



Transmission System Plan 2025

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Appendix G

Response to Submissions



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Western Power is required to publish a Transmission System Plan in accordance with the Electricity System and Market Rules (ESMR).

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Introduction

Western Power thanks stakeholders for their engagement with the Draft Transmission System Plan 2025 and for the thoughtful submissions received during the consultation period.

Seven submissions were received from a range of consumer and industry representatives, providing valuable insights on key aspects of the proposed plan. This document summarises the key themes raised and outlines Western Power's responses, including where the submission has informed refinements to the final Transmission System Plan.

This appendix summarises the submissions into themes and provides response and clarification. Submission summary is shown in *italics* while responses are shown in **normal text**.

Forecasting, assumptions & data transparency

Summary of feedback

A key theme raised by multiple stakeholders was the need for greater clarity and robustness in forecasting assumptions and modelling inputs. Stakeholders expressed concern that demand forecasts may not adequately capture accelerated growth in population, industry, and electrification, particularly given recent increases in electric vehicle uptake and behind-the-meter battery installations.

There were also requests for clearer articulation of assumptions underpinning generation entry and exit and distributed energy resource uptake.

Some stakeholders questioned specific modelling assumptions, including the extent to which future battery storage would adopt grid-forming capabilities, and called for sensitivity analysis to better reflect uncertainty in future outcomes.

Closely linked to this was a broader call for increased transparency in the presentation of data and modelling outcomes. Stakeholders sought more detailed information on network capacity, asset ratings, constraint drivers, and the methodologies used to assess both technical and economic impacts.

Submissions noted the absence or limited availability of supporting appendices and technical detail, which made it difficult to fully assess modelling assumptions or validate conclusions. There was also feedback suggesting that approaches to quantifying constraint impacts may underestimate real-world costs, particularly where lost generation opportunities are not fully captured.

In addition, stakeholders requested clearer definitions of key terms and classifications used in the TSP to support consistent interpretation and decision-making.

Stakeholders placed strong emphasis on the treatment of emerging technologies, particularly distributed energy resources, battery storage, and inverter-based generation. Submissions highlighted the need for clearer integration of these technologies within both demand forecasting and system planning, noting their potential to reduce peak demand, alter power flows, and defer network investment.

Demand growth

TSP 2025 maximum demand is aligned to ESOO 2025 Expected scenario. This reflects historical distribution core and major industrial load growth patterns and technology shifts such as DER and transport electrification. Transport electrification contribution to peak demand growth is moderated by charging patterns outside peak demand periods. Demand growth due to industrial process electrification is expected; however, this is not forecast prior to 2035.

Appendix D – Demand forecast methodology provides a detailed overview of the demand forecast developed for TSP 2025. Additional analysis of DER and customer trends is added to the TSP 2025 Report.

Battery EV & storage uptake

DER uptake analysis has been added to the TSP 2025 Report to better illustrate the scale of DER forecast and embedded in the operational demand input used for TSP. The DER uptake assumptions for TSP demand assume the continuation of existing policies and changes that have been committed over the 10 year modelling horizon. No Virtual Power Plant (VPP) orchestration is modelled.

Project timing, sequencing & deliverability

Summary of feedback

Project timing, sequencing, and deliverability were also prominent considerations raised in the consultation feedback, including recognition of the increasing challenges associated with delivering large-scale transmission infrastructure, such as supply chain constraints, workforce availability, financing, and approvals processes.

Some stakeholders suggested that, in the current environment, ensuring projects are delivered on time and with a high likelihood of success may be as important as achieving least-cost outcomes, particularly given the risks associated with delays to critical infrastructure. There was a strong preference for sequencing that unlocks usable capacity early and avoids periods where security or congestion risks emerge ahead of planned solutions.

Project deliverability

Western Power acknowledges stakeholder feedback that large-scale transmission projects are inherently complex and challenging to deliver. These projects often involve long development timelines, significant capital investment, and a range of external factors including supply chain issues, workforce availability, environmental approvals, and community engagement.

In addition, the delivery of transmission infrastructure must be carefully coordinated with the timing and location of new generation and load connections, which may themselves be subject to uncertainty and evolving market conditions.

The TSP seeks to address this by identifying a development pathway that enables future generation while maintaining system security and reliability; however, the exact timing and scale of both network and generation investments will continue to evolve as projects progress, demand forecasts change and other new information becomes available.

