

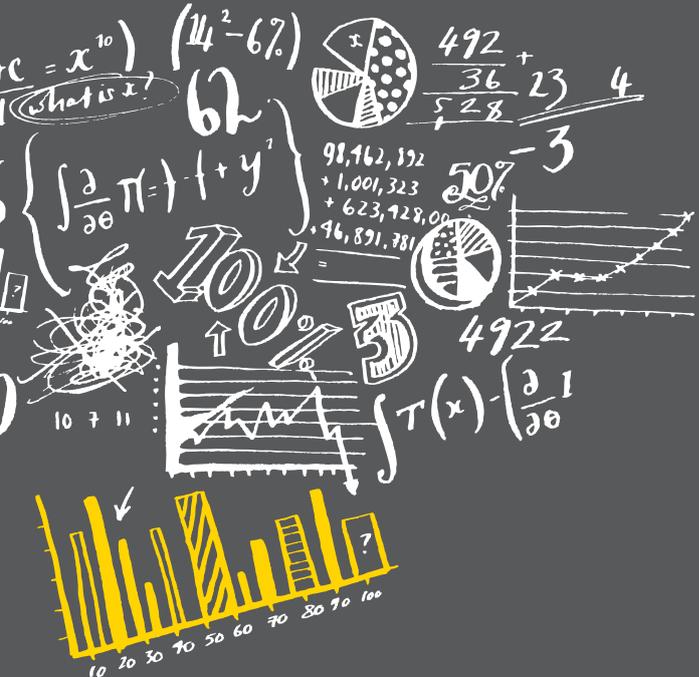
Electricity network services

Long-term trends in prices
December 2016



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Executive summary

EY has been engaged by Infrastructure Partnerships Australia to analyse the long-term trends in the prices of providing electricity network services.

This report summarises the long term price performance of electricity networks or 'poles and wires' businesses in New South Wales (NSW), Queensland (Qld), Victoria, South Australia (SA) and Western Australia (WA).¹

It builds on EY's previous analyses on the long term trends in the prices and costs of providing electricity network services, including our 2014 work for the NSW Treasury.² This report updates our report for the NSW Treasury and includes WA for the first time.

This report shows that network prices for typical residential customers in:

- ▶ Victoria and SA - have fallen and increased modestly in real terms respectively since privatisation
- ▶ NSW, Qld and WA - have increased substantially in real terms, by approximately 100% or more in some cases

Meanwhile, there is no evidence that network service levels have declined in Victoria and SA; on the contrary, standards of service appear to have improved. So Victorian and SA electricity customers appear to be benefitting from both better price and service outcomes.

Over the last two years, there have been significant reforms in the electricity network sector aimed at achieving significant efficiency improvements and price reductions. In:

- ▶ NSW, the NSW Government is in the process of offering long-term leases over 49% of its electricity networks. This includes the 100% lease of TransGrid in November 2015 and 50.4% lease of Ausgrid in October 2016, with the 50.4% lease of Endeavour Energy to be completed
- ▶ Qld, Energy Queensland was formed in June 2016 following the merger between Energex and Ergon Energy to create a single electricity distributor
- ▶ WA, the Minister for Energy has announced a number of energy market reforms, including the Electricity Market Review

Notwithstanding the reforms being undertaken in Qld and WA, it is widely recognised that it is difficult to replicate the incentives generated by private ownership under government ownership. The latter typically places a variety of constraints or conflicting incentives on network businesses, which can be difficult to overcome and can lead to higher operating and capital costs.

¹For WA, our work focuses on the South West Interconnected System (SWIS). The SWIS is owned and operated by Western Power. Horizon Power provides similar and other electricity services in WA outside the SWIS.

²EY, Electricity network services: Long-term trends in prices and costs - A report for NSW Treasury, 2014', available online at https://www.nsw.gov.au/sites/default/files/miscellaneous/attachment_a_-_ernst_young_report.pdf. For more information, including detail of the assumptions and methodology we used, refer to 'EY, Victoria domestic electricity prices 1996-2010: The contribution of network costs - A report for the Victorian electricity network businesses, 9 September 2011'. Available at <http://www.aemc.gov.au/Media/docs/SP%20AusNet-9ec43dc9-c71c-451c-ae77-e71a25cc9aa8-0.pdf> as

Background

Electricity prices continue to be a significant business, community and political issue in Australia.

