

## Singapore Futures Trading Market

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IES in association with MMIC are undertaking a project for the Asian Development Bank (ADB) to provide technical assistance to the National Energy Management Committee as part of preparing a 20-year integrated energy master plan for the country.



Gerhard Jörén, ADB - Tangled wires are seen with an electric pole in Yangon.

### Singapore Futures Trading Market

IES has recently undertaken work to assess the potential of the freshly created Singapore Futures Market, using a tool developed specifically to quantify a participant's optimal risk limits, variability of Profit and loss (P&L) outcomes and the 99% 1 day Value-at-Risk of a participating Market Maker (MM).

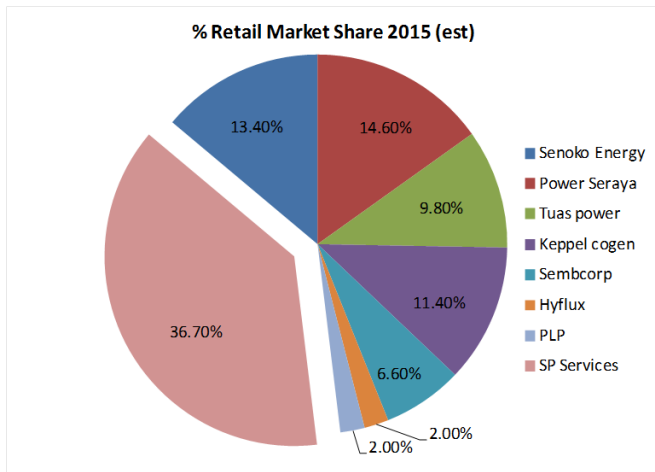
The critical variables affecting the future success of the Singapore Electricity Futures Market ("SEFM") that we have identified are those of vertical integration, physical oversupply and the high level of vesting contracts remaining, which directly impact the liquidity of the proposed market and thereby its ultimate success.

The ownership structure of Singapore's electricity industry is one of significant vertical integration between vertically integrated portfolios ("gentailers") who have undertaken a significant amount of capacity overbuild in order to manage portfolio and outage risks internally. Combined with moderate demand growth across all sectors and the use of vesting contracts as a way to manage prices for non-contestable load, the potentially traded portions of the Singapore electricity market appear to be small.

There is a strong relationship between vertical integration and liquidity. Vertical integration means that there is a limitation to the depth to which the futures market can be traded, because the 'natural' volume of contract trade is reduced.

To understand the level of vertical integration in the Singapore Electricity Market, we have prepared the following pie chart:

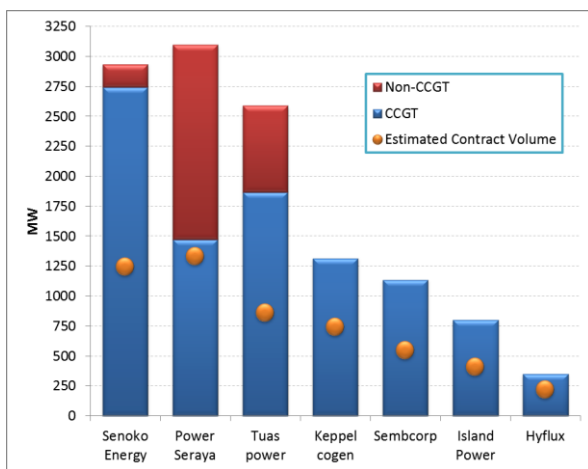
Singapore Retail Market Shares 2015 (IESestimate)<sup>1</sup>



As the chart shows, gentailers could be expected to account for 63% of total electricity consumption in Singapore. SP Services holds the non-contestable part of the market. Of the market proportion that is contestable, vertically integrated portfolios could account for 97% of the market.

The extent of market over-supply for gentailer portfolios is illustrated in the chart following. This analysis takes into account the positions already sold as vesting contracts or as contracts under Forward Sales Contracts. It shows the total supply per portfolio expected by mid-2015 split into CCGT and non-CCGT (i.e. more expensive / less efficient) generation. The sold position of each gentailer has been estimated based on an assessment of vesting contracts, FSC and retail contracts.

Estimated Oversupply in Singapore Market by Portfolio for 2015<sup>2</sup>



<sup>1</sup> IES estimate based on public retail market share data, an estimate of market share for new market participants, and no significant changes to the structure of Singapore’s retail electricity market.

