



FINAL DETERMINATION

VESTING CONTRACT LEVEL FOR 1 JANUARY 2009 TO 31 DECEMBER 2010

OCT 2008 | ENERGY MARKET AUTHORITY
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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 first two quarters of 2007 (i.e. Jan 07 to Jun 07). The vesting level was reduced to 55% from 1 Jul 07, after Keppel Merlimau Cogen’s power plant started commercial operation. In accordance with the established procedures, the vesting contract level will be reviewed every two years. This review will determine the vesting contract level for Jan 2009 to Dec 2010.

Review of the Vesting Contract Level for Jan 2009 – Dec 2010

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 long run marginal cost of a combined cycle gas turbine. 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 2009 and 2010, the input data for the Cournot Gaming Model has been updated with the actual 2006 and 2007 market prices and demand (for calibration of the Model) and the latest demand and supply projections. On the supply-side, we had considered PowerSeraya’s new cogeneration plants and the shutdown of three of Senoko Power’s steam plants for repowering.

6 After careful assessment of the Consultant’s recommendations and the feedback and comments of the industry, it has been decided to retain the vesting contract level at 55% for Jan 2009 to Dec 2010, with an intermediate position on the period weighting factor. This decision takes into consideration the fact that the Cournot Gaming Model simulation tends to present conservative results on market power estimations and the market evidence that showed the vesting contract regime may have over-constrained generator behaviour in the past¹.

~ End ~

¹ Historical analysis have shown that USEP has been on average below the vesting contract strike price over the period Jul 2007 to May 2008.

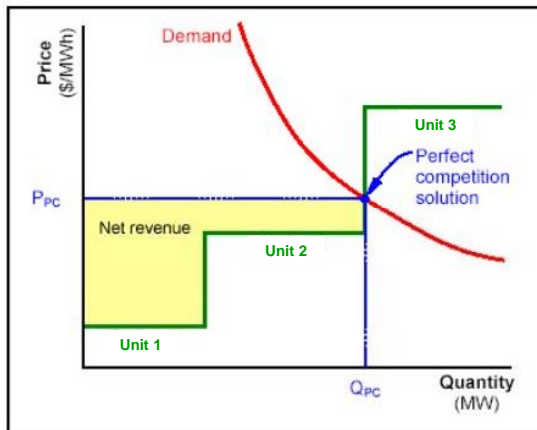
Appendix

MECHANICS OF VESTING

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.²

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 ($Q_{PC} \times P_{PC}$) and its SRMC (the area under the supply curve).

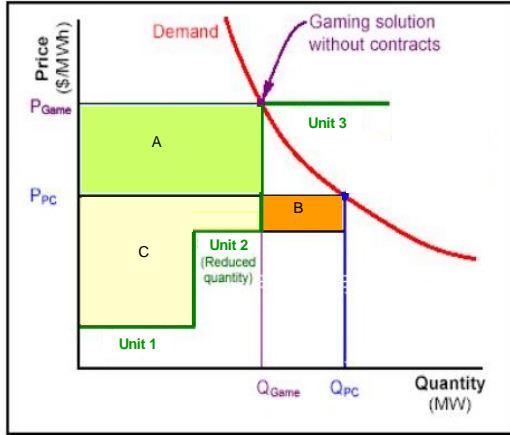
Figure 1: Perfect Competition Solution



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.

² 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

