this is not unrealistic in the market and has been the case historically. Examples include the renewable development in south-west New South Wales and South Australia in anticipation of EnergyConnect and the operation of deep storage hydroelectric plant in anticipation of policy changes.
The PADR states that "avoided/deferred generation and storage capital costs … are primarily driven by deferred/avoided investment of large-scale storage and gas as well as some early deferral of predominantly wind capacity". But the PADR spreadsheets show no change in gas capacity pre-commissioning. In fact, there is no alteration in gas capacity until 2035-36, when 672 MW of open-cycle gas turbine (OCGT) plant is not required due to VNI West.	Ted Woodley, p 6.	The observation that no gas capacity in deferred until 2035-36 in the PADR *Step Change* scenario forecast is correct. The wholesale market modelling in the PADR forecast no investment in new gas capacity in the base case until 2035-36 and so no deferral is possible before this date. The statement quoted from the PADR was correct as it did not include any information about the timing of the capital cost benefits.
Costs associated with generation and storage should be taken into account		
With respect to costs, the calculation that should have occurred is the transmission investment cost, plus all other future generation and transmission costs that will arise as a result of that investment, set against the cost of all the other investments that would occur if the transmission was not built.	EGA, p 10.	EGA is correct that the costs of the investments that would need to occur (including generation and storage costs) should be included in the analysis, and this is the case. The approach used in the modelling includes all the relevant costs for both the option cases and the base case. Each case has its own cost to supply demand while maintaining constraints such as emissions reduction and renewable energy targets, and subject to the assumed fixed and variable costs of operating new and existing capacity and the capital and operating cost of new investments (generation, storage and transmission). The difference between the total system costs of the base case and an option case (excluding the direct cost of that option) represents the gross market benefits of that option (and is captured in the benefit categories
The PADR recognises that avoiding investment in generation and storage is a benefit, acknowledging there is a cost associated with this investment. EGA was therefore concerned that the PADR does not include the costs (capex or opex) of these investments	EGA, p 9.	

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when the increased generation capacity and associated investment is needed to facilitate VNI West.		'avoided fuel costs' and 'avoided generation/storage costs (excluding fuel costs)'). The net market benefits are then calculated by subtracting the direct cost of the option.
Specific questions regarding the estimated market benefits (outside of those summarised elsewhere)		
The VNI West PADR indicates a transfer capacity from Victoria to New South Wales of 1,930 MW and from New South Wales to Victoria of 1,800 MW. These transfer capacities avoid or defer the capital costs of new generation in both Victoria and New South Wales. The greater the assumed transfer capacity in both directions, the greater the benefits. VNI West PADR may be over claiming benefits. EGA suggested the calculation that should have occurred is the calculation of the 'net' transfer capacity, being 130 MW (1,930 – 1,800), not 3,730 MW (1,930 + 1,800).	EGA, p 5.	AVP and Transgrid note that the increases in transfer capacity between the states quoted in the PADR were only indicative and provided to illustrate the notional differences between maximum flows in each direction with each option. The actual wholesale market modelling is conducted on an hourly basis and the transfer limits between Victoria and New South Wales (and on intra-regional links in Victoria and Southern New South Wales) are considered for each hourly interval. In each interval, the VNI and other link flows can be only in one direction, but limited within the bounds of the available transfer limit, meaning that the annual net flow is different depending on the flow in each hour (but could even be close to zero for some years).
Transgrid did not undertake stakeholder engagement on the inclusion of competition benefits for HumeLink, which was not considered good practice by the AER. EUAA asked what guarantees the project proponents can provide that they will not seek to include competition benefits at the PACR stage, if the proponents determine to include competition benefits in the PACR, and whether the proponents can guarantee effective consultation will be undertaken regarding this prior to publication of the PACR.	EUAA, p 12 and 13.	Competition benefits have not been included in this RIT-T analysis.