As shown, the present level of oversupply in Singapore’s electricity market is significant and the situation is unlikely to change in the near future. Most gentailers are in a position to cover a single outage in their generation portfolios without compromising their ability to satisfy contracted volumes. This means that the proposed market will be imbalanced towards sellers, with no natural buyers in the market. This will have a direct impact on liquidity.

### Liquidity Expectations for Singapore’s Electricity Futures Market

The key challenge to the development and sustainability of the SEFM is to ensure that the market is liquid – both initially and on an ongoing basis. Initial liquidity is required to provide the confidence to potential participants, including non-physical players (such as financial institutions), such that there is sufficient market depth, and ongoing liquidity will ensure that the market is sustainable. To create liquidity in the SEFM, it will be necessary to counterbalance the naturally long position through the creation of buyers in the SEFM. The EMA is doing this in part through the Market Making (MM) contract regime, but it is unclear whether the volume currently proposed will be adequate to create sufficient market liquidity. An additional measure that could be taken by the EMA to promote market liquidity would be to reduce vesting contract levels and require SP Services (as the default retailer) to purchase the load currently being served by vesting contracts through the SEFM.

The importance of market liquidity is well recognised. To address this issue the MM arrangement with the FSC incentive has been established by the EMA. In EMA’s view:

*“EMA agrees that, on its own, the electricity futures market is unlikely to take off due to low level of liquidity. Hence, as part of the implementation approach, the EMA is providing incentives in the form of FSC in exchange for generators’ participation as market makers in the electricity futures market. The market marking arrangement with a fixed two way price spread*

<sup>2</sup> Based on present vesting contract levels in place at the start of 2014. Vesting contracts levels are presently under EMA review.

*ensures the creation of the liquidity necessary for development of the electricity futures market.”<sup>3</sup>*

IES contends that the MM opportunity will enhance market liquidity on the supply-side of the market but, for the SEFM to function well, the obstacles outlined earlier in this section remain to be addressed, namely:

- Enhancing the number of natural buyers in the market such as by reducing the level of vesting contracts; and
- Addressing vertical integration and physical oversupply in the market, which will tend to discourage market participation.

Under these circumstances it is possible that participants undertaking the Market Making function in the SEFM could develop a “false bid” strategy to take advantage of the lack of “natural buyers”. Under this type of strategy the market makers sit at the far edge of the MM specified spread in the opposite direction to market movement, thus meeting the MM obligations with no real expectation of the offer being acted upon. In this situation, the SEFM would remain illiquid, MM participants would comply with the market making rules and perpetually price to achieve the effect of non-participation. This would further decrease market liquidity.

Therefore with no natural buyers in the Singapore SEFM, a 6-7% spread (\$10/MWh), the ability to “false bid” and liquidity deriving only from market makers (MM), SEFM liquidity is likely to be low.

**KEY FEATURES OF THE PROPOSED SINGAPORE ELECTRICITY FUTURES MARKET**

The stated objectives of the SEFM are: to provide market participants with an additional avenue for commercial and operational risk management, enhance efficiency of wholesale and retail electricity markets via enhanced price discovery and transparency, and to reduce barriers for new entrants.

The SEFM’s design parameters include voluntary participation, a cleared exchange with standardised quarterly contracts, and an incentive offered to generators under the Forward Sale Contract (FSC) scheme in exchange for the generators participating as Market Makers (MMs) at the start of the SEFM.

**Is it worth participating in the SEFM?**

IES has made an initial assessment of the opportunities presented to a generic participant in the SEFM, based on two principal trading limit scenarios – Scenario 1 represents participation with high trading limits, and Scenario 2 participation with very low trading limits. The sub scenarios A-C are variants of overall market liquidity from low to high.

Based on current fundamentals it is likely that initial trading volumes on the SEFM will be subdued. It is still worthwhile considering the potential opportunity should trading liquidity increase over time or as a result of shorter-term market influences such as changes to the vesting contract regime. The range of liquidities modelled are intended to reflect this uncertainty.

