# Chapter 3

# Australia Country Report

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# Chapter 3
# Australia Country Report

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## 1. Background

The coronavirus disease (COVID-19) pandemic has wreaked havoc on the global economic system. In Australia, a swift and orderly approach to restricting and quarantining inbound arrivals from overseas—including effective lockdowns, contact tracing, community awareness, health system mobilisation, etc.—were vital for suppressing the domestic spread of the disease. Nonetheless, COVID-19 and formal measures taken to control its spread have had a notable impact on patterns of daily life and economic activity. In 2020, Australia went into its first recession in almost 30 years, although its gross domestic product (GDP) contracted less than in many other developed countries.

Each of these effects has impacted energy use and supply. This chapter analyses the pandemic's impact on near- and long-term energy demand and supply by comparing the results from two scenarios: business-as-usual (BAU) and COVID-19.

## 2. Macro Assumptions of the COVID-19 Scenario

The quick responses to minimise the pandemic's economic consequences, such as generous fiscal stimulus packages and wage subsidies, were critical for minimising the effects of shutdowns and initial shocks. The COVID-19 scenario assumes that GDP decreases by 0.9% in 2020, in contrast with an expected increase of 2.8% in BAU.[4] However, signs point to the economy entering a recovery period, with strong rebound growth seen in 2020 after the second quarter because of favourable health outcomes of observing COVID-19–safe lifestyles, international border closure, and substantial monetary and fiscal policy support. The GDP growth rate is assumed to continue to rebound in 2021 to 3.8% and gradually slow to 3.1% in 2022 and 3.0% in 2023. Annual GDP growth rates are the same as in the BAU scenario: 2.3% in 2023–2030, 1.9% in 2030–2040, and 1.6% in 2040–2050 (Table 3.1).

[3] The Institute of Energy Economics, Japan.
[4] All data in this chapter, unless otherwise cited, is attributed to the modelling results for Australia of The Institute of Energy Economics, Japan.

**Table 3.1. 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** | 2.8% | 2.1% | –0.9% | 3.8% | 3.1% | 3.0% | 2.3% | 1.9% | 1.6% |
| **BAU** | 2.8% | 2.1% | 2.8% | 2.8% | 2.6% | 2.6% | 2.3% | 1.9% | 1.6% |

BAU = business-as-usual, COVID-19 = coronavirus disease.
Source: Authors, based on International Monetary Fund (2020).

## 3. Short-term Impact (2018–2023)

### 3.1. Final Energy Consumption

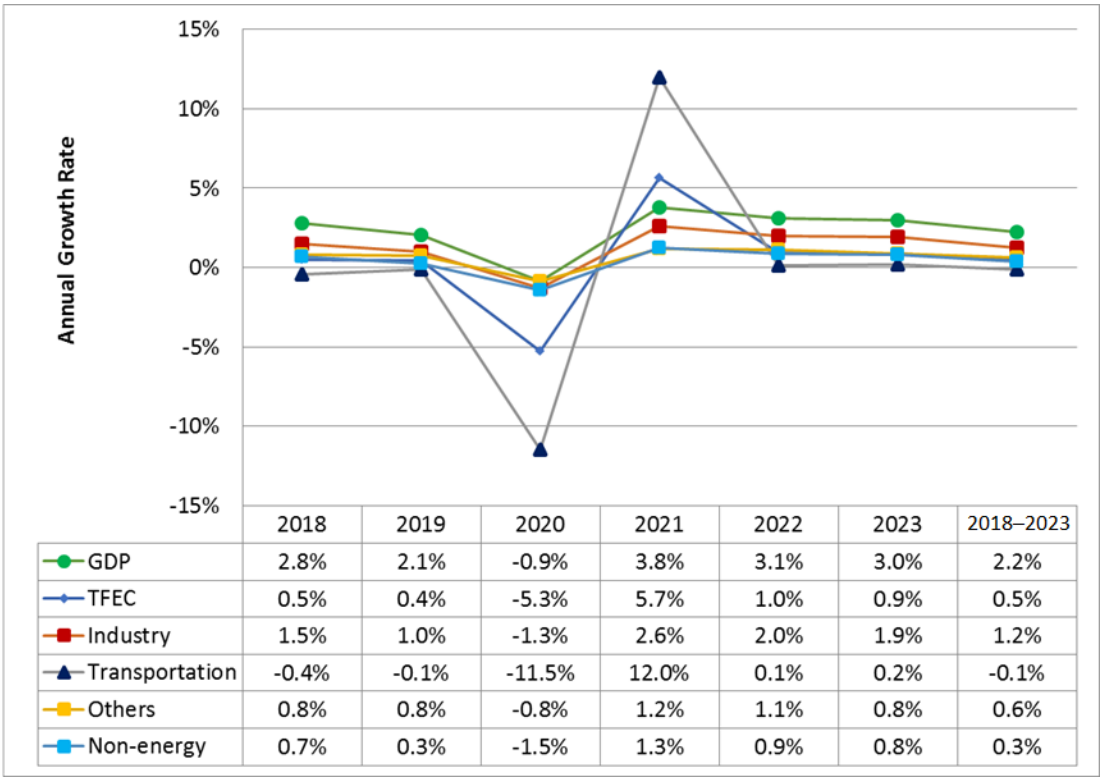
In the COVID-19 scenario, total final energy consumption (TFEC) decreases by 5.3% in 2020 but sharply increase by 5.7% in 2021 (Figure 3.1). Yet, even with this rebounded growth, TFEC increases on average by only 0.5% per year in 2018–2023 (0.7% in BAU).