This report aims to illustrate the historical trends in electricity network prices for typical residential customers in Australia. As with our previous reports, it relies on publicly available data to illustrate the historical performance of certain electricity network businesses in Australia in terms of network prices.

Terminology used in this report

In this report, unless otherwise stated, the term:

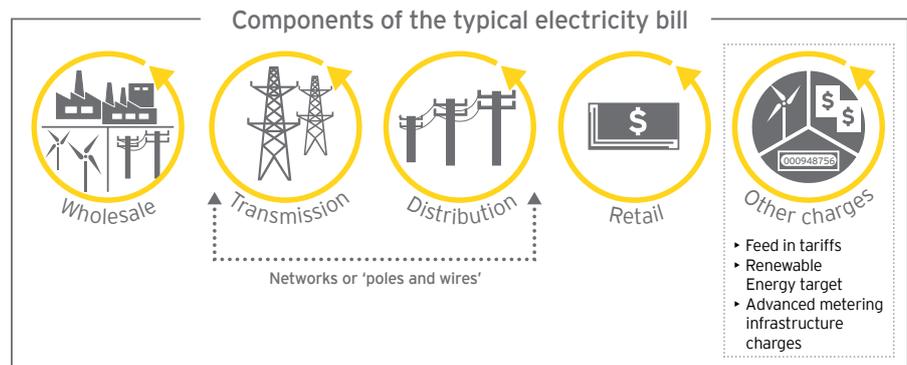
- ▶ 'Network price' - refers to the annual cost of the transmission and distribution network charges paid by the typical residential customer as reflected in retail electricity bills
- ▶ 'Retail electricity price' - refers to the annual cost of the total electricity charges paid by the typical residential customer as reflected in retail electricity bills
- ▶ 'Customer' - refers to the typical residential customer in each State who consumes the average volume in each year

Introduction to electricity in Australia

The electricity bills that residential customers pay are made up of the costs of the various components required to generate and deliver electricity to homes, as illustrated by Figure 1.

This report focuses on electricity network prices, or the component of electricity bills attributable to the 'poles and wires'. This is made up of two types of networks - transmission and distribution - which transport electricity from power stations to homes. It is also important to note that network prices are only part of the final electricity bill paid by residential customers (typically between 35-60%).

Figure 1: Electricity bill components



Source: EY

Significant reforms to electricity networks have been undertaken in some Australian States. For example, the Victorian and SA Governments privatised their electricity network businesses in 1995-1996 and in 1999-2000 respectively.

The NSW Government is in the process of offering long-term leases over 49% of its electricity networks. While in the rest of Australia, the electricity network businesses remain government-owned, there have been recent mergers between electricity network businesses in Qld.

Electricity networks are made up of large amounts of infrastructure, which exhibit large economies of scale. This means that electricity network services are typically most efficiently delivered by one supplier. This is what is widely known as a natural monopoly.¹

The prices charged by all electricity network businesses in Australia – whether they are government-owned or privately-owned – are regulated to manage the risk of monopoly pricing and to encourage efficient investment in and use of the infrastructure.

In NSW, Qld, Victoria and SA – the electricity networks are regulated by the Australian Energy Regulator (the AER), an independent Commonwealth agency which is part of the Australian Competition and Consumer Commission

In WA – the electricity network within the South West Interconnected System (SWIS) is currently regulated by the Economic Regulation Authority (ERA)²

Network prices are usually set for 5-year periods and are based on the regulator's assessment of the efficient and prudent cost of meeting required service levels.

In all States except Victoria, the required levels for service and reliability are determined either by the State government or the jurisdictional regulator. The service and reliability levels are reviewed and can change periodically. For example, electricity network reliability standards have been modified in recent years in both NSW³ and Qld.⁴

¹Although technological disruption may change the cost structure of the industry over time and lessen this condition, thus also reduce the need for regulation.

²The WA Minister for Energy announced the planned transfer of economic regulation of the SWIS to the National Electricity Rules and the AER. However this will no longer occur and WA's Economic Regulation Authority will continue to be the economic regulator of the SWIS.