Scenario	Description
1A	Low liquidity, 500 MW trading limit
1B	Low to Medium liquidity, 500 MW trading limit
1C	High liquidity, 500 MW trading limit
2A	Low liquidity, managed trading limit
2B	Low to Medium liquidity, managed trading limit
2C	High liquidity, managed trading limit

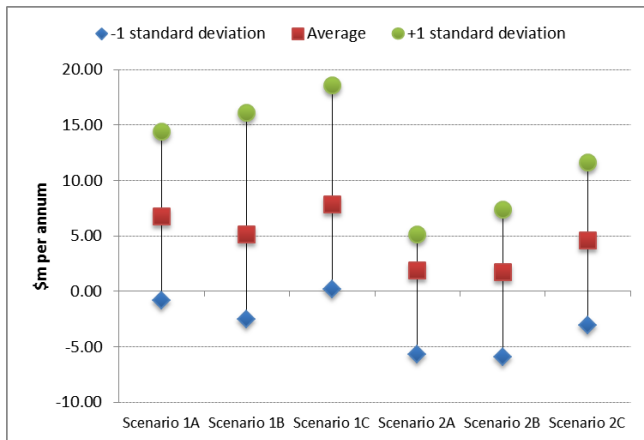
Scenario	Buy/Sell Mkt MW (CAL)	Bid/Ask spread	QTR MW limit
1A	200/300	6.50%	500
1B	300/500	6.50%	500
1C	900/1000	3.50%	500
2A	200/300	6.50%	100
2B	300/500	6.50%	200
2C	900/1000	3.50%	250

The impact on our generic participant’s Profit and Loss (P&L) is summarised below, and shows that the variability in P&L outcomes is highly consistent with the trading limits imposed on the participant.

<sup>3</sup> EMA: Appendix to the EMA’s RFI on the FSC Scheme to Facilitate the Development of an Electricity Futures Market in Singapore: Response

to Feedback on the Development of an Electricity Futures Market in Singapore. 23 May 2013

P&L Results per annum

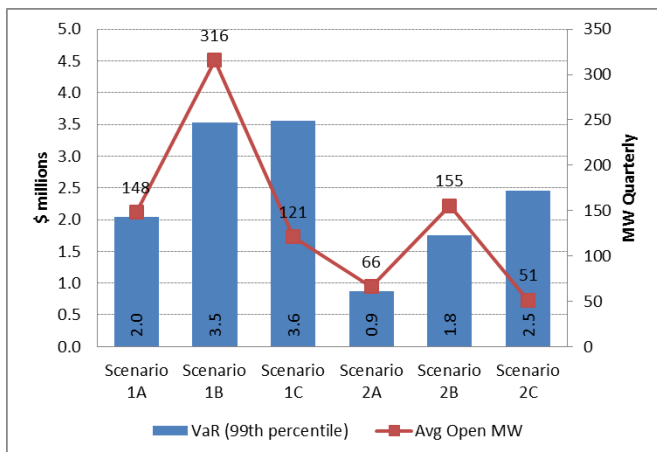


The liquidity constraints on the market are to some extent overcome by the participant’s use of higher trading limits as illustrated by the differential in spread between the two scenario groups. The tighter trading limits of Scenarios 2A – 2C have reduced the standard deviation of the results set, but have also reduced the average significantly. Across the two trading limit scenarios the averages of all three liquidity scenarios are as follows:

Case	P&L/pa	Standard Deviation
Scenario 1 Average	6,575,678	9,787,622
Scenario 2 Average	2,738,893	5,281,348

But what are the risks associated with each of these trading strategies? We have plotted the relative risk measures on the graph below. As anticipated, the managed trading limit scenarios show a lower risk profile than the more open trading limits.

VaR and Average Open Positions



Clearly, a fully functioning market with high trading volume shows the highest risk but this is due to the potential to carry higher amounts of that risk (as represented by the higher volumetric limit). These Scenarios (1A-C) also show a significantly higher average level of P&L.

Clear from our analysis is that **the SEFM has the potential to enable participants to make a profit from participation – even in a market with limited liquidity.** The risk – reward tradeoff decisions are critical, so the setting and quantifying of trading limits is key to managing a successful outcome in this new market.

**CONTACTS**

**IES Asia**

Intelligent Energy Systems Asia (IES Asia) is the arm of IES that focusses on providing energy market advice in the Asian, and specifically ASEAN region. IES is currently most active in Singapore, the Philippines, Vietnam, Myanmar and Indonesia.

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