Market Surveillance & Compliance Panel
Market Watch

Issue 56
Second Quarter (April to June 2020)

Market Assessment Unit
Executive Summary

Energy prices continued to fall for the third consecutive quarter in Q2 2020, following the decline which started from Q4 2019. Like Q1 2020, the lower energy prices in Q2 2020 were largely brought about by reductions in the fuel oil price, outage volumes and demand, coupled with increases in supply cushion and lower offer prices submitted in the National Electricity Market of Singapore (“NEMS”). The lower energy prices in Q2 2020 also fell to be among the lowest levels the market had experienced in years, as the Coronavirus Disease 2019 (“COVID-19”) took its toll on the economy.

Chart 1: USEP and WEP by Quarter

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q2 2019</th>
<th>Q1 2020</th>
<th>Q2 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>USEP ($/MWh)</td>
<td>94.25</td>
<td>94.61</td>
<td>80.83</td>
</tr>
<tr>
<td>WEP ($/MWh)</td>
<td>80.83</td>
<td>50.71</td>
<td>51.05</td>
</tr>
</tbody>
</table>

From Q1 2020 to Q2 2020, the Uniform Singapore Energy Price (“USEP”) decreased 37.27% to $50.71/MWh and the Wholesale Electricity Price (“WEP”) decreased 36.85% to $51.05/MWh (refer to Chart 1). The monthly averages of the USEP and the WEP in Q2 2020 were the lowest recorded since June 2016.

The drop in energy prices could be attributed to a combination of the following movements in Q2 2020 when compared to the previous quarter:

- A 40.85% decrease in the planned outage volume (refer to Table 1);  
- A 90.64% reduction in the forced outage volume (refer to Table 1);  
- Lower fuel oil price, down 33.99% to US$185.69/MT (refer to Chart 6);  
- A 4.96% decrease in demand to 5,712 MW (refer to Chart 7);  
- A 1.26 percentage point rise in the supply cushion to 25.00% (refer to Table 3); and  
- A 2.01 percentage point increase in the generators’ offers submitted in lower price ranges (refer to Chart 9).  

The last time these energy prices were observed at similar levels was in Q2 2016, when an oversupply of generation capacity applied a downward pressure on energy prices in the NEMS. At that time, the USEP was $49.42/MWh and the WEP was $49.90/MWh.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q2 2019</th>
<th>Q1 2020</th>
<th>Q2 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Outage Volume (MWh Cumulative)</td>
<td>3,100,222</td>
<td>3,580,337</td>
<td>2,117,722</td>
</tr>
<tr>
<td>Planned Outage</td>
<td>3,100,222</td>
<td>3,580,337</td>
<td>2,117,722</td>
</tr>
<tr>
<td>Forced Outage</td>
<td>150,124</td>
<td>99,727</td>
<td>9,337</td>
</tr>
<tr>
<td>Ancillary Services ($/MWh)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Reserve</td>
<td>0.03</td>
<td>1.16</td>
<td>0.74</td>
</tr>
<tr>
<td>Contingency Reserve</td>
<td>5.68</td>
<td>11.67</td>
<td>10.87</td>
</tr>
<tr>
<td>Regulation</td>
<td>8.43</td>
<td>12.69</td>
<td>10.39</td>
</tr>
</tbody>
</table>

Table 1. Quarterly Outage Volume and Ancillary Service Prices

MSCP Market Watch
Issue 56: Second Quarter (April to June 2020)
Prices in Q2 2020

Table 2. Quarterly Vesting Contract Prices

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Q2 2019</th>
<th>Q1 2020</th>
<th>Q2 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vesting Contract Prices ($/MWh)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allocated Vesting Price</td>
<td>154.24</td>
<td>157.48</td>
<td>146.43</td>
</tr>
<tr>
<td>LNG Vesting Price</td>
<td>154.77</td>
<td>157.48</td>
<td>146.43</td>
</tr>
<tr>
<td>Balance Vesting Price</td>
<td>151.79</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

Upon the removal of the Balance Vesting Price on 1 July 2019, the Allocated Vesting Price (“AVP”) has solely depended on the LNG Vesting Price (“LVP”). The vesting contract regime will be phased out completely (i.e. there will no longer be any vesting price) when the LNG vesting contracts expire on 1 July 2023. For Q2 2020, both the AVP and LVP were $146.43/MWh, a 7.02% decrease from the previous quarter (refer to Table 2).

