



Smart Energy, Sustainable Future

SINGAPORE ELECTRICITY MARKET OUTLOOK (SEMO) 2021

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Sixth 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.
- 1.3 In this sixth 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, to support power generation investment decisions.

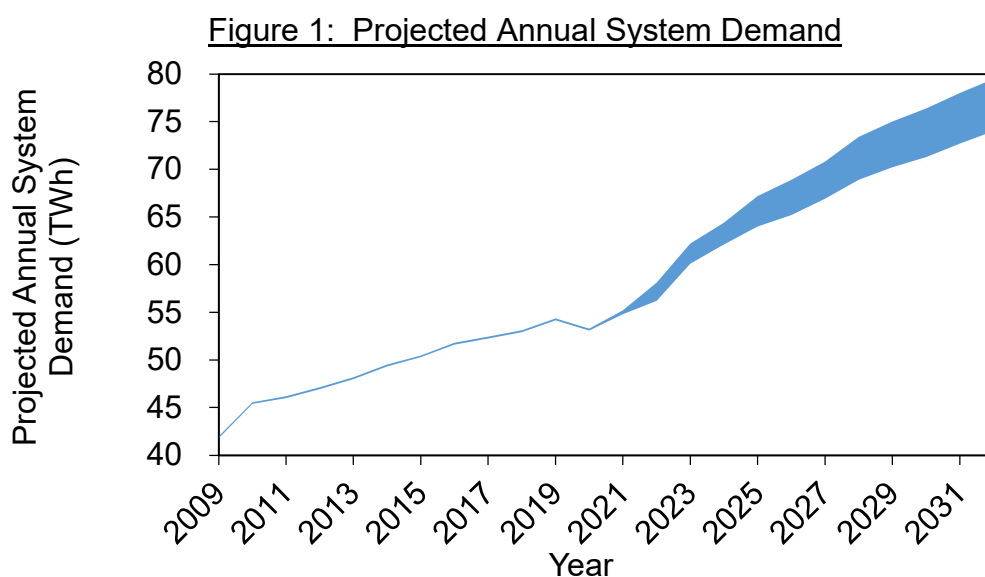
¹ More information on the initiatives can be found in the Final Determination paper "Preparing for Future Power Generation Investments in Singapore", published on 29 July 2016 [https://www.ema.gov.sg/cmsmedia/Determination Paper %20Preparing for Future Power Generation Investments Final 29 Jul.pdf](https://www.ema.gov.sg/cmsmedia/Determination%20Preparing%20for%20Future%20Power%20Generation%20Investments%20Final%2029%20Jul.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 42 TWh in 2009 to about 53 TWh in 2020 at a compound annual growth rate (CAGR)⁴ of 2.2%. System peak demand grew from 6,041 MW to 7,376 MW over the same period at a CAGR of 1.8%. In 2020, the year-on-year annual system demand fell by around 2% due to lower business activities resulting from the COVID-19 measures. In 2021, electricity demand is expected to pick up to around 55 TWh (around 3% increase from 2020 level). As of Oct 2021, the 2021 system peak demand was 7,667MW.

2.2 Over the next decade, from 2022 to 2032, the annual system demand and system peak demand are projected to grow at a CAGR⁵ of between 2.8-3.2% (see [Figures 1 and 2](#)). These take into account various factors, including changes to population, temperature⁶, projected Gross Domestic Product (GDP) growth rates, and projected demand from new high-growth sectors such as data centres.



Year	Projected Annual System Demand (GWh)
2022	56,200 – 58,100
2023	60,100 – 62,200
2024	62,100 – 64,400
2025	64,000 – 67,200

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.