Questioned why a 'less frenetic' transition is seen as a benefit for consumers when we are continually being told by AEMO and various governments that we need to transition quickly. Mr Woodley noted the 'less frenetic' transition would result in more coal generation, slightly more solar and slightly less wind, which is viewed as not a positive outcome.	EUAA, p 16. Ted Woodley, p 6.	The modelling forecasts that commissioning of VNI West is of benefit to consumers because it allows the NEM to maintain sector emissions within the emissions budget at lower system cost than without VNI West. In the modelling for the Consultation Report, coal withdrawal dates are fixed between base cases and options based on the scenario-specific ISP 2022 outcomes. In the context of the current market environment, the scale of development needed in the next decade, the continued acceleration of thermal generation withdrawals, supply chain constraints, workforce limitations and project delays, and limitations with the operational tools currently available to AEMO to operate the system in periods of high instantaneous renewable penetration, the pace of the transition is important. AVP considers that a faster, more 'frenetic' and less coordinated transition that sees more coal close before 2030 while emitting the same amount of greenhouse gases in total to 2050, could challenge AEMO's ability to maintain the system securely and reliably, and lead to inefficient investment.
The PADR estimates cumulative gross benefits of $2.8 billion by 2047-48 and $0.5 billion thereafter. Both estimates appear to be wildly overstated. Rather than having a modelled net benefit of $0.9 billion, VNI West looks almost certain to result in a substantial negative net benefit.	Ted Woodley, p 10.	The results show strongly positive net benefits for all options.
If up to 94% of gross benefits are derived from avoiding or deferring generator, storage or transmission investments, EGA	EGA, p 9.	AVP and Transgrid are unaware of AEMO or the AER undertaking a retrospective assessment of whether the modelled sources of market benefit for a RIT-T have been considered to have

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would like to understand what mechanisms AEMO or the AER will be putting in place to monitor, report and regulate the future avoidance and/or deferral of such investments.		arisen or not. AVP and Transgrid note that this would be an extremely complicated exercise given the need to consider the counterfactual, that is, what could AVP and Transgrid expect to have happened in the absence of the investment. Moreover, AVP and Transgrid are not convinced that undertaking such an exercise would be helpful as a multitude of things can change going forward, including things that were not contemplated when preparing the RIT-T and ISP (where the RIT-T assumptions are drawn). The purpose of the RIT-T is to make a decision today, in light of the best information and taking into account the uncertainty going forward, that is expected to maximise the net market benefits to the NEM.
Enquired as to whether the decision to build VNI West had already been made. Questioned what is really under consideration in the RIT-T given AEMO/Transgrid assume that VNI West will be built and also investors are already convinced of this and so are altering their investment decisions now.	VEPC, p 7.	The decision to build VNI West has not been made and is subject to the RIT-T process and other regulatory and environmental processes. The base case for each scenario does not assume VNI West consistent with the actionable ISP framework. The difference between the base case and the option cases is what drives the benefits of the options.
Mr Bartlett suggests that the suggested non-compliances with the estimated benefits from REZ transmission deferrals and interconnector limits could lead to an incorrect generation development program where REZ's with higher wind/solar resources are incorrectly developed by forcing REZ transmission investments and there is excessive peaking plant operation (i.e. OCGT's and PHES) towards the end of the study period. The EY report claims VNI West unlocks diverse VRE resources, however this is incorrect as it requires interstate investments in REZ transmission which has been non-compliantly and incorrectly modelled.	Simon Bartlett (late submission), p. 4.	As already discussed, REZ transmission build is not forced in the model, it is the outcome of least cost optimisation. The model decides to build renewable in each REZ and if there is no transmission capacity, it builds REZ transmission if it's least cost. The fuel cost savings are an outcome of this co-optimisation. The contention of dispatch non-compliances relates to the use of short-run marginal cost bidding in the market modelling. We note that the RIT-T instrument (section 29) states that, for actionable ISP projects, market development modelling must be adopted from the ISP, insofar as practicable, and, in general, be undertaken on a 'least-cost' basis. It is true that dispatch based on short-run marginal cost bidding may differ slightly from dispatch under "realistic bidding" however, AVP and Transgrid undertook a preliminary, order-of-magnitude assessment of competition benefits, using realistic bidding, as part of the PADR analysis and concluded that there is no material difference in benefits using short-run marginal cost bidding and using realistic bidding. Given that the majority of the benefits from VNI West are associated with capital deferral, this finding is not unexpected.