³The reliability standards in NSW gradually increased over the period from 2005-06 until 2010-11, with the NSW distribution businesses required to operate increasingly reliable networks, as reflected in tightening annual standards for the System Annual Interruption Duration Index (SAIDI) and System Annual Interruption Frequency Index (SAIFI). The current requirements in NSW in relation to network reliability, which came into effect on 1 July 2014, have relaxed the standards with a focus on more efficiently meeting reliability targets. For more details, refer to Houston Kemp, "Electricity Network Service Standards: An Overview: A Report for the NSW Department of Premier and Cabinet (2014) and Minister for Resources and Energy, Reliability and performance licence conditions for electricity distributors, July 2014.

⁴Minister for Energy and Water Supply, Reforming Queensland's electricity network reliability standards, March 2014.

Factors affecting electricity pricing

Estimating the typical residential electricity bill is complicated by a number of factors, which differ by State.

There are differences in the regulation, level of competition and government policies affecting the electricity retail market. Some States still regulate retail prices for the typical residential customer and there is either no retail competition allowed, or little competition occurs in practice due to the level at which those regulated prices are set (i.e. either below costs or below the cost at which third parties can compete). More specifically:

- ▶ Retail prices for small customers consuming less than 160 MWh of electricity per annum (which covers most residential customers) in Victoria, SA and NSW are not regulated
- ▶ In Qld and WA, retail prices for small electricity customers are regulated
- ▶ In rural Qld (i.e. all areas other than the south-east) and WA, retail prices are subsidised and do not fully recover the costs of supply

This is also influenced by the introduction of Full Retail Contestability (i.e. which allows customers to choose which retail company supplies them with electricity) and the removal of retail price regulation creating associated information constraints. For example, many customers are on 'market contracts' with their retailer and often pay a significantly lower rate than the standing offer rate that retailers are generally obliged to provide. Our analysis attempts to address the issue by using electricity standing offer retail prices (which are public available and adjusting for the average discount for customers on market

contracts and the estimated proportion of customers who have switched to a market contract. Some limited information exists on these two variables

In WA, retail electricity prices are complicated by various government policies and industry developments including the:

- ▶ WA Government's Tariff Adjustment Payment (TAP), which provides payments to Synergy (i.e. the electricity retailer in the SWIS) to cover the shortfall between the revenue it receives and its cost of supplying its customers. This means that retail prices understate the 'true' cost of providing electricity to customers in the SWIS. The extent to which retail prices are understated has also varied year to year over the period of the analysis
- ▶ Tariff Equalisation Contribution (TEC) payments which are added to network prices in the SWIS to fund the WA Government's uniform tariff policy across the State. This means that network prices in the SWIS are higher than the 'true' cost of providing network services in the SWIS. This amount has also varied year to year over the period of the analysis
- ▶ TAP exceeding the TEC for electricity prices paid by smaller customers which means that overall, the costs of supply are understated for small customers. This results in some of the estimated increase in retail electricity costs in WA actually being paid by electricity consumers through their state taxes rather than in electricity tariffs

- ▶ The ERA's decision to defer the recovery of network revenue from the second access arrangement (AA2) period to subsequent periods, which effectively means that network prices in the SWIS are lower than they otherwise should be

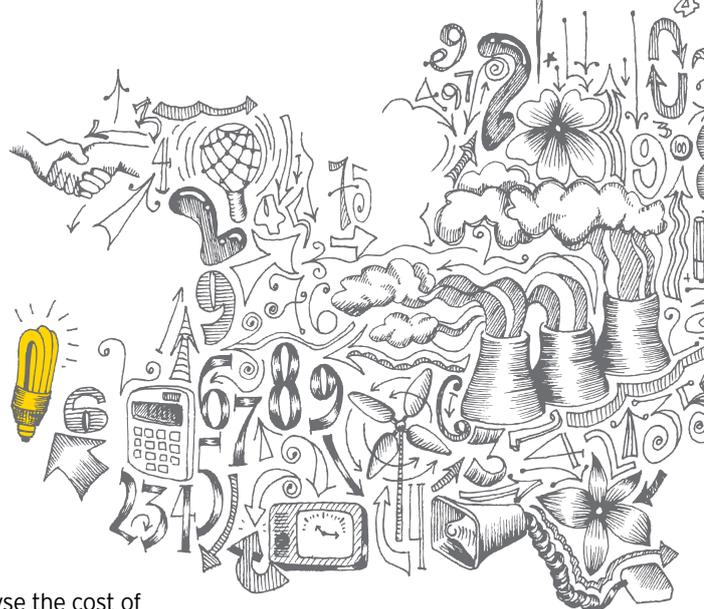
In this report, we have made some adjustments to WA electricity prices to account for these factors. In other words, they are not the prices that typical residential customers pay but it makes WA electricity prices equivalent and comparable to other States.

