

MEMO

To: Mr Andrew Dillon, CEO, Energy Networks Australia

Cc: AER Board Members
Mr John Devereaux, Chair, AER Rate of Return Guideline Consumer Reference Group
Mr Warwick Anderson, General Manager, Network Finance and Reporting

From: Professor Stephen Gray, Frontier Economics

Date: 10 August 2018

Subject: **Nyrstar network charges**

Background

During the AER's stakeholder forum held on 2 August 2018, a question was posed in relation to the relative network charges paid by two smelters operated by Nyrstar – one in Port Pirie (South Australia) and the other in Buden (Netherlands). The questioner stated that the network charges for the Port Pirie smelter were four times the charge for the Buden smelter. Energy Networks Australia agreed to investigate the issue and to report back on any implications for the allowed return on equity.

Key findings

The price paid for network services depends on many factors including operating costs, capital costs (depreciation), borrowing costs (the allowed return on debt), and the allowed return on equity.

It is important to properly investigate the sources of any price differences. It does not automatically follow that a higher price in Australia means that the AER provides more generous allowances than its Dutch counterpart (the Authority for Consumers and Markets – ACM). In particular, regulatory judgment and discretion is applied largely in relation to the beta and MRP parameters (which is why they are always the most contentious). There is less judgment and discretion in relation to capital, operating and borrowing costs, as those costs are more directly observable and do not require the application of theoretical economic models.

When comparing network charges between South Australia and the Netherlands, it is important to understand that the Netherlands has 17 million consumers in an area not much larger than greater Adelaide and without material challenges of terrain and vegetation. Thus, the South Australian network requires much higher capital and operating costs, which are borne by many fewer customers. The higher capital and operating costs in Australia flow through to prices.

Borrowing costs are currently higher in Australia than in the Netherlands, which also flows through to prices.

A particular focus is the allowed return on equity, where there is most scope for regulatory judgment to be applied. In particular, regulatory judgment is applied in the selection of beta and MRP allowances. As shown below, the Dutch regulator allows an equity risk premium (the product of beta and MRP) that is more than 100 basis points above the corresponding allowance proposed by the AER.

Key conclusion

It is important to carefully and properly evaluate comparisons on a like-with-like basis. It would be wrong to infer that higher prices in Australia are evidence of the Australian regulator being more generous in the exercise of its judgment and discretion in relation to the allowed return on equity. This example shows that such any such suggestion would be misleading and unsupported by the evidence.

Nyrstar supply arrangements in South Australia

Electricity is supplied to Nyrstar's Port Pirie smelter by SA Power Networks, who have provided detailed information about charges in Australia, and about differences between the electricity systems in SA and the Netherlands.

Nyrstar's smelter/refinery is located at Pt Pirie, approximately 220km north of Adelaide.

Nyrstar is a distribution customer connected to the SA Power Networks distribution network at two 'high voltage' distribution supply points, one at 33kV and one at 6.6kV. Both of these points are supplied from SA Power Networks' Bungama substation.

Electricity network charges

SA Power Networks' network charges to customers (which are billed to the customers' retailers) recover ElectraNet's transmission charges, SA Power Networks' distribution charges, and the cost of the South Australian Government's photo-voltaic feed-in-tariff schemes. Tariffs, incorporating all these costs, are approved each year by the Australian Energy Regulator.

On a per unit basis, network tariffs reflect the amount of network used to supply electricity to the customer. So, for example, a customer supplied at lower voltages will have higher prices than customers connected at higher voltages – as they require more network to supply them.

Below is a table showing the network charges (\$) and network pricing (\$/kVA) for Nyrstar's two supply points in 2012/13 and 2018/19 in nominal dollar terms. Note that network prices are lower in 2018/19, and the Nyrstar load in 2018/19 (19,939kVA) is also around 25% lower than it was in 2012/13 (26,775kVA).

Table 1: Network charges (\$) and network pricing (\$/kVA) for Nyrstar’s two supply points in 2012/13 and 2018/19, nominal dollar terms

		2012-13	2018-19		2012-13	2018-19
		\$000's	\$000's		\$/kVA	\$/kVA
33 kV supply				Peak kVA	26,775	19,939
	Transmission	\$ 2,635	\$ 1,499	\$/kVA pa	\$ 98.43	\$ 75.20
	Distribution	\$ 554	\$ 390	\$/kVA pa	\$ 20.70	\$ 19.54
	Neg Service					
	PV FiT	\$ 117	\$ 84			
		\$ 3,306	\$ 1,973			
6.6 kV sub-station supply				Peak kVA	17,734	18,165
	Transmission	\$ 1,598	\$ 1,329	\$/kVA pa	\$ 90.08	\$ 73.15
	Distribution	\$ 1,334	\$ 1,312	\$/kVA pa	\$ 75.22	\$ 72.24
	Neg Service		\$ 25			
	PV FiT	\$ 282	\$ 81			
		\$ 3,213	\$ 2,747			
Total				Peak kVA	44,509	38,104
	Transmission	\$ 4,233	\$ 2,828	\$/kVA pa	\$ 95.10	\$ 74.22
	Distribution	\$ 1,888	\$ 1,702	\$/kVA pa	\$ 42.42	\$ 44.66
	Neg Service	\$ -	\$ 25			
	PV FiT	\$ 398	\$ 165			
		\$ 6,519	\$ 4,720			

Source: SA Power Networks

Why are South Australia’s network charges four times that of Holland?

