

Datathon 2020



Impact of COVID-19 on Electricity Consumption



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1. Introduction:

Covid-19 is a global health crisis which impacts a lot of areas, such as working style, employment rate, people's behaviors. The electricity consumption is an indicator of economic activity which is related to several drivers: weather, seasonality, business cycles and base load. Using the open dataset and digging out the insight information related for electricity consumption related to covid-19 is the main purpose of this project.

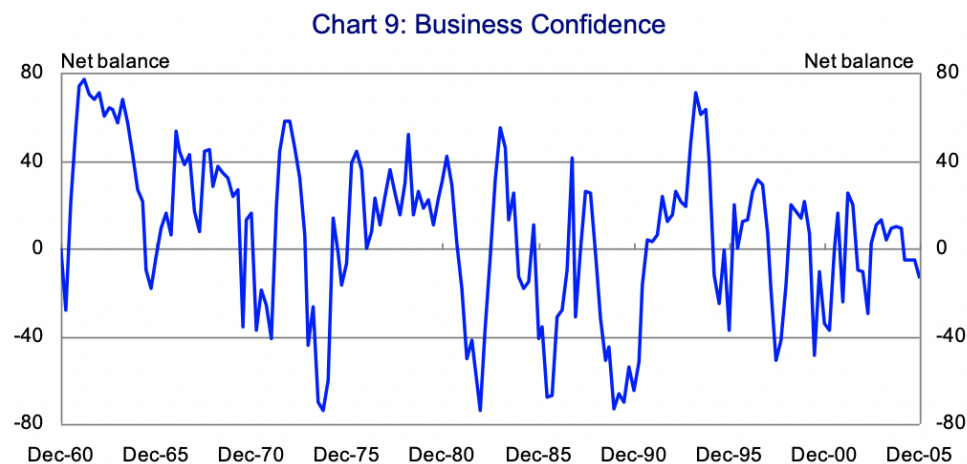
2. Benefits & Assumptions:

➤ Benefit/Business Values:

- Help Government make better decision regarding the investment in Electricity area.
- Provide indicator to Government/Banks regarding the Economic trends.
- Help Electricity companies of their Power supply VS demand.

➤ Assumptions:

- All the data collected are corrected and trustable.
- Each state of the weather has been leveraged from different weather stations in the state.
- **RRP (regional reference price)**: regional reference price for the region containing connection point i.
- The data in non-mainland of Australia has been removed, i.e: Christmas island.
- 2016-2017's weather data has been used (assume similar trends cross the whole year compare with 2020).
- Business Confidence. Assume the business confidence over the pandemic time with the patterns.



(source: BusinessCyclesinAustralia)

3. Resource:

➤ Dataset

- Electricity: AMEO
- Covid-19: daily change cross Australian dataset
- Weather dataset: from 2016-2017 FY which will have a similar trend or cycle each year.

➤ Software and tools:

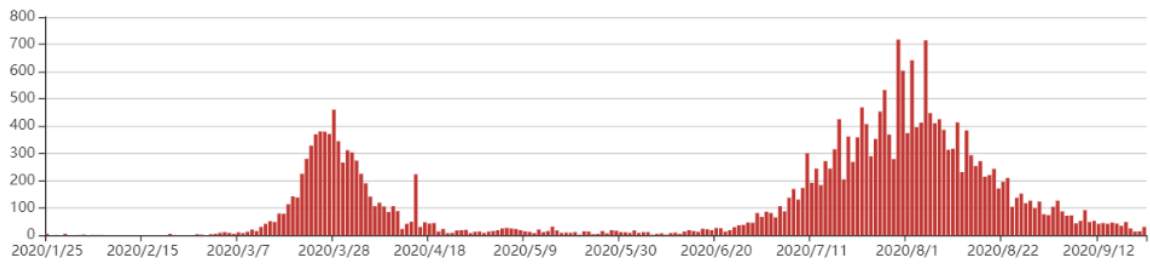
- Colab (Google drive) - coding
- Cloud storage – storage
- Echarts – visualization
- Tableau – visualization
- Python 3.7