Western Power has worked closely with AEMO and the Coordinator to align the TSP transmission development plan with the expected system needs identified in the TSP and other planning documents.

Importantly, transmission augmentations often require planned outages on critical network elements, which can temporarily reduce system capacity and increase operational risk. As such, detailed outage planning and coordination with AEMO, generators, and other stakeholders is essential to ensure that works can be completed safely without compromising reliability.

Western Power recognises that further work is required to refine project sequencing and outage strategies, particularly as projects mature and the scale and pace of network development increases. This will continue to be an area of focus as part of detailed project development and will be progressively incorporated into future planning and operational processes.

Least cost outcomes

The TSP is required under the ESMR to set out a plan for the efficient development of the transmission system over at least a 10-year horizon, while meeting power system security and reliability requirements and promoting the long-term interests of consumers.

We appreciate stakeholder feedback highlighting the importance of timely delivery and a high likelihood of project success as these are also in Western Power's best interests. However, it is essential that the projects are investigated in detail to ensure a fit for purpose solution is implemented and objectives are pursued in a manner that preserves affordability for consumers, underpinned by prudent management of delivery and execution risks.

System strength

Summary of feedback

System strength and system security emerged as a critical and, in some cases, urgent issue across submissions. There were recommendations to accelerate investment in proven solutions such as synchronous condensers, introduce clearer definitions of minimum system strength, and adopt planning frameworks that prevent new connections from exacerbating existing system strength issues.

At the same time, several stakeholders raised questions regarding the treatment of system strength, including the role and capability of grid-forming inverters. In particular, there was concern that modelling assumptions may overstate the ability of grid-forming batteries to meet system strength requirements, especially for existing generators.

More broadly, there were calls for improved alignment of system strength assumptions across organisations and clearer explanation of how emerging technologies are expected to contribute to system stability outcomes over time.

System strength is evolving

System strength is a complex and rapidly evolving area of power system planning and operation, particularly in the context of the SWIS transition toward higher penetrations of utility and behind the meter inverter-based resources.

Western Power notes that system strength is an active area of reform and investigation across both regulatory and technical domains. The Power System Security and Reliability (PSSR) Standards Review is a central component of this work, seeking to consolidate and modernise existing frameworks into a single, end-to-end set of standards under the ESMR. This review is being delivered in stages and includes consideration of gaps in current arrangements, development of revised technical requirements, and the establishment of a more integrated and transparent governance framework for system security and reliability. Future TSP will evolve the modelling of system strength to reflect outputs of the PSSR Standards Review.

A significant component of this work program focuses on improving understanding of inverter-based resources and their contribution to system strength. The PSSR consultation process includes the development of detailed technical requirements for grid-forming and grid-following technologies, addressing areas such as fault ride-through, voltage control, oscillation damping, and performance under system disturbances. These developments reflect the recognition that while grid-forming inverters have the potential to support system strength, their capabilities and limitations are still being actively studied, and their performance depends on system conditions, control strategies, and interactions with other plant.

System strength studies

In parallel, Western Power continues to undertake detailed technical studies to assess both existing and emerging system strength limitations across the SWIS. This includes modelling a range of future system scenarios, assessing the impacts of changing generation mixes, and evaluating the interaction between network configuration and generation technology. These studies are undertaken in collaboration with AEMO, government and industry participants, and are informed by both local operational experience and international developments.

This work also considers a range of potential solutions to support system strength, recognising that no single approach is likely to be sufficient. Planning is therefore considering a combination of network augmentation, synchronous plant such as synchronous condensers, and the evolving capabilities of inverter-based technologies. The relative role of these solutions is continuing to be assessed as the evidence base develops and technology performance becomes better understood.

Given the pace of change in this area, system strength is considered a continuous improvement space. Planning approaches, modelling assumptions and technical standards will continue to evolve as further insights are gained through ongoing studies, consultation processes and operational experience. Western Power will continue to incorporate these learnings into future iterations of the TSP to ensure that system strength is managed in a way that is robust, adaptive and aligned with evolving industry understanding.

Why are GFM excluded from providing inertia response?

Under the current WEM framework, inertia for the purposes of managing RoCoF is defined specifically as the kinetic energy stored in the rotating mass of synchronous machines. This means that inertia requirements are inherently based on synchronous generation or synchronous condensers, which provide an instantaneous and passive response to frequency disturbances.

Under current WEM arrangements, grid forming technologies are not presently counted toward meeting RoCoF requirements, reflecting both the existing rule definitions and a conservative approach to system security. Western Power has adopted a consistent approach in the 2025 TSP modelling.