Frontier is not familiar with Nyrstar’s supply arrangements in Holland but we have undertaken some analysis of Tenet (Netherlands Transmission) pricing from their website (and converting to AUD). If Nyrstar smelter(s) were being supplied at extra high transmission voltages (e.g., 200kV) in Holland, then the network prices it pays in South Australia would indeed be around four times Tenet’s extra high voltage prices. And if this is the case, Nyrstar is using much less transmission network (and no distribution network) compared with their supply arrangements in South Australia.

Also, a number of exogenous factors will contribute to higher transmission and distribution network prices in South Australia than Holland, including major geographic and climatic factors unique to Australia:

- **Customer density** – South Australia has a far lower customer density than a relatively heavily populated region such as Holland, reflecting the smaller population spread over a much larger geographical area, increasing the amount of network that must be maintained to supply each customer. It is also important to recognise that a key role of the network is to transport power from generation sources to major load centres, often over very long distances in Australia.

- **Load factor** – South Australia has very ‘peaky’ demand driven by air conditioning load and consequently a very low load factor, as measured by maximum demand relative to average consumption. This load factor continues to deteriorate, with average consumption levels on the transmission network declining due to the rapid uptake of embedded solar PV generation (with minimum grid demand levels predicted to fall to zero in regions such as South Australia within 5-10 years). This increases the level of capacity needed to deliver each unit of energy, pushing up unit costs.
- **Scale** – the spread of the network and smaller population limit the scope for economies of scale in service delivery relative to much larger networks in heavily populated areas such as Europe. SA Power Networks services an area of 178,000 km² in South Australia - more than four times the entire area of the Netherlands – serving a tenth of the population (with a customer base of 1.7 million compared with the population of the Netherlands at 17 million). The map below shows the entire area of the Netherlands superimposed on South Australia.¹

Figure 1: Area of the Netherlands relative to area of South Australia



Source: SA Power Networks

- **Topology** – given the nature and spread of customer load, networks in regions such as South Australia have a large number of substation assets that must be maintained relative to larger networks servicing bigger, denser load centres and include a range of smaller voltage assets that

¹ The total area of the Netherlands is 41 thousand square kilometres, whereas the total area of South Australia is 984 thousand square kilometres, a factor of 25.

may more typically be found in distribution systems elsewhere (for example, long 132 kV radial lines servicing country areas) which increases the measured cost of transmission services.

Overall, the integrated grid spanning Australia's NEM is one of the longest interconnected power systems in the world, serving the lowest level of proportionate demand with a population base of around 22 million across the NEM.

By comparison, Holland's power system serves around 17 million people (i.e. the population of Vic, NSW and QLD) with around 19 GW peak demand in an area of around 41,000 km² (less the size of Tasmania at 67,000 km²) across relatively flat, featureless terrain, and could therefore be expected to have relatively low per capita cost.

More broadly it also needs to be remembered that the NEM operates under an open access, shallow connection charging regime, whereby the bulk of shared transmission network costs are funded directly by customers. Whereas, markets elsewhere can recover transmission costs differently, for example generators bear a portion of these costs under contract carriage models, making direct comparisons less meaningful.

Return on equity comparison

The AER's Draft Rate of Return Guideline proposes an equity risk premium of 3.6% above the prevailing risk-free rate – made up of an equity beta (geared to 60%) of 0.6 and a market risk premium of 6.0%.

On a like-with-like basis, the equity risk premium allowed by the Dutch regulator (ACM) for electricity transmission and distribution firms (geared to 60%) is 4.63%, more than 1% above the corresponding allowance proposed by the AER.²

We note that we have followed the AER in performing the comparison based on the equity risk premium:

The critical allowance for an equity investor in a benchmark efficient entity is the allowed equity risk premium over and above the estimated risk-free rate at a given time. Under the standard application of the SLCAPM, this equals the MRP multiplied by the equity beta. Hence, we have compared equity risk premium estimates where appropriate.³

That is, higher network charges in Australia certainly do not result, in any measure, from any generosity in judgmental/discretionary allowances in relation to the allowed return on equity.

² https://www.acm.nl/sites/default/files/old_publication/publicaties/17231_incentive-regulation-of-the-gas-and-elektricity-networks-in-the-netherlands-2017-05-17.pdf and https://www.acm.nl/sites/default/files/old_publication/publicaties/15617_wacc-report-final.pdf.

³ AER, Jemena Gas Networks Final Decision, Appendix 3, p. 39.