#### 3.1.1. Final Energy Demand by Sector

In the COVID-19 scenario, transport energy consumption decrease the most, by 11.5% in 2020 (0.2% in BAU). The decrease in transport fuel demand is the result of limited travel and work-from-home arrangements during the lockdown in 2020. However, transport demand increases sharply (12.0%) in 2020–2021 in the COVID-19 scenario, offsetting some of the sharper divergences between the BAU and COVID-19 scenarios. In 2018–2023, transport energy use declines by an average rate of 0.1% per year in both scenarios.

In the COVID-19 scenario, energy consumption in the non-energy sector is the next most impacted, reduced by 1.5% in 2020 (increased by 0.6% in BAU). Industry decreases energy consumption by 1.3% (1.7% in BAU). However, industry increases energy use by 1.2% per year in 2018–2023 (1.5% in BAU). Energy use in the residential and commercial sectors (‘others’) decreases by 0.8% in 2020 (0.9% in BAU) and increases by 0.6% per year in 2018–2023 (0.8% in BAU) (Figure 3.1).

**Figure 3.1. Annual Growth Rate of Final Energy Consumption, by Sector, COVID-19 Scenario, 2018–2023**




| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2018–2023 |
|---|---|---|---|---|---|---|---|
| GDP | 2.8% | 2.1% | -0.9% | 3.8% | 3.1% | 3.0% | 2.2% |
| TFEC | 0.5% | 0.4% | -5.3% | 5.7% | 1.0% | 0.9% | 0.5% |
| Industry | 1.5% | 1.0% | -1.3% | 2.6% | 2.0% | 1.9% | 1.2% |
| Transportation | -0.4% | -0.1% | -11.5% | 12.0% | 0.1% | 0.2% | -0.1% |
| Others | 0.8% | 0.8% | -0.8% | 1.2% | 1.1% | 0.8% | 0.6% |
| Non-energy | 0.7% | 0.3% | -1.5% | 1.3% | 0.9% | 0.8% | 0.3% |

