



# **REVIEW OF POLICY ON DIRECT SUPPLY OF ELECTRICITY BY GENERATING SETS TO ONSITE LOADS**

## ***EMA'S ASSESSMENT AND DECISION***

5 JUL 2010 | ENERGY MARKET AUTHORITY  
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## 1 Background

1.1 In 2008, the Government had appointed a consultant, NERA Economic Consulting ("NERA") to conduct a comprehensive review of the electricity market. The review covered *inter alia* policy issues pertaining to embedded generators (EGs).

1.2 Following this review, NERA assessed that there was an artificial bias towards EGs due to the way grid charges are structured. More specifically, grid charges today consist of a fixed component (the contracted capacity charge or kW charge) and a variable component (kWh charge). On the whole, the latter currently accounts for around 25% of grid charges. Consequently, companies may find it more attractive to build their own generators in order to save on this variable component of grid charges. Hence NERA recommended that this artificial incentive be removed by shifting towards a 100% fixed charging regime.

1.3 At the same time, NERA proposed changes to streamline current market rules, simplify and remove restrictions, and introduce market mechanisms where possible, so as to enhance the efficiency of the market and ensure clearer price signals to investors.

1.4 EMA broadly agrees with the NERA approach, which is for the deployment of EGs to be driven by the market. After reviewing NERA's recommendations and initial consultations with industry stakeholders, EMA had in its consultation paper dated 19 Nov 2009 proposed to make the following changes to the policy on direct supply of electricity:

### 1.4.1 Transition towards Fixed Grid Charges

Remove the artificial incentive by shifting the balance of grid charges towards a fixed charging regime. This could be carried out progressively through the annual review of grid charges, taking into consideration the impact of any such changes on consumers.

#### 1.4.2 Net Treatment of Non-Reserve Charges for Embedded Generators

Currently, only EGs that do not export electricity to the power grid will get net treatment on non-reserve charges. EMA had proposed to relax this criterion and allow all EGs to be granted net treatment on non-reserve charges regardless of whether they export electricity to the power grid. Allowing EGs on net treatment to export electricity would enable EGs to optimize their operation and enhance competition in the electricity market. An illustration of how the current and new treatment works is shown below.

Example:

Non-reserve charges for an EG generating 10MWh with an onsite consumption of 8MWh (and therefore exports 2MWh to the power grid) under the current and new treatments:

*Under current treatment:*

<b>Non-reserve charges</b>	<b>Allocation of MWh to:</b>	
	<b>Generation</b>	<b>Load</b>
Energy Market Company (EMC) Fees	10	8
Power System Operation (PSO) Fees	10	8
Market Support Services (MSS) Charge	0	8
Monthly Energy Uplift Charge (MEUC)	0	8

*Under new treatment:*

<b>Non-reserve charges</b>	<b>Allocation of MWh to:</b>	
	<b>Generation</b>	<b>Load</b>
EMC Fees	2	0
PSO Fees	2	0
MSS Charge	0	0
MEUC	0	0

Under the new treatment, we will net off the 10MWh of total generation and 8MWh of onsite load and effectively treat the EG as generating 2MWh. The EMC and PSO Fees will then be charged based on this 2MWh of generation. As the MSS charge and the MEUC are borne only by loads, the EG will not have to pay any MSS charge or MEUC under the new treatment.

#### 1.4.3 Gross bidding of Embedded Generators

Currently, all generators (including EGs) with aggregate capacity of 10 MW or more are required to bid their gross generation capacity into the market regardless of whether they wish to export power or not. This is to allow the market clearing engine to schedule generation and reserve so as to ensure balance between electricity demand and supply. EMA had proposed to streamline this rule in the following way: First, EGs that do not export electricity into the grid need only to provide specified information pertaining to their generation quantities for their own use to the EMC and PSO on an *ex-ante* basis. Second, for EGs that export, they will be required to bid into the market only for the 'export' quantities, and have to provide the specified information pertaining to their generation quantities for their own use to the EMC and PSO on an *ex-ante* basis. The quantities of generation for EGs' own use will be treated as 'must run' quantities in the market clearing engine

#### 1.4.4 Non-Frequency Responsive (NFR) Cap

Replace the current NFR cap with a suitable market mechanism by way of a security constraint imposed in the MCE and to give PSO the power to 'back-off' EGs' 'must run' generation quantities during system emergencies to maintain secure operation of the power system. The tie breaking mechanism is required should the total 'must run' quantity of all EGs exceed the amount of NFR capacity allowed by the MCE. EMA proposed a mechanism such that the MCE 'backs-off' EGs on a pro-rated basis.

#### 1.4.5 Automatic Penalty Scheme

Implement an automatic penalty scheme for all Generation Registered Facilities (GRFs) that deviate from their dispatch schedule. The methodology is such that when the actual metered energy deviates by more than 10% from the scheduled energy, the defaulting generator will be imposed with a penalty calculated at a rate of 2 times the Value Of Lost Load (VOLL), i.e.  $2 \times \$5000/\text{MWh} = \$10,000/\text{MWh}$ . The

penalty collected will be returned to the market through the Monthly Energy Uplift Charge (MEUC).

- 1.5 EMA initiated a public consultation on 18 Nov 09 to seek feedback on the above proposals. The consultation closed on 13 Jan 2010 after an extension was granted, as industry participants had requested for more time to review the paper.

