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Australian Energy Market Operator
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Essential Energy Submission: 2025 Inputs Assumptions and Scenarios Report Consultation Paper

Essential Energy appreciates the opportunity to provide input on the Australian Energy Market Operator's (AEMO) consultation for the 2025 Inputs, Assumptions, and Scenarios Report (IASR). Essential Energy operates over 183,000 km of powerlines that cover 95 per cent of New South Wales NSW and parts of southern Queensland, serving more than 890,000 customers including homes, hospitals, schools, businesses and community services.

As a key stakeholder in the National Electricity Market (NEM), we believe it is crucial that AEMO's planning scenarios incorporate a more comprehensive understanding of the capabilities and potential of distribution networks in hosting generation and forms of storage to help deliver the nation's renewable energy targets. Additionally, the unique network topography of Essential Energy, particularly in rural and regional areas, offers significant advantages for prospective generator projects. Our extensive network spans areas with desirable project site selection, making us unique relative to other networks in supporting large-scale renewable energy developments.

AEMO's recently released 2024 Integrated System Plan (ISP) has underscored the critical role of Consumer Energy Resources (CER) in achieving Australia's net zero objectives and maintaining the stability of the NEM. Under all three scenarios outlined in AEMO's Integrated IASR scenarios — Step Change, Progressive Change, and Green Energy Exports — CER connected to the distribution network will be pivotal.

Importance of Distribution Networks in the Energy Transition

Essential Energy has made significant strides in connecting a substantial number of CER, particularly solar photovoltaic systems, to its distribution network. As of the end of April 2024, there were 289,363 solar connections to the network, with a total panel capacity of 2,042 MW[1]. This represents almost a third of total Essential Energy connections having CER in some form.

In public discourse, household CER can sometimes be mislabelled as a "glut of solar in the middle of the day," necessitating a blunt network response such as hard limits and physical curtailment. However, in practice, distribution networks are highly dynamic and capable of responding in ways that benefit the entire system over time. Household CER is only problematic if managed poorly. At Essential Energy, one of our core pillars is to enhance the utility of CER for our customers through smart management. This approach maximises the benefits for our customers, ensuring they derive more value from their own investment and the utmost utility from being connected to our network. Ultimately, smart management

[1] This includes residential and small commercial/industrial applications but does not include large-scale embedded generators.

of CER lowers costs across the entire network by deferring augmentation for peak events, which delivers value to all connected customers.

By way of example, Essential Energy is investing in Dynamic Operating Envelopes (DOEs), which provide flexible export limits based on real-time network capacity. This initiative is designed to optimise the utilisation of CER by adjusting export capacities dynamically, thus preventing overvoltage issues and improving overall network stability. Essential Energy's approach in implementing DOEs is expected to offer customers equitable access to the network and support the efficient integration of solar and other distributed generation sources including front of meter storage.

Moreover, by leveraging its detailed understanding of current and future network needs, Essential Energy can strategically deploy front of meter battery storage such as community batteries in locations where they will provide the greatest benefit to the network. This distribution-led approach ensures that these batteries are positioned to alleviate constraints and enhance network reliability, while also taking advantage of synergies with existing and planned distribution assets. Such efficient coordination maximises locational value and drives down costs, ultimately benefiting customers through downward pressure on pricing.

These efforts demonstrate Essential Energy's commitment to facilitating the energy transition. However, more can be done by fully leveraging underutilised capacity on the distribution network. This will allow Essential Energy to support the growth and integration of CER including rooftop solar, front of meter battery storage, and electric vehicles (EVs). This integration not only supports meeting renewable energy targets but also enhances the resilience and reliability of the electricity grid at the point of consumption.

Whilst Essential Energy is committed to the smart management of CER, the energy transition in Australia requires an integrated approach that leverages both transmission and distribution networks to host medium-sized generation and storage. Essential Energy’s distribution network has significant sub transmission assets operating at 66kV and 132kV which possess significant latent and currently underutilised hosting capacity.

Leveraging the opportunity that exists on Essential Energy’s network

The underutilised hosting capacity within distribution networks represents a valuable resource that, if effectively leveraged, can significantly contribute to the energy transition. Essential Energy is uniquely positioned to integrate more medium-sized generation projects and household CER, reducing reliance on large-scale, centralised generation. This decentralisation fosters a more resilient and adaptable energy system.

For example, utility-scale generation projects connected to distribution networks such as Essential Energy’s can provide substantial consumer benefits by reducing the need for extensive greenfield transmission investments. Essential Energy’s latent network capacity could enable proactive upgrades that support new connections large scale renewable generation. Capacity can be unlocked efficiently by upgrading switching stations, lines, and other electrical assets in a manner that maximises available capacity. Currently, upgrades are conducted on a project-by-project basis, leading to higher costs and fragmented network planning.

In response, Essential Energy has undertaken detailed thermal capacity studies, revealing multiple locations within our distribution network where small augmentations could substantially increase hosting capacity at low cost. Essential Energy has identified 15GW of underutilised hosting capacity across 37 bulk supply points. Through targeted augmentation to its distribution network in strategic areas for renewable generation, Essential Energy can connect generation at a substantially lower cost compared to greenfield investments. However, effective coordination and joint planning with the transmission network are required to ensure augmentations are planned efficiently and effectively.

The Role of Distribution Networks in AEMO's Planning Scenarios

Considering the significant potential of distribution networks, such as that managed by Essential Energy, and incorporating comprehensive ISAR inputs will enable AEMO to develop ISAR scenarios that accurately reflect current and future distribution capabilities. This includes recognising the underutilised hosting capacity within distribution networks and integrating detailed data on distribution network existing capabilities and constraints. By doing so, future ISPs can develop more accurate and comprehensive scenarios that reflect the real-world capabilities and opportunities of the distribution network.

Essential Energy welcomes the opportunity to provide elements of the analysis mentioned above to AEMO directly on a more formalised basis to assist in the development of the IASR scenarios. This includes detailed thermal capacity studies, data on real-time network performance, and projections of CER integration impacts. Our detailed insights and data can support a more nuanced understanding of the distribution network's capabilities, ultimately contributing to more effective planning and execution of the energy transition.

If you have any questions in relation to this submission, please contact Mr Anders Sangkuhl, Regulation Strategy Manager via anders.sangkuhl@essentialenergy.com.au or via phone 0409 968 326.

Yours sincerely,

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