



REVIEW OF THE VESTING CONTRACT REGIME

DRAFT DETERMINATION PAPER

Closing date for submissions of comments and feedback:
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991G Alexandra Road
#01-29 Singapore 238164
www.ema.gov.sg

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INTRODUCTION

1 The Energy Market Authority (“EMA”) implemented the vesting contract (“VC”) regime on 1 January 2004. The objective of the VC regime is to mitigate the exercise of market power by the generation companies (“gencos”). Vesting contracts mandate a specified amount of electricity (viz. the vesting contract level) to be hedged at a specified price (viz. the vesting contract price), which in turn removes the incentives for gencos to exercise their market power by withholding their generation capacity to push up spot prices in the Singapore Wholesale Electricity Market (“SWEM”).

2 EMA has appointed Frontier Economics (“FE”) to undertake a review of the VC regime (“Review”) including:

- a. Reviewing the vesting contract level (“VCL”) for 2017 and 2018;
- b. Reviewing the existing mechanisms used to mitigate market power in the SWEM;
- c. Reviewing the international experience in market power mitigation; and
- d. Developing possible new mechanisms to mitigate market power in the SWEM.

3 On 16 May 2016, EMA circulated FE’s Draft Report for consultation. The responses of FE and EMA to the comments received are set out in **Appendix 1** (refer to **Appendix 2** for the detailed comments). FE’s Revised Report, which takes into account the comments received, is attached at **Appendix 3**.

4 EMA has considered the comments received, FE’s responses thereto and FE’s Revised Report. EMA’s Draft Determination is set out below.

RECAP ON FE’S ASSESSMENT & RECOMMENDATIONS

VCL for 2017 & 2018

5 To determine the VCL for 2017 and 2018, FE has modelled the spot price in the SWEM under a wide range of potential VCLs for 2017 and 2018 – from 35 percent (of total electricity demand) down to the LNG vesting level (~18 percent).

For each VCL, FE has considered both cases of the unvested load served by the Market Support Services Licensee (viz. SP Services) at the regulated tariff (“MSSL load”) either: (a) hedged via competitive tenders and/or electricity futures in the Singapore Exchange (“SGX”); or (b) unhedged such that the spot price exposure of the gencos would increase. FE also modelled the impact of the different VCLs across the following scenarios:

- a. A base case scenario, incorporating standard assumptions of demand and plant availability¹;
- b. A bidding sensitivity scenario, where FE assumed that both steam and OCGT units were offered into the SWEM at \$350/MWh²; and
- c. A supply-demand sensitivity scenario, where FE assumed that the growth rate for electricity peak demand doubled, and that around half of the steam units were removed from the SWEM.

6 FE has observed that in all (base case and sensitivity) scenarios, spot prices on average remain substantially below the LRMC, with potentially higher and more volatile spot prices with unvested MSSL load unhedged in the sensitivity scenarios.

7 Given the limited evidence of the likely exercise of market power in the near term, FE has assessed that there is scope to reduce the VCL to the LNG vesting level by the end of calendar year 2018 if all unvested MSSL load is prudently hedged.

Alternative Regimes for Mitigating Market Power in SWEM

8 FE has assessed that although the VC regime has been effective in mitigating market power, the regime is relatively intrusive and introduces concerns on long term resource adequacy. Specifically, the VC regime allocates VC quantities to the vested gencos in proportion to their installed capacities that were licensed before the decision was made in 2001 to implement VC. Consequently, gencos may unduly defer retirement of their less efficient plants so as to be allocated more VC quantities. Furthermore, the biennial review of the VCL reduces certainty and predictability on the VCL for the gencos.

9 To address the above shortcomings of the VC regime, FE has considered four alternative packages/regimes for mitigating market power in SWEM by combining various features of the current regime and/or the mechanisms adopted in other jurisdictions (refer to **Table 1**).

¹ Refer to Appendix C of FE’s Revised Report for the assumptions.

² \$350/MWh is roughly equivalent to the short run marginal cost (“SRMC”) of an OCGT unit with double fuel cost, which is higher than the current SRMC of any plant in the market.

Table 1: Packages to mitigate market power in SWEM

Packages	Maintain Vesting Contracts		Phase Out Vesting Contracts	
	Status Quo	Improved Vesting Contract Regime	Balanced Market Regime	Combined Approach
Market monitoring	Retain EMA's monitoring and investigation powers under the <i>Electricity Act</i>			
Capacity / concentration cap	Maintain current licensed capacity cap	Introduce capacity market share cap of 25%		
VCL	<p>No change to approach, scope for reduction in VCL</p> <p>Explicit cap on the maximum VCL and the maximum change in VCL over any given two-year period</p>	Set VCL based on target vested Herfindahl-Hirshman Index ³ ("HHI") of 1,250	<p>Reduce Balanced Vesting Quantities ("BVQ") to zero over a defined period (e.g. 2 to 3 years);</p> <p>Transit LNG Vesting Quantities ("LVQ") to zero once the LNG vesting contracts expire in 2023</p>	
Vesting allocation	No change to approach	Gradual change to allocation based on all <i>effective</i> capacity (licensed CCGT + OCGT)	Not applicable	
Hedge invested MSSL load (i.e. non-contestable / non-market load served by MSSL)	Hedge via tender	Transition to hedging via SGX		
Pivotal supplier test ("PST")	Not applicable			Energy offers of pivotal generators capped at notional level, for example \$350/MWh representing an OCGT plant's SRMC with doubled fuel costs

³ The vested HHI level is defined as the HHI obtained by excluding any vested generation capacity from each genco's market share.

- 10 FE recommends adopting the Balanced Market regime for the SWEM.
- a. Under this regime, the phasing out and ultimate removal of vesting contracts would avoid the intrusiveness, administrative burden as well as the lack of transparency and predictability associated with the status quo VC regime.
 - b. The imposition of a 25% capacity market share cap along with prudent hedging of unvested MSSL load would form an effective mechanism to mitigate market power
 - c. FE also advocates a gradual transition path of 2-3 years from the status quo to the proposed new arrangements to allow appropriate enabling arrangements such as the prudent hedging of MSSL load to be developed, and ensure market participants are able to adjust their portfolios.

KEY INDUSTRY COMMENTS AND EMA'S ASSESSMENT

11 EMA would like to thank the market participants for the extensive comments provided on FE's Draft Report (refer to **Appendix 1** and **Appendix 2** for EMA/FE's responses and the detailed comments respectively).

12 The large gencos (viz. YTL PowerSeraya, Senoko Energy, and Tuas Power Generation) did not support the measures under the Balanced Market regime. They commented that the Review had focused solely on market power mitigation without regard for their financial sustainability. They asserted that the VCL should be increased to 40% till 2023 to provide them with revenue support in a highly competitive market environment.

13 In contrast, the other market participants comprising the smaller gencos (viz. Keppel Merlimau Cogen, PacificLight Power, SembCorp Cogen, and Tuaspring) and the independent retailer (viz. The RCMA Group Pte Ltd) supported the Balanced Market regime, with some suggesting to immediately lower VCL to LNG Vesting level from 2017 instead of a gradual transition. In addition, the smaller gencos supported the use of the PST to manage localised market power, but requested to review the nodal pricing regime in the SWEM to address potential localised market power due to transmission network constraints in the near term.

14 EMA acknowledges the challenging market conditions for gencos. However, there is no basis for EMA to extend the use of vesting contracts to provide financial support to the gencos since the objective of vesting contracts is to control market

power, and investments in new/repowered generation capacity are commercially driven.

15 EMA is mindful that large and sudden changes to aggregate contract positions are potentially disruptive to the market. EMA agrees with FE that this should be avoided to ensure market participants are able to adjust their portfolios and also allow appropriate enabling arrangements to be developed for prudent hedging of unvested MSSL load.

16 With regard to localised market power, EMA agrees with FE's assessment that the occurrence of nodal price separation events has not been frequent or persistent in the SWEM, and is not likely to become a material problem in the future as transmission network constraints will be reduced/removed over time. While there is no strong justification to implement the PST currently, it may warrant further consideration if there is material increase in transmission congestion in the future.

EMA'S DRAFT DETERMINATION

17 EMA has carefully considered FE's assessment and recommendation as well as the market participants' comments. On balance, EMA intends to adopt the Balanced Market regime by implementing the following measures:

- a. Impose a capacity market share cap of 25% on each generation licensee. The existing licensed capacity cap imposed on each of the three large gencos will remain until their respective capacity market share has fallen below the 25% threshold;
- b. Prudently hedge unvested MSSL load which could be via a combination of futures products, tenders and bilateral trades. EMA will separately review and develop the regulatory framework for this and consult the industry where appropriate; and
- c. Gradually phase out VC by maintaining VCL at 25% (of total demand) from 1 Jan 2017 to 30 Jun 2018, and reducing to 22.5% and 20% for 2H 2018 and 1H 2019 respectively. Thereafter, only LNG vesting quantities will remain until the expiry of LNG vesting on 30 Jun 2023. During the transition period, the current VC allocation method and period weighting factors for VCL will be retained. **Table 2** summarises the VCL rollback schedule to phase out VC with effect from 1 Jul 2023.

Table 2: VCL Rollback Schedule

Period	VCL	Period Weighting Factor*		
		Peak	Shoulder	Off-Peak
1 Jan 2017 to 30 Jun 2018	25%	1.1	1	Balancing Factor
1 Jul 2018 to 31 Dec 2018	22.5%			
1 Jan 2019 to 30 Jun 2019	20%			
1 Jul 2019 to 30 Jun 2023	LNG vesting only	N.A.		
With effect from 1 Jul 2023	N.A. (VC regime phased out)			

REQUEST FOR COMMENTS

18 EMA would like to invite comments on the Draft Determination and FE's Revised Report. Please submit all written feedback via email to: ema_mdspd@ema.gov.sg

19 All feedback should reach EMA not later than **5pm on 20 Sep 2016** in the format as shown in **Appendix 4**. You are requested to include a soft-copy of your comments in both **PDF and Microsoft Word** format in your submission.

20 EMA will acknowledge receipt of all submissions via email. Please contact Mr Lee Guo Rui (6376 7830) or Ms Ong Yu Hui (6376 7661) if you do not receive an acknowledgement of your submission within two business days.

21 Please note that EMA will not consider anonymous submissions. EMA reserves the right to make public all or part of any written submissions made in response to this Consultation Paper and to disclose the identity of the source. Any part of the submission, which is considered by respondents to be confidential, should be clearly marked and placed as an annex (with justification on the need to maintain confidentiality). EMA will take this into account in the disclosure of the information submitted.

