VNI West Frequently Asked Questions

What is VNI West?

Victoria – New South Wales Interconnector (VNI) West (via Kerang), referred to as 'VNI West', is a proposed new high capacity 500 kilovolt (kV) double-circuit overhead transmission line between Victoria and New South Wales. The project would connect the Western Renewables Link (WRL) (at the proposed terminal station north of Ballarat) with Project EnergyConnect (at Dinawan substation) via new stations near Bendigo and Kerang, and is currently estimated to cost $3.256 billion.

Why do we need VNI West?

Australia is undergoing a once-in-a-lifetime change towards a net-zero emission future. VNI West is a critical project to prepare the grid for a net-zero energy system, helping Australia to reach its clean energy targets while delivering a safe, reliable, and affordable energy future.

VNI West will harness clean, low-cost electricity from existing and future renewable energy zones in New South Wales and Victoria, and increase access to Snowy 2.0's deep energy storage. Together, this will reduce carbon emissions and help to fill the electricity supply gap as coal-fired power stations close.

The project will help maintain system security and reliability for energy users, by increasing the capacity to share electricity across the National Electricity Market (NEM) and allow more renewable energy connections to the grid, helping address climate change.

Why do we need 500 kilovolt (kV) lines to meet this need?

High voltage transmission lines are used throughout Australia to efficiently and cost effectively transfer large amounts of electricity compared to lower-voltage transmission lines.

The Integrated System Plan (ISP) considered and assessed a range of options to meet the identified need as part of developing the Optimal Development Path (ODP) across the NEM. These options included 500 kV and 330 kV network options and non-network technology. AEMO's analysis confirmed that the electricity capacity delivered by a double-circuit 500 kV line would most efficiently meet the need by enabling a higher electricity capacity to be transmitted.

The higher transfer capacity between Victoria and New South Wales will most efficiently maintain supply reliability, harness large volumes of high quality renewable resources, and enable more efficient sharing of resources between NEM regions. The 2022 ISP therefore selected VNI West via Kerang as the only ISP candidate option for VNI West in the ODP.

Through the Regulatory Investment Test for Transmission (RIT-T), AEMO Victorian Planning (AVP) and Transgrid considered the possibility of staging capacity for VNI West by building to 500 kV but initially operating at 330 kV, or by stringing only one side of the double-circuit line initially. These options were not progressed as the cost of this staging option is nearly the same as for the full VNI West option due to easement requirements and, in the case of operating at 330 kV initially, the cost of having to introduce new 330 kV terminal stations. Staging of option capacity would also introduce uncertainty as to the required technical requirements of connecting assets for new generators. Therefore, these were not considered to be credible options.

Why is the outcome of a RIT-T decided primarily on market benefits, ultimately for consumers?

The RIT-T is an economic cost benefit test. Under the National Electricity Rules (NER), the scope of the RIT-T is limited to determining if a project will deliver net market benefits to the NEM as a whole. The matters that can and cannot be considered are set out in RIT-T application guidelines developed by the Australian Energy Regulator (AER). These guidelines are to protect consumers from paying more than necessary for their electricity.
In line with the NER and these guidelines, this Project Assessment Draft Report (PADR) models market benefits from avoided or deferred investment in new generation and storage that would be required if VNI West does not proceed, including:

- changes in fuel consumption arising through different generation dispatch patterns
- differences in renewable energy zone – or intra-regional – transmission investment costs
- changes in supply reliability related to voluntary or involuntary load curtailment
- changes in network losses
- option value – assessed through alternative scenario and project implementation timing.

In effect, a RIT-T can be likened to a business case for any project or venture. It is the first stage of the development and represents an early decision gateway before a project can progress to the next stages of investment, planning and approvals.