Work underway through the PSSR Standards Review is exploring how system strength and related services may evolve toward more technology-neutral, performance-based frameworks; however, this transition is still in progress and, until complete, planning and operational requirements will continue to be based on established sources of synchronous inertia. Western Power will update its assumptions regarding grid forming inverters and their contribution to inertia in future TSPs to be consistent with treatment in the WEM at the time.

The safe RoCoF limit

As outlined in the TSP, system security is maintained through the application of a minimum inertia requirement, which constrains the commitment of synchronous machines to ensure the rate of change of frequency (RoCoF) does not exceed 0.5 Hz per second. This requirement reflects technical standards and operating framework applicable to the SWIS at the time of the TSP modelling.

An increase in the RoCoF safe limit to 0.75 Hz per second is currently being considered by the Coordinator of Energy as part of the broader Essential System Services Framework Review. The analysis presented in the TSP is based on the prevailing regulatory settings at the time of development.

Network capacity, constraints & augmentation

Summary of feedback

In relation to network development and augmentation, stakeholders generally supported the strategic direction of enabling renewable generation but raised concerns about whether the transmission system will have sufficient capacity to accommodate future growth.

There was a particular focus on key transfer corridors, including the north–south 330 kV backbone, with stakeholders identifying potential risks of congestion and insufficient transfer capability as new generation connects in northern regions, and potential shifting of bottlenecks through augmentation, rather than global relief.

Stakeholders also requested more detailed justification of planned upgrades and clearer quantification of the benefits of major projects, including the extent to which they will alleviate constraints or unlock additional hosting capacity. Greater transparency of modelling inputs, assumptions, and results was also requested.

Concerns were raised that assessing binding constraints does not consider actual costs incurred by Participants and that, where possible, Western Power should consider actual costs that have been incurred due to constraints in their assessments.

There was strong interest in clearer quantification of congestion relief and hosting capacity outcomes.

Power transfer constraints

Western Power acknowledge stakeholder feedback regarding the potential for constraints to emerge across key transfer corridors, particularly relating to north–south flows during periods of peak demand.

The outcomes presented in the TSP indicate that, under the modelled scenarios, some constraints do arise within the power system. However, these are generally not significant in nature and are consistent with the underlying planning framework. It is important to note that the scenarios assume significant transmission augmentation alongside the connection of new generation, resulting in a network that has substantially higher transfer capability than at present.

It is important for stakeholders to be aware that The TSP does not seek to determine an unconstrained development pathway or reintroduce a firm access framework. Rather, it adopts the principle that a degree of congestion is generally economically efficient and an expected outcome in a security constrained economic dispatch (SCED) environment. Consistent with this approach, our analysis indicates that the Reliability Standard can be met, notwithstanding the presence of constraints that may limit some facilities during peak periods, and the incidence of binding constraints is generally expected to be low if the modelled development pathway is realised.

In relation to proposed augmentations, including stakeholder suggestions such as additional investment on specific corridors, current analysis does not indicate material limitations on these assets under the modelled conditions. As such, further investment would require clear evidence of sustained need and net system benefit. Western Power agrees that there is merit in continuing to consider how the network can be developed in a more efficient and coordinated manner over time.

Quantifying congestion

Western Power considers it important to clarify the nature of the costs being assessed in the TSP and their alignment with allowable costs to be considered within a regulatory test type of framework. From this perspective many costs incurred by individual participants are considered externalities or are implicitly reflected within the categories of costs considered in the planning and assessment processes (e.g. operational costs, capital costs, reliability costs).

Western Power acknowledges that participants may face a wide range of impacts from congestion, including impacts on contractual arrangements such as PPAs and potentially on capacity credits. Accordingly, the TSP does not seek to forecast or quantify the full range of participant specific impacts arising from network constraints, but instead focuses on achieving least cost system level outcomes.

In relation to concerns raised about the South West region, the analysis does not identify significant limitations on the 132 kV and 66 kV networks under forecast demand growth. While constraints may arise at a local level, these are generally associated with local reliability considerations rather than broader transfer capability limitations that are managed through SCED.

Hosting capacity

Western Power acknowledges that clearer articulation of generation hosting capacity is important to stakeholders. A hosting capacity study has been progressed to meet this need. The study will initially focus on dispatchable generation and will provide a foundation for more comprehensive hosting capacity assessments in future TSP.