Various factors also contribute to the change in non-network costs, which include all costs other than transmission and distribution prices (e.g. wholesale energy prices, environmental schemes, retailer costs), all of which differ by State. Non-network costs include a category of 'other costs' which aim to capture those costs that are the outcome of specific policies by the State governments, where data exists to allow the costs to be easily separated from network costs. This includes the Climate Change Fund contributions in NSW, Advanced Metering Infrastructure (AMI) costs in Victoria, Photo-voltaic feed-in tariff (PV) costs in SA and the TAP and TEC amounts in WA

⁷For example, in the AER's Annual Reports on the Performance of the Retail Energy Market

⁸In January 2010, the ERA decided to defer transmission and distribution revenue from the second access arrangement period (2009 to 2012) to subsequent periods to avoid any resultant price shocks. The total amount deferred was equal to \$549m.

Qualifications



This report analyses the trend in prices of the electricity network businesses in NSW, Qld, Victoria, SA and WA (i.e. from privatisation of the Victoria and SA electricity networks). For WA, our work focuses on the SWIS.

All findings in this report refer to estimates of the electricity costs paid by customers in each State, either expressed on a per megawatt hour (MWh) basis, which adjusts costs for the amount of electricity consumed, or on a per customer basis. Costs are expressed in real 2015 terms for all States.

The period of the results between each State differs due to the availability of data from regulatory documents, which are typically produced consistent with the 5-year regulatory control period applying in each State. In:

- ▶ NSW, Qld and Victoria results are presented from 1996, the year of privatisation in Victoria. This is because major industry restructures accompanied privatisation and therefore consistent and verifiable publicly available data is not available prior to this point in time
- ▶ SA results are presented from 1998-99, the year of privatisation in SA, for the same reason above
- ▶ WA results are presented from 2007-08, the first year that data is publicly available for the electricity networks business in the SWIS following the disaggregation of the integrated electricity supplier Western Power Corporation in 2006

This report does not analyse the cost of electricity in the industrial or business sectors. For these sectors, similar analysis is not feasible given data limitations, the large number and complex structure of non-residential tariffs and the prevalence of individually negotiated non-standard contracts. Residential customers comprise the vast majority of customers (close to 90 per cent) and roughly 30 per cent of consumption, although the precise breakdown varies by State.

⁹The SWIS is owned and operated by Western Power. Horizon Power provides similar and other electricity services in WA outside the SWIS.

Trends in network prices

Summary of impact on network prices

Table 1 shows the real historical change in annual network prices paid by the typical residential customer over the long term. The results have been presented in two ways – i.e. on a per MWh basis and on a per customer basis.

It illustrates that network prices for government-owned businesses have increased at a faster rate than they have for privately-owned businesses – where they have increased at a much lower rate or have fallen. Indeed, in Victoria network prices have fallen in real terms by 6% on a per MWh basis and by 12% on a per customer basis over almost twenty years.

Table 1: Long-term change in average annual electricity network prices (% , real 2015 terms)¹⁰

State	Period	Network prices per MWh	Network prices per customer
Government-owned			
NSW	1996-97 to 2014-15	+114%	+80%
Qld	1996-97 to 2014-15	+196%	+195%
WA	2007-08 to 2014-15	+121%	+97%
Privately-owned			
Victoria	1996 to 2015	-6%	-12%
SA	1998-99 to 2014-15	+21%	+2%

Source: EY

The difference in the percentage change in network prices on a per MWh basis compared to a per customer basis reflect the declines in typical consumption, which has generally become more volatile in recent times.

This difference is particularly evident in SA and NSW where residential loads have generally decreased significantly over the period of analysis. For example, average annual consumption for the typical residential customer in NSW and SA has fallen by 16% and 15% respectively from the start of the period to 2014-15 due to various factors including the increased penetration of rooftop photo-voltaic (PV) / distributed generation and greater energy efficiency.¹¹ In contrast, average residential loads have been more stable over the period that we have used for our analysis in Qld (-0.2%) and Victoria (-2%).¹² In WA, average residential loads have also fallen (-11%) over the period of analysis.