The environmental, land-use, safety, amenity, social, cultural and community matters raised by stakeholders are important considerations that, if not appropriately taken into account, will result in higher project costs that would lower benefits for consumers. At the RIT-T stage, these factors are only able to be considered at a high-level using desktop studies, because the route (and therefore the potentially impacted communities) is not determined until after the RIT-T is finalised. As a result, allowances have been made in the cost to accommodate adjustments to the project such as route detours that may later be determined to be needed to mitigate potentially adverse environmental or social impacts.

Does the RIT-T consider social and environmental factors?

AVP and Transgrid understand social and environmental issues are key considerations for a range of stakeholders in the assessment of major transmission projects. At the RIT-T stage, these factors are only able to be considered at a high-level using desktop studies, because the route (and therefore the potentially impacted communities) is not determined until after the RIT-T is finalised. These issues have been taken into account as part of the RIT-T, to the extent possible at this stage of the process.

These important environmental, social and cultural matters will be assessed in detail and addressed through the subsequent state and federal government environmental and planning approvals processes, which will include extensive community and stakeholder consultation. The environmental, social, and cultural matters will be considered to ensure delivery of a project that is sensitively designed, located and constructed to minimise environmental and social impacts.

At this early stage, the route, design and location of any new infrastructure required to deliver VNI West has not been determined, and any maps that appear in the RIT-T or ISP reports are illustrative only.

Why are you doing the RIT-T now if the project is not built until 2031?

Transmission projects are long lead-time projects that require extensive community engagement, planning and construction activities. VNI West has been identified as an actionable project in the 2022 ISP to be progressed urgently, so that it can be commissioned in time for when its most needed.

The 2022 ISP describes VNI West as a staged project:

- Stage 1: to carry out early works immediately for completion by approximately 2026.
- Stage 2: to complete implementation of the project by July 2031 (or earlier with additional support).

The first stage – early works – is expected to take three to four years to complete, and may include project initiation, land use planning, detailed engineering design, route development, biodiversity offset strategy, and cost estimation.

Early works in New South Wales also includes the efficient construction of the transmission line between Dinawan to Wagga Wagga as part of Project EnergyConnect at 500kV and operating at 330kV for the interim period.

Early works will provide an opportunity to engage with and consult communities and stakeholders on a range of matters to help prepare planning and environmental approval applications. The works will also reduce cost uncertainties and provide greater confidence to consumers that they will not be over- or under-investing in this key project.

Why are you relying on connecting into a terminal station along the Western Renewables Link route when this project that has not yet received planning approvals?

Western Renewables Link (WRL) is a critical network upgrade to provide additional capacity to the Western Victoria REZ. WRL is in the preparatory stage of the Environment Effects Statement (EES) and is therefore yet to receive the required environmental and planning approvals.

For this RIT-T, it is assumed that the EES process and consultation results in an agreed design that appropriately balances the social, environmental, economic and technical requirements of the project and allows for timely delivery ahead of VNI West. VNI West would then link into the proposed terminal station north of Ballarat.

This is in no way intended to undermine the importance of the EES process or pre-determine an outcome. Should any changes to WRL's design be necessitated, the implications on VNI West will be analysed. If it is deemed to materially impact the design and therefore business case for VNI West then the RIT-T may need to be re-examined before the commencement of any environmental and planning processes.

Why is VNI West progressing in advance of the outcome of the WRL EES?

Transmission projects are long lead-time projects that require extensive community engagement, planning and construction activities. VNI West has been identified as an actionable project in the 2022 ISP to be progressed urgently.

If the project is confirmed from a technical and economic perspective through this RIT-T process, there is a significant program of work that would need to occur before any approvals processes may commence. Progressing now with this RIT-T puts AVP and Transgrid in the best position to deliver VNI West by the time it's needed, noting that there are many uncertainties and risks that could lead to schedule slippage in a large linear infrastructure project such as this.

Why can't VNI West be routed through Horsham and Bulgana, rather than going straight through to Hepburn?

