AEMC

INFORMATION

Fact sheet: How transmission frameworks work in the NEM

This note explains how the transmission framework currently operates in the NEM. Specifically it outlines the nature of access in the NEM, how generators make investment decisions in the NEM and the planning and investment frameworks that underpin transmission investment decisions.

Key points

The current transmission framework in the NEM can be summarised as:

- **An open access system:**
  - The focus of transmission businesses, including their operation and investment decisions, is to deliver a reliable supply to consumers and to make offers to connect to generators and loads that wish to connect to their network.
  - The development of transmission infrastructure to enable the export of energy from generators will only occur to the extent that is necessary to ensure consumers receive a reliable supply of electricity.
- Under this open access system, a generator has a right to connect to the transmission network but there is no guarantee they will be able to sell their output. A **generator's right to use the transmission network, and so earn revenue, is based solely on whether or not it is dispatched by AEMO** in the wholesale market. Dispatch of electricity is determined by dispatch offers of generators and the level of network congestion.
- Therefore, because there is an obligation on transmission businesses to reliably supply their customers, **it is customers who fund investments in the transmission network** that enable export of energy from generators, and relieve congestion where necessary. The costs of the assets necessary to provide a reliable supply are recovered solely from load (that is, customers).[1]
- As generators have no access right to the transmission network, that is, there is no guarantee they will be able to sell their output, they only pay charges relating to the cost of their immediate connection to the shared transmission network, **the charging regime for generation can be characterised as a "shallow" connection charging approach**.

Access in the NEM

The NEM operates under what is called an **open access** regime. Transmission businesses must make investments or procure services to meet the relevant jurisdictional reliability standard. Reliability standards relate to how transmission and distribution networks can withstand risks without consequences for consumers and guide the level of investment that networks undertake. These standards are set by state and territory governments. These standards generally ensure a level of redundancy on the system, implying that the supply of power to total load (i.e., customers) will be robust in the event of a certain level of risk, or contingency.

Load as a whole is therefore considered to receive some level of implied access 'right' or firm access to the network. Given this, consumers pay transmission use of system (TUOS) charges in return for this access provided to them: the costs of the assets necessary to provide them with a reliable supply that comprise the shared transmission network together with operational expenses are recovered solely from load (i.e., customers).

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[1] Generators pay for connection assets which are part of the shared transmission network. These assets are known as 'identified user shared assets' under the National Electricity Rules. Consumers only pay for what is needed for a reliable supply of electricity.

The NEM operates under an open access system. There are obligations on transmission networks to reliably supply their customers and to facilitate connections to their network.

When networks have reached their limit of how much energy it can transport, this 'congestion' can usually be relieved by augmenting the capacity of the network. TNSPs are also permitted, but not obliged, to undertake capital expenditure to reduce congestion – within their own region, or between two regions – when any such options for augmentation passes a cost-benefit test, the regulatory investment test for transmission (RIT-T)

Generators have the right to negotiate a connection to the transmission network and pay a shallow connection charge relating to the cost of their immediate connection to the shared transmission network. But there is no firm access in that generators have no guarantee that they can export all of their output to the system. Therefore, generators do not pay any form of TUOS charge.

In the NEM, generators earn money by being dispatched. Generators do not have a firm inherent right to be dispatched,[2] nor do they have a right to be compensated when not dispatched.

Physical dispatch of electricity for generators is determined through AEMO's NEM dispatch engine (NEMDE) system, based on the dispatch offers of generators and the physical limits of the transmission system. In other words, if the network is congested, generators face a risk of not being dispatched - being constrained-off the system - or, in some cases, being constrained on.[3]

The focus of transmission businesses, and so their investment and operation decisions, is to deliver a reliable supply to consumers and to make offers to connect generators and load to their network. The development of transmission infrastructure to enable the export from generators will only occur to the extent that is necessary to ensure consumers receive a reliable supply of electricity.

How are generation investment decisions made?

The NEM was established to introduce competition in the wholesale electricity sector, with the objective of decentralising the operational and investment decisions to commercial entities that are better placed to bear the costs and manage the risks of those decisions.