Therefore it is useful to consider results which include and exclude the impact of declining consumption to provide a more balanced assessment of the changes in network prices. Indeed, the results on a

per customer basis would now appear to provide a better basis for assessing price changes (given customer numbers have been much more stable over time compared to consumption volumes, a trend that is likely to continue).

It should be noted that various factors can and do contribute to the differences between the States (e.g. the starting position in respect of price levels, the age of the assets and therefore the need for investment, service and reliability standards¹³ etc.). Not all of these factors are within the relevant businesses' control.

For example, in NSW, Qld and WA there was relatively high investment in some recent regulatory periods.¹⁴ In contrast, the businesses in Victoria and SA are approaching a stage in their life cycle which may require substantial further investment.

¹⁰We have only presented the change in overall network prices as it is not possible to disaggregate network prices into transmission and distribution charges for all States for the entire period of analysis. Further, transmission charges capture some costs that are in practice unrelated to transmission services such as National Electricity Market fees, settlement residue costs and the costs of associated auctions. As a result, they are more volatile than distribution charges.

¹¹Energy Supply Association of Australia, Electricity Gas Australia 2015, page 5

¹²The period of analysis and the starting year in particular can significantly affect such percentage changes on a 'point to point' basis. Average residential loads have fallen significantly in more recent years. For example, since 2009, average residential loads have fallen by an estimated 17% in Qld and by 10% in Victoria. However our starting year (i.e. 1996-97 for Qld and 1996 for Victoria) starts from a relatively low base such that the change over the period of analysis appears to be small but conceals variation in average consumption from year to year.

¹³For example, particularly when reliability standards change over time, as in NSW and Qld. Refer to Section 0.

¹⁴The previous regulatory period refers to 2009-14 for NSW, 2010-15 for Qld and 2009-12 for WA.

Retail electricity prices

Table 2 represents the change in typical annual retail electricity prices in each State on a per MWh basis, and the change in electricity network prices and other costs which make up that electricity bill over the same period. Table 3 provides the same analysis on a per customer basis.

Note that this approach to estimating bills necessarily involves some approximation, so the absolute level of bills should be viewed as a broad estimate only. Moreover, there is a variety of reasons why total bills will differ between locations.

The focus should therefore be on the long-run trends in total bills and the components of those bills, rather than the absolute levels.¹⁵

Change in electricity prices per MWh

Table 2: Long term change in typical annual electricity prices per MWh (% , real 2015 terms)

State	Period	Retail electricity prices (per MWh)	Network prices (per MWh)	Non-network plus other costs (per MWh)
Government-owned				
NSW	1996-97 to 2014-15	+56%	+114%	+7%
Qld	1996-97 to 2014-15	+96%	+196%	+40%
WA	2007-08 to 2014-15	+88%	+121%	+74%
Privately-owned				
Victoria	1996 to 2015	+16%	-6%	+38%
SA	1998-99 to 2014-15	+61%	+21%	+124%

Source: EY

Change in electricity prices per customer

Table 3: Long term change in typical annual electricity prices per customer (% , real 2015 terms)

State	Period	Retail electricity prices (per MWh)	Network prices (per MWh)	Non-network plus other costs (per MWh)
Government-owned				
NSW	1996-97 to 2014-15	+31%	+80%	-10%
QueenslandQld	1996-97 to 2014-15	+95%	+195%	+39%
WA	2007-08 to 2014-15	+67%	+97%	+55%
Privately-owned				
Victoria	1996 to 2015	+10%	-12%	+31%
SA	1998-99 to 2014-15	+37%	+2%	+90%

Source: EY

Table 2 and Table 3 illustrate that:

- ▶ Retail electricity prices have risen significantly over the long term in most States, except in Victoria
- ▶ Network prices have been the major driver of the increase in electricity prices in NSW, Qld and WA. This is not the case in Victoria and SA
- ▶ In SA, network prices have contributed to the increase in electricity prices but have not been as large a driver of the increase as non-network costs
- ▶ There are significant differences in the change (in percentage

