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CEO's Message

As most of you know already, we have made some changes to our organisational structure to better align the company's management structure with the changing focus of the business. The article below provides full details and, as you can see from the other activities covered in this issue, it has been a busy two months for the company overall.

Most interesting for the National Electricity Market of Singapore (NEMS) is the recent investigation by the Market Surveillance and Compliance Panel (MSCP) into market abnormalities alleged by one of the market participants. The results of the investigation are detailed in the article on page 2. This

investigation affirms that the NEMS has a sophisticated and effective governance process in place to ensure compliance with the market rules and fair play among all market participants.

Visits by three foreign delegations in April underscore the position of the NEMS as the leading electricity market in Asia and one from which others are eager to learn. The first group comprised energy journalists from the Philippines on a study tour to learn more about the Singapore electricity market in order to help them to better understand the liberalisation of their own country's electricity market. Management executives from Kyushu Electric Power Company Inc in Japan were

here to learn more about the operational aspects of the NEMS. The representatives of the Electricity & Co-Generation Regulatory Authority of Saudi Arabia were interested in the Singapore industry model as the country is considering restructuring its electricity industry.

The recently published 2005 Market Report also gives testament to the achievements and developments of the NEMS in 2005 and if you have not read it, go to the EMC website www.emcsg.com or request a printed copy.



Jomar Eldoy

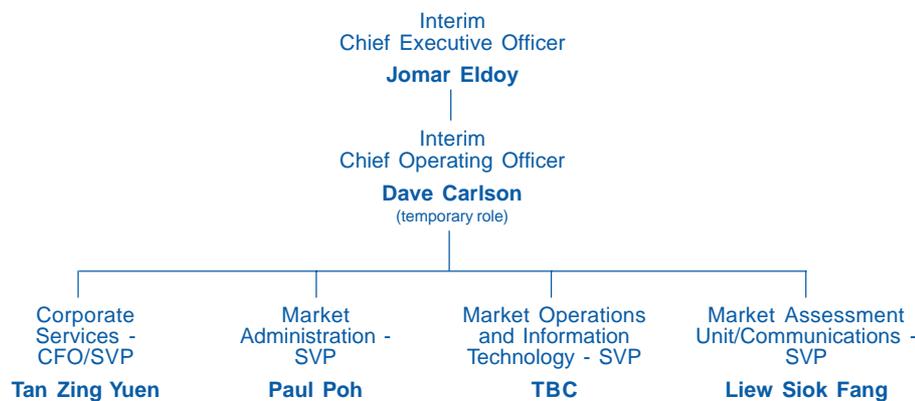
Management Changes

Over the last few years, EMC has played an important role in developing the NEMS. With the market maturing, EMC's role is becoming much

more operationally focused. In light of this shift, the structure of the organisation has been revised to ensure better alignment between the company's management structure and the changing focus of the business.

EMC has now concluded the review of its management structure, and this has yielded a more streamlined management team. The IT and Market Operations Teams have been combined into one team, the Market Operations and Information Technology team. The four VPs in this team remain the same:

- Henry Gan**
Vice President - Pricing and Information
- Jennise Ting**
Vice President - Settlement
- Stephen Black**
Vice President - IT Applications
- James Ng**
Vice President - IT Infrastructure



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MSCP Investigates Alleged Market Abnormalities

Request for investigation

In November 2005, the Market Surveillance and Compliance Panel (MSCP) received a request for investigation into market abnormalities from a market participant (MP). The MP raised concerns over price spikes in wholesale electricity prices observed during the maintenance period of one of its units during late September and early October.

The MP thought that with its level of total installed capacity, there should have been sufficient reserves to provide for the shortfall arising from the displacement of its unit under maintenance. It thought that it was inconceivable that there could be a significant impact on wholesale electricity prices, causing the MP to suffer an adverse financial impact. The MP therefore believed that the market observations were not reflective of a fair and efficient outcome and unduly penalised a generation company during its maintenance period.