* * *

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
Issue: Review framework - scope, financial sustainability and resource adequacy		
<p>Senoko, YTLPS, Tuas Power</p>	<p>The focus of the review on generator market power downplays the other functional aspects of the vesting contracts in the past, including revenue and price certainty (for Gencos’ vested quantities), and support for the introduction of LNG. The review should take into account the broader contribution of generators in providing “a reliable and secure source of power”.</p>	<p>The objective of vesting contracts is the mitigation of market power, hence the focus of the review. EMA acknowledges that the review takes place in the context of challenging market conditions for Gencos. While EMA fully understands their desire for EMA to extend the use of vesting contracts to provide them with financial support beyond the objective of controlling market power, there is no basis for EMA to do so given that investments in new or repowered generation capacity in Singapore are commercially driven. (EMA)</p>
<p>Senoko, YTLPS, Tuas Power</p>	<p>The review should consider the impact of changing the VCL on the financial sustainability of Gencos.</p>	<p>Vesting contracts are not intended to support the commercial decisions of businesses operating in the Singapore Wholesale Electricity Market (“SWEM”). This review therefore assessed the impact of vesting regime on, inter alia, the likely future resource adequacy of the electricity industry, based on the extent to which it promotes efficient investment and retirement decisions in the longer run, as well as transparency and predictability for investors. (EMA)</p>
<p>Senoko, YTLPS, Tuas Power</p>	<p>The vesting contract regime effectively caps prices, limiting the ability of generators to recover fixed costs. When the market was tight the VCL was set to target LRMC, effectively capping prices; vesting contracts provide an important source of revenue support now as market prices are relatively low.</p>	<p>The vesting contract regime does not appear to have capped market prices in practice. Please refer to the discussion in Section 4.1.1 of our revised report. (FE)</p>
<p>Senoko, YTLPS, Tuas Power</p>	<p>The relatively low market prices reflect the broader policy settings influenced by the EMA and the Government and outside the control of individual Gencos, including the large reserve plant margin and over supply of take-or-pay gas following the introduction of LNG.</p>	<p>Investments in new or repowered generation capacity in Singapore are commercially driven. Gencos voluntarily signed up LNG supply contracts on a commercial basis for which they were eligible to the allocated LNG vesting quantities. It is notable that some Gencos secured additional LNG supply contracts, above and beyond their allocation of LNG vesting quantities. (EMA)</p> <p>Gencos can take action in response to the current market conditions to manage factors within their control, consistent with commercial</p>

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		decision making (e.g. renegotiation of take-or-pay (“TOP”) gas commitments with gas importers). (FE)
Senoko, YTLPS	Actual (or perceived) constraints on pool prices caused by the prospect of regulatory policies and interventions leads to a “missing money” problem, requiring a capacity payment to ensure there are efficient investment incentives. Vesting has provided a de facto capacity remuneration mechanism to accompany Singapore’s “energy only” electricity market design. If the vesting regime is to be transitioned away it is essential that EMA puts in place a capacity remuneration mechanism.	<p>The objective of vesting contracts is to mitigate market power, rather than to support Genco’s commercial investment decisions. The current low pool prices are a result of excess generation capacity arising from Gencos’ commercial investment decisions. There is no basis to use vesting contracts or implement a capacity market to provide financial support for Gencos’ commercial decisions. As the supply-demand balance adjusts in response to demand increases over time, we expect market prices will increase to incentivise Gencos to make efficient investment decisions in the absence of market power. (EMA)</p> <p>As discussed in Section 5.3.1 of our revised report, we believe capacity payments introduce a range of issues and do not <i>a priori</i> lead to more efficient market outcomes where they have been introduced. We see little evidence to support the introduction of a capacity market or payment with regard to the management of market power in the SWEM. A transition away from vesting contracts will promote more efficient investment and retirement decisions in the SWEM into the long term. (FE)</p> <p>Our review has included an assessment criterion (resource adequacy) that accounts for the extent to which the various market power mechanisms impact on dynamic efficiency, primarily in terms of investment in, and retirement of, capacity. (FE)</p>
YTLPS	Resource adequacy is an essential objective and requires a long-term perspective. Investors must consider the regime to be sufficiently stable and fair for the long term to invest. Removal of vesting contracts would be unfair to existing Gencos, undermining cost recovery on existing assets, impacting equity investors and lenders and therefore deterring future investment. VCL of 40% required to ensure “adequate resource and the sustainability of	<p>The objective of vesting contracts is the mitigation of market power. There is no basis to extend the use of vesting contracts to provide Gencos with financial support given that investments in new or repowered generation capacity in Singapore are commercially driven. (EMA)</p> <p>We defined the resource adequacy criterion to reflect issues of dynamic efficiency, as opposed to the direct financial sustainability of</p>

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	investment in the sector”.	specific market participants. Removing vesting contracts improves transparency and is likely to increase dynamic efficiency (via changed incentives around uneconomic steam units), thereby promoting resource adequacy. (FE)
Issue: VCL for 2017 and beyond		
Senoko, Tuas Power, YTLPS	VCL should be set at 40% to 2023 to address financial sustainability issues while the market moves to a “sustainable demand/supply equilibrium”.	The VCL is set to manage market power, not to provide financial support to the Gencos. (EMA)
Sembcorp Cogen	VCL should be reduced to LNG vesting level starting 1 January 2017, to remove “an intrusive market measure that adds inefficiency to the market”.	We agree that vesting contracts are intrusive and create potential inefficiencies. To allow for necessary arrangements to be established and to give participants time to adjust their positions, we recommend a gradual adjustment over 2 to 3 years from the status quo to the new arrangements. (FE)
Issue: Status quo		
YTLPS	The precise impact of “Status Quo” is unclear without a clear statement of the implied vesting levels for 2017/18 under this method.	As discussed in the draft report we modelled a range of VCLs (35%/30%/25%/20%/LNG levels). Based on this analysis we recommended that there is scope to reduce VCL under the status quo to LNG vesting, subject to hedging unvested MSSL load. (FE)
YTLPS	If market power is to be the only criteria for VCL, balance vesting should be 0% for 2017 and 2018. Caps and overall limits on vesting and the speed of change of vesting are unlikely to be meaningful in the context of a possible one way reduction in total vesting from 25% to LNG vesting.	Large and sudden changes to aggregate contract positions are potentially disruptive to the market, and should be avoided. We therefore recommend gradual changes to the VCL. (FE)
Issue: Improved vesting contract regime		
YTLPS	The precise method of calculation would be complicated and subjective; VCL of 17% unlikely to be effective in mitigating market power; HHI at 1250 “feels very low as a benchmark”.	The HHI methodology is more systematic and transparent than the status quo. The mechanics of the formula are completely objective (by design). The threshold can be set objectively and transparently. (FE) A higher HHI threshold in turn results in a lower VCL. It is therefore inconsistent to contend that a VCL of 17% is unlikely to be effective

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		(too low) while simultaneously suggesting that an HHI threshold of 1250 is also 'low'. We have provided an example in the revised report to clarify this issue (see Section 6.3.1). (FE)
YTLPS	It would be wrong to allocate vesting only to capacity that can respond quickly to short term pricing events, defined as CCGTs and OCGTs. The proposed reallocation would immediately promote a shutdown of the steam turbines, removing the valuable ability for Singapore to generate power using alternative fuel and may temporarily delay the shutdown of the E Class machines, which provide neither efficient gas fired capacity, nor back up capacity by a different fuel or technology.	CCGT units in the SWEM are capable of hot switching, so the alternative fuel benefits provided by the steam units are unlikely to be large. In practice, steam units (which currently rarely run) are unlikely to mitigate the risk of short term shortages in any material way. This view informs our recommendation regarding allocation according to effective capacity under the improved vesting contracts regime. (FE) Vesting quantities are allocated to curb market power of dominant Gencos in the SWEM, and not to remunerate Gencos for providing fuel diversity and security of supply. (EMA)
Keppel, SembCorp, Tuaspring	Allocating VCL based on effective capacity encourages efficient retirement and investment decisions. The retention of inefficient units in the market compromises the reliability of the Singapore power system and keeps the overall SRMC of the industry higher than it ought to be. Furthermore, FE's modelling has shown that there is no material difference in price outcomes between the two allocation methods.	We broadly agree and continue to recommend reallocation of balance vesting quantities ("BVQ") on the basis of effective capacity under the improved vesting contracts regime. However, we do not recommend reallocating BVQ under the balanced market regime, because the phasing out of BVQ means that the benefits of reallocation are likely to be limited (FE)
Issue: Combined approach		
Keppel, Sembcorp, PLP	While a PST is likely to be time consuming, costly and may be unnecessary in the future due to transmission investment, price separation remains a material issue that needs to be addressed in the short-term through an interim mechanism (like option 1 or 5 from the RCP paper CP61: Proposed Measures to Mitigate Price Separation), a separate review on the issue of price separation, or the removal of nodal pricing.	The core issue is transmission congestion which currently manifests as price basis risk for certain Gencos. The measures suggested will change the form of issue caused by the transmission congestion, rather than remove the underlying congestion, as discussed in Section 6.5.1 of our revised report. We reiterate that price separation, and any resultant exercise of localised market power, has not been a frequent occurrence in the SWEM (with transmission constraint occurring only 1.1% of all trading periods in 2015), nor is it likely to become a material problem in the future as constraints will typically be

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
		alleviated over time. Nevertheless, a PST may warrant further consideration if there is material increase in transmission congestion in SWEM in the future. (FE)
Issue: Balanced market regime		
YTLPS, Senoko, Tuas Power	Big 3 Gencos disagree with the proposal to move to the balanced market regime as they were of the view that and the review did not take into account Gencos' financial sustainability.	We note the objections of the 3 large Gencos but on balance continue to recommend the balanced market package on the basis that our analysis, after taking into account all industry comments, remains unchanged. (FE)
PLP, RCMA	Small Gencos and other market participants support the recommendation of adopting a Balanced Market Regime. For example, RCMA Group agrees that the removal of the current burden and lack of transparency "would be a positive aspect for the market and result in cheaper electricity costs for consumers".	We note the support of a number of stakeholders and, on balance, continue to recommend the balanced market package. (FE)
Keppel	Keppel supports FE's recommendation to adopt the balanced market regime, subject to: <ul style="list-style-type: none"> • Allocating BVQ based on effective capacity, to encourage planning of efficient generation capacities and retiring older and inefficient units. • Adopting a measure to manage localised market power over the next two years. 	We note Keppel's support. However, we do not recommend reallocating BVQ based on effective capacity under the balanced market regime. This is because the recommended phasing out of BVQ within 2 to 3 years would mean that the benefits arising from reallocation would likely be limited, and changing the allocation does involve some effort. As noted above, the case for introducing a PST at the current time is limited, as price separation, and any resultant exercise of localised market power, has not been a frequent occurrence in the SWEM (with transmission constraint occurring only 1.1% of all trading periods in 2015). Nevertheless, a PST may warrant further consideration if there is a material increase in transmission congestion in the SWEM in the future. (FE)
Issue: Capacity cap		

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
YTLPS	Subject to competition laws, EMA must allow the market to find its own way to address the effects of competition. The imposition of a market share cap of 25% in the generation licence is unjustified and unduly intrusive. EMA has sufficient tools at its disposal to deal with abuse of market power and does not need to create additional ones.	We continue to recommend 25% capacity cap. We view this as less restrictive than the current MW licence cap arrangements because it allows for portfolio expansion as the market grows and ensures consistent application to all generation licensees. We note that both the current MW cap and our proposed 25% market share limit would deliberately prohibit some potential mergers in order to structurally limit the aggregation of market power. (FE)
Issue: Transition path		
Sembcorp	The VCL should be reduced to LNG vesting levels from 1 January 2017, rather than gradually reduced.	In light of industry consultation, to allow for necessary arrangements to be established and to give participants time to adjust their positions, we recommend a gradual adjustment over 2 to 3 years from the status quo to the new arrangements. The hedging of unvested MSSL load over this time could be via a combination of SGX products, tenders and bilateral trades once appropriate trading, risk management and compliance arrangements are in place. (FE)
YTLPS	While noting YTLPS does not agree with the recommendations, it is preferable to reduce balance vesting to 0% at 1 January 2017, encouraging the sector to find its own equilibrium sooner rather than later.	
PLP	PLP supports the gradual removal of the BVQ at a pre-determined rate to avoid sudden changes that could adversely impact market equilibrium.	
PLP	A decision on the timing of the rollback of LNG vesting should be made closer to the expiry date, say 2021.	We suggest a systematic approach to hedging MSSL load in anticipation of the expiry of LNG vesting to minimise the potential market disruption associated with the expiry of LNG vesting. (FE)
Issue: Hedging of unvested non-contestable load		
YTLPS	As far as we are aware, the idea that market power of the generators is assessed based on the way in which MSSL procures power is new. This has not been part of EMA's stated justification for vesting to date. Introducing this is again to move the goal posts.	This is the first VCL review that starts from a vesting level less than the MSSL load, and our analysis reflects these market realities. (FE) Our intention is not to set VCL based on the way which MSSL procures power, but rather to ensure that any unvested MSSL load arising from the reduction in VCL is prudently hedged to minimise the risk to competitive and efficient outcomes from the VCL reduction. (FE)