The transfer capacity increases outlined in TSP 2025 represent the additional network capability expected from planned augmentations. References within the TSP to generation connections reflect the aggregate connection of storage, wind and solar resources enabled under the assumed development pathway. The analysis should not be interpreted as explicit hosting capacity limits, but rather as an indicative view of the scale of generation that may be supported.

In considering hosting capacity, it is important to recognise the operational diversity of different generation technologies. This is relevant for renewable generators where the aggregate production in an area of the network can significantly exceed the network transfer capability due to the non-coincident nature of generation output and the complementary role of storage in the system.

Non-network solutions & network optimisation

Summary of feedback

Another recurring theme was the role of non-network solutions, their timing and operational measures in supporting the energy transition. Stakeholders broadly supported Western Power's increased focus on network optimisation, including the use of dynamic line ratings, thermal uprating, remedial action schemes and network support services. These were viewed as valuable transitional or complementary tools, particularly where they can deliver benefits more quickly than large-scale augmentations.

Many submissions emphasised the value of these approaches as both transitional "bridge" solutions and longer-term tools to improve utilisation of existing infrastructure and defer capital investment.

However, some stakeholders raised concerns about the timing of procurement processes for system services, noting that current timelines may not align with the urgency of emerging system needs.

Increased focus on network operation & modification options

Western Power appreciates stakeholder feedback on the role of non-network solutions and operational measures in supporting the energy transition. We acknowledge the strong support for initiatives such as dynamic line ratings, thermal uprating, remedial action schemes and network support services, and recognise their value as both near-term solutions and longer-term tools to improve utilisation of existing infrastructure.

Western Power is actively progressing work to identify and implement shorter term, lower cost options to address existing and emerging network limitations. These measures are being explored and advanced in parallel with planning and assessment of larger, more complex augmentation projects, which typically take longer to implement and are more capital intensive.

Western Power also acknowledge stakeholder concerns regarding the timing of procurement processes for system services and the importance of aligning these processes with the pace of emerging system needs. The outcomes from this and future TSPs will assist with improving timely delivery in this regard.

Planning integration & policy alignment

Summary of feedback

Submissions highlighted the importance of ensuring that planning frameworks are well integrated with regulatory processes and policy settings. Stakeholders sought clarity on how the TSP aligns with Western Power's forthcoming Access Arrangement (AA6), and how any differences between planning documents would be managed and explained.

There were also requests for clarification on the potential impacts of emerging policy mechanisms, such as the proposed Fixed Capital Charge, and how these may influence transmission development and connection decisions.

Role of the TSP

The TSP is developed in accordance with the requirements set out in the ESMR, which establish both the purpose and scope of the report. In particular, the TSP is required to set out a plan for the efficient development of the transmission system over at least a 10-year horizon, while meeting power system security and reliability requirements and promoting the long-term interests of consumers.

The TSP is a planning report that reflects current standards, assumptions and available information at the time of preparation. The ESMR requires Western Power to develop the TSP in consultation with AEMO and the Coordinator, taking into account forecast demand, generation developments, credible contingencies, and relevant system studies. The TSP must also be informed by broader frameworks such as the Whole of System Plan, power system standards, and government policy settings.

Therefore, the role of the TSP is to adopt the prevailing frameworks and inputs that have been informed through consultation with relevant bodies. This ensures that the TSP remains an adaptive planning tool that is responsive to new information, while maintaining consistency with the established governance and regulatory processes.

Environmental, consumer & transparency outcomes

Summary of feedback

Stakeholders emphasised the need to more explicitly consider broader outcomes, including environmental impacts and consumer interests. While there was general support for the focus on reliability and enabling renewable generation, some submissions noted that environmental considerations and emissions outcomes were not explicitly addressed in the report.

Stakeholders also highlighted the importance of maintaining a strong focus on long-term consumer outcomes, including affordability, reliability, and sustainability.

More broadly, there was positive feedback on improvements in transparency and communication within the TSP, particularly in explaining network constraints and project rationale. Stakeholders encouraged Western Power to continue enhancing transparency and engagement to support stakeholder understanding and social licence as the scale of network investment increases.

Responding to system planning direction

While TSP needs to adopt an assumption around generation and storage expansion, it is not intended to define the future direction of the SWIS.

For TSP 2025 major network expansion projects have been identified through previous system planning work; these projects are treated as committed and therefore not subject to cost, societal or environmental benefits considerations within TSP.

