

Chapter 15

Singapore Country Report

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Chapter 15

Singapore Country Report

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1. Background

The coronavirus disease (COVID-19) pandemic has had many economic and social impacts on Singapore, which are closely associated with changes in energy demand and supply. To what extent the pandemic has affected the energy system, therefore, must be quantified to facilitate policy development. This chapter develops a scenario that allows such an assessment based on Singapore's Low Emissions Analysis Platform.

2. Macroeconomic Assumptions of the COVID-19 Scenario

Annual gross domestic product (GDP) growth rate in 2020 is preliminarily projected to decrease by 6% (increase by 4% in the business-as-usual [BAU] scenario) and then to increase by 5% in 2021 and 2.6% in 2022 and 2023.

In 2023–2030, the growth rate is 2.4% per year, lower than in BAU. In 2030–2040 economic growth is 2.2% and in 2040–2050 2.0% (Table 15.1).

Table 15.1. Assumed Gross Domestic Product Annual Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

	2018	2019	2020	2021	2022	2023	2023–2030	2030–2040	2040–2050
COVID-19	4.4%	0.7%	–6.0%	5.0%	2.6%	2.6%	2.4%	2.2%	2.0%
BAU	4.2%	3.1%	4.0%	4.0%	3.9%	3.8%	3.5%	3.0%	2.5%

BAU = business as usual, COVID-19 = coronavirus disease.

Sources: Author, based on [International Monetary Fund](#) (2020).

3. Short-term Impact (2018–2023)

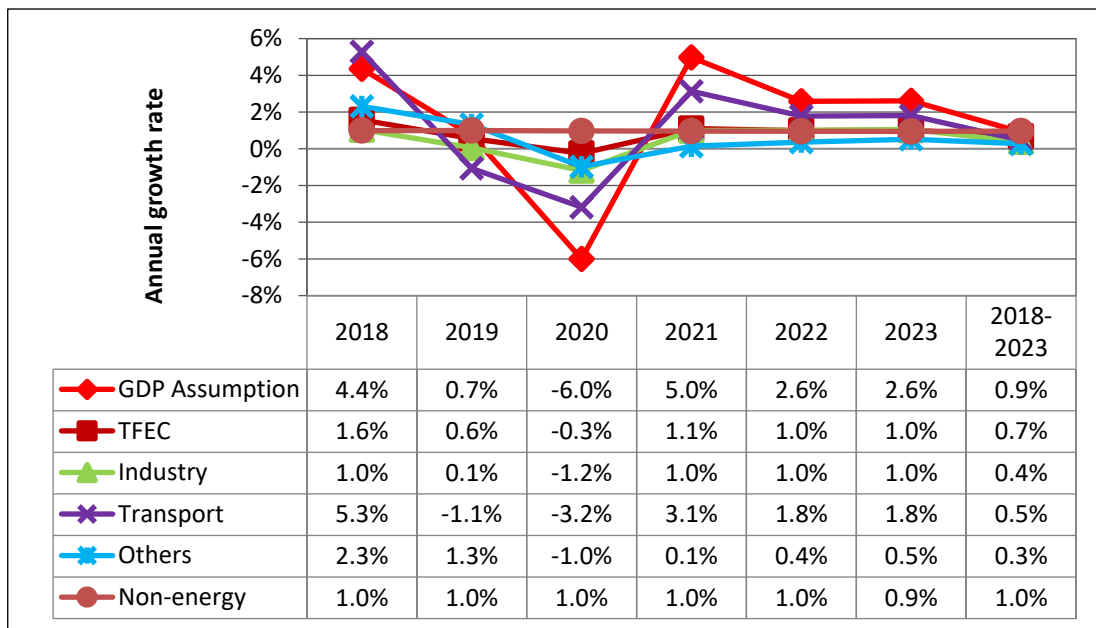
3.1. Final Energy Consumption

In the COVID-19 scenario, GDP sharply decreases by 6.0% in 2020 and starts increasing after 2020. Total final energy consumption (TFEC) increases by an average of 0.7% per year in 2018–2023 (1.3% in BAU). In 2020, TFEC decreases by 0.3% because of the COVID-19 pandemic (increases by 1.2% in BAU).