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
PLP	PLP suggest that MSSL be given the option to hedge the unvested portion either by tender or via the futures market rather than to prescribe that it be done solely via the futures market.	We agree that there is likely to be some benefit to allowing flexibility in the instruments to be used to hedge unvested MSSL. We therefore suggest hedging unvested MSSL load using a combination of SGX products, tenders and bilateral trades once appropriate trading, risk management and compliance arrangements are in place. We expect SGX contracts will become an increasingly important tool for hedging unvested MSSL load as the market matures We discuss this in Section 6.3.1 of our revised report. (FE)
Keppel, RCMA	A robust framework, methodology and procedures to guide MSSL hedging transactions via the futures market and should be developed and tested. Keppel suggests industry feedback be sought on the proposed approach to regulating electricity tariffs prior to hedging MSSL load through futures. In the meantime, Keppel supports FE's proposal to continue hedging the unvested MSSL load through the EMA tender process.	EMA will separately review and develop the regulatory framework for hedging MSSL load and consult the industry where appropriate. (EMA)
Tuaspring, RMCA	Should EMA decide to hedge the balance MSSL load, Tuaspring prefers the adoption of the proposal to hedge the balance MSSL load through the exchange as opposed to tendering. RMCA suggests increased liquidity in the futures market will attract Gencos to participate in the longer term.	We broadly agree and note support for our recommendation. (FE)
Buri Energy	Buri suggest a hybrid to hedging these volumes directly at SGX, to manage the risk the volumes will be more than the liquidity that the SGX can handle. An alternative could be to organize an open tender, held as a Dutch auction for contracts based on SGX specifications which could be settled by the SGX. It is not necessary to introduce a range of new products which may dilute liquidity; adding an additional peak product would enable the basis risk to be managed.	We agree that a staged approach to tendering and hedging via SGX contracts needs to be developed to manage potential liquidity issues associated with hedging the MSSL load via the exchange. The addition of only one new product to avoid diluting liquidity is a sensible strategy, and is discussed in our updated Section 6.3.1. (FE)

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
<p>Senoko</p>	<p>Hedging unvested MSSL load is unlikely to be as effective in mitigating market power as the current vesting contracts because:</p> <ol style="list-style-type: none"> 1. A generator with market power in the spot market are also likely able to influence prices in a NCC tender or the electricity futures market. 2. Vesting is expected to have a peakier profile than MSSL load, and is therefore likely to be more effective at mitigating market power. 3. There is no mechanism to allocate contracted quantities to participants with market power under a tender or futures transaction. 4. Non-physical players may act as counterparties in the futures market. 5. Mandating that MSSL must procure via SGX appears to be “picking winners” rather than necessarily achieving the desired outcome at the lowest optimal cost. 	<p>We respond by point:</p> <ol style="list-style-type: none"> 1. We agree there is a close relationship between contract prices and spot prices in the underlying physical market, and that both contract and spot prices may reflect the extent of generator market power. However, our analysis suggests there is limited scope for Gencos to exercise market power in the SWEM. We note that it seems inconsistent to argue that Gencos would not recover costs without vesting contracts due to low spot prices, whilst also suggesting that generators have sufficient market power to raise contract prices. (FE) 2. Our analysis was focused on exactly this issue. We conclude that hedging the unvested MSSL load is as effective at mitigating market power as an equivalent vesting level. (FE) 3. The allocation mechanism in the balanced market package is a market mechanism and would reflect competitive tension to supply contracts. Our modelling indicates that the actual allocation does not appear to unduly influence prices outcomes, and that the aggregate level of contract cover is more important. (FE) 4. While we agree, we do not expect financial intermediaries to dominate the market. Our experience with such intermediaries is that they do not carry exposure to term, i.e. they will either back a position with offsetting physical supply or load or merely attempt an intertemporal arbitrage that is closed off prior to contract maturity. In the Australian NEM, intermediaries that take open exposures to term have typically exited the market due to insolvency. (FE) 5. The electricity futures market is a risk management platform which is already available on SGX. Conducting this hedging via SGX provides more effective and ongoing opportunity to manage risk, which we believe most strongly supports long

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
		term competitive outcomes. (FE)
Issue: Modelling approach and results		
Tuas, Senoko, PLP	<p>The modelling results were based on a higher LRMC estimation. The lower LRMC in the addendum may change the conclusions, and may necessitate more modelling to ensure consistency.</p>	<p>Our modelling assumed a confidential input fuel price provided by the EMA. This fuel price was used to calculate SRMCs and for modelling pool price outcomes. LRMC was calculated to compare modelled results. Our original LRMC calculation used a fuel price as of 2014, this was corrected via the addendum. However, there is still a gap between the confidential fuel price used (to calculate SRMC, which drives the modelled results) and the fuel price used (to calculate the comparative LRMC). We have clarified this in Figure 19 in Appendix E of our revised report. (FE)</p> <p>Our recommendation on VCL is conditional on prudently hedging invested MSSL load. Under this condition, forecast pool prices are substantially less than either the original or comparative LRMC, or an LRMC calculated based on the confidential fuel cost inputs used in the modelling. Our conclusions and recommendations remain unchanged. (FE)</p>
Tuas, Senoko	<p>The potential for Gencos to exercise market power has been understated because:</p> <ul style="list-style-type: none"> • Gencos are likely to retire steam plants if vesting contracts are removed. The supply-demand sensitivity scenario is therefore a more credible baseline to assess the potential of exercising of market power, but should assume the retirement of all the steam plants and OCGTs offering into the market above their SRMC in order to recover their start-up and fixed costs. • FE's calibration with actual 2015 average USEP suggests its model understates market prices. • Modelling a limited number of demand points 	<p>The modelling analysis is based on reasonable assumptions, and our conclusions hold under the modelled bidding and supply-demand sensitivities. (FE)</p> <p>Our supply-demand sensitivity assumes a combination of the retirement of approximately half the steam units, and higher demand. The rationale for this sensitivity was to develop a plausible case reflecting significantly tighter market conditions against which we have tested incentives to exercise market power. In our view, higher than expected demand and the exit of some, but not all, existing steam units over the period to 2020 reflects this rationale. We note that any commercial decision to retire steam units in practice would need to</p>

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
	<p>understates volatility.</p> <ul style="list-style-type: none"> • Contingency services have been excluded from the model. 	<p>account for expected vesting contract volumes and revenue, but numerous other factors would also influence specific decisions to exit. Our bidding sensitivity similarly reflected what we consider a plausible 'high bid' outcome for non-baseload plant. It is always the case that market modelling could adopt assumptions that lead to more extreme bidding outcomes and higher prices. In our view, our sensitivities are plausible and fit for purpose. (FE)</p> <p>As discussed in Appendix D of our draft report we did not include a number of constraints that occurred in practice during 2015 in our calibration and that this explains much of the difference between modelled and actual prices in 2015. (FE)</p> <p>Demand points were determined based on robust statistical sampling techniques, to ensure variation is captured. This allows us to model a large strategy set and focus the analysis on participant incentives. We have modelled 3,936,600 unique bidding combinations per annum across 150 unique levels of demand, substantially more than the 17,520 trading intervals per year. Figure 14 in Appendix C of the revised report demonstrates the close relationship between the demand points modelled and half hourly demand. (FE)</p> <p>Contingency has been excluded consistent with our demand point approach. Inclusion of contingency would raise prices to some extent (we expect by a small amount) in all cases. (FE)</p>
Senoko	<p>Several participants have suggested changes to the assumptions underlying the modelling analysis:</p> <ul style="list-style-type: none"> • Assume the retirement of all steam plants. • Bidding the OCGTs at a level that would lead to positive economic outcomes for those units given their limited running hours. 	<p>The modelling analysis is based on reasonable assumptions, and our conclusions hold under the modelled bidding and supply-demand sensitivities.</p> <p>Our supply-demand sensitivity assumes a combination of the retirement of approximately half the steam units, and higher demand.</p>

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
	<ul style="list-style-type: none"> Consider the impact of consolidation of generating portfolios. Extend the analysis beyond 2020. 	<p>The rationale for this sensitivity was to develop a plausible case reflecting significantly tighter market conditions against which we have tested incentives to exercise market power. In our view, higher than expected demand and the exit of some, but not all, existing steam units over the period to 2020 reflects this rationale. We note that any commercial decision to retire steam units in practice would need to account for expected vesting contract volumes and revenue, but numerous other factors would also influence specific decisions to exit. Our bidding sensitivity similarly reflected what we consider a plausible 'high bid' outcome for non-baseload plant. It is always the case that market modelling could adopt assumptions that lead to more extreme bidding outcomes and higher prices. In our view, our sensitivities are plausible and fit for purpose. (FE)</p> <p>We did not consider major generation consolidation (consistent with our 25% market share recommendation), nor did we model outcomes beyond 2020. (FE)</p>
Senoko, YTLPS	<p>Theory suggests that modelling the market as a one-shot game will tend to understate the equilibrium price that will emerge from a game that is repeated indefinitely.</p>	<p>As discussed in Appendix B of our revised report, theory suggests that infinitely repeated games may support equilibria that involve tacit collusion via the assumptions of so called punishment strategies. We believe that single shot, simultaneous Cournot games provide the most appropriate tool for assessing strategic incentives in electricity markets like the SWEM. Alternative game theoretic approaches – such as Bertrand games and/or repeated games– do not appear to provide a superior analytical framework based on our testing of such approaches. (FE)</p>
Senoko	<p>Senoko have commented on some assumptions and requested more information on other modelling assumptions and results:</p> <ul style="list-style-type: none"> The annual demand growth rate appears to be 	<p>Please refer to our revised report, Appendix C which includes more information on system demand and SRMC as requested. Heat rate by technology type was already included in the draft report. TOP is included on a must run basis in our modelling analysis.</p>

Stakeholder(s)	Stakeholder Feedback	Response (with attribution)
	<p>~1.5%. Please confirm the growth rate used.</p> <ul style="list-style-type: none"> • The SRMCs used, and the difference from LRMC cost estimates (of any). • The net Heat Rate for the F-class units in the model should be on average higher than that assumed for the vesting unit of 7.5GJ/MWh. • Forward oil/FX prices should be used rather than the Japan LNG Index and World Bank crude oil index, with different indexation assumptions for PNG and LNG. • TOP gas should be modelled at a reduced price (relative to the contract price) to represent the cost of on-selling excess gas. Can EMA provide Senoko with the assumption used for our portfolio on a confidential basis so we can check it for accuracy? • How is the retail load adjusted for changes in the vesting contracts allocated to each of the Gencos in the model runs? • It is not clear from the box and whisker plots whether the FE model is appropriately estimating market volatility. Please provide price duration curves or more granular pricing results/data for each case. • FE appear to use a stochastic approach for generation unit outages in the VCL analysis but a derating approach for the market power analysis. It is unclear why different approaches were used. The stochastic approach seems more appropriate 	<p>The modelling analysis is based on reasonable assumptions, developed in discussion with the EMA, and the modelling results are robust to a range of sensitivities. (FE)</p>

Buri Energy’s Comments

S/N	Section/Paragraph in Consultation Paper/Report	Buri Energy’s Comments
1	Consultation Paper: Sections 8, 16 (b)(iv) and 16 (c)(iii)	<p>Overall, we believe that Frontier Economics has presented a comprehensive list of options on the vesting contract regime transition path from status quo.</p> <p>We recognize the importance of having to hedge the unvested SP Services’ load under the various options presented, and we would like to suggest a hybrid to hedging these volumes directly at SGX. In particular, the volumes involved will be more than the liquidity that the SGX can handle, especially at points in time where vesting levels change. To alleviate this problem, an alternative could be to organize an open tender, held as a Dutch auction. Volumes will be based on SGX Futures Contracts specifications whereby these volumes can be subsequently cleared via the SGX. This would allow MSSL to be hedged in a liquid product that can be adjusted (via normal trade on SGX) as consumers opt in (and out) of contestability.</p> <p>We do not agree with Frontier that introducing a multitude of new contracts is a prerequisite for hedging via SGX. The main risk is basis risk and it is more important to have a volume neutral position than to accurately hedge the profile risk. Furthermore, only introducing “peak” contracts (in addition to the already listed “base load” contract) would go a long way to remove the profile risk. The introduction of “off-peak” and “shoulder” contracts would add very little value and only serve to dilute liquidity.</p>

Energy Market Company’s Comments

S/N	Section/Paragraph in Consultation Paper/Report	Energy Market Company’s Comments
1	FE’s Report: Section 3.2 page 7 last paragraph	A generator may have retail load, however some retail load could be based on spot price pass through. Such retail load (based at spot price pass through) does not mitigate a genco’s market power.