Fuel cost savings could be too high due to the additional energy being generated from REZ's with higher solar and wind resources, lower transmission losses due to the forcing of the ODP, transmission limits being too high and the apparent dispatch non-compliances.	Simon Bartlett (late submission), p. 4.	
Including low interest government loans as a financial benefit to VNI West would appear non-compliant with the RIT-T in that they are not part of the direct costs of the options. Some loans are conditional on advancing VNI West completion to 2028 from the optimal 2031 determined in the 2022 ISP.	Simon Bartlett (late submission), p. 4.	No government loans have been factored into the costs of the options assessed.
Mr Bartlett notes that paragraph 29 of the RIT-T states "market development modelling must (for actionable ISP projects) or may (for other RIT–T projects) be adopted from the ISP, insofar as practicable". Mr Bartlett also asserts that clause 4.3.9 of the AER	Simon Bartlett (late submission), p. 5.	While Mr Bartlett's reference to paragraph 29 of the RIT-T is correct, AVP and Transgrid note that his assertion that the AER Guidelines require a modelling period at least equal to the ISP is not correct. Specifically, section 4.3.9 of the Guidelines states 'the RIT–T proponent must

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Guidelines requires a modelling period at least equal to the ISP (i.e. to 2050/51) and when the modelling period is shorter than the life of the credible option, any relevant terminal values for generators must be included in the discounted cash flow and explained and justified. Mr Bartlett states that the optimal generation development program and VNI West market benefits have been calculated from the NPV of the generation/storage up-front capital investments plus the NPV of opex and fuel costs over only the modelling period with no allowances for terminal costs.		consider using the ISP modelling period (also known as the planning horizon) of 20+ years as the default when assessing credible options to meet identified needs arising out of the ISP.' There is no allowance for terminal costs' since generation and storage costs have been included as an annualised cost, consistent with the ISP, which does not require terminal values.
Mr Bartlett notes that paragraph 22 of the RIT-T states that a "reasonable scenario means a set of variables or parameters that may include 22(h) "generation bidding behaviour using: (i) short run marginal cost; and (ii) approximates of realistic bidding". Mr Bartlett suggests that the inclusion of approximates of realistic bidding is required to have realistic generation dispatch, forecast realistic future wholesale electricity prices and to check whether investors in new generation/storage infrastructure would earn sufficient revenue from the market to justify investing and to inform retirement decisions in the model.	Simon Bartlett (late submission), p. 5.	AVP and Transgrid note that paragraph 22 states that scenarios 'may include', rather than setting out a requirement. Further, paragraph 20(a) of the RIT-T requires that the proponent adopt the relevant scenario/s for that actionable ISP project, as set out in the most recent ISP parameters unless it provides demonstrable reasons for why adding, omitting or varying this/these scenario/s is necessary. AVP and Transgrid consider the approach taken to generator bidding in the market modelling consistent with the RIT-T framework. Specifically, the RIT-T requires that the proponent: - adopt the relevant scenario/s for that actionable ISP project, as set out in the most recent ISP parameters unless it provides demonstrable reasons for why adding, omitting or varying this/these scenario/s is necessary; and - must comply with the cost benefit analysis guidelines and adopt the market modelling from the ISP in so far as practicable. We note that the ISP computes least-cost development paths (as noted in the AER CBA Guidelines at page 16). Further, the RIT-T (section 29) states that, for actionable ISP projects, market development modelling must be adopted from the ISP, insofar as practicable, and, in general, be undertaken on a 'least-cost' basis. Moreover, we note that AVP and Transgrid undertook a preliminary, order-of-magnitude assessment of competition benefits, using realistic bidding, as part of the PADR analysis, to further determine whether this benefit category is expected to be material to the outcome of this RIT-T. These investigations concluded that competition benefits are not expected to be material for this RIT-T and hence have not been included in the NPV assessment in this PADR (and nor was the approach to generator bidding changed from that applied in the ISP).

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Terminal value methodology		
Agreed with the approach used in the modelling to use explicit expenditure profiles rather than the ISP approach of converting capital costs into an annual annuity.	EUAA, p 9.	Noted.