The vesting contract prices are determined based on a list of long run marginal cost parameters from the Energy Market Authority (“EMA”). The foreign exchange rate of US dollar per Singapore dollar, the fuel oil price and the Brent index price are some of the parameters considered when calculating the vesting contract prices. With a decrease observed in these parameters in Q1 2020, it was not surprising for vesting contract prices in Q2 2020 to go down as well.

Chart 2. VCHP versus WEP by Quarter

Chart 2 shows that the WEP remained below the vesting contract hedge price (“VCHP”) during Q2 2019, Q1 2020 and Q2 2020. With a lower WEP in Q2 2020, the difference between the VCHP and the WEP widened even more this quarter. The observation of the WEP being consistently below the VCHP aligned with the EMA’s decision to phase out the vesting contract regime gradually.
Charts 3 and 4 show the frequency of the WEP in various price ranges, measured as a percentage of the total number of hours and a percentage of the total metered energy quantity in the quarter respectively.

Throughout the past quarters, the WEP was typically between $50/MWh and $100/MWh, in terms of hours and metered energy quantity. It was also observed that both distributions of the WEP had been moving towards the lower price ranges over time.

This trend became more pronounced in Q2 2020, as illustrated by a leftward shift of the distribution curves. In Q1 2020, the WEP was between $50/MWh and $100/MWh for 91.96% of the time and across 91.74% of the total metered energy quantity in the market. With a further decline in the WEP in Q2 2020, the WEP went below $50/MWh for 63.07% of the time and across 60.55% of the total metered energy quantity in the market.

A decrease in $r^2$ from 0.59 in Q1 2020 to 0.51 in Q2 2020 implied that the metered energy quantity had a smaller influence on the WEP in Q2 2020 (refer to Chart 5). There were also fewer days where $r$ was greater than 0.5 – 72 days in Q2 2020, compared to 80 days in Q1 2020.

Despite a weaker correlation between the WEP and the metered energy quantity in Q2 2020, the metered energy quantity remained as the main contributing factor, explaining 51.43% of the changes in the WEP.

As the WEP is also dependent on factors such as fuel oil price, maintenance level, supply cushion and generators’ offers, the effect of the metered energy quantity on the WEP could have been thinned out by these variables, resulting in a weaker correlation this quarter.

The fuel oil price fell 33.99% to US$185.69/MT in Q2 2020 (refer to Chart 6), reflecting the significant drop in oil demand globally as economies cut down production due to the COVID-19. Since the fuel oil price is an input to the cost of electricity generation, following the decline in the fuel oil price, the WEP also decreased to $51.05/MWh.

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1 Due to the unavailability of the Intermediate Fuel Oil ("IFO") 180 price after 19 February 2020, the fuel oil price recorded from Q2 2020 (MSCP Market Watch Issue 56) was changed from the IFO 180 price to the SGX Platts Singapore Fuel Oil 180cst Index Futures.
Demand and Supply in Q2 2020

Chart 7. Average Forecast and Actual Demand

![Chart showing average demand for Q2 2019, Q1 2020, and Q2 2020 with forecast and actual demand values.]

The average forecast demand slipped 4.96% from 6,010 MW in Q1 2020 to 5,712 MW in Q2 2020 (refer to Chart 7). The monthly averages of the average forecast demand in Q2 2020 (5,650 MW to 5,776 MW) were the lowest since February 2018 (5,628 MW).

Like the forecast, the average actual demand dropped 5.17% from 5,910 MW in Q1 2020 to 5,604 MW in Q2 2020. The forecast and actual peak demand were lower in Q2 2020 as well, registering at 7,002 MW and 6,919 MW respectively (refer to Chart 8).

The lower demand in Q2 2020 was likely due to:

- tighter preventive measures put in place by the Singapore Government in April 2020 (circuit breaker), where many businesses were temporarily closed and people were strongly advised to stay at home to curb the spread of the COVID-19; and

- further preventive measures in May 2020, where more workplaces were closed.

Although there was a gradual reopening of the economy in June 2020, namely safe reopening from 2 June 2020 (phase 1) and safe transition from 19 June 2020 (phase 2), Singapore was still operating at below business as usual conditions.

Chart 8. Forecast and Actual Peak Demand

![Chart showing forecast and actual peak demand for Q2 2019, Q1 2020, and Q2 2020.]