S/N	Section/Paragraph in Consultation Paper/Report	Energy Market Company's Comments
2	FE's Report: Section 4.3.2 (page 22), and Section 4.4.1 (page 32)	<p>We understand that the current EMA tenders for unvested NCC load are settled against the USEP, instead of a genco's VCRP.</p> <p>Does FE's market modelling (described in section 4.3.2 of FE's report) consider the fact that EMA tenders are settled against USEP, not VCRP?</p> <p>Would this have any implications on the effectiveness of such tenders (acting as substitutes for vesting quantities) in mitigating incentives to exercise market power (either localised or general)?</p>
3	FE's Report: Section 4.3.2 Figure 5 (page 27)	Please make clear, for each of the cases (i.e. VestingLNG, Vesting20, Vesting25, etc...), what % is vesting and what % of unvested MSSL is hedged.
4	FE's Report: Section 6.3.2 (page 64)	For contracts traded over SGX, gencos may not necessarily be the counterparty. Should FE also model a scenario whereby none of the unvested MSSL load are allocated to gencos?
5	FE's Report: Section 6.2.1 (page 60)	If MSSL is unable to fully hedge its unvested MSSL load via Electricity Futures, does MSSL or NCCs bear the risk if the spot electricity prices are very high?
6	FE's Report: Section 6.2.1 (page 53)	<p>Does this mean that gencos with less than 25% capacity market share can increase capacity share to 25% by new built or acquisition of existing capacity?</p> <p>If there are only 4 gencos left, each with 25% capacity market share, the HHI will be 2500. Is this concentration too high (i.e. above FERC's threshold of 1800)?</p>
7	FE's Report: Figure 26 (pdf page 147)	<p>The "improved vesting regime" comprises:</p> <ul style="list-style-type: none"> (i) capacity market share cap of 25%, and (ii) setting VCL to target vesting-adjusted HHI of 1250. <p>If gencos consolidate such that there are only 4 gencos left, each with 25% market share (as allowed under (i)), this would imply that the VCL must increase in order to achieve the target HHI of 1250 set out in (ii). How do we reconcile implementing (i) and (ii) concurrently?</p>
8	FE's Report: Box 2 (pdf page 144)	Should it be "Where unvested MSSL load is <u>un</u> hedged"?
9	FE's Report: Paragraph below Figure 31	Should the reference be to <u>Box 3</u> instead?

S/N	Section/Paragraph in Consultation Paper/Report	Energy Market Company's Comments
	(pdf page 152)	

Keppel Merlimau Cogen's Comments

S/N	Section/Paragraph in Consultation Paper/Report	Keppel Merlimau Cogen's Comments
1	Consultation Paper: Paragraph 21	<p>Keppel supports FE's recommendation to adopt the balance market regime for the SWEM with some modifications to the proposed regime to ensure the orderly and smooth transition to an even more efficient and competitive market.</p> <p>The proposed modifications are:</p> <ol style="list-style-type: none"> 1) Changing the allocation of VCL such that vesting contract quantities will be allocated to generation licensees in proportion to their respective effective capacity before BVQ is being reduced to zero. The proposed allocation method based on effective capacity will encourage planting of efficient generation capacities and retiring older and inefficient units in the system which is beneficial in the longer run; and 2) Adopting one of the measures proposed by RCP to curb the exercise of localized market power during the immediate next 2 years due to transmission constraint between Jurong Island and Singapore mainland.
2	Consultation Paper: Paragraph 16	<p>To more accurately reflect actual plant capacities that can positively influence market outcomes, Keppel supports FE's proposal that the VCL be allocated based on effective capacity during the period as long as there is BVQ.</p> <p>The current vesting contract allocation discourages gencos from retiring their older and inefficient plants and does not incentivize gencos to make efficient investment decisions.</p> <p>Furthermore, FE's modelling has shown that there is no material difference in price outcomes between the two allocation methods, concluding that there is little drawback in making the changes.</p>
3	Consultation Paper: Paragraph 19	Keppel agrees with FE that the balanced market approach is less effective than the alternatives in managing localized market power, especially when the system is still constrained by multiple

S/N	Section/Paragraph in Consultation Paper/Report	Keppel Merlimau Cogen's Comments
		<p>transmission line limits.</p> <p>Furthermore, while FE has pointed out that “significant price separation occurs only very occasionally in the SWEM”, this only accounts for periods of realized price separation, and not instances where mitigation measures were successfully taken by constrained gencos (e.g. by reducing their scheduled dispatch). As long as the threat of financial losses due to price separation is present, constrained gencos would be unable to schedule their units for dispatch at optimal capacity even though they may have the more efficient generating units.</p> <p>Under the combined approach, FE suggested the pivotal supplier test (“PST”) to address instances of localized market power. However, the time needed to implement this proposed methodology is uncertain, involves substantial works on MCE and may not be of practical use by the time it is implemented. By 2018, the transmission constraint between Jurong Island and the Singapore mainland would be removed. This negates the advantage of the combined approach if such a combined approach can be implemented only after 2018 and at substantial costs. In addition, the sharp increase in market energy price cap (“MPC”) to compensate for increased costs incurred in analyzing / implementing the PST significantly raises gencos’ exposure to the spot market.</p> <p>Hence to mitigate the impact of price separation and enhance dispatch efficiency, EMA should implement immediate, temporary measures to curb the exercise of transient market power. Two possible measures that was discussed at recent RCP meetings should be reconsidered:</p> <p>(1) “Option 1c” - to adopt weighted MNN pricing for constrained gencos in the event of transient market power being exercised, or</p> <p>(2) “Option 5” - to impose must-run obligations for gencos with locational market power with price cap at a notional level as suggested by FE which is the SRMC of an OCGT with its fuel costs doubled.</p> <p>These measures can be implemented for a period of two years, after which they can be removed once the transmission constraint between Jurong Island and the Singapore mainland is removed.</p>
4	Views/proposals on the	The transition to the balance market regime would oblige the MSSL to hedge unvested MSSL load

S/N	Section/Paragraph in Consultation Paper/Report	Keppel Merlimau Cogen's Comments
	transition path from the status quo to any of the new regimes (viz. improved vesting contract, balance market and/or combined approach)	<p>via futures contracts to be purchased on the SGX, subject to certain pre-conditions. Keppel notes that there would be several implementation challenges arising from this obligation, chief of which is that there are currently no peak, off-peak, or shoulder products on the SGX.</p> <p>In addition, MSSL is procuring electricity futures contracts on behalf of non-contestable consumers, MSSL should be extra vigilant in ensuring that a robust framework, methodology and procedures are developed to guide their hedging transactions via the futures market. Such framework and procedures should also be rigorously tested, coupled with consultation from the industry as this has implications on regulated tariff setting mechanism.</p> <p>In the meantime, Keppel supports FE's proposal to continue hedging the unvested MSSL load through the EMA tender process.</p>

PacificLight Power's Comments

S/N	Section/Paragraph in Consultation Paper/Report	PacificLight Power's Comments
1	Consultation Paper: Section 16 (c) FE's Report: Section 6.3.1	<p>We appreciate the opportunity to comment on the Consultation Paper "Vesting Contract Regime" dated 6 June 2016 which includes the report by Frontier Economics (FE).</p> <p>After reviewing the options outlined by FE, PLP would support the consultant's recommendation of adopting a Balanced Market Regime.</p> <p>Our observations/comments on the Balanced Market Regime/Combined Approach are noted below.</p>
2	Consultation Paper: Section 16 (c)(i)(1) FE's Report: Section 6.3.1	<p>We understand it is proposed to implement a gradual reduction to zero of the Balance Vesting Quantities (BVQ) over a defined period of two to three years. PLP supports the gradual removal of the BVQ. To ensure that the market is not subject to sudden changes that could adversely impact market equilibrium we would advocate that the reduction is done at a pre-determined rate.</p>
3	Consultation Paper:	The LNG vesting quantities expire in 2023. Given that the market situation is likely to change by

S/N	Section/Paragraph in Consultation Paper/Report	PacificLight Power's Comments
	Section 16 (c)(i)(2) FE's Report: Section 6.3.1	then, PLP advocate that a decision on the timing of the rollback of LNG vesting be made closer to the expiry date, we would propose 2 years prior ie 2021.
4	Consultation Paper: Section 16 (c)(iii) FE's Report: Section 6.2.1	Under the Balanced Market and the Combined Approach Regime, it is proposed that the MSSL will have an obligation to hedge all of the unvested MSSL load via futures contracts on the SGX futures market. PLP suggest that MSSL be given the option to hedge the unvested portion either by tender or via the futures market rather than to prescribe that it be done solely via the futures market.
5	Consultation Paper: Section 16 (d) FE's Report: Section 6.4.1	The terms of reference for the Vesting Review include the identification of possible mechanisms to mitigate the exercise of market power, including localised market power. FE propose the introduction of a pivotal supplier test (PST) which could assist in managing transient exercises of market power. However the PST is not included as part of the Balanced Market, which is FE's recommended approach to adopt. Whilst PLP appreciates that the introduction of a PST is one approach to mitigate situations of market power during periods of transmission constraints, we would request that the EMA conduct a more fundamental review on whether nodal pricing should remain as an inherent part of the SWEM or whether Nodal pricing should be removed. We believe it is timely to undertake this review which, in the longer term, might be a more appropriate approach to mitigate localised market in the context of the SWEM. The implementation of a PST and the additional cost to the market may be avoided if nodal pricing is determined as no longer required for SWEM.
6	Addendum to FE's Draft Report	We note that FE have adjusted the projected LRMC for 2017 & 2018 in line with the 2015 average fuel cost component for vesting prices and using the same World Bank's Commodities Price Forecast. To ensure consistency in analysis, we would request confirmation on the fuel pricing assumptions used by FE in forecasting Pool prices.

The RCMA Group's Comments

S/N	Section/Paragraph in Consultation Paper/Report	The RCMA Group's Comments
1	Consultation Paper: Section 16(b)(i)	While imposing an ownership cap of 25% on a generating licensee may help reduce the concentration of ownership, it doesn't address the issue of lack of supply of forward hedging contracts in the wholesale market (both OTC and SGX Futures). The RCMA Group suggests additional information sessions for potential Futures Market participants to outline the risk management benefits of Futures and the complementary outlet that they provide for excess MW sales beyond retail and also how this can help with ToP gas relief.
2	Consultation Paper: Section 16(c)(iii)	Managing the unvested MSSL load in the SGX market dynamics would need to be done with great care and RCMA Group notes that certain pre-conditions need to be met. Such increases in liquidity will eventually attract Gencos to hedge their excess load via futures.
3	Consultation Paper: Section 19	RCMA Group agrees that the removal of the current burden and lack of transparency would be a positive aspect for the market and result in cheaper electricity costs for consumers.