Questioned what empirical evidence the proponents have that their assumption (for terminal values) is 'conservative'. Assumed fuel cost savings from avoided gas costs can't be assumed to continue until 2072, as ISP forecasts minimal gas plant at that time.	EUAA, p 11.	Terminal values have been used to ensure that costs/benefits are measured over the same period. The terminal value can be calculated by using a forecast of the benefit streams expected over the remaining life of the assets, or by relating to the remaining cost of the asset at the end of the assessment period. For this RIT-T, the terminal values are calculated as the undepreciated value of capital costs at the end of the analysis period. Section 3.5 of the Consultation Report provides a full discussion of the terminal value, including its materiality, in response to submissions. We consider also that the approach to estimating and including the terminal value is consistent with industry standard and note that it has been applied in many RIT-Ts to-date that have been accepted by the AER (for example HumeLink, Energy Connect and QNI). It should be noted that AVP and Transgrid do not believe that VNI West will be a stranded asset post 2050, and this is supported by inspection of flow duration curves that show the interconnector being utilised in both directions at the end of the planning horizon to support sharing of renewable generation across the NEM.
Queried what assumptions are made on fuel cost savings beyond 2047-48, and what gas cost is going to be avoided in 2050, 2055, and 2060. Similarly, Mr Woodley noted the issue of fuel costs after the modelling period, and noted that by 2050, there should be no fossil fuel generation with or without VNI West and therefore no fuel costs to avoid.	EUAA, p 11. Ted Woodley, p 1.	No assumptions have been made with respect to fuel cost savings beyond the end of the assessment period (2049-50). See Section 3.5 of the Consultation Report for more detail regarding benefits beyond the end of the assessment period.
Enquired as to the assumptions around stranded asset risks underpinning what is seen as a 'conservative' assumption that the undepreciated value of capital costs at the end of just 16 years of actual operation.	EUAA, p 11.	AVP and Transgrid do not consider there to be a significant risk of asset stranding for the preferred option. For example, the analysis finds that the cumulative benefits in present value terms of Option 3A option are expected to exceed the costs in present value terms by 2040-41 on a weighted basis, that is, the costs are expected to have been fully paid back by then. Furthermore, inspection of flow duration curves shows the interconnector being utilised in both directions at the end of the planning horizon to support sharing of renewable generation across the NEM.
Considered the assumption that the residual value of VNI West is $536 million is extremely overstated, noting it accounts for 60% of the stated net benefits of $884 million. Further, average benefits over the last five years of the assessment (used to assess the residual value) is described in the PADR as around $280 million/pa, should be lower.	Ted Woodley, p 8 and 9.	AVP and Transgrid note that the terminal value is not material in the analysis since the analysis finds that the cumulative benefits in present value terms of the preferred option are expected to exceed the full investment cost (without deducting the terminal value) within the assessment period.

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Noted benefits with a present value of about $536 million that arise after 2049 have been included but the power system is assumed to be fully decarbonised by then (due to government policy). Such benefits will not, by definition, arise and the benefits arising after 2049 should be zero.	EGA, p 8. VEPC, p 5.	
Mr Bartlett states that clause 3.12 of the AER Guidelines requires the terminal value at the end of the modelling period "to represent a credible option's expected costs and benefits over the remaining years of its economic life after the modelling period". He suggests that the terminal value in the PADR is non-compliant as it is "the undepreciated value of capital costs at the end of the analysis period". Mr Bartlett also suggests that, even if there are some market benefits beyond the modelling period, they are unlikely to exceed the routine and non-routine opex costs of VNI West.	Simon Bartlett (late submission), p. 2.	AVP and Transgrid note that for actionable ISP RIT-Ts, section 4.3.9 of the CBA Guidelines is the relevant clause, which states "where the modelling period is shorter than the expected life of a credible option, the RIT–T proponent is required to include any relevant and material terminal values in its discounted cash flow analysis." The relevance/materiality of the terminal value (and any benefits beyond the assessment period) is discussed in Section 3.5 of the Consultation Report.