4. Data Analysis:

Findings

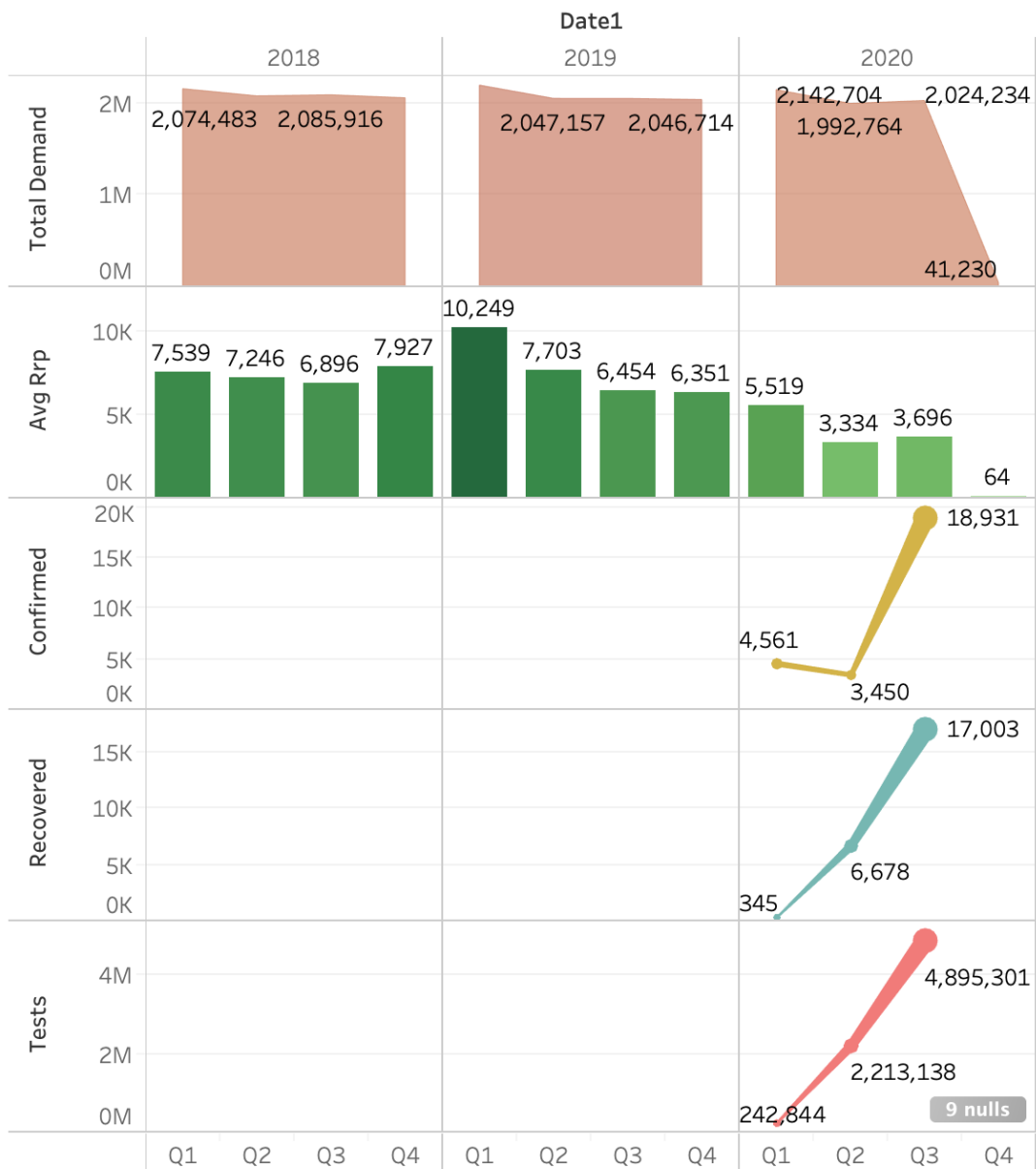
1. National:

COVID-19 confirmed cases:



(Coronavirus (COVID-19) current situation and case numbers)

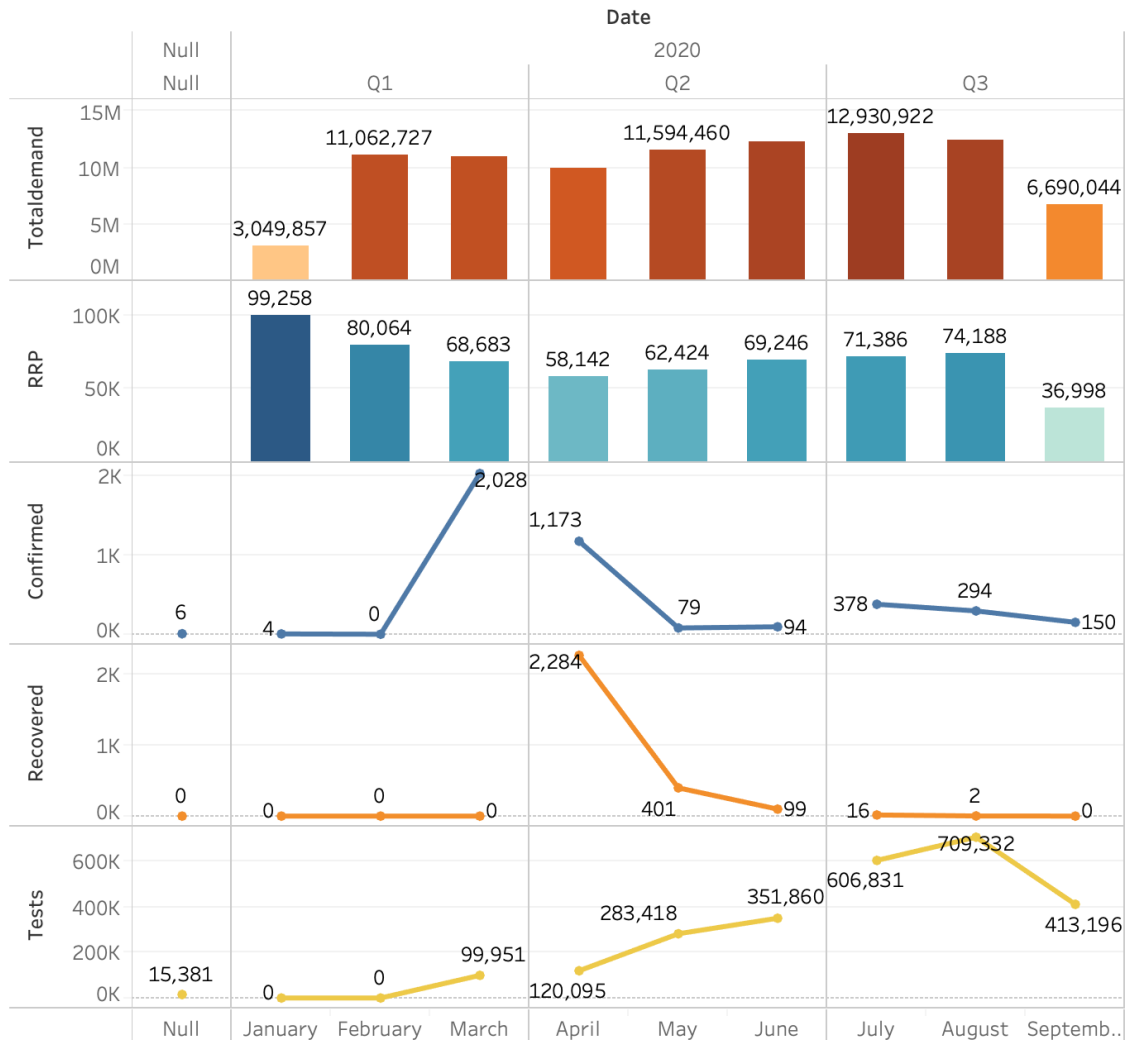
National



Overall, compared with 2018 and 2019 the total consumption did not change that much. While the RRP has been dropped a lot after COVID-19 impacted. Over the pandemic time, the confirmed cases of COVID-19 National, did impact the demand of Electricity consumptions. If the confirmed cases were growing, then the demand of Electricity were decreasing a bit. More people stayed at home, businesses shut down and etc.

2. NSW COVID-19 RRP VS Electricity trend:

NSW_Covid VS Total_Demand & RRP

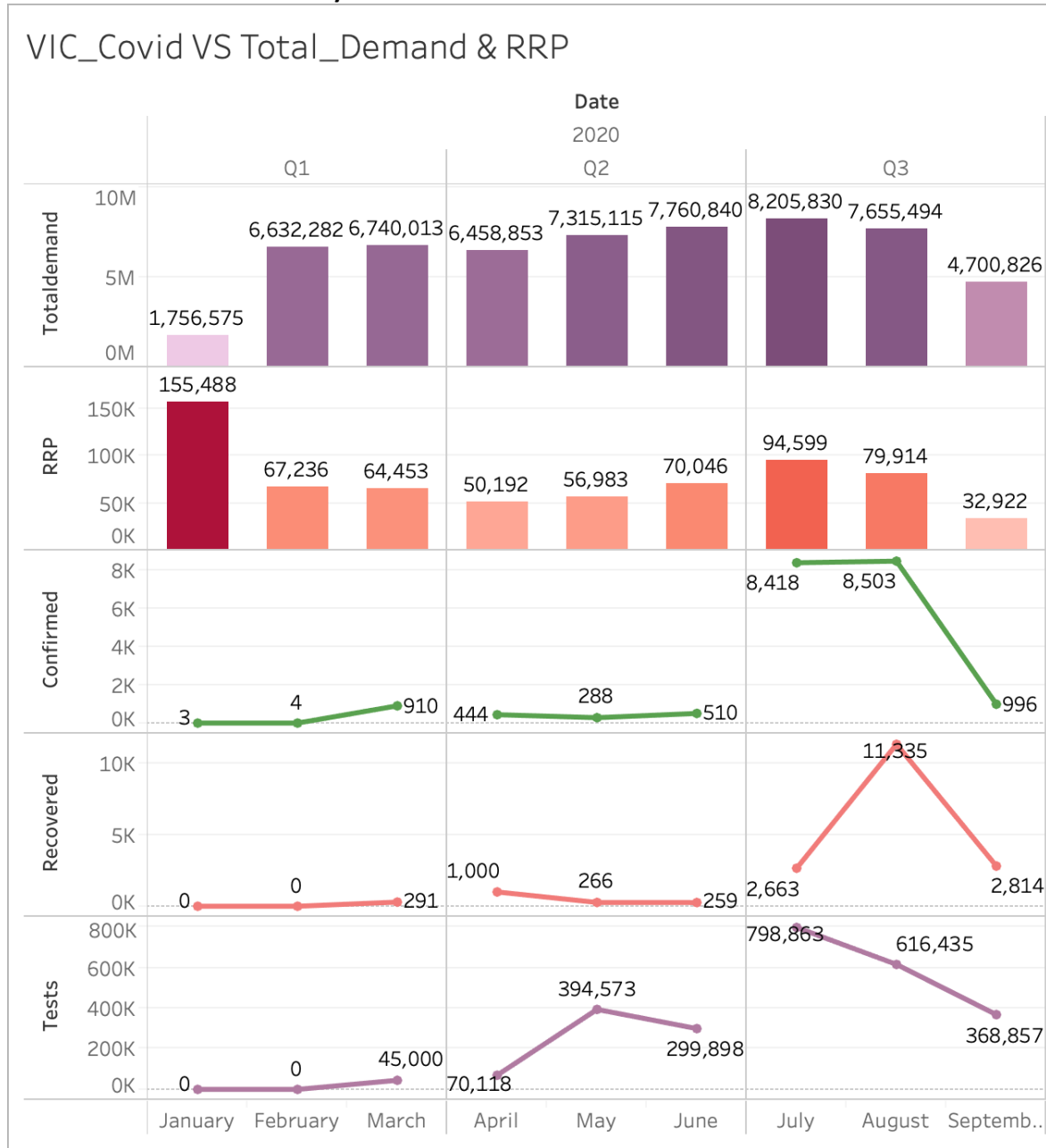


(Generated from tableau)

COVID-19 NSW VS the RRP and the Electricity consumptions shows:

The correlation between confirmed case in between with RRP is slightly negative from Feb to Mar 2020. (Everyone is will stay at home – First round lock down). A lot of people had not been tested but got into the countries in early March at Sydney. Restrictions applied after it. (<https://www.nsw.gov.au/covid-19>) The RRP of electricity is dropping down until Covid-19 data is stabled. After August the confirmed COVID-19 cases dropped a bit but the RRP and demand of electricity was dropped a lot. It means people no need to have that much electricity.

3. VIC COVID-19 VS Electricity demand



(Generated from tableau)

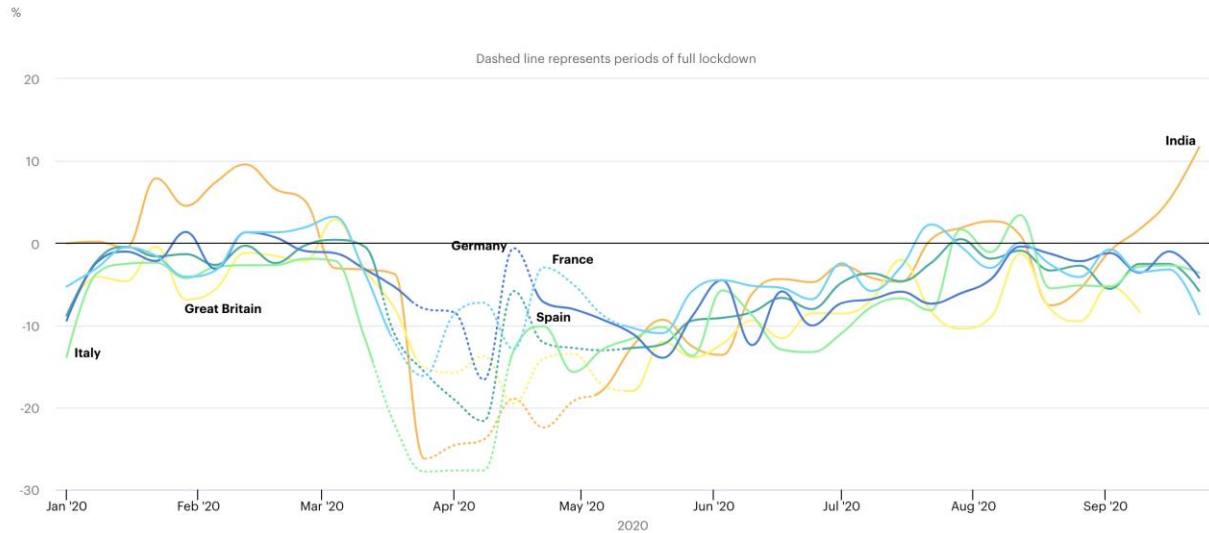
The total demand of the electricity was increasing from April to July, we consider it as the weather and seasonal impacts. In VIC, after March the weather would be getting colder. The aircon consume a lot of electricity.

The correlation between confirmed case in between with RRP is negative from Feb to Mar 2020. (People stays at home). VIC had been impacted by COVID-19 twice since March 2020. Well, the RRP increasing this time based on the increase of the confirmed cases in VIC from July onwards. The changing of RRP in VIC is stronger compare with NSW cross Jan 2020 to Sep 2020. Due to a large amount of cases confirmed after July 2020.

4. Comparison with other countries

Comparison with other countries:

Year-on-year change in weekly electricity demand, weather corrected, in selected countries, 2020



(Covid-19 impact on electricity, source: <https://www.iea.org/reports/covid-19-impact-on-electricity>)

Compared with other major countries with impacts on COVID-19. The electricity demand had not been impacted that much over the lock down period compared with India, Spain and Italy. The trend is similar to France and Germany, the demand and RRP of Electricity had been impacted over the stage 4 lock down time.

After the first lockdown, around April 2020, the demand of Electricity was increasing until July in Australian. The second lockdown has little impact of the demand of Electricity. Over the wintertime, the demand of electricity is higher than any other seasons.

5.Conclusion:

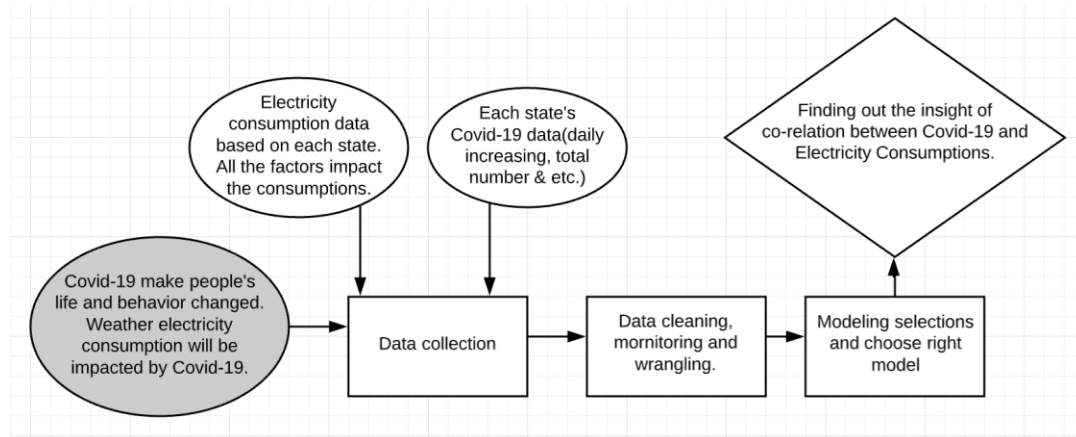
After finding the insights information from some graphs we generated. The demand of electricity will be impacted by the COVID-19 confirmed cases. However, it looks not that strong correlation between each other based on the graphs generated. It is more depends on the policies, whether it is the full lock down or people still can run businesses.

6.Reference:

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2. Free data online, Bureau of Meteorology, 2020, Retrieved from: <http://www.bom.gov.au/climate/data-services/station-data.shtml>
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4. Aggregated price and demand data,2020, AMEO, Retrieved from: <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/aggregated-data>

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7. Business Cycles in Australia, Robert Ewing and John Hawkins, 2005.

7. Appendix: Business Model:



Main Flow