The existing transmission network from Ballarat to Bendigo and Kerang, made up of 220 kV lines, is currently heavily congested due to development in the region. The proposed VNI West option would reinforce this network, ensuring more reliable and resilient supply of power to homes and businesses in these areas. Routing through other areas, such as Horsham and Bulgana, would not address the critical energy needs of this area in the longer term. Additionally, routing this line through Horsham and Bulgana would increase the length, and therefore cost, of the proposed preferred option.

Will putting the transmission line underground be considered?

The project, as proposed, consists of approximately 600km of double circuit 500 kV overhead lines with an estimated capital cost of this option of approximately $3.256 billion: $1.605 billion in Victoria and $1.651 billion in New South Wales. The network capital costs in the PADR do not include any allowance for undergrounding of the transmission line, either in full or partial.

Options to underground the lines were raised in submissions to the Project Specification Consultation Report (PSCR) and continue to be suggested by stakeholders and communities as possible solutions that could help minimise social and environmental impacts of the project. Overhead transmission lines and underground cables can be high voltage alternating current (HVAC) or high voltage direct current (HVDC) technology:

- HVAC is flexible to support a 'meshed' network and is adaptable to enable the connection of new equipment.
- HVDC can be a superior option to enable point-to-point interconnection, such as Basslink or Murraylink, or to connect a single project into the network, and is typically cheaper than underground HVAC for these purposes.

VNI West will form part of the overall electricity transmission network delivering electricity from where it is generated to where it is used and facilitating the wholesale electricity market to deliver reliable and affordable electricity to homes and businesses. VNI West is not a point-to-point connecting link, but an integral part of the electricity transmission network. HVDC technology has therefore been ruled out as an option for VNI West, as additional costly converter stations to convert between direct current and alternating current would be required in the future for other connections anticipated to be required along the route. This was discounted in the 2020 ISP, reconfirmed in the 2022 ISP, and is further discussed in this PADR.

HVAC is the superior technology type for VNI West, as a key driver of the project is enabling integration with the existing network and facilitating the connection of new renewable energy generation. However, based on current cost assumptions, delivery of high -capacity HVAC 500 kV underground lines along the full length of the project is not economically justifiable under the RIT-T, with HVAC undergrounding costing in the order of at least 10-20 times more than overhead[1].

Significant third-party funding commitments (or other interventions) would be required if undergrounding was deemed necessary to balance the cost of investment imposed on electricity consumers with the burden of hosting linear infrastructure for landholders and regional communities. The cost range is broad because these costs are project-specific due to different

[1]There are a range of public references comparing overhead HVAC and underground HVAC costs. The range referenced is guided by the ISP Cost Database, which has been consulted on, see https://aemo.com.au/en/consultations/current-and-closed-consultations/transmission-costs-for-the-2022-integrated-system-plan.

technical requirements and are heavily dependent on the need for transition stations, line capacity, terrain and competing land uses.

AVP and Transgrid acknowledge the importance of considering all reasonably practicable route refinement options, which may, in exceptional circumstances, include partial undergrounding short distances. The factors to be considered are route-specific and can therefore only be investigated, and remediation options considered, as part of the project's early works stage, following the RIT-T process.

When will you be able to share a detailed route alignment?

If a project is confirmed through the RIT-T process, the first stage – early works – is expected to take three to four years to complete. Early works will provide an opportunity to engage with and consult communities and stakeholders at a detailed level on a range of matters. The assessment of and consultation on more detailed, potential route alignments will occur after the RIT-T process has concluded (expected to be late 2022), and if the project is approved to proceed to the next phase of development. To determine a route, a detailed route selection study that considers all technical, environmental, social and cultural constraints including community and stakeholder feedback must be completed.

AVP and Transgrid are committed to working with stakeholders and communities from an early stage, to build our understanding of the local context, listen to concerns, and help refine transmission line route options. We want to ensure that the people living and working nearby have the opportunity to participate in shaping an outcome that is socially acceptable, while meeting the needs of consumers. As part of this commitment, we will engage with regional stakeholder representatives throughout the RIT-T process to facilitate early community input on potential social and other impacts of the proposed preferred option at this stage.

