ENERGY MARKET AUTHORITY

VESTING CONTRACT LEVEL FOR
1 JANUARY 2007 TO 31 DECEMBER 2008

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Preface

The Energy Market Authority (EMA) implemented vesting contracts on 1 Jan 2004. The objective of the vesting regime is to control the market power of generation companies ("gencos").

2   The vesting contracts commit the gencos to sell a specified amount of electricity (viz. the vesting contract level) at a specified price (viz. the vesting price). Such contracts control market power by removing the incentives for the gencos to exercise their market power to withhold their generating capacity to push up spot prices in the wholesale market.

3   The vesting contract level is set to effectively control market power based on projected supply and demand. At its last review, EMA had determined that the vesting contract level required is 65% for the 2 years, from 1 Jan 05 to 31 Dec 06. In accordance with the established procedures EMA will review the vesting contract level every 24 months.

Review of the Vesting Contract Level for Jan 2007– Dec 2008

4   The Cournot Gaming Model is used to simulate non-collusive interactions among the gencos and determine the vesting contract level to effectively control their market power. Specifically, the model estimates the level of vesting contract coverage required to remove gencos' incentives to withhold capacity to drive up the market price above the LRMC of CCGT. The mechanics of how vesting contracts work to control market power is illustrated in Appendix 1.

5   In the review of the vesting contract level for 2007 and 2008, the input data for the Cournot Gaming Model has been updated with the actual 2004 and 2005 market prices and demand (for calibration of the Model) and the latest demand and supply projections. On the supply-side, we had considered the possibility that Keppel Merlimau Cogen ("Keppel")'s new power plant will be ready in 2007.

6   In the determination of the vesting contract level, EMA has taken into consideration the recommendation of its consultant for the review and the comments and feedback it received from the industry and electricity consumers.

7   EMA's consultant had recommended that the vesting contract level can be reduced to 50% for 2007 and 2008 with Keppel's new plant entering into commercial operation. Without Keppel Merlimau Cogen's entry, the consultant's recommendation is for a vesting contract level of 54% in 2007 and 55% in 2008.

8   One of the gencos pointed out that it would be prudent for EMA to adopt a more gradual roll back of the vesting level i.e. to maintain the current vesting level of 65% and only reduce the vesting level when Keppel Merlimau Cogen is in commercial operation. The genco also proposed to take a conservative approach of reducing the vesting level to 55% rather than to 50% when Keppel Merlimau Cogen comes into commercial operation.

9   The findings from the Cournot modelling are that the vesting contract level can be reduced. However the modelling is not an exact science. If the vesting contract

level is reduced too much, market power would not be effectively controlled. After careful consideration, EMA has decided that the vesting contract level of 65% will continue to apply for the first two quarters of 2007 (i.e. Jan 07 to Jun 07). Industry has been informed of this earlier. The vesting contract level would be reduced to 55% for Jul 07 to Dec 08, after Keppel's power plant comes into commercial operation.

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Appendix

MECHANICS OF HOW VESTING CONTRACTS WORK TO CONTROL MARKET POWER

A genco has the incentive to withhold some of its capacity to drive up the market price if the loss in revenue due to the reduction in quantity sold is less than the increase in revenue due to the higher market price.[1]

2   To illustrate, Figure 1 shows a genco with three generating units available: Unit 1 has a low SRMC, Unit 2 has a moderate SRMC, and Unit 3 has a high SRMC. Faced with the residual demand curve as shown, the genco in a perfectly competitive market will operate Units 1 and 2 at full capacity and not run Unit 3. The spot market price will be at the perfectly competitive level P_{PC}. The genco receives net revenue equal to the shaded area, which represents the difference between its revenue (Q_{PC} x P_{PC}) and its SRMC (the area under the supply curve).

Figure 1: Perfect Competition Solution
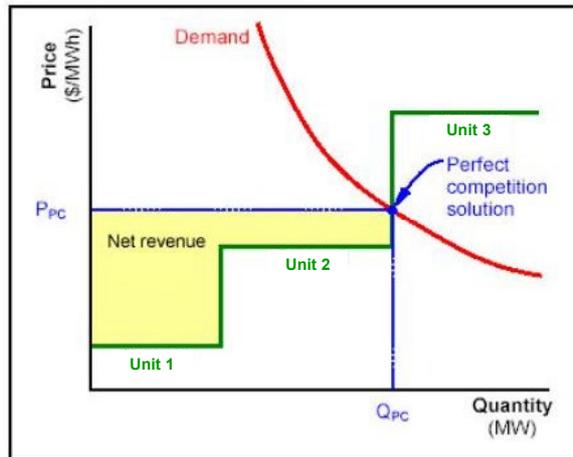
3   Suppose the genco has market power such that it can withhold some of Unit 2's capacity to make Unit 3 marginal and hence receive a higher price. As shown in Figure 2, the offered quantity from Unit 2 is reduced, and Unit 3 is setting the market price P_{Game}. Overall, the genco sells less but at a higher spot price. The genco forgoes net revenue equal to area B, but gains net revenue equal to area A. In this example, the genco is receiving higher net revenue in total since area A is larger than area B, and therefore has the incentive to reduce its output (Q_{Game}) to increase the spot price (P_{Game}) until area A is equal to area B.

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[1] A genco can withhold capacity either physically (by declining to offer capacity) or financially (by offering capacity at an increased price). The two methods of exercising market power are equivalent.

Figure 2: Gaming solution without vesting contracts
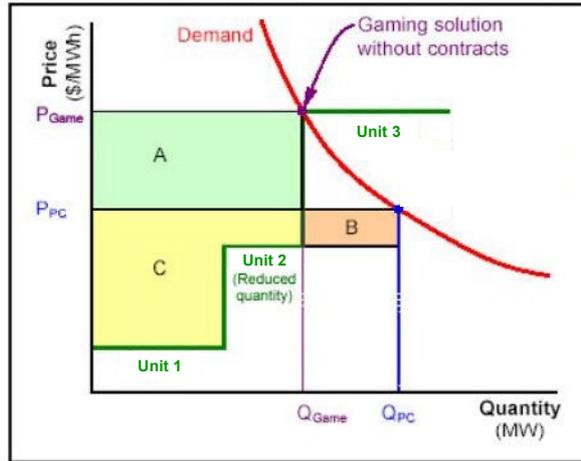
4   Vesting contracts can reduce the genco's incentive to withhold capacity by decreasing its exposure to the spot price. Figure 3 illustrates the situation in which the genco has quantity Q_K under vesting contracts: it receives the vesting price for this quantity regardless of the spot price. The size of area A is therefore reduced by area D. In this example, the increase in net revenue (area A) is less than the net revenue lost (area B) from withholding capacity. Consequently, the genco will not withhold so much of Unit 2's capacity: it will increase its output Q_{Game} (and hence lower the spot price P_{Game}) until area A is again equal to area B. Clearly, increasing the vested quantity Q_K will result in a spot price P_{Game} closer to the Perfect Competition level.

Figure 3: Gaming solution with vesting contracts