



Smart Energy, Sustainable Future

SINGAPORE ELECTRICITY MARKET OUTLOOK (SEMO) 2018

30 OCTOBER 2018

Third Edition

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SECTION 1 INTRODUCTION

- 1.1 In Singapore's liberalised market environment, power generation investments are commercially driven. Prices in the electricity market send signals to investors to make investment decisions with respect to the timing of new plantings, as well as the amount of capacity and the type of technology. For such a market-based approach to work well, it is important that there should be sufficient and reliable information for investors to make investment decisions. This is especially so for the power sector, considering the high capital cost and significant lead time required for power generation planting.
- 1.2 The Energy Market Authority (EMA) continually seeks to work with the industry to ensure a conducive environment for power generation investments. A public consultation paper was launched in October 2015 to seek feedback on initiatives and enhancements to prepare for future power generation investments in Singapore. This led to the publication of the EMA's Final Determination paper "Preparing for Future Power Generation Investments in Singapore" (29 July 2016)¹, where EMA indicated that it will release an annual information package to improve visibility on the longer term outlook of the energy landscape in Singapore. The EMA launched the inaugural Singapore Electricity Market Outlook (SEMO) on 24 October 2016 and the second edition on 23 October 2017.
- 1.3 In this third edition, the EMA continues to provide the projected demand and supply conditions² in Singapore, complementing existing publications such as the Singapore Energy Statistics.
- 1.4 The EMA welcomes feedback on information that may be useful to include for future editions to enhance visibility on the longer term outlook of the energy landscape in Singapore, and to support future power generation investments.

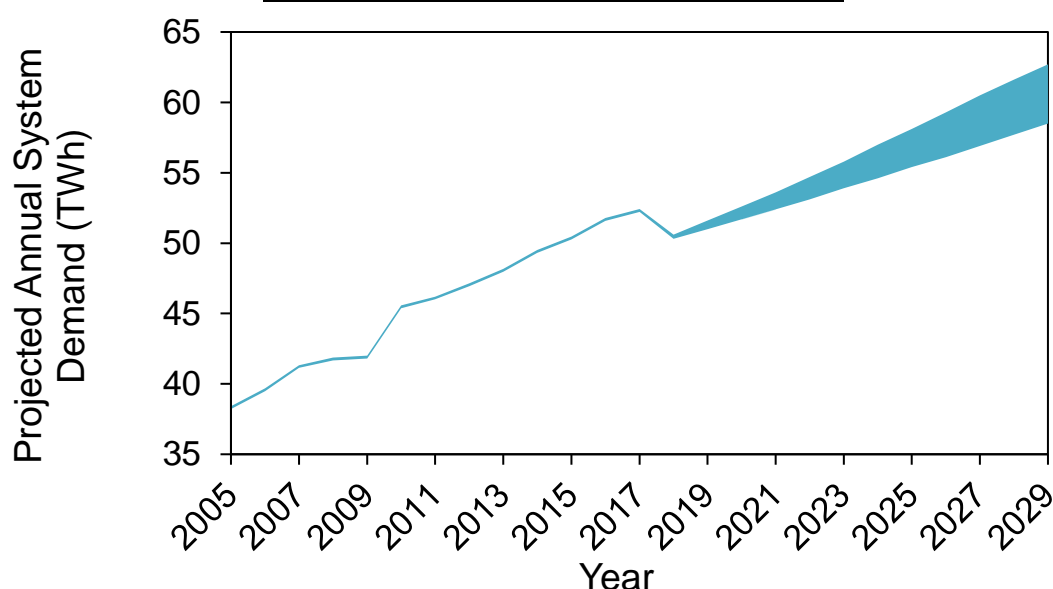
¹ More information on the initiatives can be found in the Final Determination paper "Preparing for Future Power Generation Investments in Singapore", published on 29 July 2016 https://www.ema.gov.sg/cmsmedia/Determination_Paper_%20Preparing_for_Future_Power_Generation_Investments_Final_29_Jul.pdf

² The projections are indicative and non-binding, and are dependent on factors such as prevailing assumptions and projections, policy considerations and the broader macroeconomic climate.

SECTION 2 ELECTRICITY DEMAND OUTLOOK

- 2.1 Singapore's system demand³ has increased from about 41 TWh in 2007 to about 52 TWh in 2017 at a compound annual growth rate (CAGR)⁴ of 2.4%. System peak demand grew from 5,946 MW to 7,188 MW over the same period at a CAGR of 1.9%.
- 2.2 Over the next 10 years, from 2019 to 2029, the annual system demand and system peak demand are projected to grow at a CAGR of 1.4 – 2.0% (see [Figures 1 and 2](#)). This takes into account various factors, including changes to population and temperature⁵, and projected Gross Domestic Product (GDP) growth rates.

