Executive Summary

As Singapore gradually moved to Phase 2 by easing the safe distancing measures applied during Circuit Breaker to curb the transmission of Coronavirus Disease 2019 (“COVID-19”) and more activities resumed, the National Electricity Market of Singapore (“NEMS”) observed the first increase in energy prices in Q3 2020 since the continuous decline from Q4 2019. The higher energy prices in Q3 2020 were brought about by a combination of a weaker supply cushion and a larger volume of plant outages, an increase in fuel oil price, higher demand levels and offer prices moving to the higher tranches. However, energy prices in Q3 2020 were still below the prices observed before COVID-19 happened.

From Q2 2020 to Q3 2020, the Uniform Singapore Energy Price (“USEP”) increased 32.72% to $67.30/MWh and the Wholesale Electricity Price (“WEP”) increased 32.71% to $67.74/MWh (refer to Chart 1).

The rise in energy prices could be attributed to a combination of the following movements in Q3 2020 when compared to the previous quarter:

- A 70-fold increase in the forced outage volume;
- A 37.52% increase in fuel oil price\(^1\) to US$255.36/MT;
- A 2.34% increase in demand to 5,845 MW;
- A 0.39% shrink in the supply cushion to 24.61%; and
- A 0.16 percentage point decrease in the generators’ offers submitted in lower price ranges to 83.26%.

\(^1\) The fuel oil price is based on the SGX Platts Singapore Fuel Oil 180cst Index Futures.
The vesting contract price (LNG Vesting Price and the Allocated Vesting Price) has been falling this year to date to average at $110.70/MWh in Q3 2020; this was a 24.40% decrease from $146.43/MWh observed in Q2 2020. The vesting contract price also showed a year-on-year drop of 33.99% from $167.69/MWh in Q3 2019.

Comparing the components used in the calculation of the vesting contract price in Q2 2020 and Q3 2020, the decrease in the Brent Index Price2 and the Previous Net Shortfall ("PNS") explained the reduction for the quarter.

The PNS is an adjustment to account for a shortfall or surplus between the amount paid by vesting contract consumers and the amount paid to vesting contract generators in the previous quarter. A shortfall or surplus arises because vesting contract quantities are determined based on expected electricity consumption data before a quarter commences, whereas vesting contracts are settled based on actual electricity consumption data. Therefore, a lower PNS implies that less adjustment is required to be included in the vesting contract price, resulting in a lower vesting contract price.

Although the Singapore dollar weakened against the US dollar by 2.74% in Q3 2020 and could have placed an upward pressure on the vesting contract price, such effect was likely muted by the changes in the Brent Index Price and the PNS, which decreased 61.77% and 51.77% respectively.

Chart 2 also shows that the WEP remained below the vesting contract price during Q3 2019, Q2 2020 and Q3 2020. Even though the increased WEP narrowed the gap between the WEP and the vesting contract price this quarter, the WEP was still noticeably below the vesting contract price. The observation of the WEP staying consistently below the vesting contract price aligned with the Energy Market Authority’s decision to phase out the vesting contract regime from 1 July 2023.

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2 The Brent Index Price in a quarter is the average price of Platts Dated Brent for every business day from the first business day to the 15th calendar day of the third month in the preceding quarter. For example, to calculate the Brent Index Price for Q3, the Platts Dated Brent price on each business day from 1 April to 15 June would be included. As the periods used in calculating the Brent Index Price and the fuel oil price in a quarter are not the same, the movements in these two prices may be different.

Further details on the Brent Index Price and PNS are available in EMA’s Procedures for Calculating the Components of the Vesting Contracts.
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 for Q3 2020, compared to the previous quarter and the same quarter a year ago.

In Q2 2020, the WEP was below $50/MWh for 63.07% of the time and across 60.55% of the total metered energy quantity in the market. In Q3 2020, the WEP was below $50/MWh for only 6.45% of the time and across 5.50% of the total metered energy quantity, which can be attributed for the increase observed in the WEP during this quarter.

Illustrated by a rightward shift of the distribution curves from Q2 2020 to Q3 2020, the WEP was observed to be in the higher price range of $50/MWh to $100/MWh in Q3 2020, accounting for 89.81% of the time and across 90.32% of the total metered energy quantity.