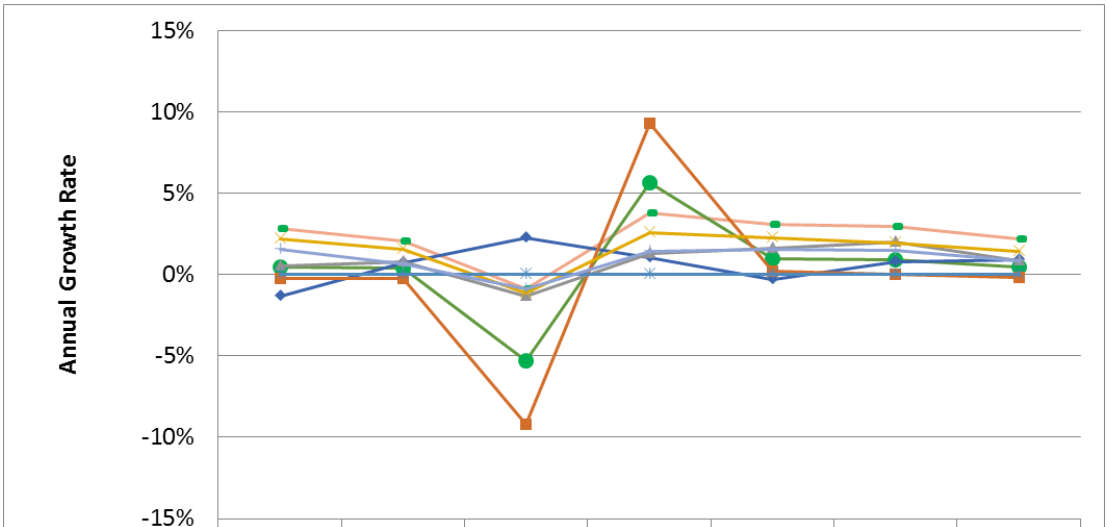
COVID-19 = coronavirus disease, GDP = gross domestic product, TFEC = total final energy consumption.
Source: Authors.

### 3.1.2. Final Energy Demand by Fuel

The COVID-19 scenario sees the strongest decline in oil consumption. Oil demand decreases by 9.2% in 2020 (0.1% in BAU). The strong decrease in oil demand is caused by reduced transport activities, work from home during the lockdown, and restrictions on international travel. Oil demand increases sharply (9.3%) in 2021 mainly because of the easing of travel restrictions. However, oil use decreases by 0.1% per year in 2018–2023 in the COVID-19 scenario, compared with flat demand growth in 2018–2023 in BAU.

In 2018–2023, demand for coal grows by 0.9% (1.6% in BAU), natural gas by 0.9% (1.1%), and electricity by 1.4% (1.8%) per year. These fuels' relatively low growth rates are caused by the expected closure of some business and industries domestically. 'Others' (e.g. biomass, liquid biofuels, solar hot water) grow by 0.9% per year in 2018–2023 (1.1% in BAU). The slower growth of 'others' is caused by reduced use of biomass in industry as linked to overall reduced industry energy demand (Figure 3.2).

**Figure 3.2. Annual Growth Rate of Final Energy Consumption by Fuel, COVID-19 Scenario, 2018–2023**




| | | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| GDP | 2.8% | 2.1% | -0.9% | 3.8% | 3.1% | 3.0% | 2.2% |
| TFEC | 0.5% | 0.4% | -5.3% | 5.7% | 1.0% | 0.9% | 0.5% |
| Coal | -1.4% | 0.7% | 2.3% | 1.1% | -0.3% | 0.8% | 0.9% |
| Oil | -0.3% | -0.2% | -9.2% | 9.3% | 0.2% | 0.0% | -0.1% |
| Natural gas | 0.6% | 0.8% | -1.3% | 1.3% | 1.7% | 2.0% | 0.9% |
| Electricity | 2.2% | 1.6% | -1.1% | 2.6% | 2.2% | 1.9% | 1.4% |
| Heat | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Others | 1.5% | 0.7% | -0.9% | 1.4% | 1.5% | 1.5% | 0.9% |

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

### 3.2. Primary Energy Supply

In the COVID-19 scenario, total primary energy supply (TPES) decreases by 5.3% in 2020 (increases by 0.2% in BAU) but increases by 4.3% in 2021. TPES growth remains flat in 2018–2023 in the COVID-19 scenario (0.3% in BAU) because of slow TFEC growth.

In 2020, primary energy supply of oil decreases the most by 11.1% (0.2% in BAU) because of limited travel activities and remote working arrangements during the lockdown. Oil supply increases sharply by 10.7% in 2021 but declines by an average rate of 0.4% per year in 2018–2023 (0.1% in BAU).

