Chapter 16

Thailand Country Report

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Chapter 16
Thailand Country Report

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1. Background

In 2020, the coronavirus disease (COVID-19) pandemic impacted the world. Thailand's first confirmed case of COVID-19 was a traveller from abroad on 13 January 2020, but the virus started spreading widely at the beginning of March. The government locked the country down in late March. The price was economic slowdown and near standstill until mid-June; 3,135 were infected and 58 died. The energy outlook in the COVID-19 scenario was inevitably reshaped.

2. Macro Assumptions of the COVID-19 Scenario

The lockdown had a direct impact on transport and the residential and commercial sectors. Industry production declined because of low domestic demand resulting from the severe economic downturn and slow exports.

Gross domestic product (GDP) in the COVID-19 scenario has much lower short- and long-term growth rates than in the business-as-usual (BAU) scenario (Table 16.1). However, the Office of the National Economic and Social Development Council has periodically revised GDP outlook. GDP in BAU in 2018 and in the COVID-19 scenario in 2020 are completely different.

Table 16.1. Assumptions of Gross Domestic Product Annual Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

	2018	2019	2020	2021	2022	2023	2020-2030	2030–2040	2040–2050
COVID-19	4.2%	2.3%	-6.0%	4.0%	3.0%	3.0%	3.1%	2.8%	2.7%
BAU	4.2%	2.3%	3.9%	3.9%	3.9%	3.9%	3.8%	3.6%	3.6%

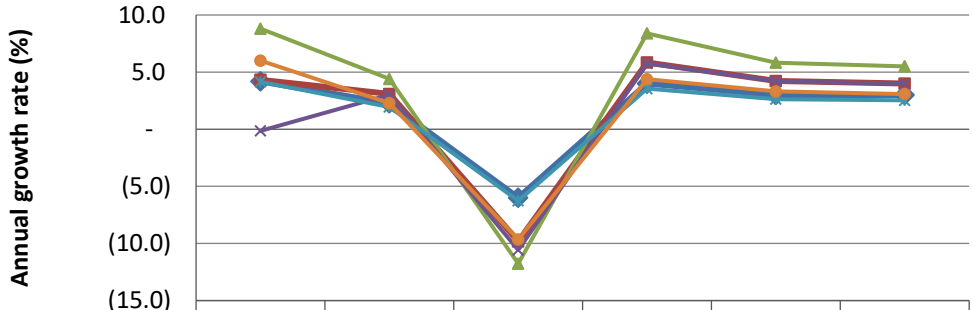
BAU = business as usual, COVID-19 = coronavirus disease.
Sources: Office of the National Economic and Social Development Council (2018).

3. Short-term Impact (2018–2023)

3.1. Final Energy Consumption

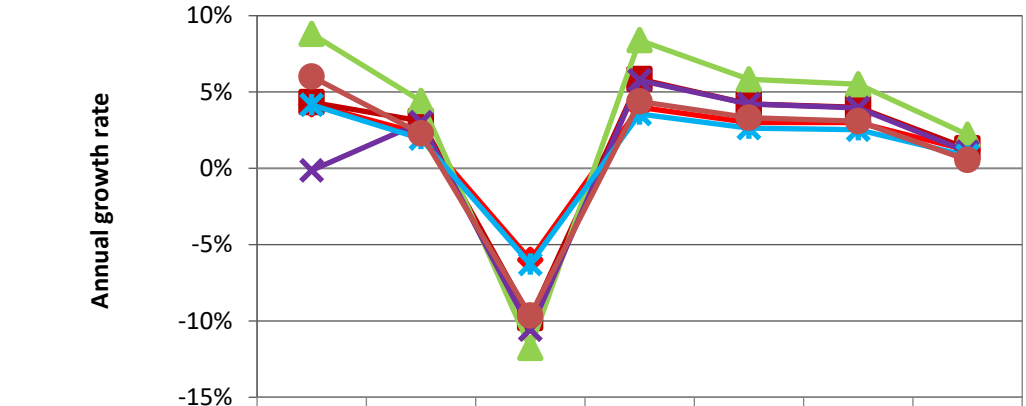
In the COVID-19 scenario, total final energy consumption (TFEC) grows by 1.3% per annum on average (4.2% in BAU) from 89.0 million tonnes of oil equivalent (Mtoe) to 94.9 Mtoe in 2018–2023 (109.3 Mtoe in 2023 in BAU) (Figure 16.1). In the COVID-19 scenario, energy consumption declines sharply by about 9.8% on average in 2020: by 11.8% in industry, 10.6% in transport, 6.3% in 'others' (agriculture, commercial, and residential sectors), and 9.6% in non-energy use. Industry energy consumption is about 25.2 Mtoe in 2020, compared with 28.5 Mtoe in 2019, and 30.5 Mtoe in 2023. Its average growth rate is about 2.2% (30.5 Mtoe) per annum in 2018–2023 (6.1% [36.8 Mtoe] in BAU). Transport energy consumption in the COVID-19 scenario decreases by 10.6% from 29.5 Mtoe in 2019 to 26.4 Mtoe in 2020 (increases by 4.6% from 29.5 Mtoe to 30.9 Mtoe in BAU). Transport energy consumption grows by 1.1% per year on average in 2018–2023 (4.0% in BAU). In the COVID-19 scenario, energy consumption by 'others' decreases by 6.3% from 21.4 Mtoe in 2019 to 20.1 Mtoe in 2020 (increases by 3.1% from 21.4 Mtoe to 22.1 Mtoe in BAU). Energy consumption by 'others', especially the commercial and residential sectors, was estimated to grow at the average rate of 0.8% per year in 2018–2023 (2.7% in BAU).