The strongest decrease in energy consumption growth rate is in transport, at 3.2% in 2020

(an increase of 2.5% in BAU) and an increase of 0.5% per year in 2018–2023 (2.6% in BAU), because of limited travel imposed by circuit-breaker measures and work from home. Industry energy consumption decreases by 1.2% in 2020 (0.9% in BAU) and increases by 0.4% per year in 2018–2023 (1.2% in BAU). Residential and commercial ('others') energy consumption decreases by 1.0% in 2020 (1.7% in BAU) and increases on average by 0.3% per year in 2018–2023 (1.8% in BAU). Non-energy use increases by 1.0% in 2020 and by 1.0% on average per year in 2018–2023, close to the increases in BAU (Figure 15.1).

Figure 15.1. Annual Growth Rate of Final Energy Consumption, by Sector, COVID-19 Scenario, 2018–2023

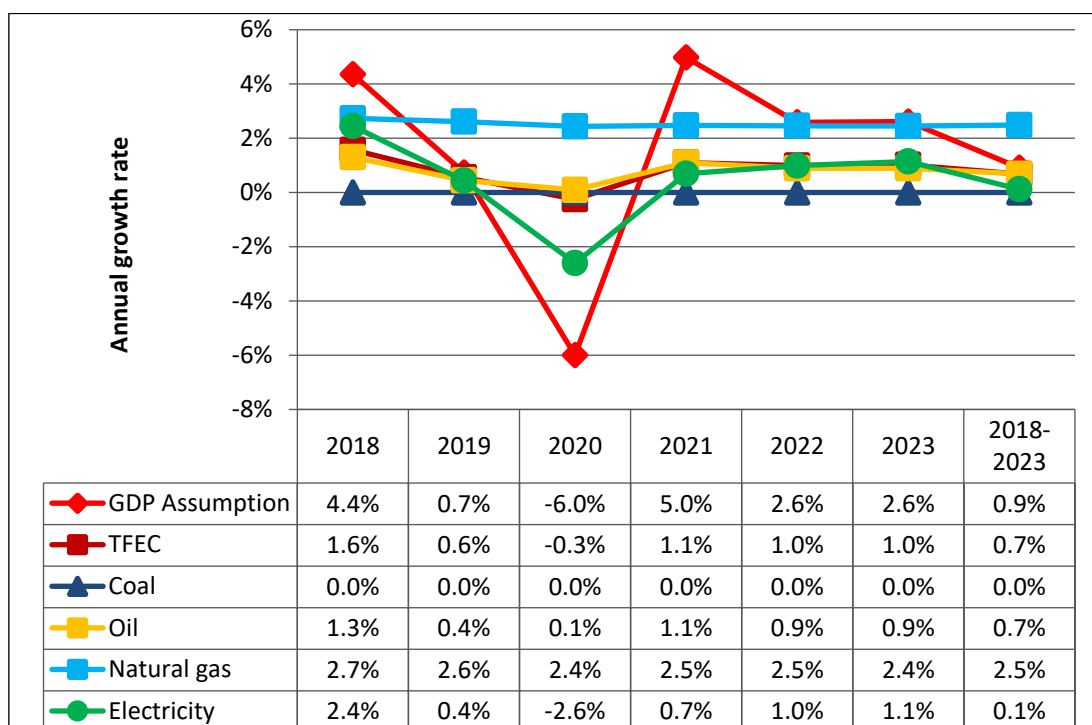


COVID-19 = coronavirus disease, GDP = gross domestic product, others = residential and commercial sectors, TFEC = total final energy consumption.

Source: Author.

In the COVID-19 scenario, the strongest decrease in TFEC is in electricity, by 2.6% in 2020 (an increase of 1.5% in BAU), with average annual growth of 0.1% in 2018–2023 (2.0% in BAU). Coal consumption remains unchanged. Oil product consumption increases by 0.1% in 2020. Natural gas consumption, however, increases by 2.4% in 2020 (2.6% in BAU) and grows on average by 2.5% per year in 2018–2023 (2.6% in BAU) (Figure 15.2).