Observations about the wholesale market modelling outcomes (outside of those covered elsewhere)		
Enquired why hydro generation would change at all, as the available water is not impacted by whether VNI West is built or not.	Ted Woodley, p 10,	The modelling considers several weather pattern reference years for wind, solar and demand profiles, as well as climate factors for the same number or years for hydro generation. The modelling aims to supply the demand at the least cost while meeting other requirements or constraints. There is no difference in assumed hydro inflows between each scenarios base case and the VNI West options. However, there are some periods in the year where some generation including hydro and renewable will spill either on an economic basis or due to constraints such as network constraints. Given the with and without VNI West cases result in different capacity and generation mixes, AVP and Transgrid observe slightly different annual hydro generation patterns in the base case and with each VNI West option. With VNI West, generally more wind capacity and generation is forecast in Victoria. Wind generation is expected to compete with hydro generation, particularly in Tasmania, and as hydro has higher running costs compared to wind, this results in more hydro spill relative to the base case.
Noted that wind generation over the modelling period is 659 GWh less with VNI West and stated that it seems incomprehensible that VNI West would result in less wind generation over the next 27 years.	Ted Woodley, p 10,	It is true that in the PADR *Step Change* scenario outcomes, VNI West Option 1 is forecast to result in 0.7 TWh less wind generation over 27 forecast years. However, there is still a significant increase in forecast wind generation over time (4.4-fold in 2047-48 relative to 2023-24) and 0.7 TWh represents only a 0.02% decrease in wind generation relative to the base case. There is also a 22.0 TWh increase in expected solar generation with Option 1 over the 27 year forecast to give an overall significant increase in expected VRE generation with VNI West Option 1. In the *Step Change* scenario modelling for the additional options analysis, VNI West Option 3A is forecast to increase VRE generation by 6.4 TWh (14.0 TWh additional wind generation and 7.6 TWh less solar generation). Option 5 is forecast to increase VRE generation by 1.6 TWh (4.6 TWh less wind and 6.3 TWh more solar). Again, there is a significant increase in forecast wind and solar generation over time in both the base case and option case. For example, in the final year of study, wind and solar generation

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		in the NEM are forecast to be 178 TWh and 130 TWh respectively in the base case; 177 TWh and 131 TWh for Option 3A; and 176 TWh and 132 TWh for Option 5. In all cases, the increase in renewable generation is more or less balanced by a decrease in hydro generation, so that, by 2050, VNI West enables about the same amount of renewable generation into the system. It just does so at lower cost to consumers.
Solar capacity varies significantly year-on-year, depending on whether VNI West is built or not, for no apparent reason.	Ted Woodley, p 10,	The aggregate NEM-wide solar capacity difference due to VNI West build does vary year on year. Solar capacity in each individual REZ either remains constant or increases year on year. That is, it is the *difference* in solar capacity between the base case and the VNI West option in any given year that is going up and down, not the total solar capacity. Differences in timing of investment between VNI West cases and the base case can mean the difference in solar capacity in an individual REZ can increase or decrease from one year to the next. For example, a deferral in investment in solar capacity in a single REZ with VNI West would appear as a negative number for the deferred years, then zero when solar investment 'catches up' to the base case. There is also a different distribution of solar investment forecast with VN West. The combined effect of VNI West altering the timing and distribution of solar investment means the aggregate NEM-wide difference in solar capacity can go up or down significantly year on year.
Avoided generation/storage cost benefits in 2031-32 are estimated to be $720 million. This is far greater than any other year, and accounts for one-quarter of the cumulative benefits over the 25 years. After this year the avoided generation/storage costs decline from $1,759 million in 2031-32 to $1,295 million in 2047-48, a 25% fall. 2037-38 accounts for 70% of the fall ($339 million).	Ted Woodley, p 10.	In the modelling, the NEM is optimised over the full modelled period (25 years in the PADR and 27 years in the Consultation Report) and not on a year-on-year basis. As such, the outcomes should be interpreted as a whole, rather than year-on-year changes. Positive annual market benefits in a given year and then negative annual market benefits in later years (or a decline in cumulative market benefits) are associated with deferral of investment. In terms of the quantum of changes in a year, as mentioned in the PADR, the charts show lump capex savings in the year the capacity is avoided rather than providing the savings on annualised basis. This is purely a presentation choice and does not affect the overall NPV assessment. If instead, the capex savings were shown on an annualised basis, the cumulative avoided generation/storage cost benefits in 2031-32 from the PADR assessment would be $115 million (compared to $720 million). See section 2.9.1 for more detail.