Figure 16.1. Annual Growth Rate of Final Energy Consumption, by Sector, COVID-19 Scenario, 2018–2023



	2018	2019	2020	2021	2022	2023
GDP Assumption	4.2	2.3	(6.0)	4.0	3.0	3.0
TFEC	4.3	3.1	(9.8)	5.8	4.2	4.0
Industry	8.8	4.4	(11.8)	8.4	5.8	5.5
Transport	(0.1)	3.0	(10.6)	5.8	4.2	4.0
Other Sectors	4.2	1.9	(6.3)	3.6	2.6	2.5
Non Energy Use	6.0	2.3	(9.6)	4.4	3.3	3.1

Figure 16.1. Continued

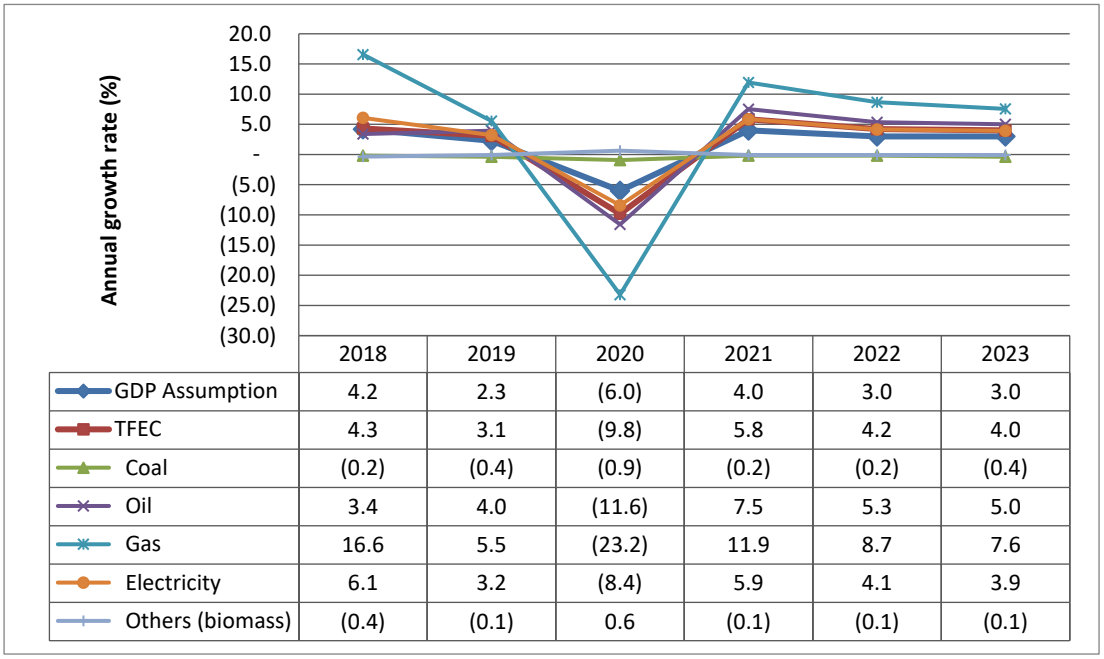


	2018	2019	2020	2021	2022	2023	2018-23
GDP Assumption	4.2%	2.3%	-6.0%	4.0%	3.0%	3.0%	1.2%
TFEC	4.3%	3.1%	-9.8%	5.8%	4.2%	4.0%	1.3%
Industry	8.8%	4.4%	-11.8%	8.4%	5.8%	5.5%	2.2%
Transportation	-0.1%	3.0%	-10.6%	5.8%	4.2%	4.0%	1.1%
Others	4.2%	1.9%	-6.3%	3.6%	2.6%	2.5%	0.8%
Non-energy	6.0%	2.3%	-9.6%	4.4%	3.3%	3.1%	0.5%