Allegations

As part of its investigation, the MSCP considered the following allegations:

- that market outcomes were not efficient because the bigger participants had seized the opportunity during the relevant period to influence energy and reserve prices for their own advantage; and

- that market outcomes were not fair because the bigger participants had a pool of backup units and had the ability and flexibility to ensure that energy and reserve prices remained stable when their units were scheduled for maintenance works.

Market efficiency

On the issue of market efficiency, the MSCP found that the higher price trend during the relevant period was the result of:

- lower combined-cycle gas turbine (CCGT) availability due to more units being on maintenance;
- higher offer prices, which coincided with surging fuel oil prices and higher dependency on the more costly steam turbine (ST) units to meet demand; and
- a tighter supply cushion, as a result of strengthening demand.

Prices were therefore responding to changes in supply and demand conditions, as may be expected from a well-functioning market.

The MSCP looked for evidence of the deliberate withholding of capacity by other MPs with the intention of raising market prices. However, the MSCP found that the proportion of zero offers from MPs actually dropped during the relevant period, as more ST capacity was injected to meet rising demand and to also replace the CCGT capacity on maintenance.

The MSCP also observed that vesting contracts, coupled with a situation where many generators have high levels of bilateral contract positions with their respective retailers, provide little incentive for generators to hold prices high for a prolonged period.

Fairness

On the issue of fairness, the MSCP reviewed the relevant market rules and design features and found there was consistency in applying them to generators.

Conclusion

The MSCP therefore concluded that there was no evidence of inefficient or unfair behaviour on the part of the NEMS during the relevant period, in relation to the MP's observations. The MSCP also found no evidence of manipulation by the bigger players during the relevant period.

The full MSCP report of findings is available at www.emcsg.com.

MSCP determinations on recent rule breaches

In February and March, the MSCP decided on recent rule breaches (gate closure incidents, non-availability of real time and short-term schedules). The full reports of its determinations are available at www.emcsg.com.

Management Changes

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The SVP position of Market Operations and Information Technology is currently vacant and Dave Carlson, in addition to his transitional role as COO, acts in this role until it is permanently filled.

Two of EMC's Senior Vice Presidents, Alex Tan and Yip Pak Ling, have resigned from the company to pursue opportunities outside of

EMC. We would like to thank both of them for their contributions to the development of EMC and the NEMS.

Furthermore, the Executive Office comprising the company's communications, legal and board secretarial functions, has been dissolved. The legal and board secretarial staff have joined the Corporate Services team. The VP Communications,

Angela Soeteber, now reports to Liew Siok Fang, SVP Market Assessment Unit (MAU). The MAU will continue to function as an independent unit supporting the Market Surveillance and Compliance Panel and the Dispute Resolution Counsellor.

The EMC Board is well advanced in its search for a new CEO and hopes to be able to announce this to the industry shortly.

