

## An Overview of Covid-19 Impact on Power Grid Operation in Malaysia

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The first notable impact of COVID-19 on the states and regions connected to the National power grid in peninsular Malaysia was a decreased ramping of load demand, particularly during usual peak demand hours. Due to the uncertainty in the transmission rates of this pandemic, the electricity demand will continue to fluctuate because of the change in human behavior and lifestyle globally.

The daily electricity demand in Malaysia has been reduced significantly during the dark days of COVID-19 pandemic, as Malaysia was compelled to reduce the business and commercial activities to combat the threat of the virus. The COVID-19 pandemic lockdown which has been extended several times was the main factor behind the increase in residential load <sup>1</sup>. On the contrary, the commercial and industrial electricity loads have been dropped at levels not seen for a long time, since many employees were prompted to work from home.

This mini-article aims to highlight the scenarios of the national power grid with the economic impact faced by power utilities during the movement control order (MCO, 25 March to 12 May 2020), conditional MCO (CMCO, 13 May to 9 June 2020) and recovery MCO (RMCO, 7 June to 31 August 2020)<sup>2</sup>.

COVID-19 induced reductions in energy demand which has undermined revenues for most power generation. The high surplus baseload generation condition observed during MCO was problematic for coal and hydro power stations. Figures 1- 6 show the difference between the generated power before COVID-19 (2019) and during COVID-19 (2020). As seen in Figure 2, a reduction of the energy generation from gas power stations is observed compared to Figure 1.

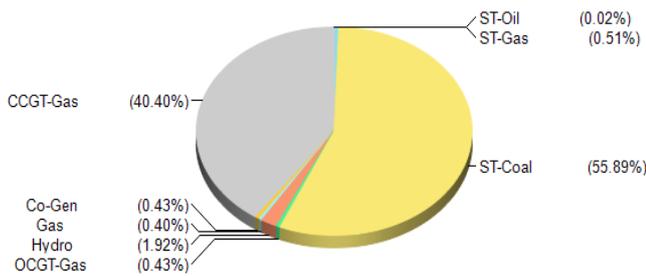


Figure 1: Power generation from 20/03/2019 to 17/05/2019

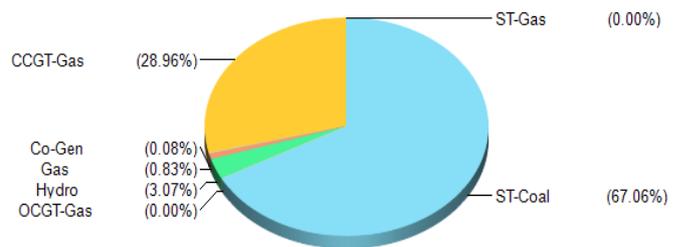


Figure 2: Power generation from 20/03/2020 to 17/05/2020 during MCO

The preventive measures taken by the federal government of Malaysia from MCO to CMCO and then, to RMCO have boosted the power generation gradually (see Figures 4 and 6) close to the normal level as in Figures 3 and 5. It is worth mentioning that the total generated energy from hydro power stations over the period of movement restriction was higher compared to the last year.

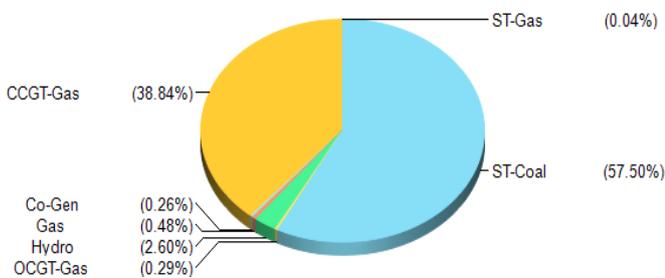


Figure 3: Power generation from 10/05/2019 to 12/06/2019

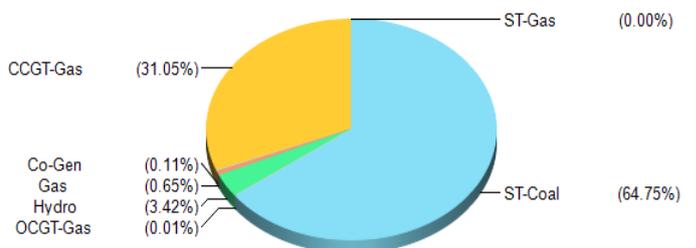


Figure 4: Power generation from 10/05/2020 to 12/06/2020 during CMCO

<sup>1</sup> The data has been obtained from the grid system operator (<https://www.gso.org.my/>), Energy Commission of Malaysia.