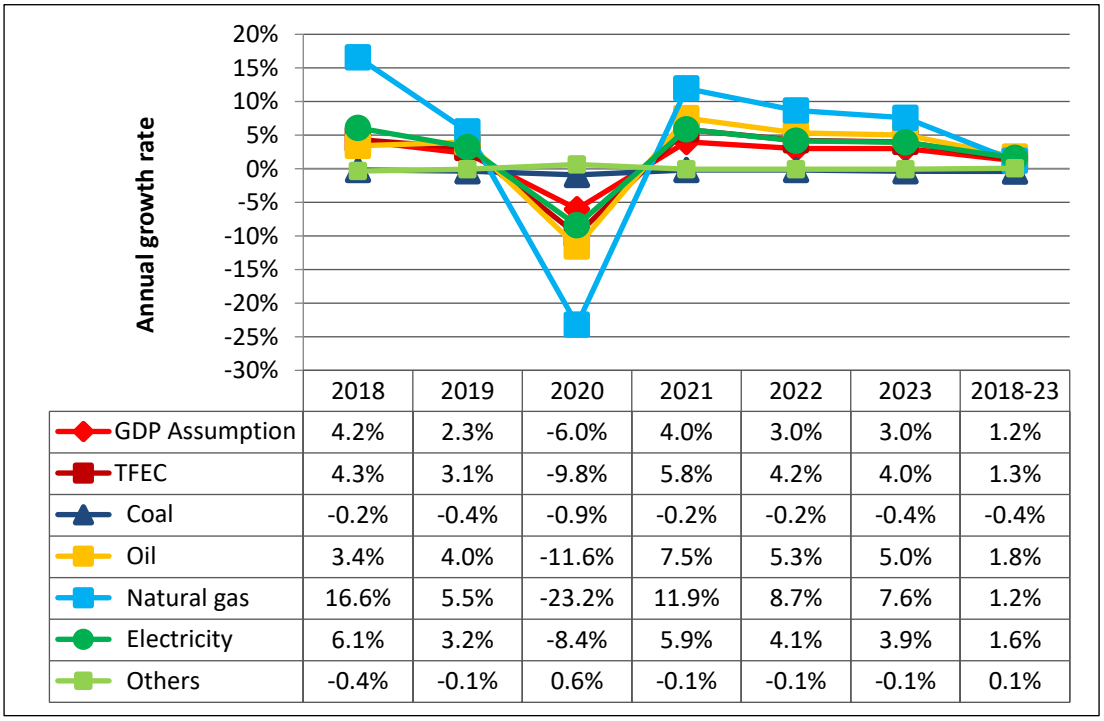
COVID-19 = coronavirus disease; GDP = gross domestic product; others = agriculture, commercial, and residential sectors; TFEC= total final energy consumption.
Sources: Author; GDP from the Office of the National Economic and Social Development Council (2018.

In the COVID-19 scenario, consumption declines for every type of energy (Figure 16.2). In 2020, natural gas decreases by 23.2%, oil by 11.6%, electricity by 8.4%, and coal by 0.9%, but other fuels increase by 0.6%. In 2018–2023, oil grows by an average of 1.8% per year (5.4% in BAU), electricity by 1.6% (4.5%), natural gas by 1.2% (6.2%), 'others' by 0.1% (0.1%), and coal by –0.4% (–0.3%). In 2020, consumption of oil is 8.0 Mtoe (11.3 Mtoe in BAU), electricity 40.0 (48.1), natural gas 15.0 (17.3), 'others' 5.4 (5.4), and coal 14.3 (14.2).