The quarter average supply declined 3.40% from 7,883 MW in Q1 2020 to 7,615 MW in Q2 2020 (refer to Table 3). The shrink in supply could be attributed to the behaviour of generators, as they responded to lower demand forecasts by offering less generation to the market.

With a smaller contraction in supply than that in demand, the resultant supply cushion strengthened 1.26 percentage points from 23.74% in Q1 2020 to 25.00% in Q2 2020. However, the supply cushion in Q2 2020 had not recovered to the 26.66% level shown in Q2 2019. This year-on-year change came about in a framework of market conditions where supply and demand fell 8.23% and 6.16% respectively.

Chart 9 shows that the offers priced at or below $100/MWh made up a larger proportion of the total offer quantity in Q2 2020, at 83.42% of the total offer quantity. The increase in cheaper offers could likely be a reason for the shift in the WEP to a lower price range, mentioned in Charts 4 and 5.

Table 3. Quarterly Average Supply and Supply Cushion

<table>
<thead>
<tr>
<th></th>
<th>Q2 2019</th>
<th>Q1 2020</th>
<th>Q2 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Supply (MW)</td>
<td>8,298</td>
<td>7,883</td>
<td>7,615</td>
</tr>
<tr>
<td>Supply Cushion (%)</td>
<td>26.66</td>
<td>23.74</td>
<td>25.00</td>
</tr>
</tbody>
</table>

The quarterly average supply declined 3.40% from 7,883 MW in Q1 2020 to 7,615 MW in Q2 2020 (refer to Table 3). The shrink in supply could be attributed to the behaviour of generators, as they responded to lower demand forecasts by offering less generation to the market.
The variations in the pre-dispatch schedule (“PDS”) and short-term schedule (“STS”) in Q2 2020 were larger than those in Q1 2020 (refer to Chart 10).

The larger deviations could be due to the changes brought about by the COVID-19. Several new regulations relating to the COVID-19 were introduced in Q2 2020 and businesses and consumers in turn had to adjust their operations and lifestyles quickly. For example, the temporarily closure of businesses and schools would reduce electricity consumption; the social distancing measures to encourage more people to stay at home would raise electricity consumption. Such changes would affect electricity consumption and could lead to variations in the forecast schedules.

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The average monthly load variation between the real-time dispatch schedule (“RTS”) and the metered energy quantity (i.e. the actual generation recorded) rose from 2.22% in Q1 2020 to 2.34% in Q2 2020 (refer to Chart 11).

The RTS includes the station and auxiliary loads, while the metered energy quantity does not. This difference in methodology creates a variation between the RTS and the metered energy quantity, with the RTS being higher than the metered energy quantity.

Another possible reason for the variation between the RTS and the metered energy quantity would be metering errors.

Normally, SP Services Limited (“SP Services”) sends meter readers to visit households to record their electricity consumption every alternate month. From 7 April 2020 to 1 June 2020, in line with the safe distancing measures to minimise the transmission of COVID-19, such physical meter reading services were suspended.

For consumers who do not have advanced electricity meters and did not submit their own meter readings, their meter readings for April 2020 and May 2020 were estimated based on previous months’ readings. This would likely result in an underestimation of their meter readings for these two months as they spent longer hours at home during the circuit breaker.
Intuitively, when the USEP falls, it should signal that there is excess supply in the system and a corresponding growth in supply cushion.

However, the USEP fell steadily throughout Q2 2020, even though the supply cushion hovered around 25.00% during the same period (refer to Chart 12). This suggests that the changes in the fuel oil price, the outage volumes and the offer prices had a constant downward effect on the USEP throughout Q2 2020.

Combining this observation with the lower correlation between the USEP and the metered energy quantity in Chart 6, it is further implied that the USEP was impacted by variables besides demand and supply in Q2 2020.

As seen in Chart 13, the capacity ratios of all generation types went down in Q2 2020. These changes in the capacity ratios were a result of lower demand in Q2 2020 (refer to Chart 7), which meant less generation from the four generation types was required to be scheduled.

Compared to Q1 2020, the capacity ratio of combined cycle gas turbine ("CCGT") units decreased 2.54 percentage points and the capacity ratio of other ("OT") units decreased 15.55 percentage points. There was no generation scheduled from OCGT units in Q2 2020, which was expected, given that energy prices were low and open cycle gas turbine ("OCGT") units are more costly to operate.
The breakdown of market share in the NEMS by generation company and generation type are shown in Charts 14 and 15 respectively. The market share is calculated based on metered energy quantity and maximum generation capacity.