Specific queries regarding the methodologies applied for the NPV modelling		
Discount rate methodology		
Queried whether 5.5% is an appropriate central discount rate given credit market developments since the IASR, and requested an explanation why the discount rate is appropriate. Asked what	EUAA, p 11.	Under the NER[88], the RIT-T proponent must adopt the most recent ISP parameters in undertaking its cost benefit assessment, or identify and provide demonstrable reasons for why an addition, omission or variation to the ISP parameters is necessary. The AER CBA Guidelines require that 'demonstrable reasons' for departing from ISP parameters be limited to

[88] NER, clause 5.15A.3(b)(7)

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evidence there is that 5.5% is a commercial discount rate for large projects.		where there has been a material change that AEMO would, but is yet to reflect in, a subsequent IASR, ISP or ISP update. The Draft 2023 IASR proposes a central discount rate of 7% to reflect the recent credit market developments. While higher than the rate assumed in this RIT-T it remains within the upper and lower bound tested through sensitivity analysis. The sensitivity analysis in the Consultation Report shows that adopting a higher discount rate does not change the finding that Option 5 and Option 3A are the two highest ranked options. A higher discount rate does favour Option 5 slightly, further supporting the selection of Option 5 as the proposed preferred option currently under consultation.
Hydrogen superpower scenario weighting		
To the extent that AEMO and Transgrid want to put forward a RIT-T that includes hydrogen superpower elements in its weighting, it would be inappropriate to do unless AEMO and Transgrid both put forward cost recovery solutions to address that issue.	PIAC, Energy Consumer Submission Forum, p 4.	AVP and Transgrid note that under the actionable ISP framework, stakeholder consultation on the ISP scenarios and the weighting that should be applied to them occurs as part of the development of the IASR. The RIT-T assessment is then required to adopt the specific scenarios and weightings for a particular ISP project specified in the ISP, with weightings being formulaically adjusted if a subset of scenarios are specified by the ISP for consideration in the RIT-T. Nonetheless, AVP and Transgrid investigated a sensitivity that removes the Hydrogen Superpower scenario from the assessment. This sensitivity shows that it has no bearing on the ranking of the options and the top-ranking options still provide positive net market benefits. See section 2.10.1 for further information.
PIAC was of the view that there is no credibility for a 18% weighting for hydrogen superpower in any project where costs are partly socialised among consumers. To the extent costs are socialised among consumers, hydrogen superpower scenarios should be irrelevant unless project proponents propose different cost recovery approaches on a beneficiary pays basis. Further, PIAC considers it unreasonable to propose consumers pay for the costs to subsidise the access to market for new big hydrogen export business. QEUN agrees that a hydrogen export industry should not be subsidised by Australian energy consumers.	PIAC and QEUN, Energy Consumer Submission Forum, p 4.	
Analysis period		
Questioned why the NPV analysis ended in 2047-48, only 16 years after commissioning and two years before the end of ISP modelling. Noted that VNI West (via Kerang) has a longer economic life and 16 years of operations makes the analysis period short.	EUAA, p 16. Ted Woodley, p 8.	The 25-year modelling period adopted in the PADR is in line with other RIT-T assessments and provides a reasonable period over which to assess the costs and benefits associated with the options, noting that some costs and benefits begin to accrue ahead of the commissioning of VNI West. In response to this feedback, AVP and Transgrid have extended the market modelling period by two years (to 2049-50) based on the inputs available from the 2022 ISP. Extending the modelling period beyond 2049-2050 would substantially increase the complexity of the modelling and simulation run-time and is not expected to affect the relativities of the options assessed. It would also require inputs to be developed beyond what is available in the most recent IASR. Further, the payback period analysis shows that benefits are expected to exceed the full investment cost (without deducting terminal value) during the assessment period.

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Consistency of inputs with AEMO		
There needs to be consistent analysis between AEMO and Transgrid, particularly with how benefits, costs and project timing are treated.	PIAC, Energy Consumer Submission Forum, p 4.	AVP and Transgrid consider that the analysis undertaken over the course of this RIT-T has been as consistent as possible with that undertaken by AEMO as part of the separate ISP process with respect to how benefits, costs and project timing have been considered. AVP and Transgrid further consider that the analysis has fully applied the actionable ISP framework designed for projects like VNI West.