Figure 16.2. Annual Growth Rate of Final Energy Consumption, by Fuel, COVID-19 Scenario, 2018–2023



	2018	2019	2020	2021	2022	2023
GDP Assumption	4.2	2.3	(6.0)	4.0	3.0	3.0
TFEC	4.3	3.1	(9.8)	5.8	4.2	4.0
Coal	(0.2)	(0.4)	(0.9)	(0.2)	(0.2)	(0.4)
Oil	3.4	4.0	(11.6)	7.5	5.3	5.0
Gas	16.6	5.5	(23.2)	11.9	8.7	7.6
Electricity	6.1	3.2	(8.4)	5.9	4.1	3.9
Others (biomass)	(0.4)	(0.1)	0.6	(0.1)	(0.1)	(0.1)



	2018	2019	2020	2021	2022	2023	2018-23
GDP Assumption	4.2%	2.3%	-6.0%	4.0%	3.0%	3.0%	1.2%
TFEC	4.3%	3.1%	-9.8%	5.8%	4.2%	4.0%	1.3%
Coal	-0.2%	-0.4%	-0.9%	-0.2%	-0.2%	-0.4%	-0.4%
Oil	3.4%	4.0%	-11.6%	7.5%	5.3%	5.0%	1.8%
Natural gas	16.6%	5.5%	-23.2%	11.9%	8.7%	7.6%	1.2%
Electricity	6.1%	3.2%	-8.4%	5.9%	4.1%	3.9%	1.6%
Others	-0.4%	-0.1%	0.6%	-0.1%	-0.1%	-0.1%	0.1%

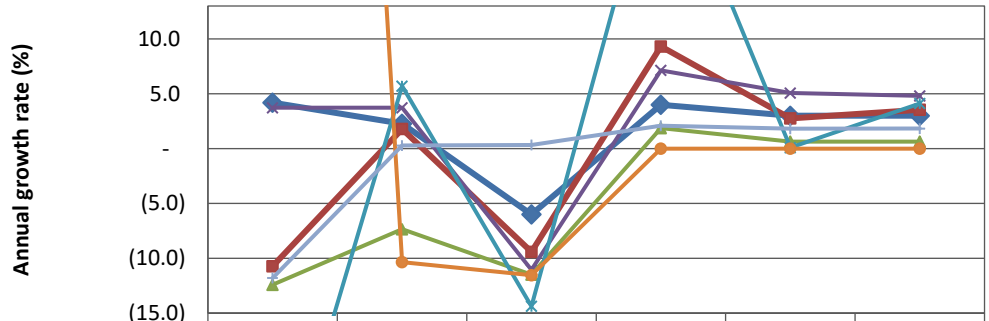
COVID-19 = coronavirus disease, GDP = gross domestic product, TFEC= total final energy consumption.
Sources: Author; GDP from the Office of the National Economic and Social Development Council (2018.

3.2. Primary Energy Supply

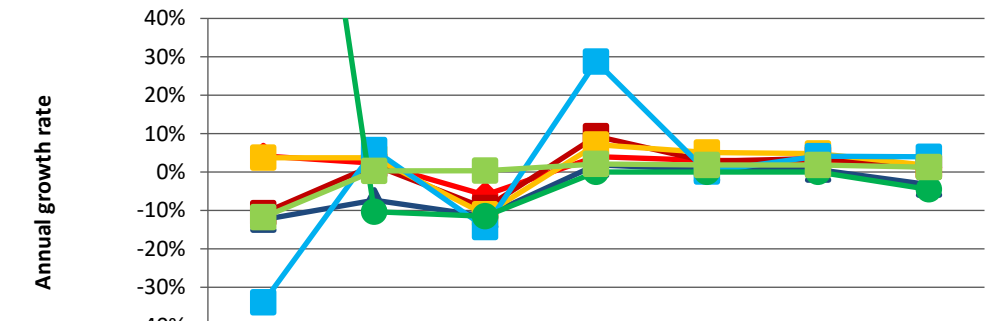
In the COVID-19 scenario, total primary energy supply (TPES) in 2020 declines steeply by 9.4% (92.2 Mtoe) (grows by 10.6% [112.6 Mtoe] in BAU). Natural gas decreases the most, by 14.4%

(17.2 Mtoe), followed by coal by 11.5% (10.7), hydro by 11.5% (0.9), and oil 11.0% (42.4), while other fuel types increase by 0.3% (21.1) (Figure 16.3). In BAU, primary energy supply of natural gas is 27.8 Mtoe, coal 11.7, hydro 0.9, oil 50.5, and 'others' 21.6. The average growth rates of TPES in 2018–2023 are 1.4% per year in the COVID-19 scenario and 5.0% in BAU.