Sembcorp Cogen's Comments

S/N	Section/Paragraph in Consultation Paper/Report	Sembcorp Cogen's Comments
1	Overall	<p>In its September 2014 Final Determination Paper, the EMA had made a clear and stated determination to lower the Vesting Contract Level (VCL) from 40% in 2014 to 30% for the first half of 2015, 25% for the second half of 2015 and 20% for 2016. However, the subsequent reversal of this determination in October 2014 resulting in an increase in VCL back to 25% in 2016 has caused disruption to gencos' hedging strategy, commercial position and regulatory uncertainty.</p> <p>The comprehensive study and report by Frontier Economics and the salient points in the EMA Consultation Paper have unanimously concluded that the scrapping of the vesting regime is overdue. Our comments and arguments are set out in the following paragraphs.</p> <p>Sembcorp urges the EMA to immediately abolish the vesting contract regime when the current 25% VCL runs out on 31 December 2016. Notwithstanding, there is a sound basis for the LNG vesting quantities (LVQ) to remain, as these LVQ were committed to the first batch of gencos who purchased the foundation quantities of regasified LNG to support the development of the LNG</p>

S/N	Section/Paragraph in Consultation Paper/Report	Sembcorp Cogen's Comments
		infrastructure and supplies of LNG into Singapore.
2	Consultation Paper: Paragraph 7	<p>The vesting contract regime should be scrapped immediately upon the expiry of the current 25% VCL on 31 December 2016.</p> <p>There is no reason to retain the current vesting contract regime as there is limited scope for the exercise of market power in the current market. Not only do FE's models validate this, it is also evidenced in the current persistently low market prices in the Singapore Wholesale Electricity Market (SWEM) despite the reduction in vesting levels in the last two years.</p>
3	Consultation Paper: Paragraph 8 FE's Report: <i>Section 4.4.4</i>	<p>Given the above, we agree with the statement that "there is scope to reduce the VCL to the LNG vesting level".</p> <p>Our view is that the VCL should be reduced to LNG vesting level starting 1 January 2017.</p> <p>As mentioned in FE's draft report (Section 4.4.4), to retain the current vesting regime for longer than necessary is to support an intrusive market measure that adds inefficiency to the market. Unlike before when electricity prices were high, this inefficiency is now clearly unnecessary since electricity prices have dropped to levels that are routinely well below all gencos' SRMCs. In fact, any VCL above LNG vesting level is actually a market distortion since it artificially sets a price for electricity that is sheltered from the forces of market supply and demand.</p>
4	Consultation Paper: Paragraph 7	Price volatility is a characteristic of a properly functioning market and should be encouraged as long as prices are not persistently high due to the exercise of market power (which is not the case in the current market). This should not be a reason to delay the reduction of the VCL.
5	Consultation Paper: Paragraph 10	<p>We agree with this statement and in fact, this is precisely the reason why inefficient plants are still in service when they should have long been retired if they were to compete in a truly competitive market governed by the forces of supply and demand.</p> <p>The retention of VCL above LNG vesting is a market distortion which encourages inefficiency in the market, which has a very real consequence, i.e., the retention of inefficient units in the market which compromises the reliability of the Singapore power system and keeps the overall SRMC of the industry higher than it ought to be if less efficient plants were to be retired according to market forces.</p>

S/N	Section/Paragraph in Consultation Paper/Report	Sembcorp Cogen's Comments
6	Consultation Paper: Paragraph 11	<p>We note the point that vesting contracts are generally used as a time-limited mechanism in most overseas markets, if applied at all. Again, this points to the fact that the abolishment of the vesting contract regime is overdue. The vesting contract regime was useful as a stop-gap measure to limit the exercise of market power while the SWEM took time to mature (i.e., as more genco plantings occurred and the market rules were refined, etc). However, the vesting contracts have outlived their usefulness and therefore should be scrapped as soon as possible.</p> <p>We therefore propose that the VCL should be reduced to LNG vesting levels on 1 January 2017.</p>
7	Views/proposals on the transition path from the status quo to any of the new regimes (viz. improved vesting contract, balance market and/or combined approach)	<p>As mentioned above, our view is that because there is no longer any meaningful scope for the exercise of market power in the SWEM, the VCL can be reduced to LNG vesting level as soon as possible in the next cycle of vesting level adjustments.</p> <p>As for our views on what form the new regime should take, we note that the Balance Market Regime and the Combined Approach advocate an approach of reducing the VCL to LNG vesting levels. This is consistent with our view except that we view that this reduction should be done as soon as possible starting 1 January 2017 rather than spread out over a few years until 2018 as stated in the paper.</p> <p>However, we would like to emphasise that there must be a means to address the issue of price separation in the market as this is a serious flaw in the market that causes certain gencos to make large gains while others make similarly large losses through no fault of their own. The Combined Approach tries to address this issue with Pivotal Supply Tests (PSTs) and limiting the bid price of the units which are deemed to be able to exercise localized market power. We would like to request that the issue of addressing price separation events and localized market power be actioned upon straightaway and dealt with separate from this vesting regime review exercise given the urgency of this issue.</p>

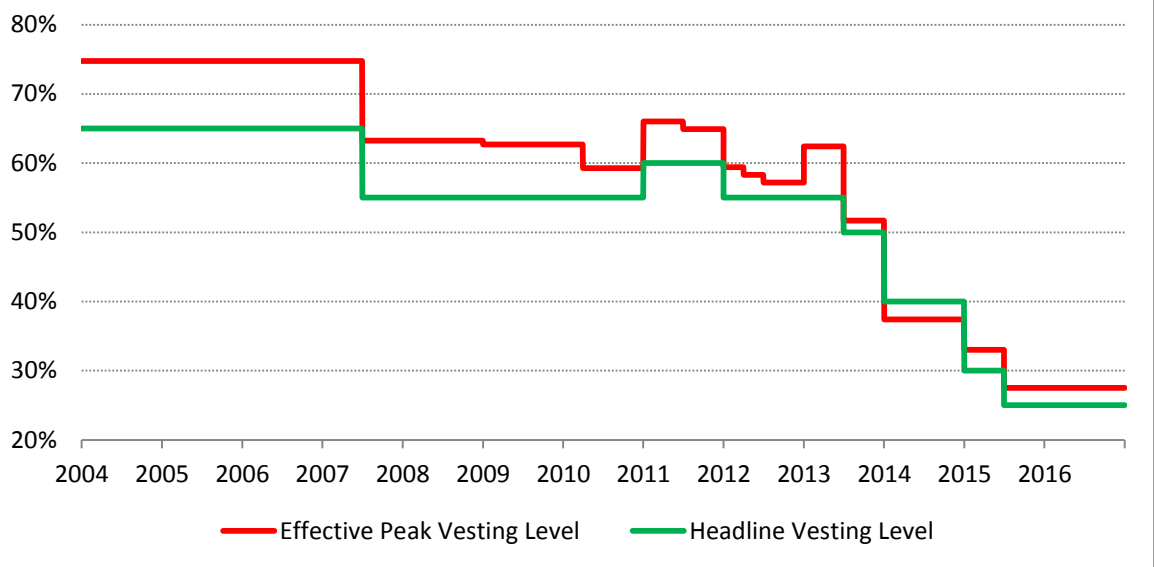
Senoko Energy's Comments

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
1	Review Framework and Evaluation Criteria	<ol style="list-style-type: none"> <li data-bbox="683 328 2002 512">1. The FE Report evaluates the current VC regime and alternative market power mitigation measures against five criteria. Senoko and a number of other Gencos requested before the FE Report was issued that the review be broadened to consider the impact that the VC regime (or alternatives) will have on market sustainability. We believe that the request remains reasonable given EMA's duties in The Energy Market Authority of Singapore Act. <li data-bbox="683 552 2002 959">2. It is apparent that the review scope adopted in the FE Report focuses on the role that the VC regime has as a tool for mitigating the exercise of market power. This overlooks that fact that the VC regime has also been used by EMA to provide competitive and stable prices for non-contestable consumers (NCCs) and as an incentive for LNG contracting and associated development of new power generation capacity. In addition, vesting provides Gencos with a degree of cash flow stability/certainty which is important in an "energy only" electricity market such as Singapore. EMA acknowledged this attribute of the vesting regime when allocating vesting contracts to Island Power and Keppel Merlimau in 2002 despite it not being necessary for market power mitigation. Our request for a holistic and comprehensive approach to the review of the VC regime appears to have been ignored based on a very narrow interpretation of our request. <li data-bbox="683 1023 2002 1358">3. Whilst sustainability was not addressed in the FE Report, Section 4.4.3 of it provides some brief commentary on whether or not the EMA's current implementation of the VC regime systematically prevents the Gencos from recovering their efficient costs. Senoko's comments on FE's analysis on this topic are as follows: <ol style="list-style-type: none"> <li data-bbox="728 1206 2002 1358">A. EMA has developed a number of policies that have both the intent and the effect of ensuring that Genco's average electricity sales prices are no higher than the vesting price (a proxy for the LRMC of an efficient new entrant) and hence are likely to result in systematic under recovery of efficient costs. Such policies include:

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		<ul style="list-style-type: none"> i. Setting the vesting contract level (VCL) in a way that has the objective of average pool prices not being above the vesting price. ii. Implementing a vesting relief scheme where certain Gencos can reduce their VC quantities during planned maintenance with such quantities being allocated to other Gencos during that period with the intent that the scheme will result in lower pool prices. iii. Conducting vesting tenders where the resultant prices can be no higher than the vesting price (as a result of offer caps). iv. Conducting NCC tenders where the resultant prices can be no higher than the vesting price (as a result of offer caps). v. Implementing a demand response scheme with associated incentive payments that is designed to reduce pool price spikes and shift surplus from producers to consumers. vi. Designing a full retail competition (FRC) model that is likely to enable smaller consumers to switch back from contestable to regulated supply which can be expected to lead to retail prices for this segment being on average lower than the regulated tariff which is based on a blend of the vesting price and NCC tender prices. <p>B. FE notes that the argument regarding EMA's targeting for spot prices to be below LRMC on average over time "might have some validity if EMA was willing to raise the VCL aggressively and potentially up to 100 percent to stabilise the USEP or push it down". Our response to this statement is as follows:</p> <ul style="list-style-type: none"> i. It is not necessary for vesting to be near 100 percent of load for Gencos to be systematically under remunerated. The overall remuneration of Gencos would still be below LRMC, on average, if EMA acts in a pro-cyclical way to constrain

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		<p>prices when the market conditions are tight but does not support prices when the market is in surplus. EMA has implemented a “roller coaster” approach to setting the effective peak VCL (i.e., taking into account the peak period weighting factor and the tendering of vesting volumes which are at a discount to the vesting price and allocated in a way that is inconsistent with the objective of market power mitigation). Refer to the chart in Appendix 1.</p> <p>ii. The comparison of vesting and pool (USEP) prices quoted by FE should be checked to ensure that it reflects an appropriate adjustment for the fact that vesting prices are set on a forward basis while pool prices reflect “spot” conditions. In a period where oil prices are rising, pool prices may be above vesting prices even though Gencos are not fully covering their LRMCs. In any case, a limited number of periodic episodes of prices exceeding the LRMC of the most efficient units in the system may be insufficient to generally remunerate capacity over the long term.</p> <p>iii. FE concludes that “we consider that the EMA’s approach to setting the VCL need not lead to Genco’s systematically under-recovering their efficient cost”. Senoko’s view is that EMA’s approach to setting the VCL and the related policies outlined above show a clear intent to ensure electricity prices remain below LRMC. As a result it is a reasonable expectation that Gencos will not be able to fully recover their non-fuel costs, with the outcome being an unsustainable market/policy structure. The actual (or perceived) constraints on pool prices caused by the prospect of regulatory policies and interventions leads to what is known as the “missing money” problem. In such circumstances, some form of payment to capacity providers is required to ensure there are efficient investment incentives. In the absence of capacity payments (explicit or otherwise), the current policy settings in Singapore have the potential to negatively impact the dynamic efficiency of the industry.</p> <p>4. Given that the FE Report does not address the issues associated with the unsustainability of current vesting regime and associated policies it is not possible for Senoko to support many of</p>