Figure 1: Projected Annual System Demand



Year	Projected Annual System Demand (GWh)
2019	51,000 – 51,600
2020	51,700 – 52,600
2021	52,400 – 53,600
2022	53,100 – 54,700
2023	53,900 – 55,800
2024	54,600 – 57,000
2025	55,400 – 58,100
2026	56,100 – 59,300

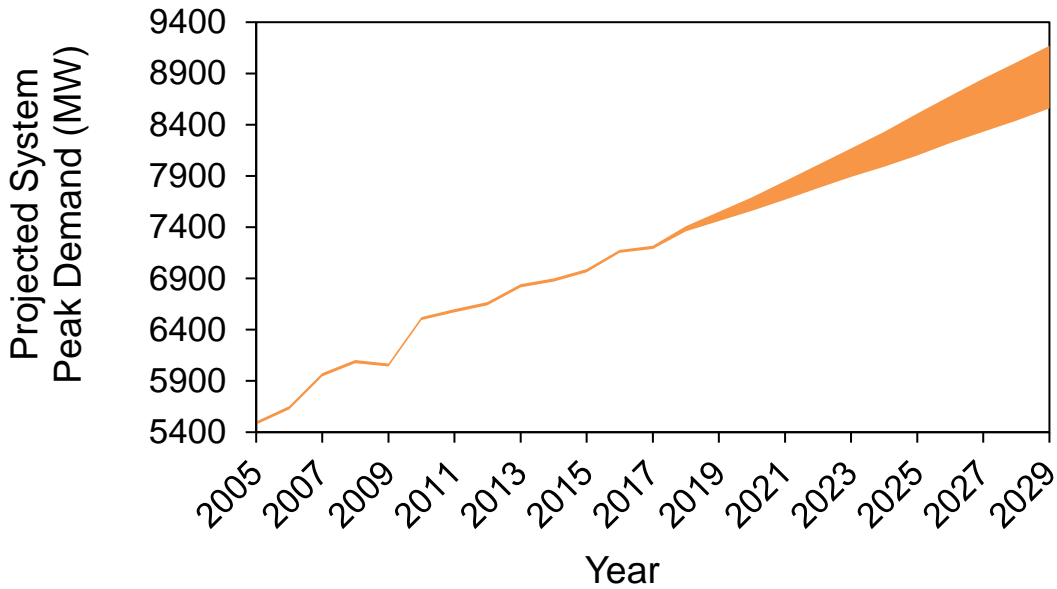
³ System demand refers to gross electricity generation, including autoproducers with their own generation and consumers with solar generation, required to meet electricity consumed by all consumers. Autoproducers are enterprises that produce electricity but for whom the production is not their principal activity.

⁴ The CAGR is calculated using 2007 figures as the base year.

⁵ For instance, higher temperatures may lead to increased electricity demand due to air-conditioning.

2027	56,900 – 60,500
2028	57,700 – 61,600
2029	58,500 – 62,700

Figure 2: Projected System Peak Demand

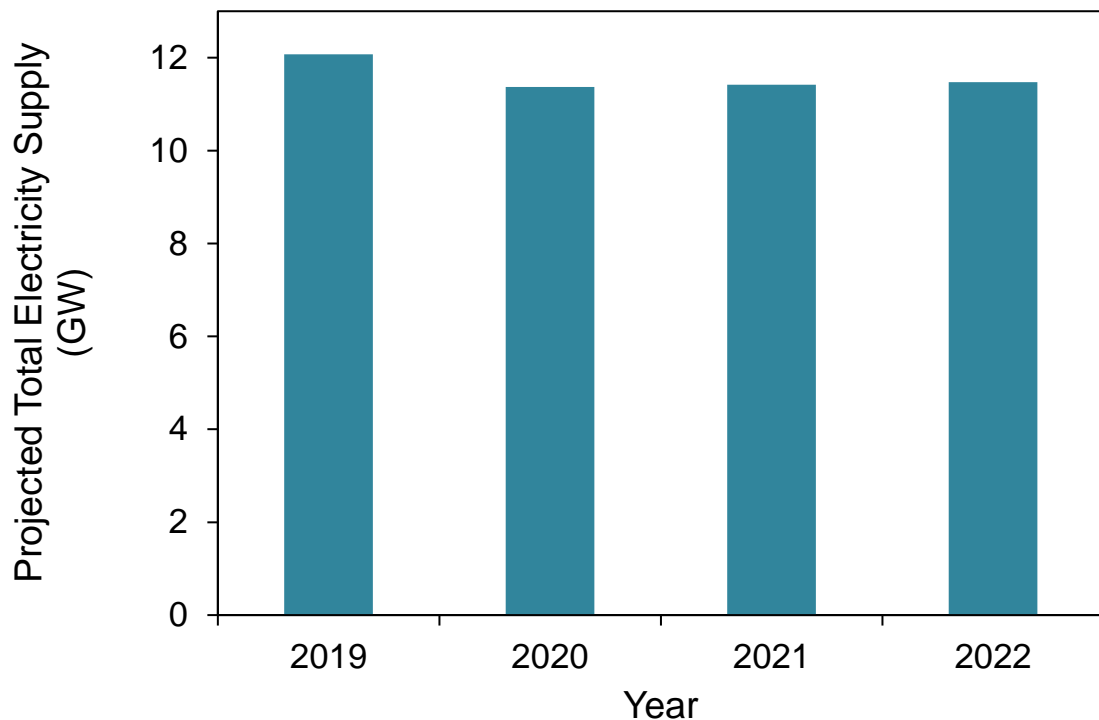


Year	Projected System Peak Demand (MW)
2019	7,460 – 7,550
2020	7,560 – 7,690
2021	7,670 – 7,850
2022	7,780 – 8,010
2023	7,890 – 8,170
2024	7,990 – 8,330
2025	8,100 – 8,510
2026	8,220 – 8,680
2027	8,330 – 8,850
2028	8,440 – 9,010
2029	8,560 – 9,170