Figure 16.3. Annual Growth Rate of Primary Energy Supply, by Fuel, COVID-19 Scenario, 2018–2023



	2018	2019	2020	2021	2022	2023
GDP Assumption	4.2	2.3	(6.0)	4.0	3.0	3.0
TPES	(10.7)	1.8	(9.4)	9.3	2.8	3.5
Coal	(12.4)	(7.4)	(11.5)	1.9	0.6	0.6
Oil	3.7	3.7	(11.0)	7.1	5.1	4.8
Natural gas	(33.9)	5.7	(14.4)	28.7	0.1	4.1
Hydro	182.9	(10.3)	(11.5)	-	-	-
Others	(11.8)	0.3	0.3	2.1	1.8	1.8



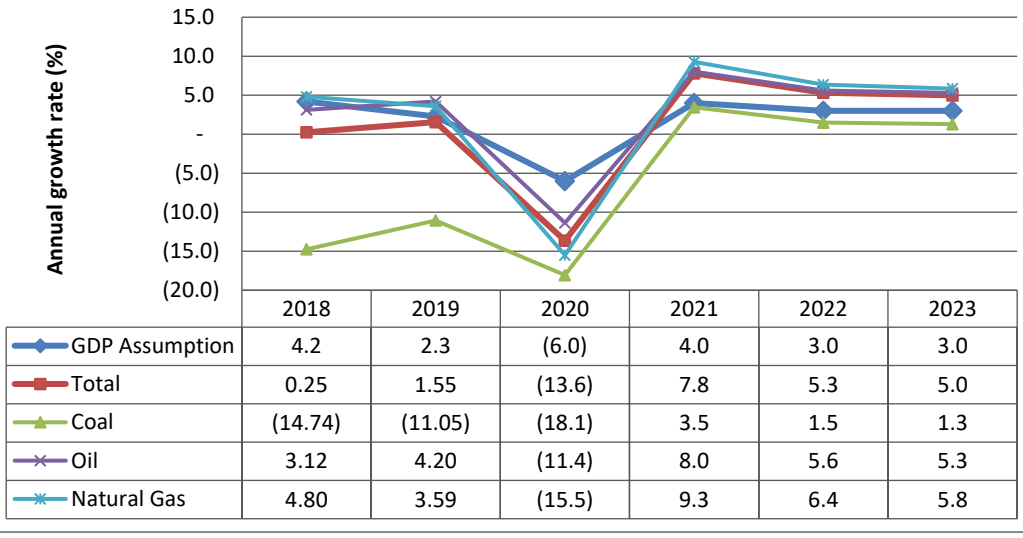
	2018	2019	2020	2021	2022	2023	2018-23
GDP Assumption	4.2%	2.3%	-6.0%	4.0%	3.0%	3.0%	1.2%
TPES	-10.7%	1.8%	-9.4%	9.3%	2.8%	3.5%	1.4%
Coal	-12.4%	-7.4%	-11.5%	1.9%	0.6%	0.6%	-3.3%
Oil	3.7%	3.7%	-11.0%	7.1%	5.1%	4.8%	1.7%
Natural gas	-33.9%	5.7%	-14.4%	28.7%	0.1%	4.1%	4.0%
Hydro	182.9%	-10.3%	-11.5%	0.0%	0.0%	0.0%	-4.5%
Others	-11.8%	0.3%	0.3%	2.1%	1.8%	1.8%	1.3%

COVID-19 = coronavirus disease, GDP = gross domestic product, TPES= total primary energy supply.
Sources: Author; GDP from the Office of the National Economic and Social Development Council (2018).

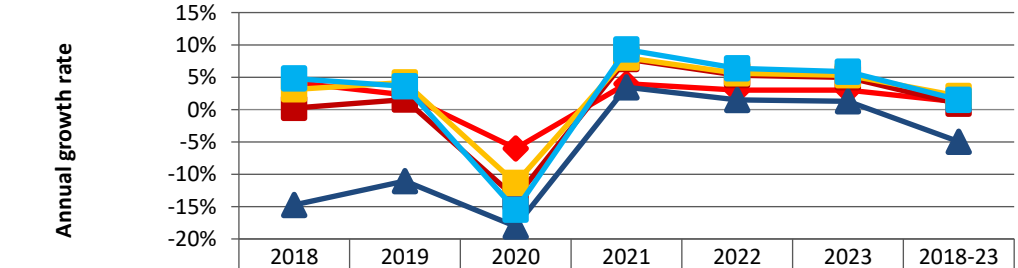
3.3. CO_2 Emissions

GDP outlook was revised to a significantly negative growth rate of 6.0%. In the COVID-19 scenario, GDP average growth rate increases by 1.2% per year in 2018–2023 (3.6% in BAU) and TPES grows on average by 1.4% per year. Greenhouse gas emissions grow on average by 0.9% per year in 2018–2023, from 205.1 million tonnes of CO_2 ($MtCO_2$) to 214.4 $MtCO_2$. CO_2 emissions from combustion of every fossil fuel type, coal, natural gas, and oil grow by a much lower rate on average than in BAU (Figure 16.4).