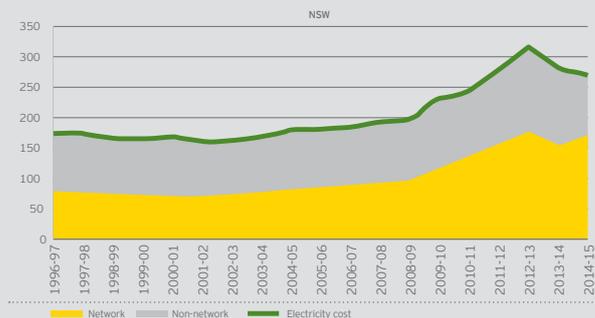
- terms) in some States based on whether the prices are expressed per MWh or per customer. This is most evident in SA, NSW and WA, the States where average consumption has fallen to the greatest extent
- ▶ There were relatively large declines in average consumption in NSW (-16%) and SA (-15%) over our period of analysis, with the majority of the reduction occurring in recent years due to the effects of increased penetration of rooftop PV and greater energy efficiency¹⁶
- ▶ A significant increase in non-network costs has occurred in WA

¹⁵Note the figures in Table 2 and Table 3 above refer to different time periods by State. To allow an indicative comparison between all States over the same period, refer to Figure 2 for an illustration of the change in prices in NSW, Qld, Victoria and SA since 2007-08. For example, it is evident that network prices in Victoria and SA (on a per MWh basis) declined significantly since the start of the period (i.e. after they were leased) and reached their lowest point around 2007-08 and have since increased somewhat. In contrast, network prices in NSW and Qld (on a per MWh basis) were at their lower point earlier on (i.e. prior to 2000) and have increased significantly over the analysis period, and particularly since 2007-08.

¹⁶Energy Supply Association of Australia, Electricity Gas Australia 2015, page 5

Figure 2 shows the long-term change in retail electricity prices in each State by component. It also shows the change in retail electricity prices in real dollar terms, and highlights the drivers of change during this period.

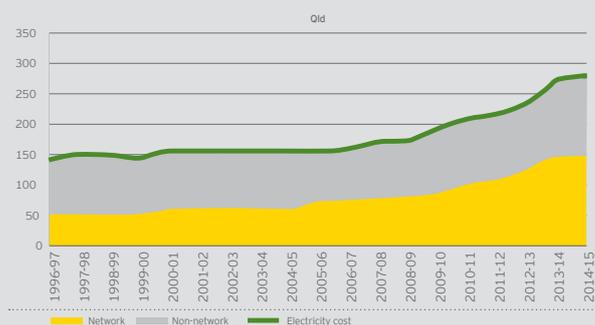
Figure 2: Breakdown of long-term electricity prices by State (\$ per MWh, real 2015 terms)



What has happened to prices from 1996-97 to 2014-15?

Retail prices increased by \$97 per MWh, of which:

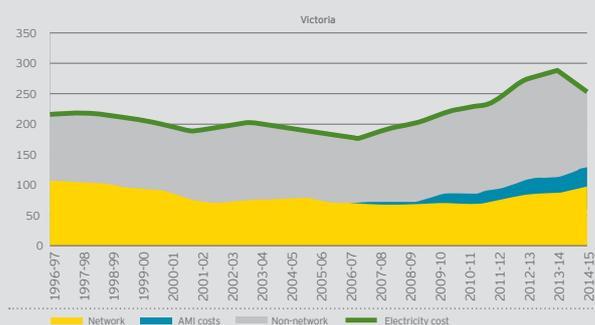
- ▶ 93% came from network prices
- ▶ 7% came from non-network costs



What has happened to prices from 1996-97 to 2014-15?

Retail prices increased by \$155 per MWh, of which:

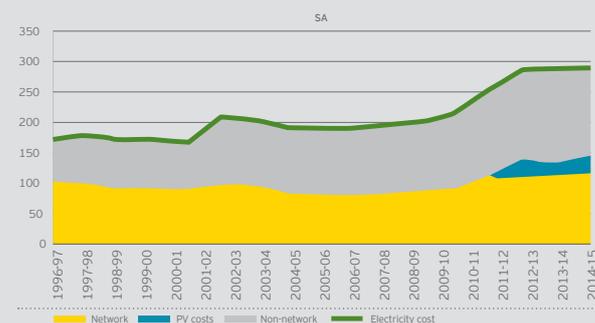
- ▶ 73% came from network prices
- ▶ 27% came from non-network costs



What has happened to prices from 1996 to 2015?