Figure 15.2. Annual Growth Rate of Final Energy Consumption, by Fuel, COVID-19 Scenario, 2018–2023

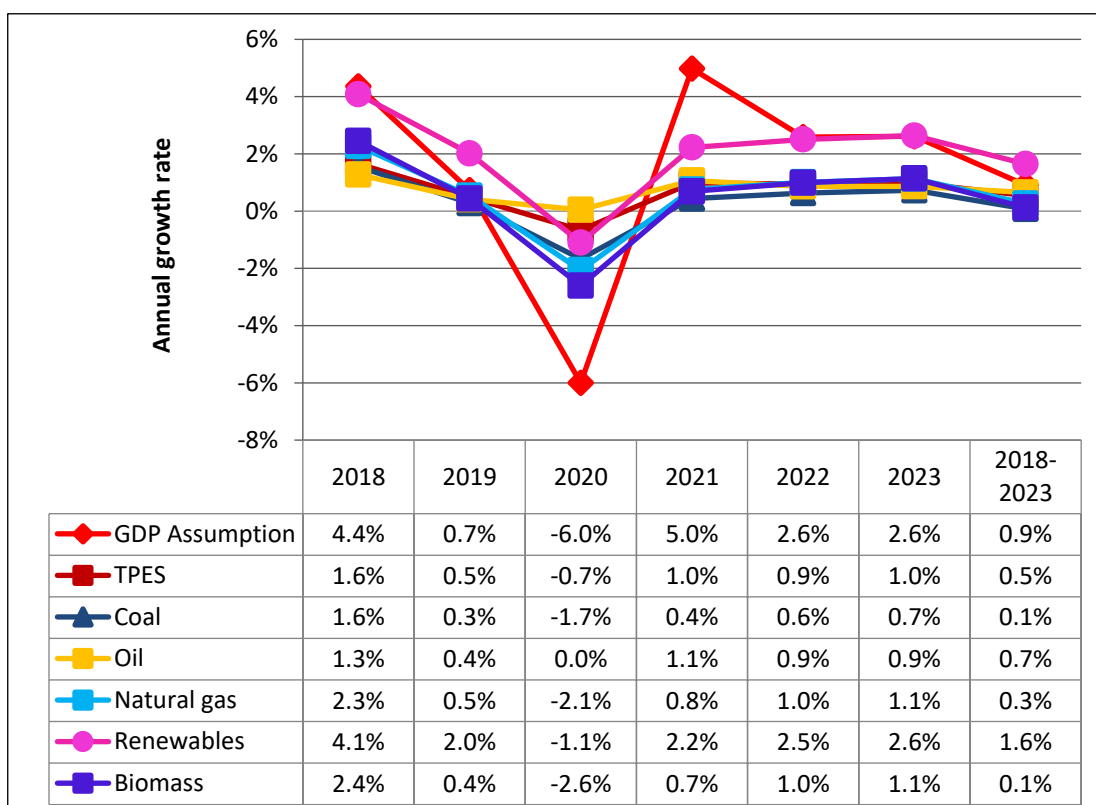


COVID-19 = coronavirus disease, GDP = gross domestic product, TFEC = total final energy consumption.
Source: Author.

3.2. Primary Energy Supply

In the COVID-19 scenario, total primary energy supply (TPES) drops by 0.7% in 2020 (increases by 1.2% in BAU) and increases by 0.5% per year in 2018–2023 (1.3% in BAU) (Figure 15.3). The strongest decrease in primary energy supply growth rate is in biomass, by 2.6% in 2020 (an increase of 1.5% in BAU), which rebounds to 0.1% per year in 2018–2023 (2% in BAU). Natural gas decreases by 2.1% in 2020 (1.4% in BAU) and increases by 0.3% per year in 2018–2023 (1.8% in BAU). Coal decreases by 1.7% in 2020 (1% in BAU) and increases by 0.1% per year in 2018–2023 (1.3% in BAU). Renewables (solar energy and municipal solid waste) decrease by 1.1% in 2020 (3.1% in BAU) and increase by 1.6% per year in 2018–2023 (3.5% in BAU).

Figure 15.3. Annual Growth Rate of Primary Energy Supply, by Fuel, COVID-19 Scenario, 2018–2023