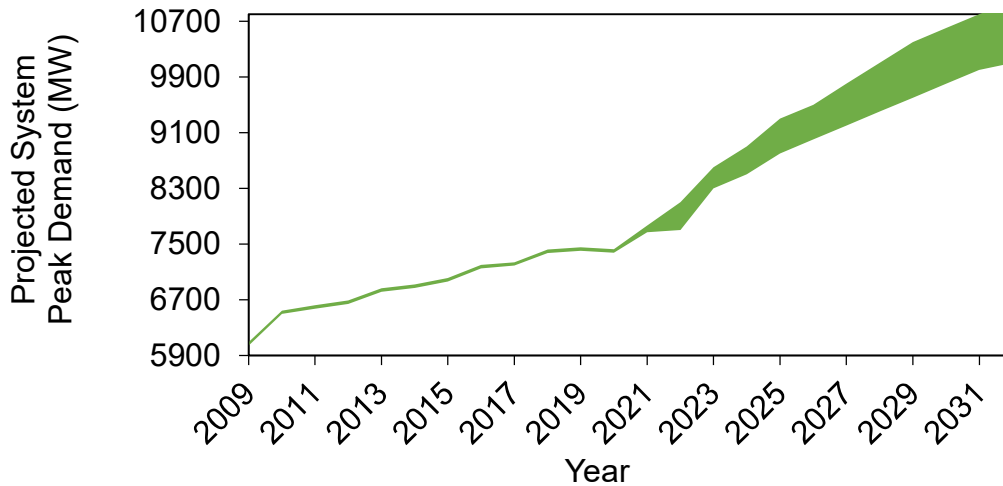
⁴ The CAGR is calculated using 2009 figures as the base year.

⁵ The CAGR is calculated using 2022 figures as the base year.

⁶ For instance, higher temperatures may lead to increased electricity demand due to air-conditioning.

2026	65,200 – 68,900
2027	66,900 – 70,800
2028	68,900 – 73,400
2029	70,200 – 75,000
2030	71,300 – 76,400
2031	72,700 – 78,000
2032	74,000 – 79,500

Figure 2: Projected System Peak Demand



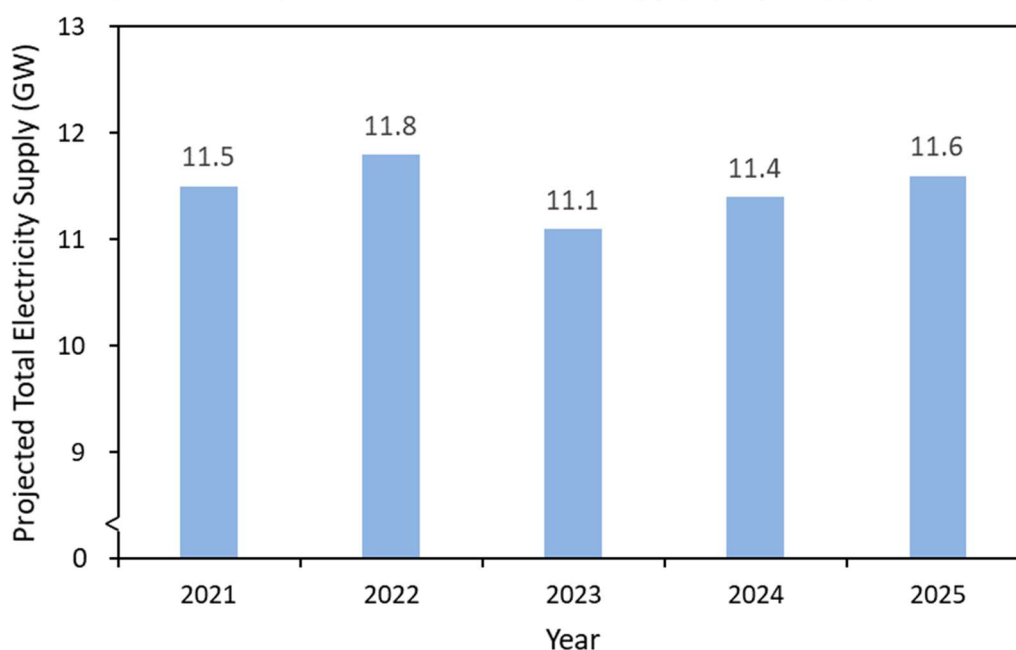
Year	Projected System Peak Demand (MW)
2022	7,700 – 8,100
2023	8,300 – 8,600
2024	8,500 – 8,900
2025	8,800 – 9,300
2026	9,000 – 9,500
2027	9,200 – 9,800
2028	9,400 – 10,100
2029	9,600 – 10,400
2030	9,800 – 10,600
2031	10,000 – 10,800
2032	10,100 – 11,000

2.3 As Singapore rebuilds our economy post-COVID-19, electricity demand is expected to grow over the medium to long term. This is due to growth in electricity-intensive sectors such as data centres and transport (through electrification of vehicles). Power requirements of these sectors are much larger and can ramp up very quickly. The government will continue to monitor these new electricity-intensive sectors to better understand their power requirements and factor this into future energy infrastructures.