Retail prices increased by \$38 per MWh, of which:

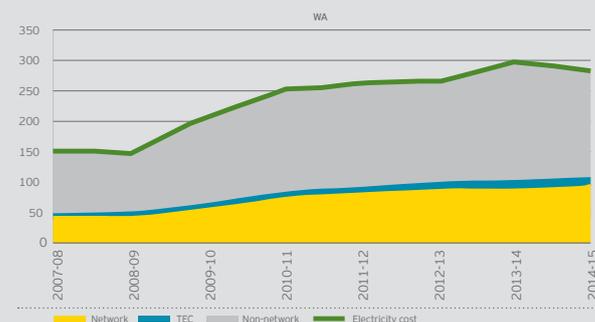
- ▶ 64% came from non-network costs
- ▶ 36% came from Advanced Metering Infrastructure costs
- ▶ Network prices fell by \$7 per MWh



What happened to prices from 1998-99 to 2014-15?

Retail prices increased by \$135 per MWh, of which:

- ▶ 21% came from network prices
- ▶ 17% came from PV feed-in-tariff costs
- ▶ 62% came from non-network costs



What happened to prices from 2007-08 to 2014-15?

Retail prices increased by \$163 per MWh, of which:

- ▶ 44% came from network prices
- ▶ 56% came from non-network costs

Source: EY. Note: The percentages in this Figure refer to how much network prices and non-network costs were responsible for the change in retail prices. They differ from the percentages in Table 1 and 2, which refer to the percentage change in network prices and non-network costs over time. PV costs in SA refer to the Jurisdictional Scheme Amount charges required to fund the SA Government's feed-in tariff credits to the owners of solar photo-voltaic electricity generators.

Network service levels



There are often concerns that the privatisation of services previously provided by governments may lead to declining service levels. The AER specifically acknowledged these concerns in its State of the Energy Market Reports, including in the inaugural 2007 edition and also in 2009:

“Noting these caveats, the System Average Interruption Duration Index data [SAIDI - a key indicator of reliability] indicates that since 2000-01 the average duration of outages per customer tended to be lower in Victoria and South Australia than other jurisdictions - despite some community concerns that privatisation might adversely affect service quality.”

The AER's findings on reliability between 2005-06 and 2013-14, as reported in its 2015 State of the Energy Market Report, show that the performance of the networks in Victoria has tended to be at or better than the average (with the exception of 2008-09 which coincided with the Victorian bushfires).

The performance in SA has declined slightly from around 2009-10, mainly on the System Average Interruption Frequency Index (SAIFI), but not the SAIDI. The Qld distribution networks have tended to have poorer performance on the SAIDI and SAIFI indices. This suggests that the commentary in the AER's 2007 report remains relevant.

Measures of electricity network reliability should be interpreted with some care, as reliability standards can differ between States and a short time series of data may not present the most accurate picture. There are also instances when one-off events affect the annual service level performance of all network businesses (e.g. bush fires in Victoria in 2008).

A detailed assessment of network service levels has not been undertaken as part of this work. SAIDI is, however, one key measure of reliability which suggests that the service levels of the Victorian and SA electricity network businesses have generally improved.

In 2014, Houston Kemp undertook a study on the reliability outcomes of electricity network businesses in the National Electricity Market since 2006 and found that:

“The reliability performance of privately owned businesses [in Victoria and South Australia] is typically quite high (relative to other network businesses) and has not deteriorated over time.”

This is also supported by other reports such as the AER and Essential Services Commission's (ESC) Annual Electricity Distribution Business Performance Report for the Victorian businesses and Essential Services Commission of South Australia's (ESCOSA) Annual Performance Report for the South Australian Energy Supply Industry.

¹⁷ Australian Energy Regulator, State of the Energy Market 2007, page 159

¹⁸ Australian Energy Regulator, State of the Energy Market 2015, page 84

¹⁹ Houston Kemp, 'Electricity Network Service Standards: An Overview: A Report for the NSW Department of Premier and Cabinet (2014), page 23.

²⁰ For example, refer to AER, Victorian electricity distribution businesses comparative performance report 2010 (May 2012). Prior to the inception of the AER, these reports were produced by the ESC. For example, refer to ESC, Electricity distribution businesses - Comparative performance report 2007 (October 2008). The AER ceased production of these reports in 2012 and they have been replaced by its benchmarking performance reports.

²¹ For example, refer to Essential Services Commission of South Australia, Annual Performance Report for the South Australian Energy Supply Industry 2010-11 (November 2011).

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