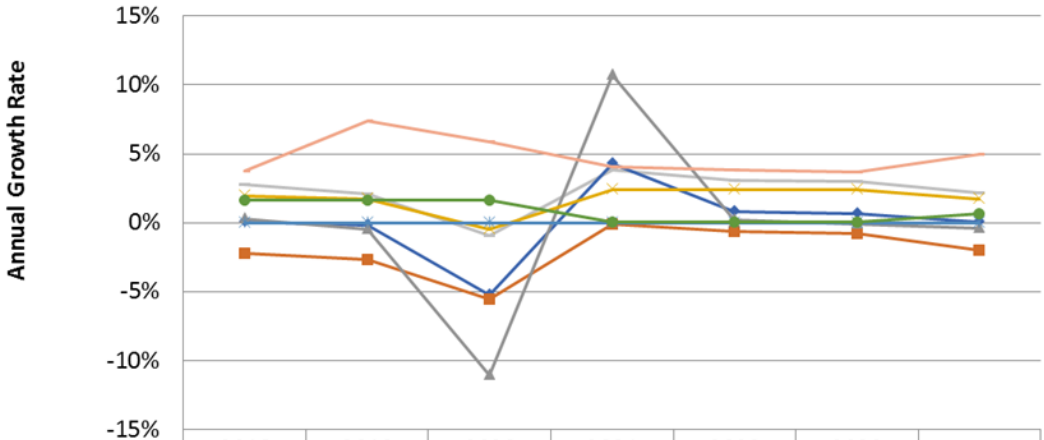
The primary supply of coal declines by 5.5% in 2020 (2.1% in BAU) and by 1.9% per year in 2018–2023 (1.5% in BAU). The changes in coal use are caused by reduced electricity demand during the lockdown, combined with the fall in coal-fired generation and accelerated switching to renewable electricity generation.

Natural gas supply decreases by 0.4% in 2020 (increases by 2.0% in BAU) and increases by an average of 1.7% per year in 2018–2023 (2.0% in BAU). The pandemic is not likely to affect

natural gas supply significantly during this period.

Average annual growth of primary energy supply from 'others', solar, wind, and liquid biofuels is faster in 2018–2023 because of the continuous shift from fossil fuels to renewables (Figure 3.3).

**Figure 3.3. Annual Growth Rate of Primary Energy Supply, by Source, COVID-19 Scenario, 2018–2023**




| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2018–2023 |
|---|---|---|---|---|---|---|---|
| GDP | 2.8% | 2.1% | -0.9% | 3.8% | 3.1% | 3.0% | 2.2% |
| TPES | 0.0% | -0.2% | -5.3% | 4.3% | 0.8% | 0.6% | 0.0% |
| Coal | -2.2% | -2.6% | -5.5% | -0.1% | -0.6% | -0.8% | -1.9% |
| Oil | 0.3% | -0.5% | -11.1% | 10.7% | 0.2% | -0.1% | -0.4% |
| Natural gas | 1.9% | 1.7% | -0.4% | 2.4% | 2.4% | 2.4% | 1.7% |
| Nuclear | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Hydro | 1.7% | 1.6% | 1.6% | 0.1% | 0.1% | 0.1% | 0.7% |
| Others | 3.7% | 7.4% | 5.9% | 4.0% | 3.9% | 3.7% | 5.0% |