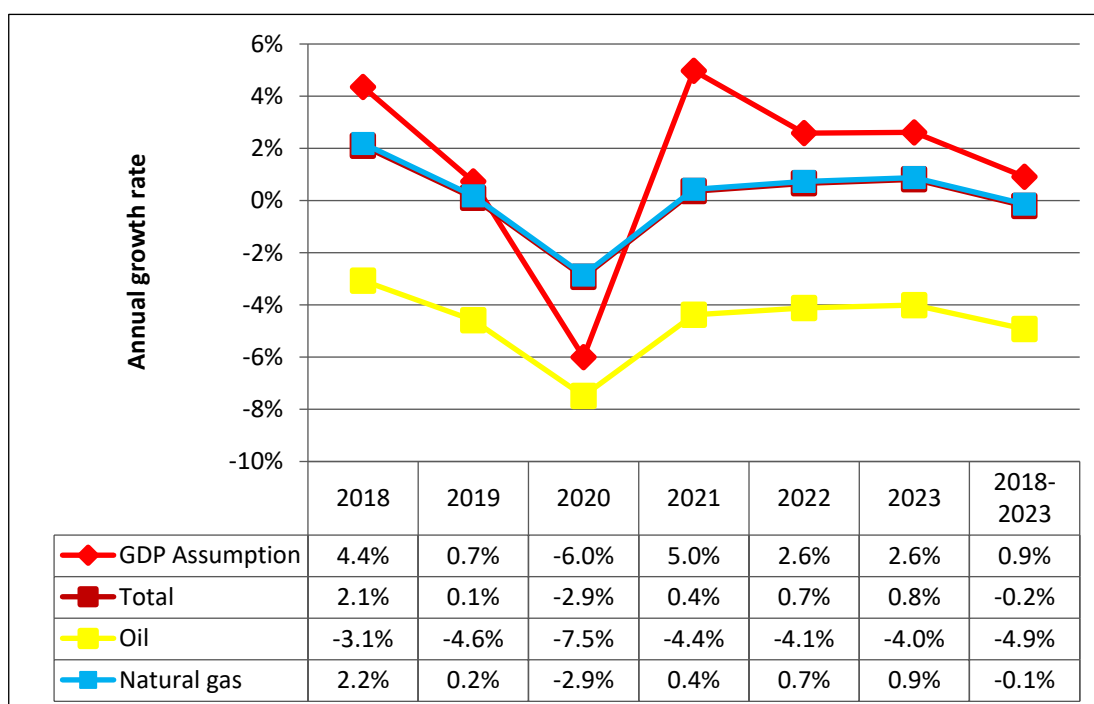
COVID-19 = coronavirus disease, GDP = gross domestic product, renewables = solar energy and municipal solid waste, TPES = total primary energy supply.

Source: Author.

3.3. CO₂ Emissions

In the COVID-19 scenario, greenhouse gas (GHG) emissions from the power sector decrease by 2.9% in 2020 (increase by 1.2% in BAU) and decrease on average by 0.2% per year in 2018–2023 (increase by 1.6% in BAU). GHG emission growth decreased most for oil products, by 7.5% in 2020 (3.6% in BAU) and by an average of 4.9% per year in 2018–2023 (3.2% in BAU), followed by natural gas, by 2.9% in 2020 (1.2% increase in BAU) and by an average of 0.1% per year in 2018–2023 (1.7% increase in BAU). CO₂ emissions decreased mainly because of COVID-19 (Figure 15.4).

Figure 15.4. CO₂ Emissions, by Fuel, COVID-19 Scenario, 2018–2023



COVID-19 = coronavirus disease, GDP = gross domestic product.

Source: Author.

4. Long-term Impact (2023–2050)

4.1. Final Energy Consumption

In the COVID-19 scenario, TFEC increases by an average of 1.0% per year in 2017–2050 (1.7% in BAU) (Table 15.2).

Table 15.2. Gross Domestic Product and Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

