
Report prepared for the Energy Market Authority

The Benefits of an Electricity Futures Market in Singapore

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Benefits of Developing an Electricity Futures Market in Singapore

The Energy Market Authority (EMA) has worked with stakeholders such as the Singapore Exchange (SGX) and industry participants to launch an electricity futures market in Singapore in 2015. The introduction of an electricity futures market in Singapore creates competition benefits for consumers that could lead to lower retail electricity tariffs than would otherwise have been the case. Based on the benefits realised by consumers in overseas jurisdictions such as Australia and New Zealand, the equivalent net consumer benefits would amount to about **\$2.20/MWh** (i.e. **1.1% of the retail tariff**), or **S\$435 mil** over 5 years.

With an electricity futures market, electricity consumers in Singapore benefit from the following:

1. **Greater retail competition.** A liquid futures market provides potential new entrants with the vital ability to access competitively priced supply and manage their risk. The result will be a more competitive retail electricity market which will exert downwards pressure on retail prices. New independent retailers can also offer more innovative retail packages (e.g. green packages or demand side management services) to improve consumer choice.
2. **Improved price transparency.** Transparent price discovery will lead to greater efficiencies in the wholesale and retail markets. Existing and new market participants will be able to see the true cost of managing risk. The energy component risk premium of retail electricity tariffs will then be likely to be compressed as participants reconcile the cost of risk with the level of risk currently being passed on to consumers, which would result in lower retail prices for consumers.
3. **Better risk management.** For generators, a liquid futures market will provide them with a risk management mechanism to better manage planned maintenance, fuel purchase costs and investment decisions. For retailers (especially new independent retailers with no generation assets), the search and transaction costs of seeking competitive hedge contracts will be reduced. This improves efficiency and energy security for the electricity market.

As a result of greater competition and more efficiency in retail price components, the retail prices for consumers are likely to be reduced. As such, the development of an electricity futures market is expected to lead to lower retail prices than would otherwise be the case.

Overseas Experiences

The Singapore electricity market has similar fundamental design characteristics to the Australian and New Zealand electricity markets. All three markets are characterised by having been dominated by a small number of vertically integrated generator retailers, and each seeks to encourage new entrant retailers and a more competitive retail electricity landscape in the interest of consumers. In order to encourage entry of new independent retailers without generating assets, essential elements include the ability to know the cost of risk, the ability to access competitively priced supply and the access to risk management

products. An electricity futures market is a critical enabling infrastructure to facilitate the entry of such new independent retailers.

With the development of liquid and transparent futures markets in the Australian and New Zealand markets, consumers have enjoyed significant benefits from the resulting greater retail competition, price transparency and entry of new independent retailers. Our research on the Australian market shows the development of an electricity futures market has resulted in the retail electricity price being in the range of **A\$8/MWh and A\$10/MWh** lower (i.e. 5 to 7% of the retail electricity tariffs) than would otherwise have been the case between 2008 and 2014.

In both the Australian and the New Zealand case, two notable developments on the cost of risk occurred following the transition to greater trading through the futures market. Firstly, the more visible and transparent futures prices were shown to be lower than the prices traded in the bilateral Over-the-Counter (OTC) market. Secondly, once the cost of risk was revealed, it was subject to downward pressure through greater competitive pressures and efficiencies.