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		<p>the Report's recommendations. Nonetheless, it is possible to identify some of the likely outcomes if the FE recommendations are accepted:</p> <ul style="list-style-type: none"> A. Market participants are likely to enter financial distress and require restructuring of their balance sheets. B. The ability to support new initiatives in the electricity and gas sectors will be limited. C. The supply-side of the industry will need to consolidate. D. More aggressive operational streamlining initiatives will need to be implemented which will be disruptive to suppliers, staff and other stakeholders. E. Future investment decisions by owners will need to reflect a perceived increase in regulatory risk. <p>5. Given the immediate importance of these issues to the industry we believe that careful consideration needs to be given to adopting an approach that results in adequate remuneration of effective capacity (e.g. via the existing vesting or an alternative scheme).</p> <p>6. The outcomes of any revised scheme should address the immediate sustainability issues whilst enabling the market to rapidly move to a sustainable demand/supply equilibrium. In the current market circumstance this would mean a scheme that delivers the equivalent of a circa 40% vesting contract level. In addition, any scheme should not require significant changes with the commencement of full retail contestability in 2018.</p> <p>Appendix 1: Vesting Contract Level Evolution</p>

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		 <p data-bbox="685 788 1951 852"><i>Effective Peak Vesting Level is the Headline Vesting Level adjusted for the peak period weighting factor and vesting tender quantities</i></p>
2	Comments on FE's Market Modelling Approach	<p data-bbox="685 866 1989 935">7. Senoko's detailed comments and queries regarding FE's modelling approach are contained in Appendix 2 of this letter. Some more general concerns are covered in the following paragraphs.</p> <p data-bbox="685 975 1989 1158">8. We note that EMA issued an Addendum to the FE Report restating the LRMC references lower by \$38/MWh. This reduction is material, so we find it surprising that FE finds that "it has no bearing on [the] analysis and recommendations set out in the ... Report". For example, in the bidding sensitivity case forecast USEP approaches the restated LRMC. Therefore, we suggest that FE's qualitative interpretation of the modelling results be reviewed and revised.</p> <p data-bbox="685 1198 1989 1382">9. Furthermore, we suggest that the cases modelled be adjusted for the following: A. Review whether the ST units are expected to achieve positive EBITDAs from market revenues. If not, their complete removal from the system should become a base case assumption instead of a sensitivity where only half the units are retired. We note FE's recommendation that STs would no longer receive vesting allocations as they fall outside</p>

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		<p>the definition of effective capacity.</p> <ul style="list-style-type: none"> B. Review whether the OCGTs are expected to achieve positive EBITDAs from market revenues in the scenario where they offer into the market at or below \$350/MWh. If not, revise their offer strategies to at least a level where they could produce positive economic returns. C. Include a sensitivity covering changes to generation portfolio ownership and increased market concentration. Given the current market conditions, consolidation of smaller portfolios is expected. Fewer smaller portfolios and larger strategic portfolios should have a material influence on market outcomes. D. Provide a base case that extends beyond 2020. A longer horizon is important given the comprehensive vesting regime review should lead to a set of policies and market outcomes that are sustainable over the medium term. <p>10. An important aspect of the FE Report is their assumption that hedging of unvested MSSL load mitigates market power to the similar extent as if the VCL had not been reduced. FE explains that its analysis “demonstrates ... fully hedging MSSL load is as effective in mitigating market power as the current vesting contracts under our base case assumptions. Phasing out vesting contracts, and relying on the complete hedging of MSSL load to mitigate market power, is therefore likely to be effective” [FE Report, page 63]. This appears to be an assumption rather than a result of FE’s modelling. We believe the assumption is suspect for the following reasons:</p> <ul style="list-style-type: none"> A. In general terms, if a generator that holds market power in the spot market then they are likely able to influence prices in either a NCC tender or the electricity futures market. There may also be additional incentives to increase spot market prices so that the impact of higher USEP prices “spill over” to MSSL’s other procurement channels. B. Vesting is expected to have a peaky profile relative to the MSSL load. Therefore, vesting, by design, is qualitatively better at reducing incentives to exercise market power. C. The vesting allocation mechanism is designed to increase the contract cover held by Gencos that are in a position to potentially exercise the most market power. Procurement via NCC tenders or the futures market cannot be expected to lead to the same result, particularly if NCC tender prices are capped the vesting price. If higher prices are expected to be achieved via sales to the pool, then Gencos may forego

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments						
		<p>participating in the NCC tender resulting in an entity with no generation capabilities being the successful tenderer.</p> <p>Similarly, procurement via the futures market may result in non-physical players holding contracts that are equivalent to the NCC load until delivery. In addition, mandating that MSSL must procure via SGX appears to be a “picking winners” approach rather than necessarily being designed to achieve the desired outcome at the lowest optimal cost.</p> <p>Appendix 2: Detailed Comments on FE's Modelling Approach</p> <table border="1" data-bbox="689 528 1933 1386"> <thead> <tr> <th data-bbox="689 528 869 568">Reference</th> <th data-bbox="869 528 1081 568">Topic</th> <th data-bbox="1081 528 1933 568">Comment/Query</th> </tr> </thead> <tbody> <tr> <td data-bbox="689 568 869 1386">Appendix B</td> <td data-bbox="869 568 1081 1386">Repeated Games</td> <td data-bbox="1081 568 1933 1386"> <p>FE's model is designed as a “one-shot game”. In reality Gencos interact on a repeated basis. The Folk Theorem describes how an infinitely repeated game can yield better outcomes for all strategic players than the Nash equilibrium in a one-shot game. Therefore, modelling using a one-shot game may understate the potential for Gencos to exercise market power.</p> <p>FE argues that Nash equilibria that arise from repeated games reflect tacit collusion and as a result these outcomes can be ignored because the EMA's vesting procedures require modeling of only non-collusive outcomes.</p> <p>FE is wrong to characterise the Nash equilibria that arise from repeated games as a collusive outcome. Tacit collusion is essentially “optimal non-cooperative behaviour” and is a distinct notion from collusion which requires explicit cooperation.</p> <p>Therefore, FE's conclusion that it is not necessary to model repeated games on the basis of the Vesting Procedures is not justified.</p> </td> </tr> </tbody> </table>	Reference	Topic	Comment/Query	Appendix B	Repeated Games	<p>FE's model is designed as a “one-shot game”. In reality Gencos interact on a repeated basis. The Folk Theorem describes how an infinitely repeated game can yield better outcomes for all strategic players than the Nash equilibrium in a one-shot game. Therefore, modelling using a one-shot game may understate the potential for Gencos to exercise market power.</p> <p>FE argues that Nash equilibria that arise from repeated games reflect tacit collusion and as a result these outcomes can be ignored because the EMA's vesting procedures require modeling of only non-collusive outcomes.</p> <p>FE is wrong to characterise the Nash equilibria that arise from repeated games as a collusive outcome. Tacit collusion is essentially “optimal non-cooperative behaviour” and is a distinct notion from collusion which requires explicit cooperation.</p> <p>Therefore, FE's conclusion that it is not necessary to model repeated games on the basis of the Vesting Procedures is not justified.</p>
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			<p>If FE's model cannot accommodate repeated interactions then it is important to recognise that it may be missing important aspects of the interactions between Gencos.</p>
		Appendix C	<p>Demand</p> <p>The annual demand growth rate appears to be ~1.5%. Please confirm the growth rate used.</p> <p>FE models 150 instances of the market each year to save on model run time. This means that only 150 demand and outage points are modelled. Price volatility is a key aspect of energy only markets and it is the low frequency but high priced spike events that play an important contribution to the annual average USEP. It is likely that the low granularity of the FE model will underestimate such price volatility.</p>
			<p>Operating Parameters</p> <p>The SRMCs appear to be based on Q4 2015 gas prices. Please confirm. The (restated) LRMCs appear to be based on the average annual 2015 gas prices. Please confirm and explain why a different basis was used (if necessary).</p> <p>Since the modelling is performed on a gross demand less auxiliary loss basis, then a net Heat Rate should be used to derive the SRMC. We would expect the net Heat Rate for the F-class units in the model to be on average higher than that assumed for the vesting unit of 7.5GJ/MWh.</p>
			<p>Fuel Costs</p> <p>Given the short modelling horizon, forward oil/FX prices should be used rather than the Japan LNG Index and World Bank crude oil index. In reality, prices of PNG and LNG have different sensitivities to underlying oil prices. Therefore, the</p>

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments	
			<p>approach adopted is likely to affect the merit order of gas fired plant and the size of the spark spreads. Given that costs of the marginal generator/fuel will affect the market clearing price, capturing a realistic relationship between PNG and LNG is important.</p>
		Ancillary Services	<p>Contingency services should not be excluded from the model as they are an important consideration in Gencos' strategies and they affect the amount of energy that each generation unit is able to offer.</p>
		TOP gas arrangements	<p>It is unclear how gas TOP constraints have been implemented in the model. We suggest that the TOP gas should be modelled at a reduced price (relative to the contract price) to represent the cost of on-selling excess gas. Incorporating TOP gas into a "must run" generation profile is likely to be unrealistic and lead to an underestimate of pool prices.</p> <p>Can EMA provide Senoko with the assumption used for our portfolio on a confidential basis so we can check it for accuracy?</p>
		Contracts	<p>A Genco's assumed contract level includes the historic load of their retail affiliate. How is the retail load adjusted for changes in the vesting contracts allocated to each of the Gencos in the model runs?</p>
		Bidding	<p>The base case does not include mark-ups in ST or OCGT offers above SRMC. Peaking plants that run for a limited (and uncertain) number of hours typically mark-up their SRMC so that they can recover their fixed costs. The assumption adopted is likely to lead to an underestimate of peak pool</p>

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			<p>prices and may mean that such plant cannot achieve dispatch weighted prices that are above their SRMCs. This also runs the risk of capping pool prices at the SRMC of the non-CCGT plant.</p>
		Generation Outages	<p>FE appear to use a stochastic approach for generation unit outages in the VCL analysis but a derating approach for the market power analysis. It is unclear why different approaches were used. The stochastic approach seems more appropriate.</p>
		Appendix D	<p>Market modelling calibration results</p> <p>The modelled average USEP is ~\$10/MWh lower than the 2015 actual. This is consistent with our view that the FE modelling is underestimating pool price forecasts.</p>
		Appendix E	<p>Reference case results</p> <p>It is not clear from the box and whisker plots whether the FE model is appropriately estimating market volatility. The upper end of the whiskers are well below maximum prices typically experienced in the market. Please provide price duration curves or more granular pricing results/data for each case.</p>
		Bidding sensitivity results	<p>The assumption that OCGTs will bid at \$350/MWh appears to be conservative (even if it were included in the base case). Typically, USEP is considerably higher than this level when OCGTs are dispatched. Therefore, to form a more realistic bidding sensitivity we suggest pricing the OCGTs at a level that would lead to positive economic outcomes for those units given their limited running hours.</p> <p>We note that with the USEP values in this sensitivity are within the range of the restated LRMC.</p>

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments	
		Supply-demand sensitivity results	We suggest that his case reflect retirement all of the ST units.
		Unvested MSSL load hedge allocation	If the MSSL/NCC load shape is less peaky than the vesting load shape then we would expect that vesting quantities would be more effective in mitigating the exercise of market power. Indeed, this is the basis for the period weighting factors that form an important part of the vesting regime design.
3	Conclusions	<p>11. The vesting contract regime has for a variety of historical reasons become a material driver of value in the Singapore electricity industry. Therefore, FE's review scope is far too narrow and does not assess the impact that their proposed changes (together with associated EMA policies) will have on the sustainability of market participants.</p> <p>12. Vesting has provided a de facto capacity remuneration mechanism to accompany Singapore's "energy only" electricity market design. If the vesting regime is to be transitioned away from due to a perceived declining need to use it for the mitigation of market power, and EMA retains the objective of ensuring that average prices are not higher than an efficient LRMC when market supply conditions tighten, then it is essential that EMA puts in place a capacity remuneration mechanism that fulfils the role that has been served by vesting in the past.</p> <p>13. Aside from the FE Report failing to ask the right question, it has a number of weaknesses and potential errors which we have documented in this response. We continue to urge the EMA to widen the scope of this review exercise to identify a solution that:</p> <ul style="list-style-type: none"> A. provides transitional support to long-standing market participants who provide effective capacity until such time as the supply demand balances returns to more 'normal' conditions. Based on current market conditions this would be equivalent to a circa 40% Vesting Contract Level under the current scheme; and B. establishes a scheme which does not require material adjustments with the introduction of FRC in 2018 	

S/N	Section/Paragraph in Consultation Paper/Report	Senoko Energy's Comments
		We note a number of other jurisdictions are examining the short comings of an "energy only" market design and the associated need to ensure adequate remuneration of efficient capacity.