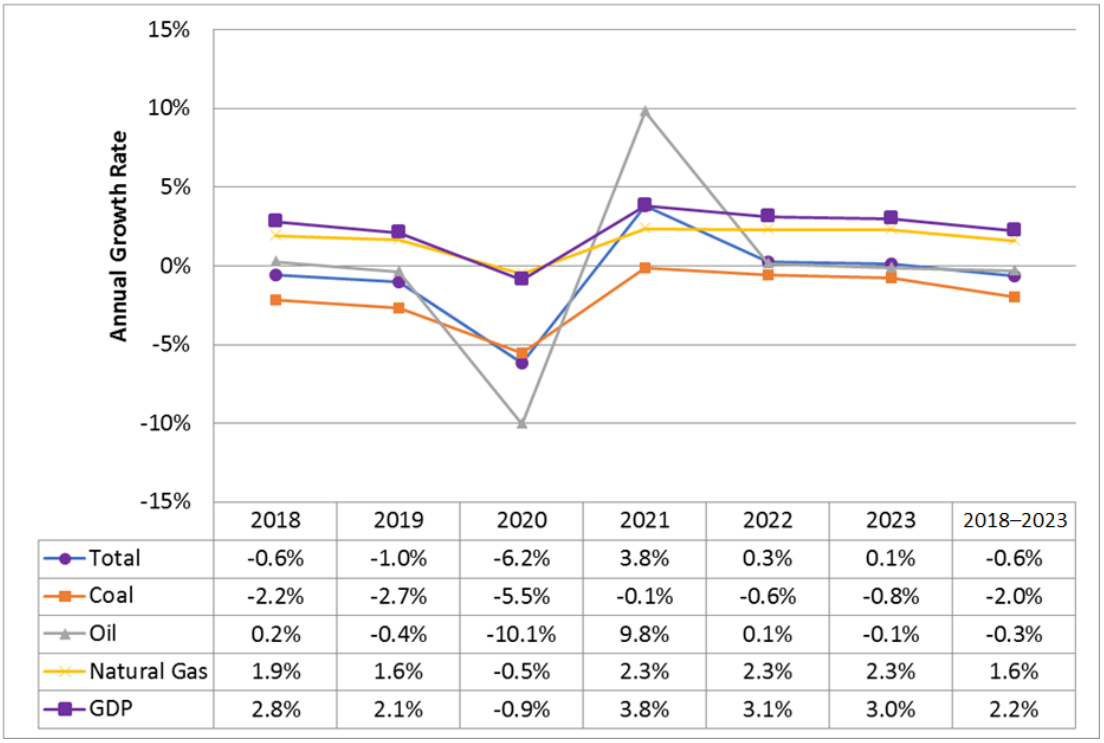
COVID-19 = coronavirus disease, GDP = gross domestic product, TPES = total primary energy supply.
Source: Authors.

### 3.3. $CO_2$ Emissions

In the COVID-19 scenario, $CO_2$ emissions decrease by 6.2% in 2020 (0.6% in BAU) and decrease by 0.6% per year in 2018–2023 (0.3% in BAU). The results suggest that the pandemic helps reduce $CO_2$ emissions (Figure 3.4).

$CO_2$ emissions decrease the most in coal, by 2.0% per year in 2018–2023 (1.5% in BAU). Emissions from oil decline by 0.3% per year in 2018–2023 (0.1% in BAU). Emissions from natural gas increase by 1.6% per year in 2018–2023 (1.9% in BAU).

**Figure 3.4. $CO_2$ Emissions, by Source, COVID-19 Scenario, 2018–2023**




| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2018–2023 |
|---|---|---|---|---|---|---|---|
| Total | -0.6% | -1.0% | -6.2% | 3.8% | 0.3% | 0.1% | -0.6% |
| Coal | -2.2% | -2.7% | -5.5% | -0.1% | -0.6% | -0.8% | -2.0% |
| Oil | 0.2% | -0.4% | -10.1% | 9.8% | 0.1% | -0.1% | -0.3% |
| Natural Gas | 1.9% | 1.6% | -0.5% | 2.3% | 2.3% | 2.3% | 1.6% |
| GDP | 2.8% | 2.1% | -0.9% | 3.8% | 3.1% | 3.0% | 2.2% |

GDP = gross domestic product.
Source: Authors.

## 4. Long-term Impact (2017-2050)

### 4.1. Final Energy Consumption

TFEC in the COVID-19 scenario increases by an average of 0.2% per year in 2017–2050 (0.3% in BAU) because the economy grows by an annual average rate of 2.0%, nearly the same as in BAU, in 2017–2050. Economic activity grows faster in the COVID-19 scenario because of recovery measures from 2021 to 2023, while GDP grows at similar rates after 2023 in both scenarios, suggesting that the pandemic has limited impact on TFEC and GDP in the long term.