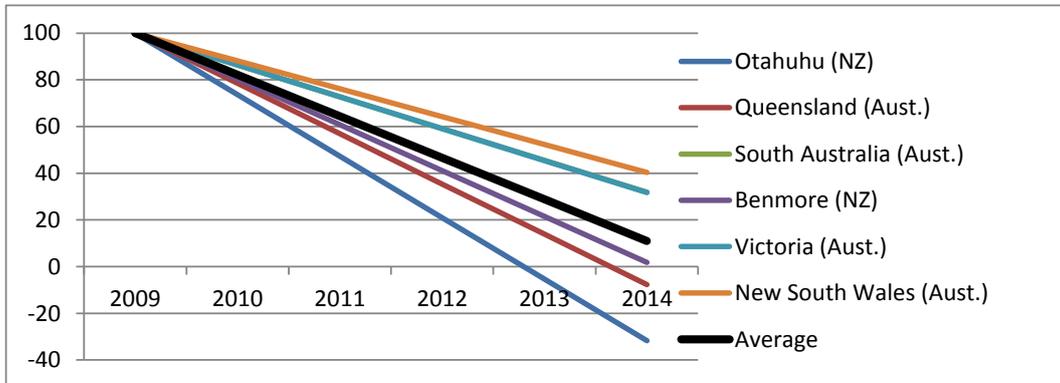
The premium between futures prices and spot prices reflects the level of risk traders perceive in the spot market and this premium is reflected in the energy component of retail tariffs. Where a premium exists it accounts for the sellers absorbing the buyers' price risk. With changes in expectations and volatility, the premium also widens and narrows and, from time to time may be negative (which is a discount for buyers).

An analysis of the differential between futures prices and spot prices in four states of Australia (Victoria, New South Wales, Queensland and South Australia) and in the New Zealand market (Otago and Bay of Plenty) reveals a consistent and considerable narrowing of that premium over a period of 5 years. In Victoria and New South Wales the premium closed from 20 - 30% to around 10% over the period. In Queensland and South Australia the premium narrowed from 40 - 50% to less than 10%. The premium of futures over spot at Otago narrowed from 20 - 30% when futures were introduced to virtually no premium by 2015.

The data series of the premium differential between futures prices and spot prices for each market in New Zealand and Australia have been normalised into an index in Figure 1¹.

¹ The trends in Figure 1 are calculated by deducting the time weighted average spot price across each quarter from the futures price 7 days before the start of each quarter.

Figure 1 Normalised trends showing the decline in premium of futures over spot prices in New Zealand and Australia



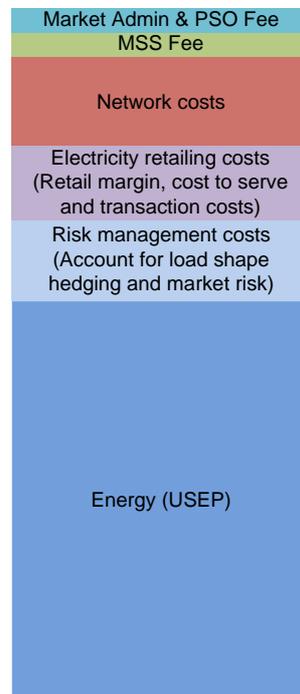
This analysis of the futures and spot price series in Australia (based on the above) show that the development of an electricity futures market has significantly compressed the risk premium, which has resulted in the retail electricity price being in the range of A\$8/MWh and A\$10/MWh lower (i.e. 5 to 7% of the retail electricity tariffs) than would otherwise be the case between 2008 and 2014 had it not been for the emergence of a liquid and transparent futures market.

The risk premium forms part of the energy cost which is a key component of retail electricity tariffs. In a contestable market, retailers take into account a number of variables and compression of any component through lower costs or competitive tensions will be reflected in the tariffs. The components of retail electricity tariffs are discussed in more detail in the following section.

Quantifying the Benefits for Singapore

The retail tariff comprises several components that will benefit from a liquid futures market. The retail tariff is decomposed into individual elements in Figure 2 below. In the retail tariff, the costs of the electricity retailing and risk management are the two components of retail tariffs that are most susceptible to compression as a result of greater price transparency and retail competition.

Figure 2 Breakdown of components of retail electricity costs



Based on the overseas experience on benefits realised by consumers in Australia and New Zealand, the value of the benefits of a liquid and transparent electricity futures market in Singapore was estimated by projecting the potential effects on each of the contestable elements of retail tariffs over a period of 5 years. The outcomes were adjusted to allow for the possibility that only a portion of cost reductions get passed through to consumers. The proportion of cost savings passed on to consumers is likely to rise with intensification of competitive pressures.

Delivering Consumer Benefits

The following effects were modelled to estimate the benefits to consumers that will follow from the introduction of a liquid and transparent futures market.