Future investment in generation is determined by market participants on the basis of market signals: expectations of future spot prices and retailers' willingness to enter into contracts to hedge against future price risk.[4]

Investment in generation assets is intended to be market-driven taking into account – amongst other things – expectations of future demand, the location of the energy source, access to land and water and proximity to transmission.

When a generator is considering investing in new plant it has no means of managing the risk of congestion associated with that plant in the future. Even if augmentation of the shared network is deemed to be economically beneficial to customers, a generator has no means of managing the risk that the augmentations are not delivered in a timely manner.

While there is scope for generators to fund network augmentation, the nature of the open access regime implies that generator funded network augmentations do not bestow any physical or financial rights to the network.

How are transmission investment and operation decisions made?

Transmission businesses in the NEM face financial incentives, with investment decisions bounded by incentives and regulation, which are developed and overseen by the AER.

The NER sets out planning and reporting requirements for transmission businesses. Under these requirements, a transmission business is to undertake an annual planning review to identify emerging network constraints expected to arise over a ten-year planning horizon.

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2 With the exception of non-scheduled generators, who effectively receive priority access to the regional reference node.

3 Congestion occurs when the flow of electricity reaches the physical limit of the affected part of the transmission network. Whenever a particular element on the network, for example a line or transformer, reaches its transfer limit and cannot carry any more electricity already, it is 'congested'.

4 Market participants in the NEM have the possibility to hedge their risks against price volatility in the contract market. This has been an integral part of the NEM market design since its inception. Hedging risks can significantly reduce market participants' (and ultimately consumers') exposure to high price events. By helping to smooth their future effective wholesale revenues or payments, contracts lower participants' risk profiles and increase the ease with which they can obtain equity and debt financing from suppliers of capital.

TNSPs in the NEM face financial incentives, with investment decisions bounded by incentives and regulation, which are developed and overseen by the AER.

The results of a review are then published in an annual planning report, which must (amongst other things) set out what the business is doing to meet its reliability standards.

Transmission businesses must make investments in order to meet the jurisdictional reliability standard. Businesses are also permitted, but not obliged, to undertake capital expenditure to reduce congestion - within their own region or between two regions - when this passes a cost-benefit test, the RIT-T.

Project specific planning is undertaken through the RIT-T, which considers the benefits to market participants and consumers of a particular investment.

Under the RIT-T, businesses are required to assess the efficiency of proposed augmentation investment options (that exceed $6 million) by estimating the benefits that would result for market participants and consumers, and comparing these to the associated costs.

The purpose of the RIT-T is to identify the transmission investment option which maximises net economic benefits and, where applicable, meets the relevant reliability standards. If a proposed investment passes the criteria governing the RIT-T, the business may proceed with the investment, and this will be funded by customers through TUOS charges.

The primary purpose of the current framework of annual planning reports and RIT-Ts is to support the planning of, and decisions on investment in, a network by:

- creating incentives for, and a framework within which, transmission businesses can consider potential non-network solutions to network constraints or limitations
- establishing clearly defined planning and decision making processes to assist transmission businesses in identifying the solutions to network problems in a timely manner
- providing transparency on network planning activities to enable stakeholder engagement with those activities in order to support the efficient investment in the network.

Transmission businesses are also subject to a number of incentive schemes which are administered by the AER, in accordance with the requirements in the NER. These incentive schemes include the Service target performance incentive scheme (STPIS). The purpose of the STPIS is to provide incentives to transmission businesses to improve or maintain a high level of service for the benefit of participants in the NEM and end users of electricity.

The planning and investment framework is supported by an incentive-based economic regulatory framework, subject to oversight from the AER. In particular, a transmission business' proposed revenue requirement is subject to assessment by the AER. The AER sets a maximum allowed revenue that a network can recover from consumers during a regulatory period. The transmission businesses revenue allowance is set by the AER on an ex ante basis. In determining the revenue allowance, the AER projects the revenue requirement of a business to:

- cover its efficient costs of reliably supplying customers (including operating and maintenance expenditure, capital expenditure, asset depreciation costs and tax liabilities)
- provide an appropriate return on capital.

The transmission businesses maximum allowed revenue is recovered through TUOS charges to consumers. No generator charges are imposed for using the shared transmission network.

Finally, transmission businesses are responsible for assessing all new generator and load connections against the requirements of the NER, together with providing the assets that are necessary to connect these parties.

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