As observed in Chart 5, \( r^2 \) increased from 0.51 in Q2 2020 to 0.60 in Q3 2020, this upward movement implied that the metered energy quantity had a greater influence on the WEP changes in Q3 2020. There were also more days in Q3 2020 where \( r \) was greater than 0.5 – 86 days, compared to 72 days in Q2 2020. This shows that the metered energy quantity and the WEP had a strong positive correlation over a longer time in Q3 2020 than in Q2 2020.

With the stronger correlation results in Q3 2020, the metered energy quantity remained the main contributing factor to the movements in the WEP, explaining 60.06% of the changes in the WEP during the quarter.

The fuel oil price\(^3\) rose 37.52% from US$185.69/MT in Q2 2020 to US$255.36/MT in Q3 2020, as shown in Chart 6, but was still below the price in Q3 2019, reflecting the changes in global oil demand as economies made reopening efforts looking to recover from the impact of COVID-19 in Q2 2020. The increase observed in the WEP to $67.74/MWh this quarter can be attributed to the rise in the fuel oil price, given that it is an input to the cost of electricity generation.

\(^3\) 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.
As observed in Chart 7, the average forecast demand went up 2.34% from 5,712 MW in Q2 2020 to 5,845 MW in Q3 2020. Although the average forecast demand increased month-on-month in Q3 2020, the demand was below the pre-COVID-19 level of 6,163 MW in Q3 2019, indicating that the NEMS was still recovering.

Like the forecast, the average actual demand climbed 2.69% from 5,604 MW in Q2 2020 to 5,755 MW in Q3 2020. The heightened demand in Q3 2020 was likely due to:

- continued safe transition in July 2020, where more businesses reopened, and some people returned to workplaces; and

- higher forecast and actual peak demand observed in Q3 2020, of 7,034 MW and 7,039 MW respectively (refer to Chart 8). In particular, the forecast and actual peak demand in August 2020 were the highest this year to date, even higher than the pre-Circuit Breaker levels of 7,032 MW and 6,999 MW in March 2020.

Table 2 shows a 1.83% increase in the quarterly average supply from 7,615 MW in Q2 2020 to 7,755 MW in Q3 2020. The growth in supply could be attributed to the behaviour of generators, as they responded to higher demand forecasts by offering more generation to the market.

As demand growth outpaced the supply growth, the resultant supply cushion contracted 0.39 percentage point from 25.00% in Q2 2020 to 24.61% in Q3 2020. In addition, there were eight periods of USEP spikes in Q3 2020 during which the periodic supply cushion was merely between 9.05% and 11.75%, bringing down the quarterly average supply cushion.

Chart 9 shows that the offers priced at or below $100/MWh made up a smaller proportion of the total offer quantity in Q3 2020, at 83.26% of the total offer quantity. The decrease in cheaper offers was likely a reason for the shift in the WEP to a higher price range, mentioned in Charts 3 and 4.
Chart 10 shows the variations in the pre-dispatch schedule ("PDS") and short-term schedule ("STS"). The average monthly variations in Q3 2020 were lesser than those observed in Q2 2020. On closer examination, the variations in July 2020 and August 2020 were among the lowest observed this year to date.

The lower variations in Q3 2020 could be that consumers had adjusted to new electricity consumption routines under the COVID-19 "new normal" conditions during Q3 2020. Although the Singapore Government implemented changes to the safe distancing measures in view of the low community spread of COVID-19, the measures were gradually eased so a large discrepancy between forecast schedules and the real-time dispatch schedule ("RTS") was unlikely to occur.

The variations in September 2020 were larger than in July 2020 and August 2020, especially the variation between RTS and PDS. This could possibly be due to fluctuations in market conditions leading to USEP spikes seen at the end of September 2020 – a generation facility experienced a forced outage before the price spikes, which would not have been captured in the PDS and would be included in the RTS.

Chart 11. Average Monthly Variation Between Real-Time Dispatch Schedule and Metered Energy Quantity

The average monthly load variation between the RTS and the metered energy quantity (i.e. the actual generation recorded) decreased from 2.34% in Q2 2020 to 2.12% in Q3 2020.