- Improvements in the wholesale market which will flow through to retail tariffs include:
 - A narrower risk factor in the energy cost resulting from observable prices in the hedge market.
 - Lower search and transaction costs for generators planning maintenance and procuring fuel.
 - Cost pressure and efficiencies for generators including the timing of investment decisions.
- Improvements in the retail market which will flow through to retail tariffs include:
 - Lower search and transaction costs for retailers.
 - Innovation in product offerings.

- Efficiencies in the cost to serve so retailers can be more competitive with their charges.
- Greater competition that will result in compressions in the retailers’ profit margin.

Table 1 presents the results as the estimated net consumer benefits arising from the development of a liquid and transparent futures market. The introduction of an electricity futures market in Singapore creates benefits for stakeholders, such as those outlined above. These benefits could lead to lower retail tariffs than would otherwise have been the case. Based on the benefits realised by consumers in overseas jurisdictions such as Australia and New Zealand, the equivalent net consumer benefits in Singapore would amount to about **\$2.20/MWh** (i.e. **1.1% of the retail tariff**), or **\$435 mil** over 5 years. Sensitivity analysis reveals that net consumer benefits could be \$1.00/MWh in the low case (or 0.5% of the retail tariff) and \$3.00/MWh in the best case (1.5% of retail price).

Table 1 Net consumer benefits

	Low case	Base case	High case
Net consumer benefits	- \$1.00/MWh	- \$2.20/MWh	- \$3.00/MWh
Net consumer benefits as a % of retail tariff	0.5%	1.1%	1.5%

Table 2 sets out the estimated net present value (NPV) of total net consumer benefits arising from the development of an electricity futures market over a period of 5 years. The base case shows a significant net benefit to consumers of **\$435 mil**. Sensitivity analysis shows that in the low case, the net benefits would be \$187 mil. In the high case, the net benefits would be \$591 mil.

Table 2 Total net consumer benefits

	Low case	Base case	High case
Total net consumer benefits (\$ mil)	187	435	591

Two points of clarification about these results have to be taken into account:

- **Consumers do not have to participate directly in the electricity futures market to receive the benefits.** The benefits arise because independent retailers are able to use the futures market to hedge their pricing risks and deliver better products and prices for consumers.
- **The benefits quantified are not contingent upon whether consumers switch their retailers.** This is because subsequent contracts will be subject to downwards competitive pressures enabled by the electricity futures market through greater retail competition and price transparency.

As we have seen in other electricity markets, and as we have seen in other analogous industries, all consumers will benefit from the competition and efficiencies that result from the futures market.

Early Signs of Consumer Benefits

This study relies on evidence from other markets and an expectation that the benefits of a liquid and transparent futures market will occur progressively in the Singapore market. It is encouraging that the electricity retail market in Singapore has started to see early signs of the benefits of an electricity futures market, with the entry of independent retailers (i.e. retailers not linked to any generation company). In fact, the Town Councils electricity tender results in Singapore for September and November 2015 suggest that the electricity futures market has already improved retail competition and has led to greater product variety for contestable consumers. Both tenders were won by independent retailers offering better prices than the incumbent generator retailers. For the September 2015 tender, all the independent retailers participating in the tender outbid the incumbent generator retailers, which led to cost savings for consumers.

Furthermore, there are early signs that generator retailers are responding to the competitive pressures from entry of independent retailers. On average, the generator retailers offered better prices for the November 2015 tender than the September 2015 tender. This has helped put downward pressure on retail prices for the benefit of electricity consumers in Singapore.

We have also seen the emergence of innovative business models and new retail options for electricity consumers. For example, in November 2015, Apple Inc. selected an independent retailer to provide electricity fully powered by solar energy for all their Apple retail stores and premises. Innovative offers like this become possible where independent retailers can leverage on the electricity futures market to hedge its pricing risk.

As such, the electricity futures market is likely to encourage greater retail competition, which will benefit consumers with improved services, greater efficiency, competitive prices and innovative products.