Figure 16.4. CO_2 Emissions, by Fuel, COVID-19 Scenario, 2018–2023



	2018	2019	2020	2021	2022	2023
GDP Assumption	4.2	2.3	(6.0)	4.0	3.0	3.0
Total	0.25	1.55	(13.6)	7.8	5.3	5.0
Coal	(14.74)	(11.05)	(18.1)	3.5	1.5	1.3
Oil	3.12	4.20	(11.4)	8.0	5.6	5.3
Natural Gas	4.80	3.59	(15.5)	9.3	6.4	5.8



	2018	2019	2020	2021	2022	2023	2018-23
GDP Assumption	4.2%	2.3%	-6.0%	4.0%	3.0%	3.0%	1.2%
Total	0.2%	1.6%	-13.6%	7.8%	5.3%	5.0%	0.9%
Coal	-14.7%	-11.1%	-18.1%	3.5%	1.5%	1.3%	-5.0%
Oil	3.1%	4.2%	-11.4%	8.0%	5.6%	5.3%	2.1%
Natural gas	4.8%	3.6%	-15.5%	9.3%	6.4%	5.8%	1.5%

COVID-19 = coronavirus disease, GDP = gross domestic product, TPES = total primary energy supply.
Sources: Author; GDP from the Office of the National Economic and Social Development Council (2018.

4. Long-term Impact (2023–2050)

4.1. Final Energy Consumption

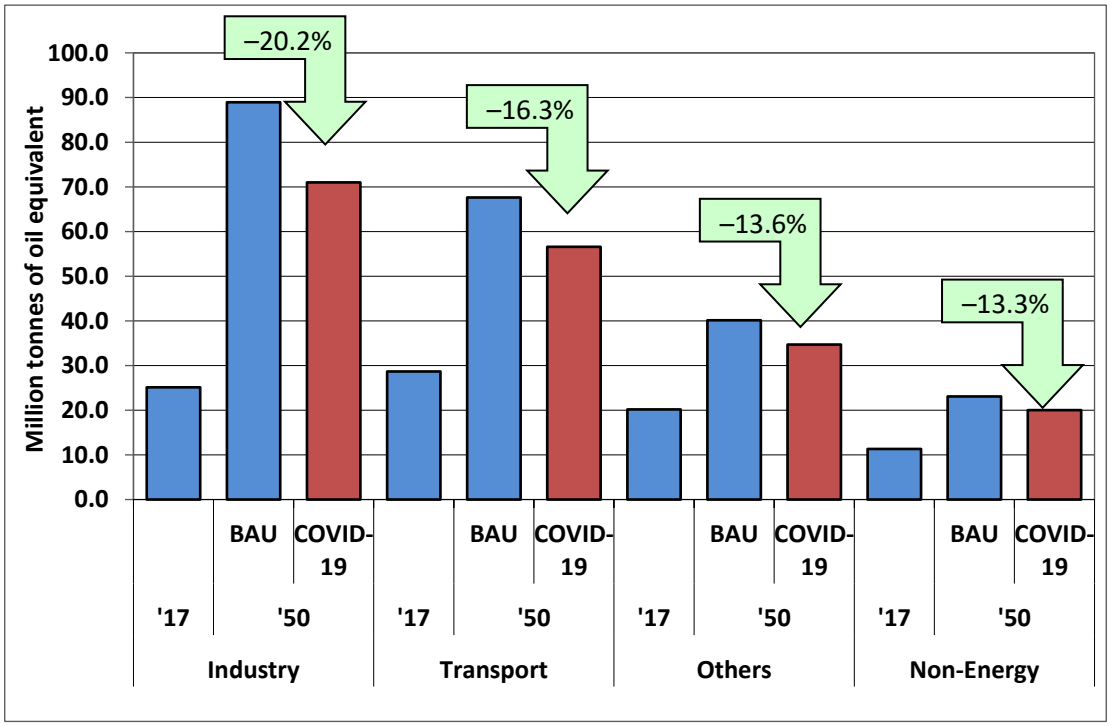
In the COVID-19 scenario, TFEC grows by 2.3% per year from 85.3 Mtoe in 2017 to 182.3 Mtoe in 2050, 17.1% lower than in BAU in 2050 (Table 16.2, Figure 16.5). Reduced energy consumption results from the decrease of energy consumption of industry by 20.2%, transportation by 16.3%, 'others' by 13.6%, and non-energy use by 13.3%.