According to metered energy quantity (refer to Chart 14), the three largest generation companies held 54.00% of the total market share in Q2 2020, a marginal dilution from 54.08% in Q1 2020.

The distribution of market share was more concentrated in terms of maximum generation capacity (refer to Chart 15) – the three largest generation companies held 62.07% of the total market share in Q2 2020. This combined market share shrank slightly from 62.36% in Q1 2020 with the exit of a steam turbine unit from the NEMS in Q2 2020.

Most of the generation in the NEMS is produced by CCGT units (98.71% of the metered energy quantity in Q2 2020 as shown in Chart 16), as the market moves towards more efficient technology (86.00% of the total maximum generation capacity in Q2 2020 as shown in Chart 17). As a ST unit was deregistered from the NEMS in Q2 2020, CCGT units held an even larger market share in terms of the total maximum generation capacity in Q2 2020, at 86.00%, compared to 77.78% in Q2 2019 and 85.33% in Q1 2020.

ST units take longer to start up so they are increasingly less scheduled to generate electricity (these units have not been scheduled in the recent quarters as shown in Chart 16). ST units are also taking up less market share in terms of maximum generation capacity – the withdrawal of a ST unit in Q2 2020 resulted in the market share of ST units to go down from 11.11% in Q1 2020 to 10.42% in Q2 2020 (refer to Chart 17).

OCGT units can start up quickly but are more costly to operate, so they are generally scheduled only when supply cushion is weak. OT units include incineration plants which convert incineration refuse to electricity, accounting for a small but consistent market share over time.
### Compliance Statistics for Q2 2020

<table>
<thead>
<tr>
<th>Potential Breaches of the Market Rules</th>
<th>Determinations*</th>
<th>Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>44 cases in total</strong></td>
<td><strong>86 determinations in total</strong></td>
<td><strong>7 cases in total</strong></td>
</tr>
<tr>
<td>0 self-report</td>
<td>7 cases determined to be in breach</td>
<td>7 financial penalties</td>
</tr>
<tr>
<td>44 referrals/complaints</td>
<td>79 cases determined not to be in breach</td>
<td>0 non-compliance letter</td>
</tr>
<tr>
<td>0 MSCP initiative</td>
<td></td>
<td>0 suspension order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0 other MSCP order</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>$48,000</strong> of financial penalty imposed</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>$7,500</strong> of costs awarded</td>
</tr>
</tbody>
</table>

*This section includes determinations of cases referred to the Market Surveillance and Compliance Panel (“MSCP”) in previous quarters.

The MSCP issued five rule breach determinations in Q2 2020 to:

i. [Energy Market Company Pte Ltd](#) for its incorrect final settlement documents for 24 and 25 October 2019;

ii. [TP Utilities Pte. Ltd.](#) for its failure to comply with declared quantity rules on 5 November 2019;

iii. [Sembcorp Cogen Pte Ltd](#) for its failure to comply with gate closure rules on 24 and 25 November 2019;

iv. [Sembcorp Cogen Pte Ltd](#) for its failure to comply with gate closure rules and submit offer variation to reflect generating capability on 30 November 2019; and

v. [Senoko Energy Pte Ltd](#) for its failure to comply with gate closure rules on 3 December 2019.
MSCP Market Watch

The MSCP Market Watch is a quarterly report prepared by the Market Assessment Unit ("MAU") of EMC and submitted to the MSCP. The report summarises the MAU’s day-to-day monitoring, cataloguing and evaluation activities and analyses, and compares the market performance for the current quarter with the quarter a year ago and the previous quarter.

All prices and percentages in this report are rounded off to two decimal places.

The User Guide to MSCP Market Watch provides a glossary of the terms used in the MSCP Market Watch among other information to facilitate readers’ understanding.

Market Surveillance and Compliance Panel

The MSCP is established by the EMC Board in accordance to section 2.6 of Chapter 3 of the Singapore Electricity Market Rules.

The MSCP, with the assistance of the MAU, monitors and investigates the conduct of market participants, the market support services licensee, EMC and the Power System Operator and the structure and performance of the wholesale electricity markets.

The MSCP comprises the following members:
- T P B Menon, Chair
- Lee Keh Sai
- Philip Chua
- Professor Euston Quah
- Professor Walter Woon

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