SECTION 3 ELECTRICITY SUPPLY OUTLOOK

3.1 Based on the submissions received from generation licensees on their indicative generation plans for the next 4 years⁷ and projected growth of solar installed capacity in Singapore⁸, the projected total electricity supply over the next 4 years is indicated in Figure 3. For avoidance of doubt, Figure 3 does not include projected electricity imports as these are subject to Request for Proposals.

Figure 3: Projected Total Electricity Supply (Capacity) (2021-2025)



	Projected Total Electricity Supply (Capacity) (MW)⁹	Change(s) in Capacity (MW) compared to previous year
2021	11,500	- 400
2022	11,800	300
2023	11,100	- 700
2024	11,400	300
2025	11,600	200

⁷ 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.

⁸ Solar is assumed to have an average growth rate of about 170 MWac per year to reach 1.5 GWp by 2025. With a solar PV effective capacity of 27%, this means that 170 MWac of solar provides about 46 MWac of effective supply during peak periods. More details on the solar effective capacity are available on [EMA's website](#).

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

- 3.2 Singapore plans to import up to 4 GW of electricity by 2035 and will commence on trials which are expected to contribute to the electricity supply over the next 4 years, starting in 2022. This has been included in the supply projections in Figure 3.
- 3.3 The reserve margin is calculated based on the lower and upper bound of the projected system peak demand (shown in Figure 2) and the indicative generation plans of generation licensees that are subject to EMA’s approval (see formula in Figure 5). Subject to the actual demand growth and generation plans being in line with projections, the projected reserve margins for 2021-2025 is largely expected to remain at above 27% as shown in Figure 4¹⁰. In 2025, based on the upper bound of the projected system peak demand, additional generation capacity may be required to meet the required reserve margin of 27%. EMA will consider the pace of electricity demand growth and manage the orderly entry and exit of generation plants and electricity imports to ensure that this does not impact system reliability.

Figure 4: Projected Reserve Margin (2021-2025)

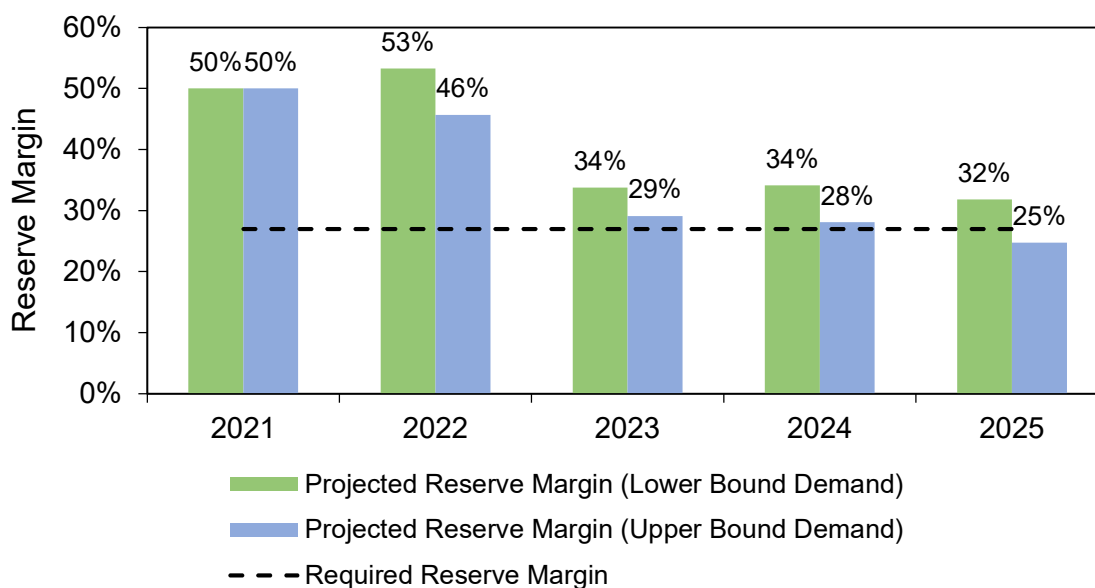


Figure 5: Reserve Margin Formula

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

¹⁰ In Singapore, the minimum reserve margin has been set at 27% to ensure system security. The reserve margin is a system-wide indicator.