YTL PowerSeraya's Comments

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
1	Consultation Paper: Section 1	<p>While accepting that restricting power was an objective of vesting contracts, the reality is that vesting contracts provide support to generator revenues at times of overcapacity.</p> <p>EMA clearly subscribed to this view when it offered 10 year LNG vesting contracts to encourage generators to take up capacity from the new LNG terminal.</p>
2	Consultation Paper: Section 4c	<p>Resource adequacy should be an essential objective of any review of the vesting regime. We do not believe it has been adequately considered in the EMA proposal and the FE review. Resource adequacy cannot be considered on a two year by two year basis given that power stations usually require 20 or so years in order to repay the capital invested. Investors must consider the regime to be sufficiently stable and fair for the long term.</p> <p>The importance of encouraging investment to ensure resource adequacy</p> <p>In considering resource adequacy, EMA needs to consider more seriously whether</p> <ul style="list-style-type: none"> • the current level of balance vesting at about 7% is already unfairly low to generators • the current level of balance vesting of about 7% inadequately compensates generators for the consequences on the market of generators having supported the introduction of LNG • without reversal the current low level of balance vesting will lead to sufficient long term investment and permit maintenance of plant <p>A material minimum level of vesting</p> <ul style="list-style-type: none"> • We consider a material minimum level of vesting to be a permanent minimum of 40% for a

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		<p>period up to 2023, to match the duration of the current take or pay PNG contracts and LNG contracts. This would provide a workable minimum degree of revenue support for generators. We believe that this type of regime is required to ensure the solvency of the generators, is necessary to encourage continuous investment and is what investors and lenders expected both when signing contracts to purchase LNG thus enhancing competition for the benefit of consumers, and on initial privatisation.</p> <p>The setting of vesting at any level below 40% is not fair to generators</p> <ul style="list-style-type: none"> • If the vesting regime is perceived to be unfair, investors will neither invest in new capacity nor maintain existing capacity. • Vesting achieves two things : with respect to the portion vested, the retail margin is effectively capped; with respect to the unhedged portion, the amount of competing capacity relative to the remaining unhedged supply market is increased, thus increasing competition and reducing prices. • The price at which vesting caps the prices is set at the price which the generator should earn over 20 or so years in order to achieve a fair rate of return. • If vesting is set at high levels when prices would otherwise be high, but unduly reduced when prices would otherwise be low, the generator can never on the portion hedged earn the target return. On the unhedged portion, the ability to earn over the life time the target return depends on the extent to which the prices for unhedged capacity move up and down. FE p33 comments that in 2011 and 2012, USEP averaged 10.1% and 3.7% above the vesting price. However, these amounts are (i) very small in terms of extra fixed margin for the generation involved – note that the vesting price is calculated based on the most efficient capacity providing 25% of the market, and not the cost of the marginal generator and (ii) the higher prices were only enjoyed by the 35-40% of capacity unvested. The more telling point can be seen from the chart on FE p17, where prices have been significantly below vesting prices since 2012, and in the example provided by FE on p 16. The Q1 2016 average spot price of S\$74.89/MWh is 37% below the vesting price of S\$119.48/MWh and applies to 75% of the generation.

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		<p>The current vesting regime does not fairly compensate for the cost of generators supporting the introduction of LNG</p> <ul style="list-style-type: none"> • Investors were allocated “LNG vesting” to compensate them for the risk of contracting for 10 year supplies of LNG. While this did give a degree of certainty to the margins which could be earned strictly from generating using LNG, it is largely this introduction of LNG which has led to <ul style="list-style-type: none"> ○ excessive take or pay risks ○ excess power generation capacity ○ the unviable situation of PNG contracts with ToP with seven years’ remaining life in a market which dispatches power half hourly and hedges it with retail customers typically for one to two years; and ○ the reduction of balance vesting to a token 7%. If generators had understood this would be the case, they would have been more reluctant to support the LNG terminal. <p>With insufficient certainty over a reasonable return on capital investors will not invest and are unlikely to be able to maintain plant</p> <ul style="list-style-type: none"> • Although perhaps not part of its brief, we are surprised that FE has not commented more on the increasing difficulties in competitive power markets which have been faced with the introduction of support mechanisms for certain types of generation, in particular renewables. There are arguments to indicate that the support for LNG has had similar effect on the market to the support provided elsewhere for renewables. The effect is that market after market is now looking to introduce incentives to provide capacity and to keep it on line, either through capacity markets (eg UK) or through remunerating capacity with availability fees and bringing it under the direct control of grid operators as “system reserve” (e.g. Germany). These capacity contracts are not primarily about controlling market power. • It is quite apparent that the current regime in Singapore makes it impossible for the generators to be confident of a reasonable mid to long term return on any new investment. We suspect the generators relying on limited recourse debt are or will soon be insolvent if the any of the proposals offered by EMA are implemented. This is not a situation which can

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		<p>be remedied by maintaining vesting at 25% or reducing it to LNG vesting only.</p> <ul style="list-style-type: none"> Investment sentiment must be sound amongst both equity investors and debt lenders. Even by its own calculations of vesting prices, the EMA assumes high amounts of long term low cost debt are available to the sector. Yet, unless vesting is increased back to 40%, we suspect that generators with limited recourse debt funding are either already insolvent or close to insolvent. Lender and investor sentiment is thus a major factor in assessing resource adequacy.
3	Consultation Paper: Section 6	As far as we are aware, the idea that market power of the generators is assessed based on the way in which MSSL procures power is new. This has not been part of EMA's stated justification for vesting to date. Introducing this is again to move the goal posts.
4	Consultation Paper: Section 7	The implication of FE's observations is that the generators currently have no market power, and continued balance vesting at any level is not needed to restrain market power. Our request above for continued vesting at 40%, however, is based entirely on ensuring adequate resource and the sustainability of investment in the sector, which we believe have not been adequately considered in the analysis.
5	Consultation Paper: Section 8	The conclusion is not supported by the analysis, which, as it is based purely on an analysis of market power over two years (thus ignoring issues of long term resource adequacy) actually points to no further controls on market power being required. How much more competitive does the market really need to get for the EMA to concede that further regulation to restrict market power is not actually required?
6	Consultation Paper: Section 16(a)	The precise impact of "Status Quo" is unclear without a clear statement of the implied vesting levels for 2017/18 under this method. We believe that the only credible conclusion of FE's review solely of market power, if this is, in our view wrongly, to be the sole criteria against which vesting levels are determined, is that balance vesting should be 0% for both years. The idea that there are caps and overall limits on vesting and the speed of change of vesting would be reasonable in the context of a meaningful minimum vesting level of 40% as mentioned above – but are unlikely to be meaningful in the context of a possible one way reduction in total vesting from 25% to LNG vesting only (i.e. about 18%), and a cap which given the current competitive landscape has little chance of biting in the current investment horizon.
7	Consultation Paper: Section 16b(i)	The imposition of a market share cap of 25% in the generation licence is unjustified and unduly intrusive.

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		<ul style="list-style-type: none"> • EMA must be clear as to whether the market is managed or competitive; • If the EMA is to pursue a liberalised market, the imposition of a new unjustified arbitrary market share cap is at variance with this objective. Subject to anti-trust law, EMA must allow the market to find its own way to address the effects of competition. • Many competitive power markets worldwide have incumbents with higher market shares than 25%, yet are still highly competitive. A market share cap could lead to effective forced reduction in licenced capacity of the original three gencos if the time permitted between decommissioning and replacing capacity is not lengthy or indefinite (see FE p55). This would be contrary to the expectations of investors based on the current licences on which the gencos were sold. • EMA has sufficient tools at its disposal to deal with abuse of market power and does not need to create additional ones.
8	<p>Consultation Paper: Section 16b(ii)</p> <p>FE's Report: Section 6.2.1 (page 56)</p>	<p>The idea of setting the vesting level at precisely that level which gives an HHI index of 1250, when vesting is allocated a market share of zero, is inappropriate :</p> <ul style="list-style-type: none"> • We suspect that the precise method of calculation would be complicated and subjective, based on arbitrary definitions of the capacity which would be included in determining market share (FE Fig 26 provides no reasoning for preferring any definition of capacity); the mechanism presumably relies on goal-seek methodology, needing to be changed as soon as one party adjusts capacity; we suspect this would entail arbitrary mismatches between actual market share of generation and share of capacity to which vesting is allocated. • FE estimates that this would lead to a VCL of about 17% (i.e. balance vesting of about 0%) calculated using market shares based on the CCGTs and OCGTs. At these low levels of vesting, this neither seems about controlling market power, nor about meeting investor expectations at the time of making investments, but is possibly more about switching vesting revenue between generators. • A level of HHI at 1250 feels very low as a benchmark for determining that participants have market power which needs to be controlled. It is considerably lower than the levels at which industries are usually considered to be uncompetitive, such that intervention is required. This is even before taking into account features of the power market which in our experience

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		<p>tend to make it more competitive for any given HHI than other markets (e.g. take or pay gas contracts, homogeneity of product, inability to store the product, natural oversizing of the supply side by definition for most of the non peak hours of the year etc).</p>
9	Consultation Paper: Section 16b(iii)	<p>Although vesting contracts may be intended to reduce market power, the reality is that they are seen by all investors as a revenue support to ensure resource adequacy and a part of the deal which investors bought into. With this objective it is important that the market perceives that investors are treated fairly in line with their reasonable expectations at the time of making the investment. As such, it would be wrong to change the basis of allocating vesting to favour investors who invested without any expectation of receiving vesting.</p> <p>It would also be wrong to allocate vesting only to capacity that can respond quickly to short term pricing events, defined as CCGTs and OCGTs. This is not the basis on which vesting was allocated and upon which investors invested. The current vesting regime should remain valid for a reasonable investment horizon, which is the period of duration of the gas contracts – that is 2023. Capacity is not only valuable because of its short term response time. Short term capacity may be expensive and only viable for a short period of time. Other capacity, albeit with a longer ramp up time may well provide cheaper power for longer, and may well be capable of anticipating imminent capacity shortages.</p> <p>As recognised in EMA 10, vesting contracts act as a disincentive to shut older capacity. But where resource adequacy is the issue, this is not necessarily a bad thing. Thus the current allocation serves to keep the steam turbines in reserve. These provide the valuable ability for Singapore to generate power using alternative fuel. Arbitrarily, however, the proposed mechanism would immediately promote a shutdown of the steam turbines, but at the same time might temporarily delay the shutdown of the E Class machines. Even though the basis of investment was the similar, one type shuts and the other does not, even though under some metrics old CCGTs are of lesser value to the system as a whole, as they provide neither efficient gas fired capacity, nor back up capacity by a different fuel or technology.</p>
10	Consultation Paper: Section 16c(i)(1)	<p>Current vesting is 25%. Of this, LNG vesting comprises about 18%. Reducing the residual 7% balance vesting to 0% in stages over a period of two to three years would be to overcomplicate the vesting regime and to turn it into one of micro management and interference by EMA. Providing a tapering of 7% certainly does not address investors' concerns about fairness, adequacy of return</p>