An indicative timeline for engagement in processes beyond the RIT-T will also be published with the Project Assessment Conclusions Report (PACR) (or earlier) to give regional stakeholders ample time to prepare for meaningful engagement should the RIT-T be successful.

Is the map shown in the PADR indicative of a likely route?

At this early stage, the route, design and location of any new infrastructure required to deliver VNI West has not been determined. To determine a route, a detailed route selection study that considers all technical, environmental, social and cultural constraints including community and stakeholder feedback must be completed. Timing on that process will be shared with stakeholders and community when it is known.

It is important to note that any maps that appear in the RIT-T or ISP reports are for illustrative purposes only.

What engagement is occurring?

We are committed to working with stakeholders and communities from an early stage, to build our understanding of the local context, listen to concerns and help develop and refine transmission line route options and terminal station locations. We want to ensure that the people living and working nearby have the opportunity to participate in shaping an outcome that is socially acceptable, while meeting the needs of consumers.

Discussions have already commenced with a number of councils at this early stage, including Campaspe, Edward River, Federation, Gannawarra, Greater Bendigo, Hepburn, Lockhart, Loddon, Mount Alexander, Murray River, Murrumbidgee, and Wagga Wagga.

AVP and Transgrid are engaging with these key stakeholders and seeking input to help co-design our engagement program to help make sure it is appropriate to the differing needs of communities. We are working with local governments and other representative organisations to inform and guide our engagement activities and to build broader community awareness of the project, and the opportunities to input at various stages.

Key learnings from previous projects also are informing the development of consultation plans.

If approved through the RIT-T process, early works will provide an opportunity to further engage with and consult communities and stakeholders.

How does VNI West improve access to renewables?

Overall, VNI West will support the development of additional renewable generation in western Victoria and southern New South Wales, as the NEM transitions to low-emission generation technologies.

A new transmission line will facilitate the development of renewable generation investment in areas with high quality renewable resources, such as wind and solar, in Victoria and southern New South Wales. Overall, it enables more efficient resource sharing between NEM regions with less variability in energy output as a result of local weather effects.

Modelling suggests that VNI West will open up opportunities for:

- Between 2.3 gigawatts (GW) and 2.6 GW of new solar generation development in Murray River
- Between 600 MW and 800 MW of new wind generation development in Western Victoria
- Up to 800 MW of new solar and wind generation developments in South-West New South Wales

What are the benefits to local areas?

The development of VNI West will open up opportunities for renewable generation investment and diversity in renewable energy zones across Victoria and New South Wales. The project is also expected to support regional employment and economic growth in some (but not all) LGAs.

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. We 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 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'.

Although VNI West will not be delivered under the VTIF, VicGrid has indicated that the principles detailed within the framework should be incorporated into the various phases of the project where possible.

AVP and Transgrid also support the Energy Charter's work in developing social licence guidelines for co-existence of transmission infrastructure and agriculture in an attempt to mitigate negative impacts and prioritise the need for shared value through the energy transition.

How can I have a say on the project?

AVP and Transgrid recognise the vital role that stakeholders, including community and landowners, have in the planning and delivery of major transmission infrastructure projects.

AVP and Transgrid are seeking 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 stakeholder, community and Traditional Owner input. This input will be cross-referenced with the findings from the PADR and, where appropriate, used to help inform the PACR.

A six-week consultation period is open following the publication of the PADR. Stakeholders and community are encouraged to submit a written submission via email to VNIWestRITT@aemo.com.au.

AVP and Transgrid are holding virtual information sessions on 10 August and 25 August where stakeholders can hear more information on the PADR and ask questions of clarification prior to providing formal submissions.

For more information about the PADR and upcoming consultation opportunities visit:
AEMO website (VIC): www.aemo.com.au/VNI-West
Transgrid website (NSW): www.transgrid.com.au/VNIW