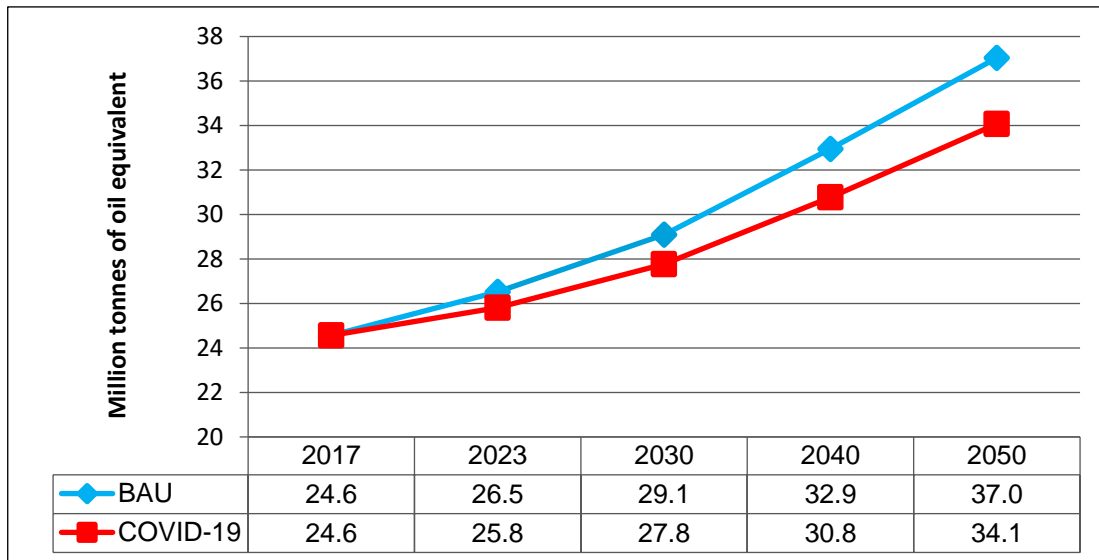
		2017	2023	2030	2040	2050	AAGR (2017–2050)
GDP (US\$ billion, 2010)	BAU	452.1	566.4	722.1	969.7	1236.8	1.7%
	COVID-19	452.1	493.7	584.0	725.9	884.9	1.0%
	COVID-19 vs BAU	0.0%	-12.8%	-19.1%	-25.1%	-28.5%	
TFEC (Mtoe)	BAU	24.6	26.5	29.1	32.9	37.0	0.5%
	COVID-19	24.6	25.8	27.8	30.8	34.1	0.4%
	COVID-19 vs BAU	0.0%	-2.7%	-4.6%	-6.6%	-8.0%	

AAGR = average annual growth rate, BAU = business as usual, COVID-19 = coronavirus disease, GDP = gross domestic product, Mtoe = million tonnes of oil equivalent, TFEC = total final energy consumption.

Source: Author.

The above calculation results show that TFEC in the COVID-19 scenario will be smaller than in BAU because the decrease in GDP resulting from COVID-19 reduces demand for final energy consumption (Figure 15.5).

Figure 15.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

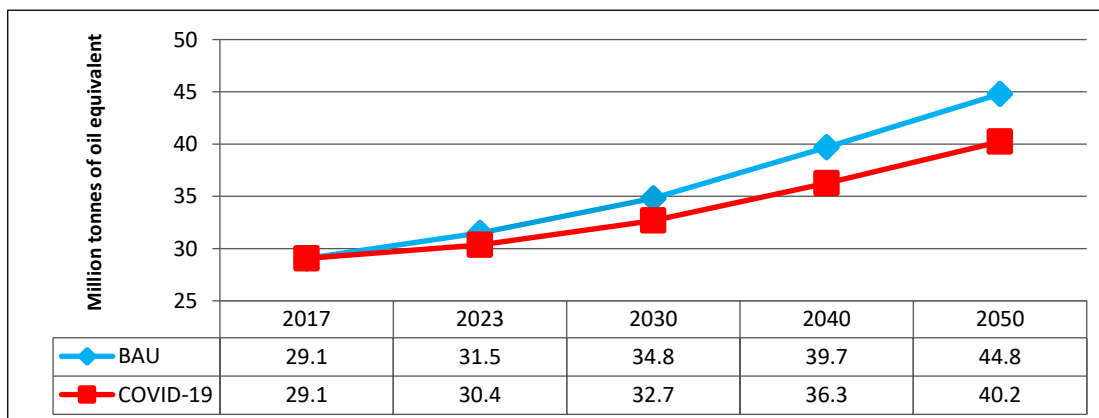


BAU = business as usual, COVID-19 = coronavirus disease.
Source: Author.

4.2. Primary Energy Supply

TPES in the COVID-19 scenario increases on average by 1.0% per year in 2017–2050 (1.3% in BAU). Like TFEC, TPES in the COVID-19 scenario is smaller than in BAU in 2017–2050 (Figure 15.6).