<sup>2</sup> New Straits Times Malaysia June 7, 2020 @ 3:08 pm

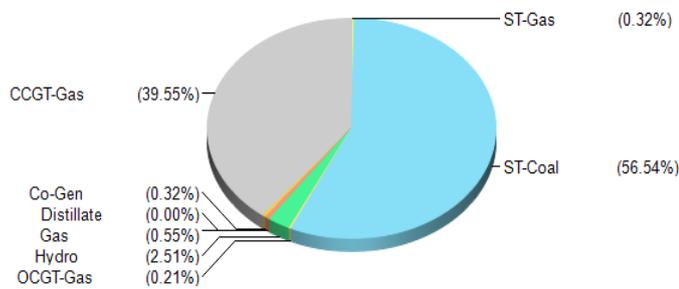


Figure 5: Power generation from 05/06/2019 to 03/09/2019

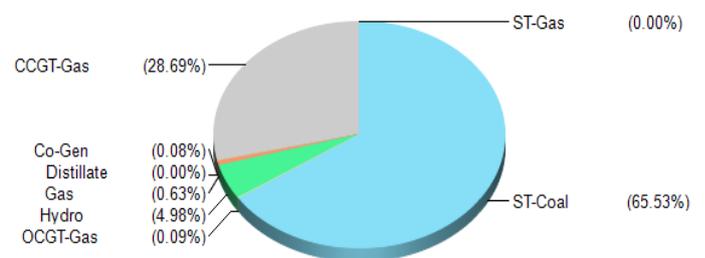


Figure 6: Power generation from 05/06/2020 to 03/09/2020 during RMCO

The impact on demand due to COVID-19 restrictions, differ according to the preventive measure imposed at each period. For instance, mitigation efforts to eliminate the risk of the pandemic during MCO have caused a significant reduction in the daily electricity demand as seen in Figure 7. Unlike, the energy consumption in 2019, the confinement measures (25 March to 12 May 2020) have resulted in a high reduction of energy consumption throughout the lockdown period. The decline of energy consumption during CMCO as seen in Figure 8 indicates the uncertainty in load demand. Gradual recovery of activities after easing the restrictions has stabilized the load profile during the RMCO as depicted in Figure 9. It can be concluded from the data that the application of full lockdown has painfully affected the energy production due to the accelerated demand reduction in (March–April) to approximately 22%, as compared to the same period in 2019.

Generally speaking, the global movement restrictions have impacted world economies in an unprecedented scale. Malaysia is no exception with more reductions in the household income and loss of jobs. As such, it is still early to fully evaluate the impacts of COVID-19 on the national power grid and its operation cost as the coronavirus still continues to spread around the world. The unforeseen circumstances of COVID-19 and its unpredictable nature will indeed open new horizons in the research related to power grid planning and operation.

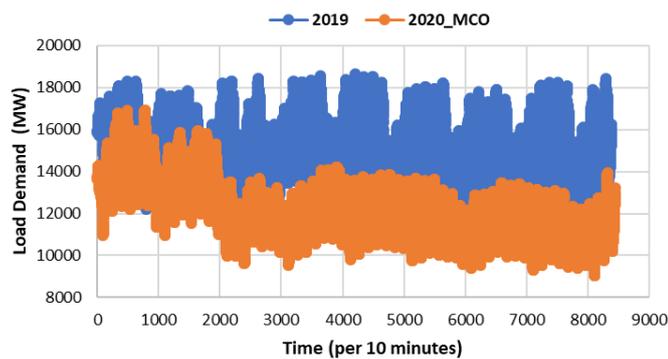


Figure 7: Daily electricity demand from 20 March to 17 May (2019 and 2020), data recorded every 10 minutes

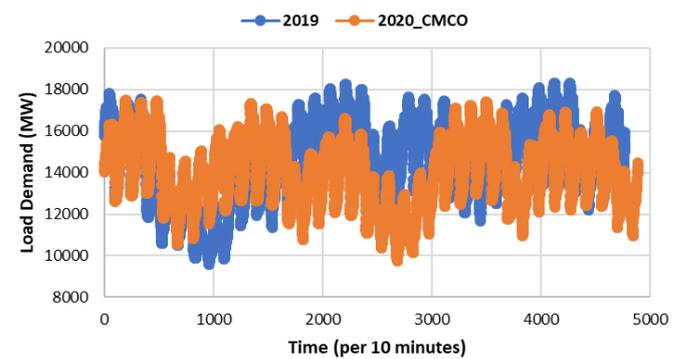


Figure 8: Daily electricity demand from 10 May to 12 June (2019 and 2020), data recorded every 10 minutes

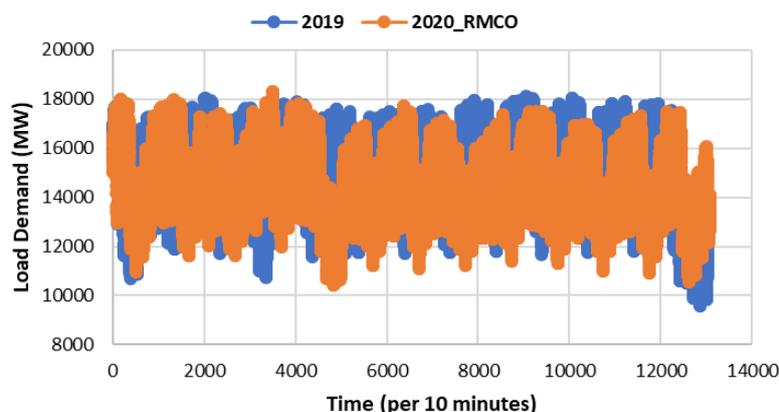


Figure 9: Daily electricity demand from 05 June to 03 September (2019 and 2020), data recorded every 10 minutes