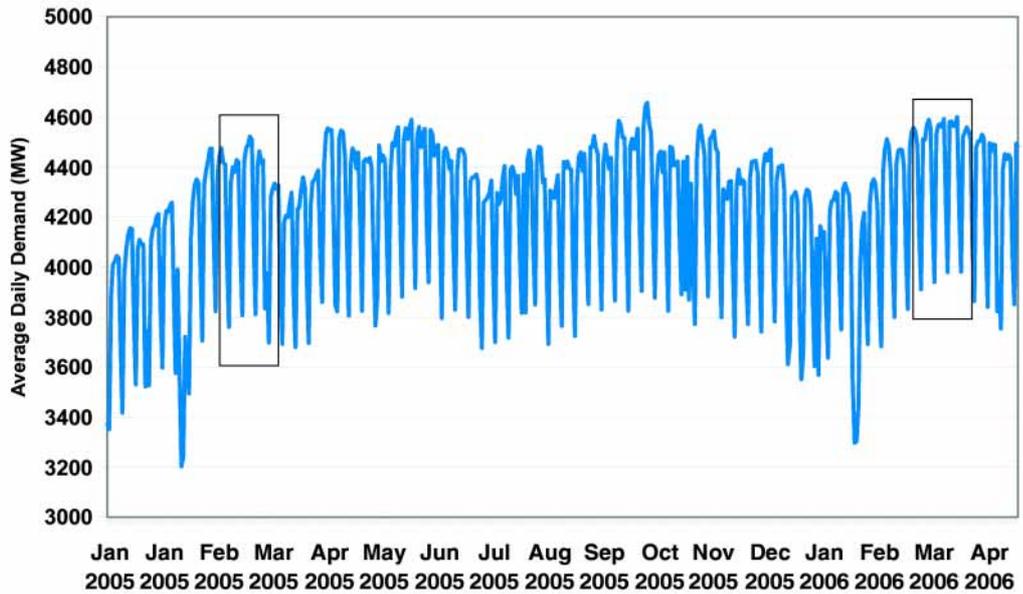


Market Highlights for March and April

Seasonal changes drive demand

Demand recovered from the January trough and increased steadily from February onwards, peaking at 4,599MW in mid-March. However, as rainfall increased, demand showed definite signs of softening, in line with the previous year's trend. With the continuing wet weather in April, demand is expected to decrease further before rising in May, when hotter, drier weather usually occurs.

Demand peaked in mid-March



CCGT market share hits all-time high

On 14 April, the Good Friday public holiday, the market share of combined-cycle gas turbine (CCGT) units reached an all-time high of 89.9%, easily surpassing the previous record of 87.6%, which was set on 15 January 2006.

88.1%, the second highest level of all time.

CCGT units have steadily increased in market share,

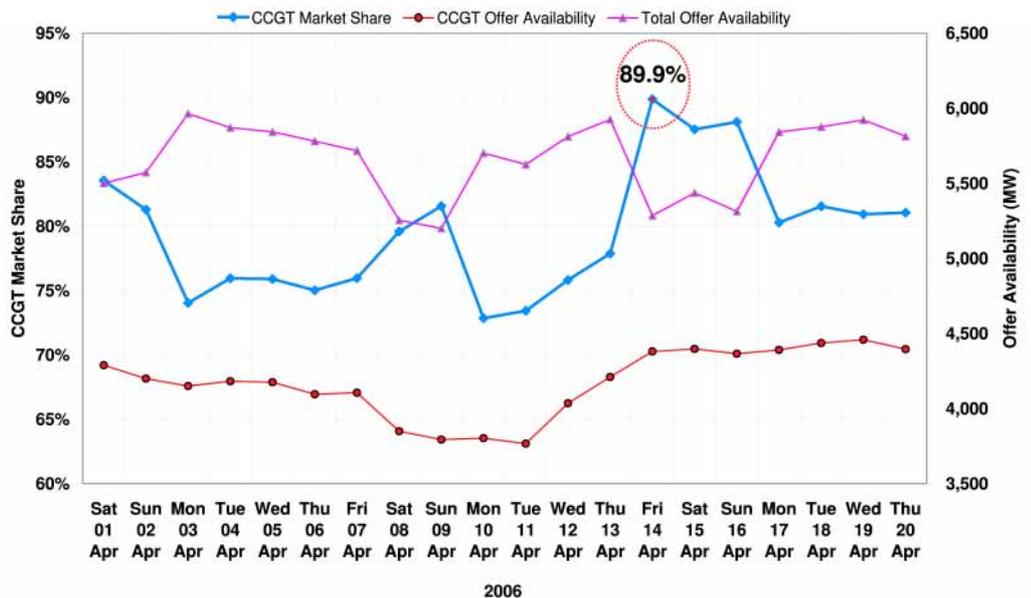
from about 60% at market start in 2003, due to their superior fuel efficiency and flexibility in comparison with ST units. Detailed information on market

share by plant type from 2003 to 2005 is provided in the 2005 Market Report on the EMC website at www.emcsg.com.