Treatment of the VTL component		
Batteries associated with the VTL will have a useful economic life beyond the period modelled in the PADR. This should be taken into account in the RIT-T analysis.	ENGIE, p 2.	The full cost of the battery is included in the RIT-T in line with the AER guidance. The battery is assumed to switch to market arbitrage operation following the end of the network support contract for the remainder of its technical life, and so the continuing presence of the battery and its impact on the wholesale market has been reflected in the analysis.
Other issues raised		
Cost burden of Victoria's offshore wind policy		
There is potential for customers to pay directly through power bills or indirectly through taxes for offshore wind developments, given that offshore wind will be developed through a derogation.	QEUN, Energy Consumer Submission Forum, p 3.	Cost recovery for offshore wind developments incentivised through government policy sits outside of the RIT-T process.
A national plan for addressing shortfalls		
Strongly believed that we cannot continue with these different insurance policies (referring to individual transmission projects like EnergyConnect and VNI West). We should be looking at a national plan to avoid the current shortfalls (New South Wales 2025-26).	QEUN, Energy Consumer Submission Forum, p 3.	The ISP is the whole-of-system plan that provides an integrated roadmap for the efficient development of the NEM over the next 20 years and beyond. Option 1, 'VNI West (via Kerang)' is an outworking of this process and is the actionable ISP project and ISP candidate option included in the 2022 ISP.
Consideration of the National Energy Objective and suggested failings of the RIT-T		
Queried why there is no mention of the NEO and asked what the impact would be if an explicit acknowledgement of the NEO is made.	EUAA, p 1.	The NEO is part of the legislative frameworks that govern the NER and the actions of the AEMC, AEMO and AER under the NER. AVP and Transgrid consider that the RIT-T and the actionable ISP framework has been developed (and modified) by the AEMC in-line with the NEO.
Concerned that the ISP and RIT-T frameworks are not fit for purpose as they do not consider matters beyond the NEO in terms of state-level economic development, emerging industries, job creation, land use, emissions targets, environment, and social considerations.	EGA, p 5.	The NER require AVP and Transgrid to apply the RIT-T to this actionable ISP project. The factors EGA has noted are outside the scope of the RIT-T. Further, AVP and Transgrid note that the new National Energy Transformation Partnership's first action is to fast track an emissions objective into the NEO, ensuring that developments to deliver net zero are undertaken in the long-term interest of consumers.
Observations suggest that the cost-benefit test, or application of it, is only concerned with net 'market benefits' to those who produce and transport electricity and not 'net economic benefits' to those	EGA, p 11.	

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who consume electricity. This is a concern when considering the NEO. EGA requested investigation and clarification before it can be certain any cost benefit analysis for the WRL, VNI West or any ISP project is accurate. Without full transparency around true costs to consumers and full accountability for keeping cost in check, EGA do not see merit in conducting any cost benefit investment test for transmission.		The NER currently require AVP and Transgrid to apply the current RIT-T framework to this actionable ISP project. The types of costs and benefits included (or excluded) from the RIT-T cost benefit analysis are set out in the NER and the AER CBA Guidelines. The MCA methodology adopted for the new options assessment attempts to take important social, environmental and land-use considerations into account as early in the planning process as possible. AVP and Transgrid note also that social licence is a key consideration that is being actively considered and will form a key focus on the engagement activities in the detailed design and route selection phase following the PACR.
Observations of the current investment framework suggest there may be errors or omissions in the current regulatory cost-benefit analysis process, or application of it, that EGA suggest requires independent review by the Productivity Commission.	EGA, p 10.	