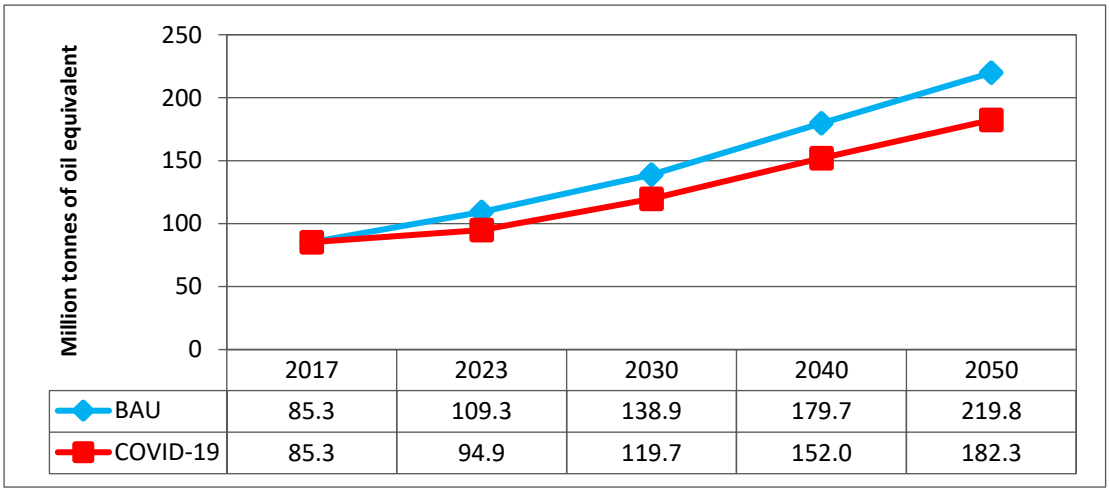
Table 16.2. Gross Domestic Product and Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

		2017	2020	2030	2040	2050	AAGR (2017–2050)
GDP (US$ billion, 2010)	BAU	424.2	526.7	682.5	974.9	1,388.6	3.7%
	COVID-19	424.2	468.8	576.5	763.6	996.7	2.6%
	COVID-19 vs. BAU	0.0%	–11.0%	–15.5%	–21.7%	–28.2%	
TFEC (Mtoe)	BAU	85.3	109.3	138.9	179.7	219.8	2.9%
	COVID-19-19	85.3	94.9	119.7	152.0	182.3	2.3%
	COVID-19 vs. BAU	0.0%	–13.2%	–13.8%	–15.4%	–17.1%	

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.
Sources: Author; GDP from the Office of the National Economic and Social Development Council (2018.