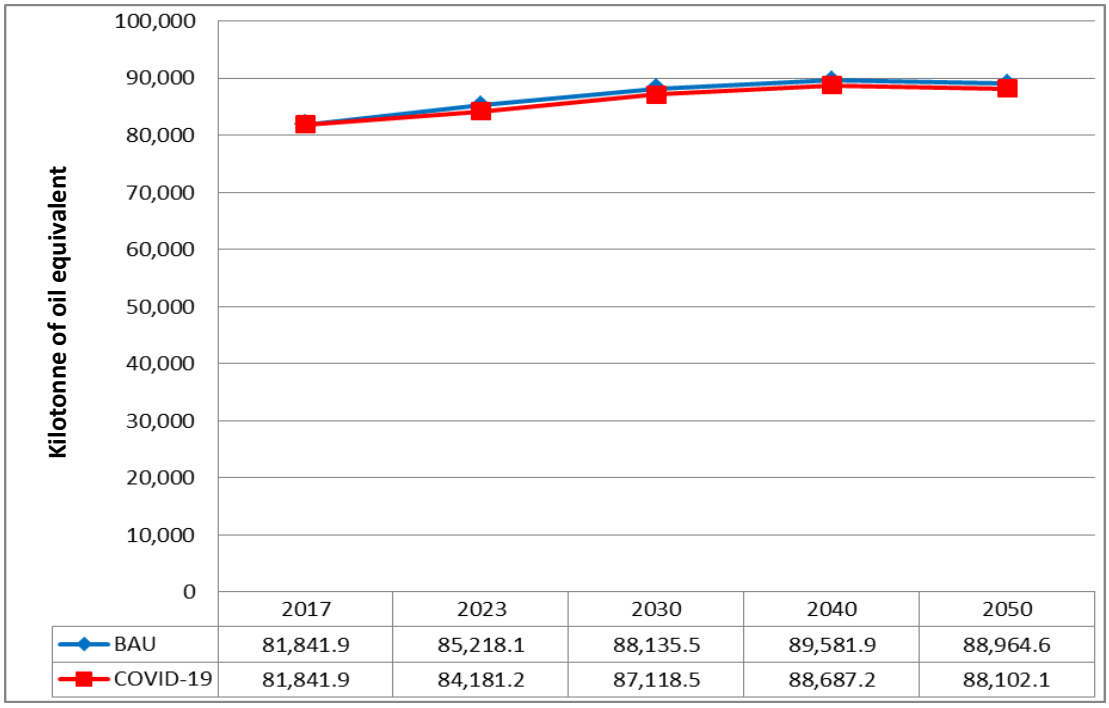
**Table 3.2. Gross Domestic Product and Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**

| | | 2017 | 2023 | 2030 | 2040 | 2050 | AAGR (2017–2050) |
|---|---|---|---|---|---|---|---|
| GDP (Billion US$, 2010) | BAU | 1,432.7 | 1,672.7 | 1,955.5 | 2,364.7 | 2,776.2 | 2.0% |
| | COVID-19 | 1,432.7 | 1,642.5 | 1,921.1 | 2,323.1 | 2,727.4 | 2.0% |
| | COVID-19 vs. BAU | 0.0 | -1.8% | -1.8% | -1.8% | -1.8% | |
| TFEC (Ktoe) | BAU | 81,841.9 | 85,218.1 | 88,135.5 | 89,581.9 | 88,964.6 | 0.3% |
| | COVID-19 | 81,841.9 | 84,181.2 | 87,118.5 | 88,687.2 | 88,102.1 | 0.2% |
| | COVID-19 vs. BAU | 0.0 | -1.2% | -1.2% | -1.0% | -1.0% | |

AAGR = annual average growth rate, BAU = business as usual, COVID-19 = coronavirus disease, GDP = gross domestic product, Ktoe = kilotonne of oil equivalent, TFEC = total final energy consumption.
Source: Authors.

Because GDP growth rebounds, TFEC in the COVID-19 scenario approaches BAU with a marginal difference (–1.0%) in 2017–2050 (Figure 3.5).