Concerned that the ISP-first regime, while it might be a reliable business model for the NEM, does not effectively or efficiently consider state-level roadmaps, effective technical solutions (batteries), offshore wind developments, REZ planning, economic development, job opportunities as well as emerging public opposition to large-scale transmission.	EGA, p 14.	The ISP and RIT-T cover all the listed concerns, with the exception of economic development and, job opportunities (which are treated as externalities under the RIT-T), and emerging public opposition to large-scale transmission. Specifically: • The inclusion of state-level policies and REZ development was consulted on as part of the ISP process and the outcome of this has been reflected in this analysis. • The assessment has assessed a battery option that was developed in combination with submitters to the PSCR. Local batteries, storage and generation as alternatives to VNI West development have also been considered in the base case. • An offshore wind sensitivity has been included in the Consultation Report in response points raised in submissions to the PADR (noting that an offshore wind policy is not yet legislated) In terms of public opposition to large-scale transmission, AVP and Transgrid note also that social licence is a key consideration that is being actively considered and will form a key focus on the engagement activities in the detailed design and route selection phase following the PACR. The MCA methodology adopted for the new options assessment attempts to take important social, environmental and land-use considerations into account as early in the planning process as possible.
Holistic view for interconnectors		
Given the high cost of implementation for VNI West, resulting in minimal net transfer capacity, analysis should take a holistic view of state-level REZ planning, and associated transmission network capacity before interconnection to the NEM is considered.	EGA, p 14.	AVP and Transgrid note that all options involve substantial increases in transfer capacity and are ultimately comparable to a large baseload power station in the NEM. The RIT-T assessment is undertaken against a base case in which state-level REZ planning and associated transmission capacity (as reflected in the ISP) is already included. The benefits noted for VNI West are therefore in addition to the benefits already provided by these developments. It should also be noted that 'net transfer' is not the correct metric for assessing the impact on the power system. In each interval, the VNI and other link flows can be only in one direction, but limited within the bounds of the available transfer limit, meaning that the annual net flow is

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		different depending on the flow in each hour (and net flow could even be close to zero for some years if electricity is flowing north just as frequently as flowing south). See section 2.9.4 for more details.
Prioritising the needs of each state		
Believed it is critical to prioritise the needs of each state to ensure costs to its people are minimised, development opportunities maximised, transitioning workforces are supported and the state government is not carrying unnecessary burdens imposed upon it to gain minimal benefit from the NEM.	EGA, p 16.	The ISP is a whole-of-system plan that provides an integrated roadmap for the efficient development of the NEM over the next 20 years and beyond. The ISP assists prioritising of transmission projects and is developed through a consultative process. Submissions can be made to AEMO during the consultation period for the ISP, where views on the needs of each state, cost minimisation, development opportunities, workforce transition, and burdens from transmission development can be expressed. Information on the 2024 ISP timeline can be found on AEMO's website[89].
Confidence of project having net benefits in the initial and final CPA stages		
Noted that the AEMO feedback loop only confirms if a project is still part of the optimal development path at the nominated project cost. It does not confirm that the project is still the preferred option and still has net benefits. It's unclear how consumers can have confidence that there are net benefits, given the winning bid on the Victorian side will be confidential. Given this observation, EUAA queried how proponents can give consumers confidence that the project will have net benefits at the initial and final CPA stages.	EUAA, p 3.	As part of the contingent project process, Transgrid will seek a "feedback loop" confirmation from AEMO (in its national planning role) in line with the actionable ISP framework ahead of lodging the Final CPA for investment in VNI West. This process will ensure that the investment is confirmed as being consistent with the optimal development path in the latest ISP, where any costs have increased. In accordance with the CBA Guidelines, in performing the feedback loop AEMO must consider re-running the CBA modelling and scenario analysis, if practicable, to test whether the optimal development path is expected to deliver a positive net benefit for consumers based on the latest cost estimates at the time of the CPA. It must also consider whether the optimal development path is still optimal with the RIT-T preferred option under the same decision-making approach, or that any difference is immaterial. If the project no longer had net benefits, it would be highly unlikely that the optimal development path of the most recent ISP would still be optimal with this RIT-T project included unless it was seen to be consistent with consumer risk preferences under the decision-making approach applied in the ISP. AVP and Transgrid therefore consider that the feedback loop does consider whether the RIT-T preferred option still has net benefits by 1) confirming that the optimal development path remains optimal, and 2) confirming that the optimal development path still delivers positive net market benefits under the most likely scenario. EUAA is correct that in the feedback loop AEMO does not need to confirm that the preferred option remains the preferred option. However, given the similarities between the options considered in the RIT-T, any change in costs for one option is also likely to apply to other options, and so the ranking of the options under the RIT-T would be unlikely to change

[89] At https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp.