



Case Study: Singapore Total & Peak Load Growth

December 2021

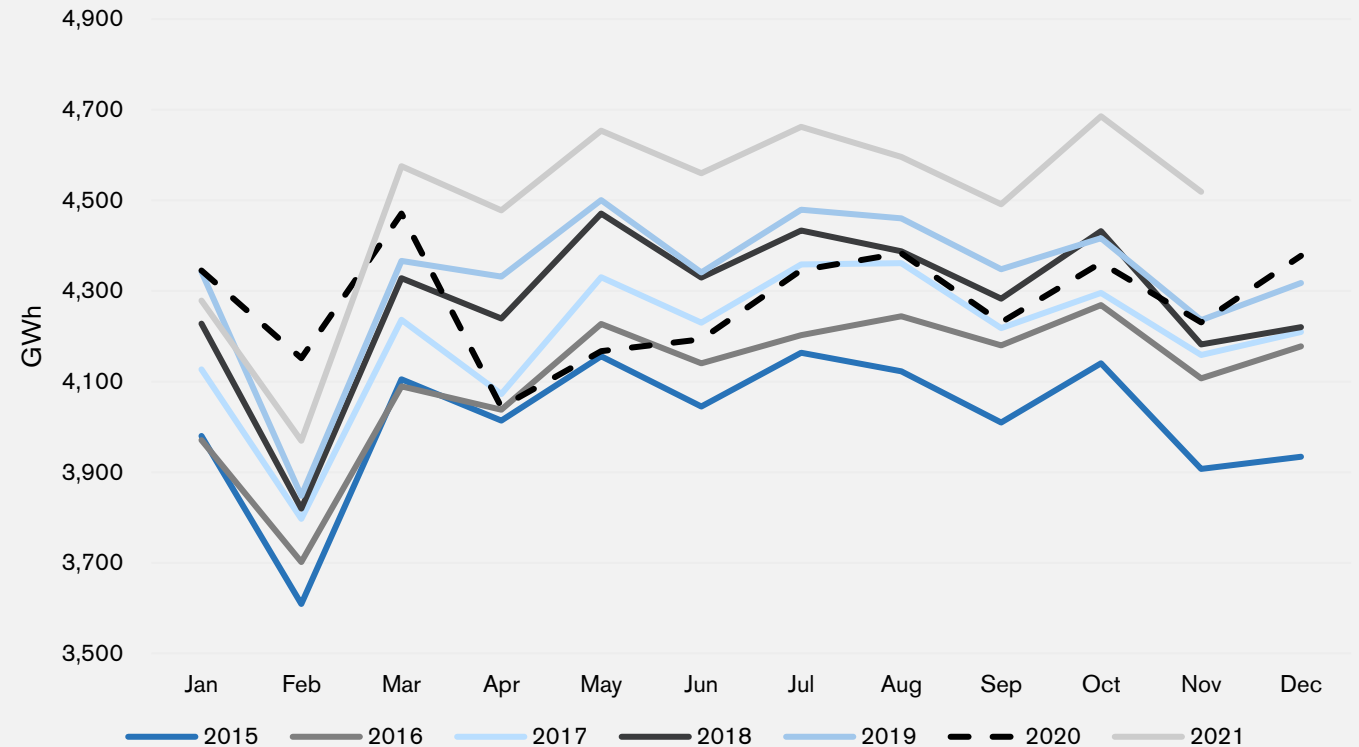
Overview

- Singapore's power market has become increasingly competitive with full liberalization in 2018. Like other power markets around the world, Singapore has recently experienced a wave of high demand and prices. In fact, October 2021 saw the highest average monthly Uniform Singapore Energy Price (USEP) on record.
- Singapore's power demand has also grown steadily over the last decade with the system hitting an all time peak of 7,315 MW on 12th October 2021.
- The purpose of this case study is to illustrate the Year-on-Year (YoY) total and peak load growth in Singapore and COVID's impact on load.
- The weather is a major driver of power demand. To prevent any weather driven results from skewing our analysis, we have used weather corrected demand. Weather Risk was also used to examine how much higher peak demand could be in the presence of more extreme weather.
- Data from 2012 up to November 30, 2021, is used – accounting for the past decade.

Singapore Demand Growth

- Firstly, it is worth pointing out that Singapore's power demand has grown steadily over the years.
- Singapore's tropical climate means there is not a whole lot of month-to-month variation in temperature. The drop off in January – February is due to the major Lunar New Year holiday period.
- Load has well surpassed pre-pandemic levels since March 2021.
- Views based on the first half of 2021 may be distorted by lingering January and February pandemic effects.

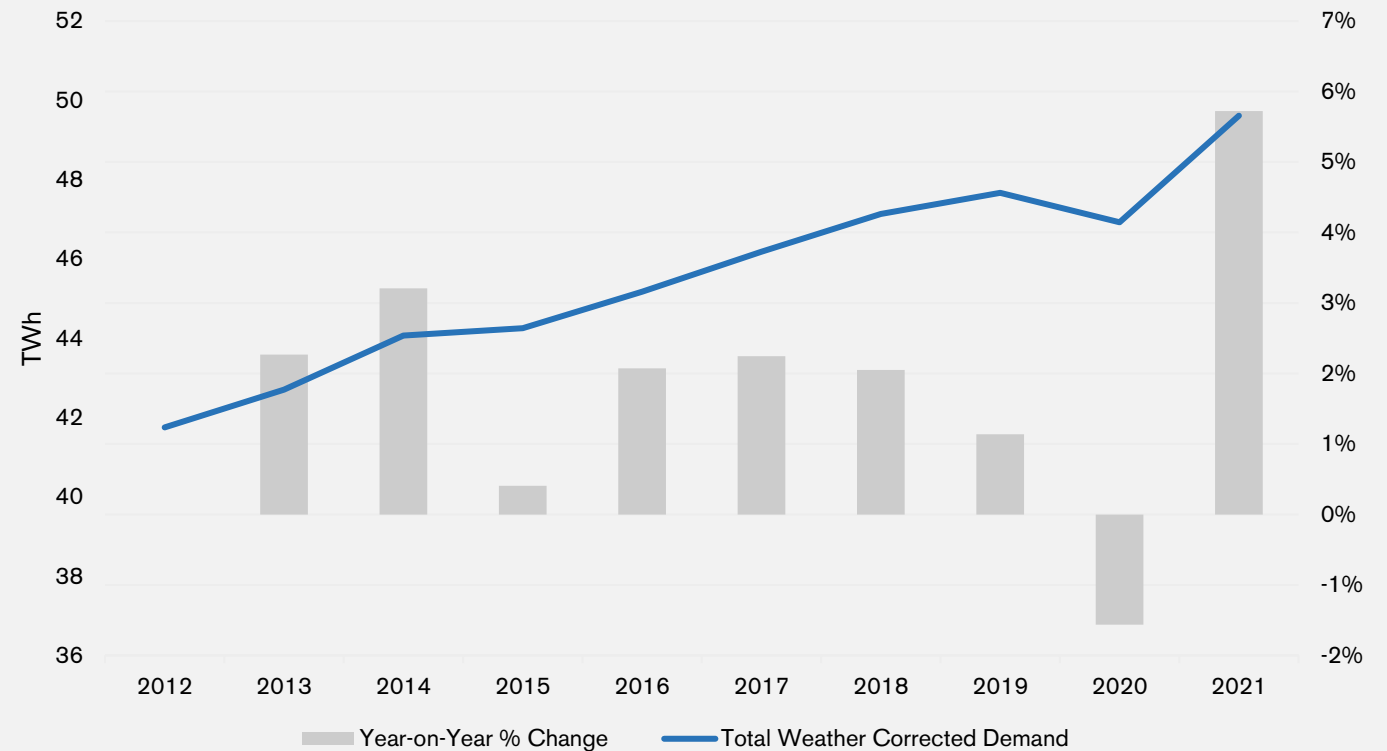
Singapore – Monthly Total Demand
Weather Corrected



YoY Total Demand Growth

- On average, load grew 1.9% each year from 2012 to 2019 before dropping in 2020, then steeply returning back to the trend in 2021.
- While the load growth from 2020 to 2021 is a whopping 5.7%, the growth from 2019 to 2021 is 4.1%. Demand has recovered sharply since March 2021.
- Based on the first half of 2021, the EMA projected* that “Assuming the same trend continues, this would bring the overall growth of total electricity consumption in 2021 to 2.0%, compared with 2020”.

Singapore Jan-Nov Total Demand
Weather Corrected

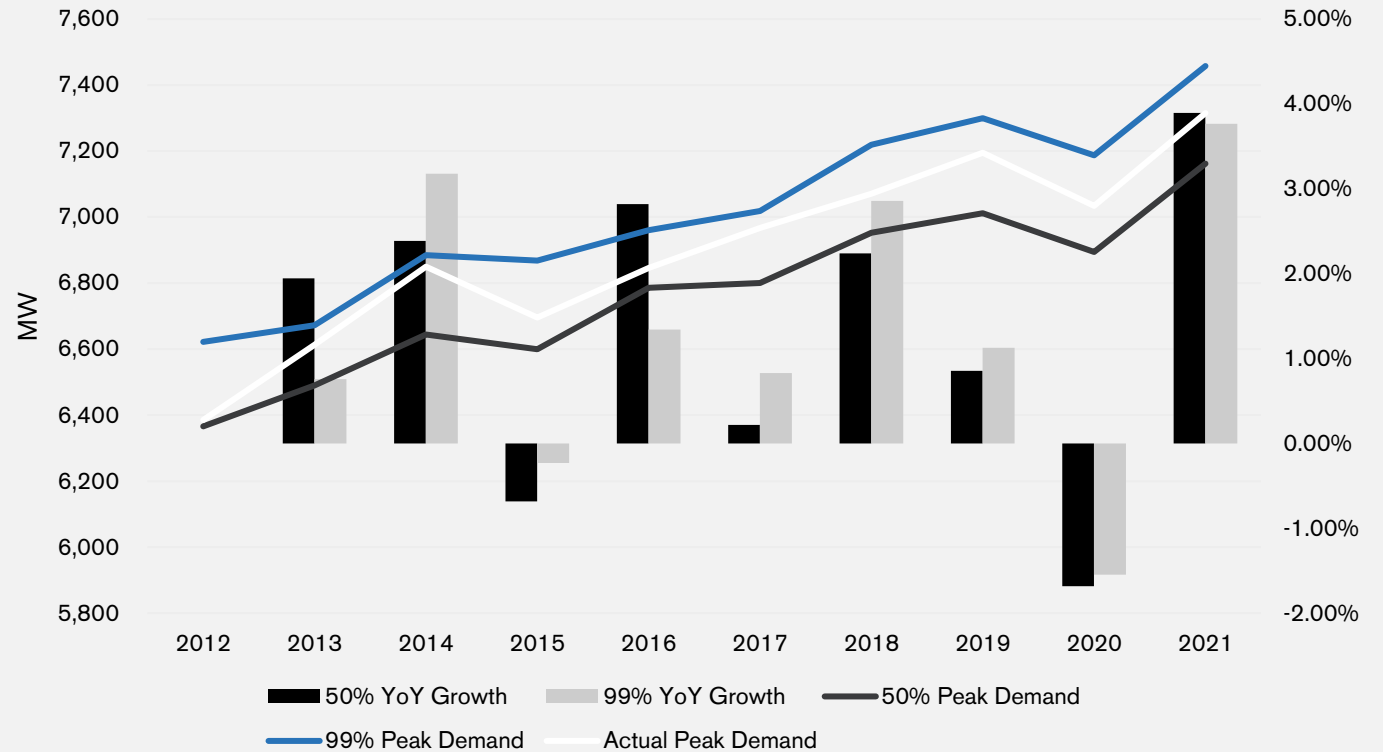


*<https://www.ema.gov.sg/singapore-energy-statistics/Ch03/index3>

YoY Peak Demand Growth

- Since 2012, Singapore's peak demand grew by 12.6%.
- To calculate the 50th and 99th Weather Risk percentiles, weather data from 2010 – 2021 was used. This means that each day was solved to 180 strips (15 per year) of weather data, resulting in 180 solutions for each day. Of these 180 solutions, half fall below the 50th and 99% below the 99th percentile.
- The 99th percentile peak demand shows peak demand growth during extreme weather. The 50th percentile peak demand shows peak demand growth under median weather.
- Both the 50th and 99th percentiles were plotted to see if there was a growing gap between them. However this gap remains uniform over the years, suggesting that peak demand flex has remained stable since 2012.

Singapore Peak Demand Growth
Weather Risk



Summary

- Although the system hit an all time peak of 7,315 MW in October 2021, our analysis shows that 2021's peak demand could have been 2% higher at 7,458 MW if we transplanted May 2016 weather to May 2021 via Weather Risk – Singapore's usual peak month. The fact that the all time peak demand occurred in October rather than May is interesting in itself and suggests May 2022's peak demand may be even higher if hot weather strikes.
- Since 2012, Singapore's total weather corrected demand has grown by 18.8%, while peak demand has grown by 12.6%.
- Although peak demand has grown, there is no evidence of a growing asymmetry in weather responsiveness on peak demand.
- Heading into 2022, the year-on-year weather corrected load growth is likely to return to pre-pandemic levels of around 2%.

■ Questions?

Mark Todoroff

Business Development Director

Level 9
4 Williamson Avenue
Grey Lynn, Auckland 1021
New Zealand

+64 27 485 2247

mtodoroff@teslaforecast.com

www.teslaforecast.com

Henry Chen

Forecasting Analyst

Level 9
4 Williamson Avenue
Grey Lynn, Auckland 1021
New Zealand

+64 21 086 95700

hchen@teslaforecast.com

www.teslaforecast.com