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		and market concerns about adequacy of resource. It would be preferable to reduce balance vesting to 0% at 1 January 2017, accepting that the industry is and should be competitive.
11	Consultation Paper: Section 16c(ii)	Please see comments to 16(b)(i) which apply equally here.
12	Consultation Paper: Section 21	We disagree with the proposed conclusion to move to the “balanced market” proposal, in particular as this includes the quite unjustified introduction of a market share cap of 25%. Further, the phasing of the reduction in balanced vesting from effectively 7% to 0% is unwarranted and unhelpful. It wrongly interprets the degree of market power and at the same time fails to address genuine and grave concerns on long term resource adequacy. FE’s suggestion (4.5, p35) that vesting could be changed by 1.25% each quarter would be an unwelcome degree of micro- adjustment by the regulator, which is neither justified by an analysis of market power, nor the need for any transitional support.
13	Consultation Paper: Section 22	The sentiments of proceeding in a staged and orderly manner are appreciated but in the limited context, are quite unnecessary and feel rather contrived in the current market circumstances. Concerns about transition paths have no basis in a regime where EMA considers that the sole purpose of vesting contracts is to restrict market power. If the market is to be fully competitive, it is preferable to have a clear liberalised market on 1 January 2017 and leave the sector to find its own equilibrium sooner rather than later.
14	Other comments	<p>The current EMA recommendation – essentially for phased reduction of the current 7% balance vesting and the introduction of a 25% market share cap - feels very contrived. EMA fundamentally needs to decide whether the market is to be either :</p> <ul style="list-style-type: none"> • a managed market where capacity is to a certain degree centrally planned and to a significant degree (i.e. 40%) remunerated through long term vesting contracts until 2023. This is essentially how the shareholders and lenders have looked at vesting at the time of investing and signing for LNG. This would be fair and would address concerns about resource adequacy. <p>A fully competitive market, where it should be left to the market to find its own equilibrium without new and contrived market share caps, but with liberalised investment and shutdown signals provided entirely by the market; all the evidence points to the market being sufficiently competitive to</p>

S/N	Section/Paragraph in Consultation Paper/Report	YTL PowerSeraya's Comments
		accommodate this. However it needs to be seen whether this will answer real concerns about future resource adequacy, given the history of investor and lender expectations, effective historical revenue caps, and the authorities' previous encouragement to support the Introduction of LNG.

SP Services' Comments

S/N	Section/Paragraph in Consultation Paper/Report	SP Services' Comments
1	Consultation Paper: Paragraph 8 and 16	<p>The proposal to have MSSL take on the hedging role is a significant change to SPS business profile.</p> <p>SPS submits that the following areas would entail further considerations.</p> <p><u>Understanding of the Market Mechanism</u></p> <ul style="list-style-type: none"> - Rationale for change to hedge invested NCL via futures contract - Hedging mechanism for unvested NCL in futures market - Specific requirements imposed by SPS should MSSL participates - Types of products for peak, off-peak and shoulder and timing of availability - Overall market structure, role for the different players and associated risks - Settlement mechanism between MSSL, SGX, Gencos and other parties - Costs associated with margins, brokerage fees, resources - Working capital requirements <p><u>Performance obligations and risks for MSSL</u></p> <ul style="list-style-type: none"> - Details underlying trading, risk management and compliance rules - Methodology for and settlement of differences in actual vs hedge quantities - Cost implications from the above - Treatment of gains and losses from change in hedging methodology - Other alternative approaches - Regulated tariff setting mechanism arising from changes

S/N	Section/Paragraph in Consultation Paper/Report	SP Services' Comments
		<p><u>Impact to consumers</u></p> <ul style="list-style-type: none"> - Price implications if hedging approach for unvested mechanism is revised - Assess pass-through of hedging gains and losses to consumers - Comparison of cost and risk implications of current unvested tendering scheme vs future contracts - Other possible models and alternatives to protect consumer interests

Tuas Power Generation's Comments

S/N	Section/Paragraph in Consultation Paper/Report	Tuas Power Generation's Comments
1	FE's Report: Section 4.3.2 Modelling results	<p>The results from FE's model should be interpreted with caution, and may have understated the scope for the exercise of market power. For example:</p> <ul style="list-style-type: none"> a) FE's interpretation of modelling results was conditional on an incorrect assumption of a much higher LRMC estimation. FE has subsequently issued a correction in which it lowered the level of LRMC against which it compares its modelled prices. With LRMC estimation being revised downwards, there are some scenarios in FE's models that have equilibrium prices approaching the LRMC; b) The supply-demand sensitivity scenario should be a more credible baseline to assess the potential of exercising of market power since lower VCLs will no longer incentivise the generation companies to continue maintaining the steam plants. The supply-demand sensitivity scenario should be modified to assume the retirement of all the steam plants and OCGTs offering into the market above their SRMC in order to recover their start-up and fixed costs. As such, the market is likely to be tighter than FE assumes; and c) FE's modelling approach seems to understate equilibrium prices: <ul style="list-style-type: none"> (i) FE's own calibration with actual 2015 average USEP suggests its model understates market prices; and

S/N	Section/Paragraph in Consultation Paper/Report	Tuas Power Generation's Comments
		(ii) Theory suggests that modelling the market as a one-shot game will tend to understate the equilibrium price that will emerge from a game that is repeated indefinitely.
2	FE's Report: Section 4.4.3 Resource adequacy	<p>FE concludes that EMA's approach to settling VCL need not lead to Gencos systematically under-recovering their efficient costs due to:</p> <p>(i) EMA has noted that the VCL does not cap the pool price at the Vesting Price (or LRMC), as pool prices can rise above the Vesting Price under tight market condition as observed in 2011 and 2012, with USEP averaging at 10.1% and 3.7% above Vesting Price respectively; and</p> <p>(ii) EMA will not raise the VCL aggressively to strictly 'cap' the USEP at LRMC and in fact has not done so in the past.</p> <p>However, it is not necessary for the constraint on prices to be a strict "cap". The Gencos' revenues would be below LRMC on average since EMA targets USEP to LRMC when the market is tight and allow the USEP to fall when market is in surplus.</p> <p>Although USEP rose above the Vesting Price in 2011 and 2012, it could likely be attributed to the differences in market conditions that EMA has assumed when setting the VCL and the actual unforeseen demand supply imbalance and that the LRMC in Vesting Price is calculated based on forward prices while the USEP is dependent on spot fuel prices.</p>
3	Views/proposals on the transition path from the status quo to any of the new regimes (viz. improved vesting contract, balance market and/or combined approach)	<p><u>Vesting Contract Level for 2017-2018</u></p> <p>We do not support the new regimes proposed by FE as the sustainability of the Gencos has not been included in their assessment.</p> <p>In this regard, the vesting contract regime review should take into consideration the contribution of the generation companies in providing a reliable and secure source of power to Singapore. In particular, the vesting contract regime, along with other policy initiatives, should lead to a situation where the generation companies are able to sustain our operations (eg fund our costs of operation, comply with our obligations to financiers and provide a modest return to our shareholders), whilst ensuring that our businesses are competitive and operate efficiently.</p> <p>Under the circumstances, we propose to use the existing vesting regime as a support mechanism</p>

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		<p>for the market to transit to one that is sustainably competitive. In this regard, the VCL could be increased till 2018 when the gas contracting situation naturally eases. We believe that a VCL of 40% for 2017-2018 should be set on the basis of market sustainability.</p>
4	Other comments	<p><u>Financial Sustainability of Gencos Has to be Considered</u></p> <p><u>(a) Vesting Contract Regime has prevented Gencos from recovering their costs</u></p> <p>LRMC-based price outcomes over the long term are a de facto expectation of a reasonable and sustainable market as shown in the derivation of vesting price from an estimate of LRMC.</p> <p>In practice, we wish to highlight that when the market was tight, vesting rollback schedule was postponed and VCL was raised to target prices to LRMC. However, when the market is in surplus, VCL is reduced (due to a reduced need to mitigate market power) and prices are allowed to fall below LRMC and even SRMC.</p> <p>Hence, it can be seen in that the vesting contract regime has effectively prevented generation companies from recovering their costs through the market.</p> <p><u>(b) Vesting Contract Regime Has Wide Ranging Consequences Other than Market Power Mitigation</u></p> <p>While the primary objective of the vesting contract regime is on market power mitigation, it has wide-ranging and often unintended consequences as with any intervention in the market. The vesting contract has served to provide revenue stability to the generation companies and as a hedge to protect consumer tariffs against fluctuations in the USEP with tariffs being set at the vesting price. It is, thus, important to consider these consequences carefully when undertaking an evolution or transition or unwinding of such an impactful feature of a market design.</p> <p>Furthermore, the vesting contract regime should not discourage future new investment. In fact, the "Procedures for Calculating the components of the Vesting Contracts Version 2.3, Sep 2015" states that</p> <p><i>This mimics the outcome of a competitive market over the long-run and ensures appropriate price</i></p>

S/N	Section/Paragraph in Consultation Paper/Report	Tuas Power Generation's Comments
		<p data-bbox="685 204 1951 236"><i>signals remain for investor to plant new and efficient generation capacity to meet demand growth.</i></p> <p data-bbox="685 280 1989 384">However, if the financial sustainability of the Gencos is not currently considered in the vesting contract regime, then, in the future longer run, Gencos will be discouraged from making new investment in generation plantings.</p> <p data-bbox="685 467 1440 499"><u>(c) Policies of EMA Contributing to Issues Facing Gencos</u></p> <p data-bbox="685 544 1989 871">While investments in new/ repowered generation capacity in Singapore are commercial decisions made by the generation companies, the vesting contract regime did influence the investment decisions made by the generation companies in ways that a vesting contract regime designed around a pure “market power mitigation” objective would not. As such, the current oversupply in generation capacities was brought in by the LNG Vesting Scheme to promote LNG uptake. The oversupply situation has resulted in surplus contracted gas volume stranded as TOP volume, which could not be absorbed by the low demand growth. Prices are likely to remain in the current unsustainable levels as the generation companies’ opportunity cost of gas consumption is very low (even below the gas contract price).</p> <p data-bbox="685 916 1989 1171">This is compounded by the industry not being able to manage their gas TOP issue commercially without regulatory approval. Some of the key terms in the gas sales contracts had been negotiated by EMA including the liquidated damages for failure to meet the TOP. However, when faced with the excess gas situation, Gencos had to obtain separate approval from EMA for each diversion required. This process created a lot of uncertainty and led to a longer process for execution of diversion contracts. Furthermore, it has prevented Gencos from taking advantage of spot market requirements for excess gas. The above has compounded the financial issues facing Gencos.</p> <p data-bbox="685 1216 1630 1248">Hence, some of EMA’s policies eg on gas diversion, should be reviewed.</p>

Tuaspring's Comments

S/N	Section/Paragraph in Consultation Paper/Report	Tuaspring's Comments
1	FE's Report: Section 2.2	<p>As this is a Review on the vesting contracts that was introduced to control market power of the generation companies (Gencos), the comments and feedback from all Gencos should be sought on matters pertaining to the Review, including the proposed scope.</p> <p>Since only selected 3 Gencos namely Tuas Power, Senoko and Seraya had been invited to provide comments on the scope of the review, this section of the report should then clearly indicated this fact and not alludes that all Gencos had been invited to comments with only 3 Gencos responded.</p>
2	Consultation Paper: Section 16(b)(iii)	Tuaspring fully supports the proposal of changing the allocation of VCL to all generation licensees (including Tuaspring) in proportion to their respective effective capacity.
3	Consultation Paper: Section 16(b)(iv), 16(c)(iii)	Should EMA decide to hedge the balance MSSL load, Tuaspring prefers the adoption of the proposal to hedge the balance MSSL load through the exchange as opposed to tendering.

FE's Revised Report in a separate attachment

FORMAT FOR SUBMISSION OF COMMENTS AND FEEDBACK

REVIEW OF THE VESTING CONTRACT REGIME

S/No.	Please indicate in each cell in this column, the section/paragraph in the Draft Determination Paper/Consultant's Report to which your comment/feedback refers	Comments
1		
2		
3		
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Any other comments and feedback		

Comments/Feedback submitted by

Name :
 Designation :
 Company :
 Email :
 Contact No. :