As shown in the chart (right), the new record came after CCGT offer availability increased steadily from Tuesday, 11 April onwards. Friday saw CCGT offer availability continue to increase, while steam turbine (ST) offer availability dropped sharply, in response to the low holiday demand.

While demand was still lower on Sunday, 16 April, ST offer availability increased and CCGT market share was

CCGT offer availability leads market share to all-time high



Asian and Middle Eastern Delegations Visit

EMC was pleased to host three delegations from Asia and the Middle East in April — one was the Philippine Energy Journalists Study Tour, another an engineering delegation from Kyushu Electric in Japan and the third represented the Electricity & Co-Generation Regulatory Authority of Saudi Arabia.



Luke Peacocke (left) shows the Philippine delegation the daily trading prices that are displayed in real time in EMC's office lobby



Kyushu delegation, executives from Tuas Power and EMC staff



Delegation from Saudi Arabia with EMA and EMC staff

Philippine energy journalists study tour

A 15-member group of media representatives from Manila, led by the US Agency for International Development and the Philippine Electricity Market Corporation, visited on 6 April. The energy reporters were in Singapore to learn more about our market and its evolution, as their country progresses towards liberalisation.

The group was mainly here to gather background information about the open market process and the impact of liberalisation and to glean an understanding of Singapore's experience as Asia's first liberalised energy market. The delegation also included representatives from Pilipinas Shell and Chevron Philippines Inc.

EMC's Corporate Analyst Luke Peacocke presented overviews of the NEMS and EMC, and COO Dave Carlson and SVP Market Administration Paul Poh fielded questions. The presentation covered the market's performance since opening, and EMC shared some of the lessons that it learned during the implementation process.

Kyushu Electric visit

A delegation from the Kyushu Electric Power Company Inc (Kyushu Electric), the fourth largest electricity generation, transmission and distribution company in Japan, visited EMC on 18 April. This visit was facilitated by Tuas Power, which is collaborating with Kyushu Electric to promote a mutual exchange of ideas and explore opportunities for business collaboration.

A presentation on the overview of the NEMS was provided by EMC's Market Analyst Lu Feiyu. The delegates were given insights into various aspects of market reform, industry and market structure as well as details pertaining to governance and interruptible load.

These delegates visited to gain a further understanding of Singapore's deregulated electricity market. Japan established its

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Rule Change: Modelling Phase-Shifting Transformer in the Market Clearing Engine

SP PowerAssets will install Singapore's first Phase-Shifting Transformer (PST) to reinforce the transmission capability of the north-eastern block of its 230KV system. Its implementation is expected in the third quarter of this year.

The PST is one of the Flexible AC Transmission System (FACTS) technologies that can improve the efficiency of transmission systems. The main purpose of this PST is to alleviate the heavy loading and constraint on a particular line in the north-eastern block. The use of a PST is a much more cost-effective option than the conventional solution of building new transmission lines.

By changing a parameter called the voltage phase angle, the PST can control power flow through the line that it is installed on. The PST can be used to direct power flows from over-loaded lines to under-loaded lines, thereby reducing the likelihood of line constraints.

Improved market efficiency

The wholesale electricity market operates on nodal pricing. Line constraints would prevent available low-cost generation from reaching certain load points and require other high-cost generation to be called upon. This results in price separation. With line constraints alleviated, more low-cost generation could be channelled to serve these loads, thus lowering total generation cost. This would improve the market efficiency as a whole.

As the PST can change the power flow distribution significantly and consequently affect nodal prices, the Market Clearing Engine (MCE) must be updated accordingly so that it can continue to produce accurate schedules that reflect actual transmission conditions.

EMC has proposed a rule modification to the MCE formulation for this purpose, details of which can be found in the paper no.: EMC/RCP/25/2006/252 on our website.