**Figure 3.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**

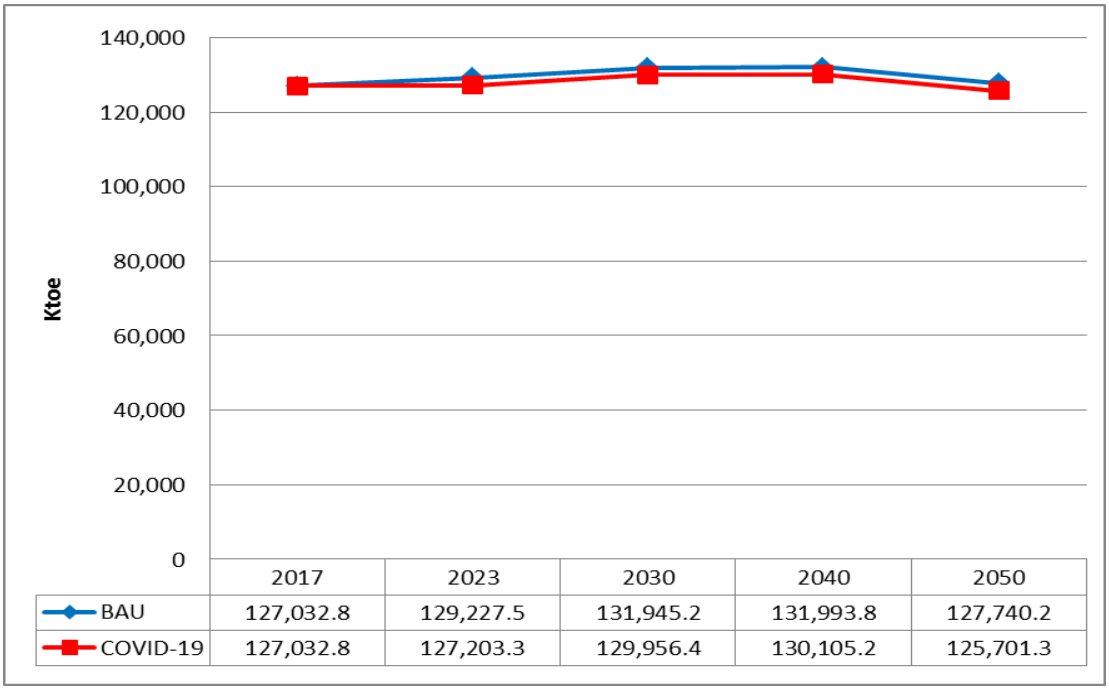



BAU = business as usual, COVID-19 = coronavirus disease.
Source: Authors.

### 4.2. Primary Energy Supply

TPES growth remains flat in 2017–2050 in both scenarios, decreasing by only 0.03% per year in the COVID-19 scenario (increasing by 0.02% in BAU). The pandemic thus affects TPES in the long term. Strong economic recovery, along with structural economic changes, flatten TPES growth in the projection period (Figure 3.6).