SECTION 3 ELECTRICITY SUPPLY OUTLOOK

- 3.1 Based on the submissions received from generation licensees on their indicative generation plans for the next 4 years⁶ and projected growth of solar installed capacity in Singapore⁷, the projected total electricity supply over the next 4 years is indicated in Figure 3.
- 3.2 Generation licensees have indicated retirement plans for about 2,600MW of generation capacity⁸ over the next 2 years. This will be replaced by projected new solar installations and waste-to-energy plantings. The lifting of transmission constraints between Jurong Island and the Singapore mainland will allow for more generation capacity to be supplied to the mainland grid.

Figure 3: Projected Total Electricity Supply (Capacity) (2019-2022)



⁶ The Final Determination paper on “Preparing for Future Power Generation Investments in Singapore” stated that generation licensees are required to inform EMA of their indicative generation plans with at least a 4-year notice period.

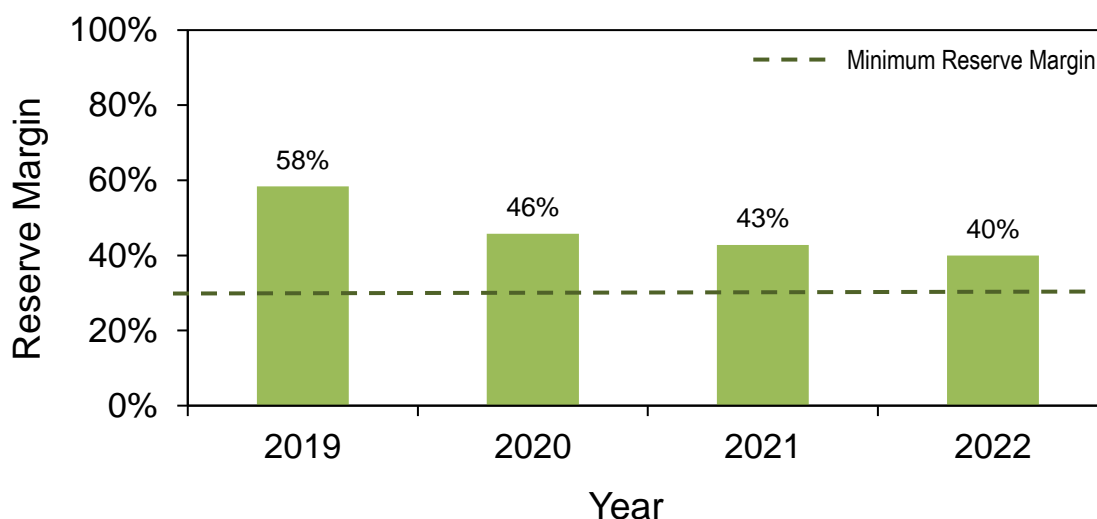
⁷ They are assumed to have a linear growth rate at about 50 MWac per year. EMA will update accordingly based on solar growth trends.

⁸ There will be about 11 plants retiring, which include combined-cycle gas turbine (CCGT), steam and open-cycle gas turbine (OCGT).

	Projected Total Electricity Supply (Capacity) (MW) ⁹	Change(s) in Capacity (MW)
2019	12,070	- 700 ¹⁰
2020	11,370	- 700
2021	11,420	50 ¹¹
2022	11,470	50 ¹²

3.3 Based on the above projected electricity demand and supply, the reserve margin over the next 4 years remain safely above 30%¹³ (as shown in [Figure 4](#)), ensuring an ample supply cushion to meet demand. The reserve margin is calculated (see formula in [Figure 5](#)) using the upper bound of projected system peak demand numbers from [Figure 2](#) and the projected total electricity supply numbers from [Figure 3](#).

[Figure 4: Projected Reserve Margins \(2019-2022\)](#)



[Figure 5: Reserve Margin Formula](#)

$$\text{Reserve Margin} = \frac{\text{Total Electricity Supply (Capacity)} - \text{System Peak Demand}}{\text{System Peak Demand}} \times 100\%$$

⁹ This is based on the projected total electricity supply (capacity) as at end of the calendar year. The projections have been rounded off.

¹⁰ The projected total electricity supply (capacity) by end 2018 is 12,770 MW.

¹¹ The growth is due to the projected annual solar growth rate.

¹² The growth is due to the projected annual solar growth rate.

¹³ In Singapore, the minimum reserve margin has been set at 30% to ensure system security is maintained. The reserve margin is a system-wide indicator.