Positive results shown by simulation

By applying the proposed modification to the MCE, EMC was able to conduct simulations to demonstrate how the PST could help to relieve line constraints. Several scenarios were created such that, without the use of a PST, the power flow on a particular line in the north-eastern block would approach or exceed its maximum rating and cause the line to be binding. For each of these scenarios, EMC then simulated the use of a PST operating at different levels.

Simulation results showed that, by appropriately adjusting the PST settings, power flow on the binding line in each of the scenarios could be reduced to below 80% of its maximum rating.

The EMC Board has adopted the rule modification proposal to modify the MCE formulation to model the PST, and the necessary system development to effect this rule modification has begun. This rule change is expected to come into effect in July, following the EMA's approval.

Asian and Middle East Delegations Visit

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whole-sale electricity market in April 2005, and Kyushu Electric is one of the market participants.

The Japanese contingent consisted of management executives from the Shin Oita Thermal Power Station. Accompanying them were executives from Tuas Power.

Electricity & Co-Generation Regulatory Authority of Saudi Arabia

The representatives of the Economic & Tariff Affairs of the Electricity & Co-Generation Regulatory Authority of Saudi Arabia were in Singapore as guests of the Energy Market Authority to learn more about the Singapore model.

The presentation by Lu Feiyu provided them with an overview of the NEMS and the role that EMC plays in the market and a description of how the governance process is structured. Saudi Arabia is considering industry restructuring and this visit provided our visitors with more insights into the structure and features of the NEMS.



Changes at EMC

Joining

Bai Jie, Market Analyst

Bai Jie is the latest person to join our Market Operations team, having started work with us on 22 March.

She completed her Ph.D from the Nanyang Technological University's Power Engineering Division of the School of Electrical & Electronic Engineering. Her research work was in the analysis of different market models with regards to optimal generation scheduling and demand-side bidding.

Prior to this, Bai Jie worked as an engineer with planning responsibilities for electricity power transmission.

Soon Poh Chin, Accounts Executive

Poh Chin joined the Finance department of Corporate Services on 27 March. She is an accountancy graduate of Nanyang Technological University.

After graduating, she worked as an audit assistant with one of the big four auditing firms for a few years.

Send us Comments, Feedback or Questions

The *EMC Bulletin* is written by EMC for you and we are always striving to improve our service. Therefore, we are interested in any feedback you might have about specific articles and topics covered or comments and suggestions about other areas you would like to see included.

Please send your comments, feedback or any questions either via e-mail to info@emcsg.com or via fax to +65 6779 3030.

Thank you in advance for your time and effort.

Market Information Sharing Forum (MISF)

The MISF was held on 15 March with about 20 market participants. Other than the usual updates on market performance and demand and supply conditions, attendees were also updated on market share and outlook. A few pricing incidents were highlighted and progress updates were given for system enhancements.

This forum also included two feature topics: Regulation Study and Loss Calculation Correction in the Market Clearing Engine (MCE). The Regulation Study discussed the high regulation charges observed in the market, with updates on regulation pre-checks, constraints and statistics. Participants were also informed of the reasons for spikes in regulation prices and were offered possible measures that may reduce regulation volatility.

The second topic covered the linear method used by the MCE to calculate the associated loss of every given flow on a transmission line.

The next MISF is scheduled for Wednesday, 17 May.

EMC Training Programme — Next Course on 17 and 18 August

EMC will be holding its regular two-day training course *Understanding Electricity Markets* on 17 and 18 August. Our staff will be conducting six sessions covering the following topics:

- Understanding Electricity
- Overview of the Electricity Sector
- The NEMS and its Unique Features
- Pricing in Detail
- Settlement
- The Demand Side

The course is also scheduled on 9 and 10 November.

We advise you to book early to secure your place in the course of your choice and benefit from our early-bird discount.

Further details on the programme and on how to register are on our website, www.emcsg.com. For enquiries please e-mail trainingprogramme@emcsg.com or contact Ong Pui Sze at +65 6779 3000.