## **2 Feedback Received**

- 2.1 A total of 14 companies responded to our consultation, which included all the commercial generation companies (i.e. PowerSeraya, Senoko Power, SembCorp Cogen, etc.), the Singapore Industrial Energy Consumers (representing the major refineries like Shell, ExxonMobil, Singapore Petroleum Company, etc.), pharmaceutical companies and the Singapore Chemical Industry Council (SCIC).
- 2.2 The respondents' comments and EMA's responses to the comments were circulated to the industry participants and uploaded on EMA's website on 25 May 2010. EMA thanks all the respondents for their feedback.

## **3 EMA's Assessment & Decision**

- 3.1 EMA has considered all comments received. Our guiding principle is that the adoption of EGs should be driven by the market, and that there should be a level playing field between EGs and commercial power generators for export of electricity into the grid. At the same time, we recognise that EGs generate electricity primarily for their own use, and are faced with various operational constraints given that selling electricity is not their main business. Where possible, therefore, we will simplify and streamline the rules for deployment of EGs. Within this context, the adoption of EGs in the industry will be guided by commercial imperatives to maximise turbine efficiency for the co-generation of steam and power.

### 3.2 Transition towards Fixed Grid Charges

EMA agrees in principle with NERA's recommendation and will proceed to progressively move towards 100% fixed grid charges. This is on the basis that grid capacity is largely a fixed infrastructure cost – it is incurred once the cable and equipment are installed, and it is not linked to the frequency of usage. EMA is mindful about the impact of any grid charge adjustments on consumers. Hence EMA will manage the transition progressively in consultation with the industry, taking into consideration the feedback from consumers.

### 3.3 Net Treatment of Non-Reserve Charges for Embedded Generators

EGs generate electricity primarily for their own use and hence are not in the business of selling electricity in competition with the commercial gencos. As such, all EGs will be granted net treatment on non-reserve charges regardless of whether they export electricity to the power grid. This would enable EGs to optimize the size of their plants according to their operational constraints, such as steam considerations, and not be artificially constrained by the amount of electricity that would be exported. EGs will continue to pay the reserve charges on a gross basis.

### 3.4 Gross bidding of Embedded Generators

EGs generate electricity primarily for their own use and do not compete against the gencos for electricity dispatch. Furthermore, EGs intending to export electricity would still have to bid and compete for their export quantities. On the above consideration, EGs will be required to bid into the market only for the 'export' quantities and to provide the specified information pertaining to their generation quantities for their own use to the EMC and PSO on an *ex-ante* basis.

### 3.5 Non-Frequency Responsive (NFR) Cap

After assessing all feedback received, EMA notes industry's feedback that a market mechanism could create uncertainty for new investors. Since there is still some margin in the NFR limit, the current first-come-first-served scheme of allocating NFR capacity will remain while EMA continues to explore other

options. EMA will also continue to make available information on the latest available NFR margin to investors (such as through its annual Statement of Opportunities), to ensure greater transparency and certainty to investors.

### 3.6 Automatic Penalty Scheme

EMA has assessed the industry's feedback and the penalty rate will be changed to two times the market clearing price for energy with a minimum penalty of \$5,000 per incident. The penalty will apply when a GRF that is not on Automatic Generator Control deviates from its dispatch schedule by more than  $\pm 10$  MW regardless of the extent of deviation. Only those GRFs complying with PSO instructions to deviate from their dispatch schedule will be exempted from the automatic penalty. The EMC will impose the penalty on the defaulting GRF and return the penalty collected to the market through the MEUC. The Market Surveillance and Compliance Panel (MSCP) could consider increasing the penalty amount on those who repeatedly deviate from dispatch schedule. The formula for calculating the penalty value is as follow:

$$\text{Penalty Value} = \text{Max} \{ [2 \times (\text{USEP} + \text{HEUC}) \times ( | \frac{1}{2} \times (\text{BeginGeneration} + \text{EndGeneration}) \times \text{DispatchPeriod} - \text{MeteredGrossGeneration} | - \text{Tolerance} ) ], \$5,000 \}$$

Where:

**DispatchPeriod** – The thirty-minute time interval beginning on the hour or the half-hour, i.e. has a value of  $\frac{1}{2}$  Hr.

**BeginGeneration** – Generation Facility's total generation output (in MW) at the start of the dispatch period as recorded by PSO's EMS system.

**EndGeneration** – Generation Facility's total MW amount scheduled by MCE for end of the dispatch period.

**MeteredGrossGeneration** – Generation Facility's gross output in MWh measured at the Generation Facility's terminal for the dispatch period, and shall include net injection into the Grid and energy withdrawn by the Generation Facility's auxiliary equipment, station and excitation transformers, where applicable.

**Tolerance** – 5MWh (or 10MW for each  $\frac{1}{2}$  hourly Dispatch Period)

Example:

For a half hourly period:

USEP + HEUC = \$200 per MWh

BeginGeneration = 200MW

EndGeneration = 260MW

MeteredGrossGeneration = 70MWh

Tolerance = 5MWh

Penalty:

= Max {[2 x (200) x (| 1/2 x (200 + 260) x 1/2 - 70 | - 5)], \$5000}

= Max {\$16000, \$5000}

Therefore the penalty is amounted to S\$16,000

#### 4 Implementation Timeline

EMA targets to implement the policy changes for the net treatment of non-reserve charges, gross bidding for EGs and automatic penalty scheme by 1<sup>st</sup> quarter 2011. The current first-come-first-served method of allocating NFR capacity will be retained while EMA continues to explore other options. The indicative implementation timeline is given in the table below.

Date	Item
Jul 2010	Commencement of Market Rule changes, codes and IT system modifications
1Q 2011	Implementation of new rules for Net Treatment of Non-Reserve Charges, Gross Bidding for Embedded Generators and Automatic Penalty Scheme
2Q 2011	Commencement of further consultation with industry on options to allocate NFR capacity