Figure 15.6. Total Primary Energy Supply, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

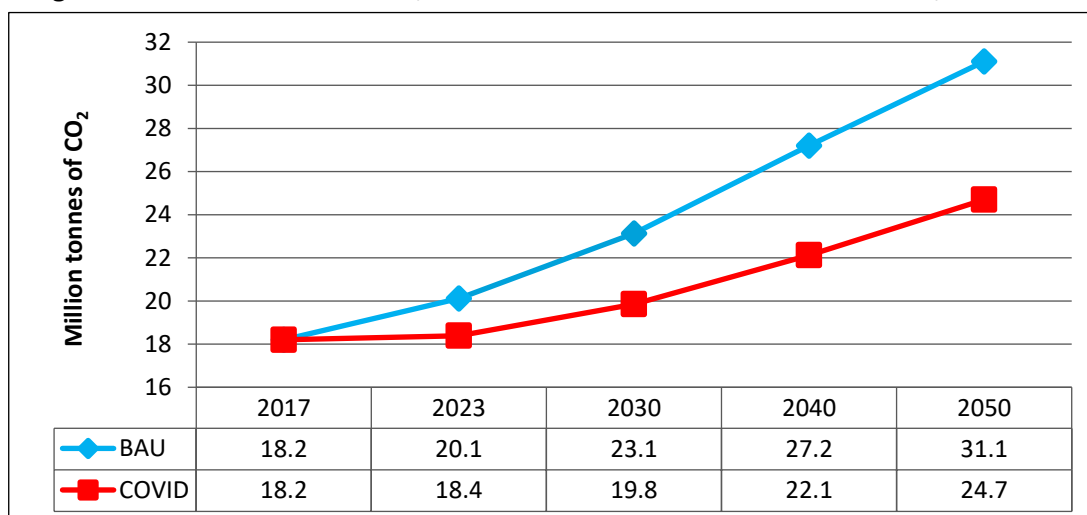


BAU = business as usual, COVID-19 = coronavirus disease.
Source: Author.

4.3. CO₂ Emissions

In the COVID-19 scenario, GHG emissions increase on average by 0.9% per year in 2017–2050 (1.6% in BAU). Similarly, CO₂ emissions are lower than those in BAU (Figure 15.7).

Figure 15.7. Total CO₂ Emissions, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050



BAU = business as usual, COVID-19 = coronavirus disease.

Source: Authors.

5. Implications and Policy Recommendations

The COVID-19 pandemic has led to significant social and economic impacts on Singapore’s economy. Since the beginning of the pandemic, Singapore has taken measures to deal with it, such as border control, safe social distancing, quarantine, circuit breaker, work from home, and enhanced health-care capacity. The government’s effective measures to combat the virus include virus testing and TraceTogether apps. The measures, however, have reduced domestic production. More importantly, the pandemic has reshaped the global supply chains to which Singapore belongs. The negative economic effects of COVID-19 on global production networks have overflowed to Singapore. In 2020, GDP is estimated to decrease by about 6.0%.

The decline in economic growth lowers demand for energy. The decline of GDP growth in 2020 affects energy consumption, and the dynamics of energy supply and demand are closely associated with post-pandemic economic recovery. The decline of GDP growth (6.0% in 2020) leads to a decline of energy consumption (0.3% of TFEC and 0.7% of TPES in 2020). Transport TFEC is the most affected, decreasing by 3.2% because of travel restrictions and circuit-breaker measures. CO₂ emissions in the COVID-19 scenario drop by 2.9% in 2020.

In the long term, TFEC in the COVID-19 scenario does not catch up with TFEC in BAU after 2020 because of lower long-term GDP projections. In the COVID-19 scenario, TFEC in 2050 reaches 34.1 million tonnes of oil equivalent, about 8.0% lower than in BAU.

CO₂ emission reductions from energy consumption in the COVID-19 scenario are significant (about 24.7 metric tonnes of CO₂ [MtCO₂] in 2050) (about 31.1 MtCO₂ in BAU). In the COVID-

19 scenario, the average annual growth of CO₂ emissions is about 0.9% in 2017–2050 (about 1.6% in BAU).

The pandemic confirms the importance of technologies. Singapore will continue to strengthen digitalisation in the post-pandemic period, for example, through the Smart Nation initiative and strategic national research and development planning. Such efforts will shape how economic activities are organised, such as remote working, e-learning, and online business, which, in turn, will have important implications for long-term planning of energy and infrastructure. The pandemic also highlights the importance of resilient and diversified energy supply chains, which calls for better regional and international cooperation, such as the Association of Southeast Asian Nations (ASEAN) Power Grid.