**Figure 3.6. Total Primary Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**



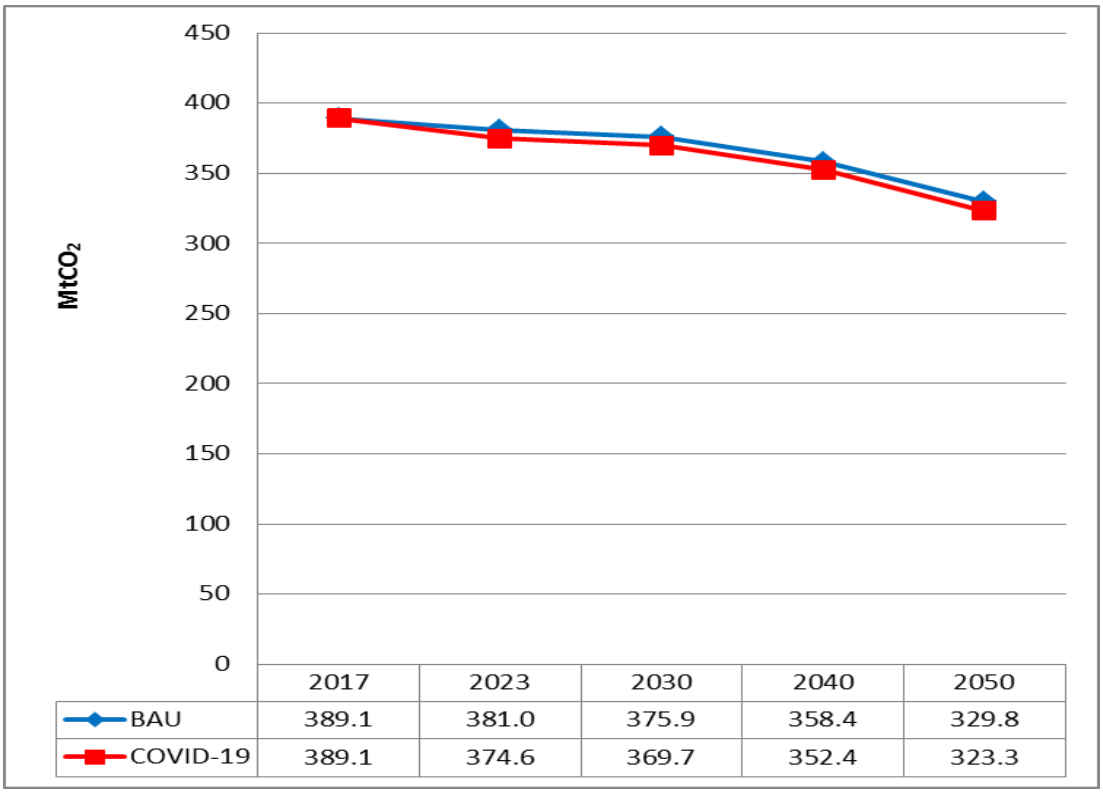

| | 2017 | 2023 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|
| BAU | 127,032.8 | 129,227.5 | 131,945.2 | 131,993.8 | 127,740.2 |
| COVID-19 | 127,032.8 | 127,203.3 | 129,956.4 | 130,105.2 | 125,701.3 |

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

### 4.3. $CO_2$ Emissions

In both scenarios, $CO_2$ emissions from domestic energy use decrease in 2017–2050, in the COVID-19 scenario, by 0.6% per year (0.5% in BAU). Energy-related emissions in 2050 are 16.9% lower than in 2017 in the COVID-19 scenario (15.2% in BAU) (Figure 3.7). $CO_2$ emission reduction levels in both scenarios are insufficient to achieve Australia's 2030 targets for energy-related emission reduction.

**Figure 3.7. Total $CO_2$ Emissions, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**




| | 2017 | 2023 | 2030 | 2040 | 2050 |
|---|---|---|---|---|---|
| BAU | 389.1 | 381.0 | 375.9 | 358.4 | 329.8 |
| COVID-19 | 389.1 | 374.6 | 369.7 | 352.4 | 323.3 |

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

## 5. Implications and Policy Recommendations

(i) This chapter suggests that negative growth of GDP in 2020 (–0.9%) reduces Australia's TPES, TFEC, and $CO_2$ emissions in 2020. Energy consumption in transport decreases significantly, followed by industry. However, energy demand and emissions increase again in 2021 with the economic rebound.

(ii) Transport has more opportunities for energy saving. Promoting remote work in appropriate sectors would put downward pressure on transport fuel use, reducing oil import dependence.

(iii) Unaffected by the pandemic, wind and solar energy supply grows faster in the short term in both scenarios. Adoption of large-scale wind and solar energy supported by energy storage in the long term would play an important role in decarbonising electricity generation.

(iv) The share of natural gas in the primary energy supply increases over the projection period in both scenarios. Natural gas is dominant, followed by oil, in TPES. Coal's dominance declines in the long term, but further reduction of coal use will help achieve emission reduction targets.

(v) The $CO_2$ emission reduction level in 2030 in both scenarios suggests that further action is needed to achieve Australia's energy-related emission reduction goals.

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