A possible reason for the variation between the RTS and the metered energy quantity would be metering errors. Upon the easing of safe distancing measures after the Circuit Breaker on 2 June 2020, SP Services Limited resumed its physical meter reading services. With meter readers visiting premises to record electricity consumption, the variation between the RTS and the metered energy quantity was lower in Q3 2020 than in Q2 2020, when physical meter reading services were suspended and meter readings were estimated.
For Q3 2020, the supply cushion and the USEP moved in tandem in July and September 2020, which was counterintuitive. This suggests that there were reasons apart from changes in demand and supply fuelling the movements in the USEP during those months.

A possible reason would be reduced offer prices submitted by the generators, in particular in July and September 2020, when the proportion of offers at or below $100/MWh became smaller. With a lower volume of cheaper offers in the market, the USEP increased during these two months.

It is also worth noting that the USEP rose 28.00% in July 2020, more than its increase of 8.91% in September 2020. This could be that the fuel oil price also went up in July 2020, further promoting the increase in the USEP.

In August 2020, the supply cushion weakened and the USEP rose to reflect the tightened supply in the system.

As seen in Chart 13, the capacity ratios of all generation types went up in Q3 2020. These changes in the capacity ratios were a result of higher demand in Q3 2020 (refer to Chart 7), which meant more generation from the four generation types was required to be scheduled.

Compared to Q2 2020, the capacity ratio of combined cycle gas turbine (“CCGT”) units increased 0.97 percentage point and the capacity ratio of other (“OT”) units increased 5.83 percentage points. Some generation was scheduled from open cycle gas turbine (“OCGT”) units in Q3 2020, specifically September 2020, giving rise to its capacity ratio of 0.02%. Given the costly operation of OCGT units, they are seldom scheduled to generate electricity. The previous time OCGT units were scheduled was February 2020.
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.

As seen in Chart 14, the market share based on metered energy quantity shows that the three largest generation companies held 53.08% of the total market share in Q3 2020, a further dilution from 54.00% in Q2 2020.

The distribution of market share based on generation capacity, as shown in Chart 15, was more concentrated – the three largest generation companies held 60.43% of the total market share in Q3 2020. This combined market share contracted from 62.07% in Q2 2020 with the exit of a steam turbine ("ST") unit from the NEMS in June 2020 (i.e. the ST unit was excluded from the market share calculation in Q3 2020).

Most of the generation in the NEMS is produced by CCGT units (98.51% of the metered energy quantity in Q3 2020 as shown in Chart 16), as the market moves towards the most efficient generation technology (89.72% of the total maximum generation capacity in Q3 2020 as shown in Chart 17). As a ST unit was deregistered from the NEMS in June 2020, CCGT units held an even larger market share in terms of the total maximum generation capacity in Q3 2020, at 89.72%, compared to 79.73% in Q3 2019 and 86.00% in Q2 2020.

Chart 16 shows that in Q3 2020, ST units gained a market share of 0.03% in terms of metered energy quantity as they were scheduled to generate electricity. However, in terms of maximum generation capacity, ST units continued to lose market share – the deregistration of a ST unit in June 2020 reduced the ratio from 10.42% in Q2 2020 to 6.54% in Q3 2020, as seen in Chart 17.

The changes in the market shares of OT and OCGT units in Q3 2020 were minimal and likely due to the changes in the market shares of the other generation types.
# Compliance Statistics for Q3 2020

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<tr>
<th>Potential Breaches of the Market Rules</th>
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<th>Enforcement</th>
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<tr>
<td><strong>116 cases in total</strong></td>
<td><strong>47 determinations in total</strong></td>
<td><strong>7 cases in total</strong></td>
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<td>115 referrals/complaints</td>
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<td></td>
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<td>$10,800 of costs awarded</td>
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*This section includes determinations of cases referred to the Market Surveillance and Compliance Panel (“MSCP”) in previous quarters.

The MSCP issued three rule breach determinations in Q3 2020 to:

i. ExxonMobil Asia Pacific Pte. Ltd. for its failure to comply with gate closure rules for 26 March 2020;

ii. ExxonMobil Asia Pacific Pte. Ltd. for its failure to comply with gate closure rules on 24 May 2020; and

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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