Figure 16.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050





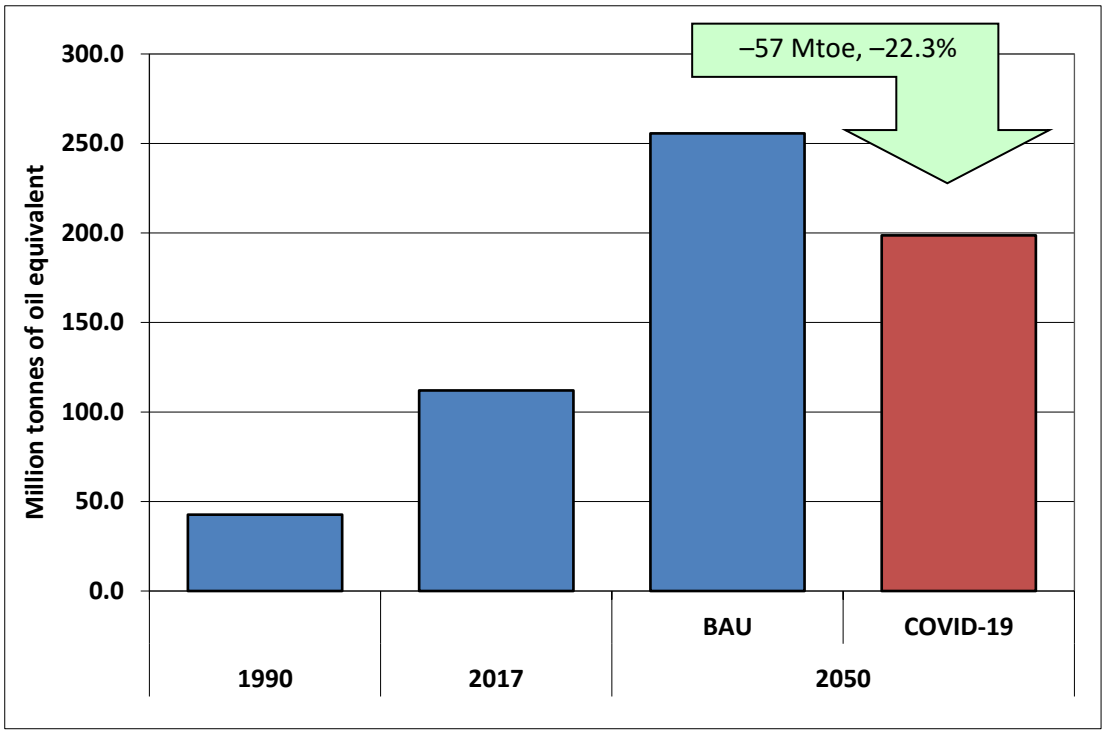
	2017	2023	2030	2040	2050
BAU	85.3	109.3	138.9	179.7	219.8
COVID-19	85.3	94.9	119.7	152.0	182.3

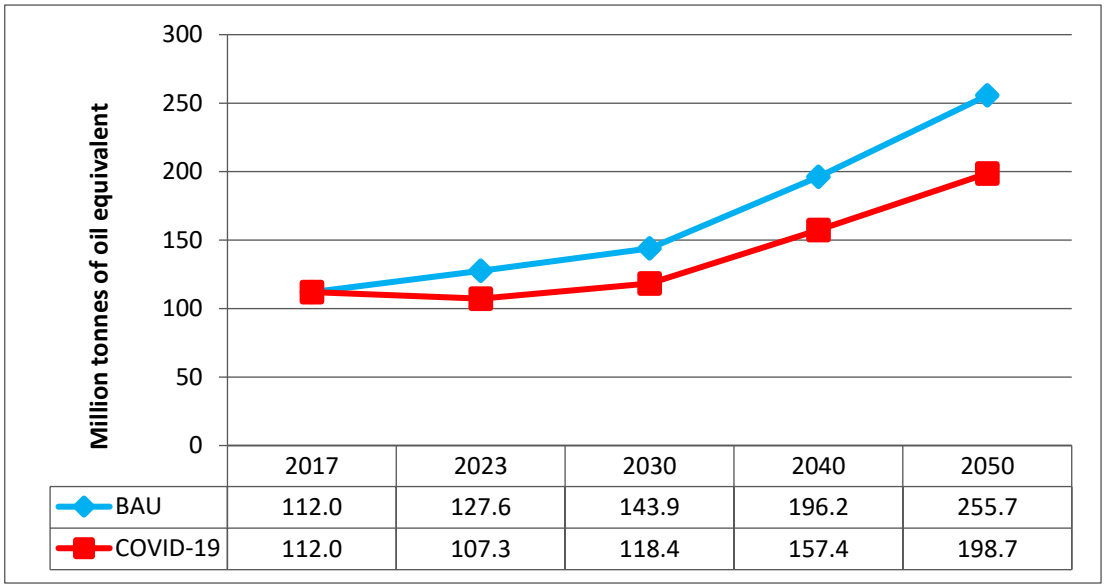
BAU = business as usual, COVID-19 = coronavirus disease.
Sources: Author.

4.2. Primary Energy Supply

In the COVID-19 scenario, TPES increases by 1.1% per year in 2017–2050 (2.5% in BAU) and is about 22.3% lower in BAU in 2050, a reduction of about 57.0 Mtoe. Coal increases by 0.3% per year in 2017–2050 (1.9% in BAU) and oil by 2.7% (3.3% in BAU). Natural gas increases by an annual average of 1.0% (2.2% in BAU), from 28.7 Mtoe in 2017 to 39.4 Mtoe in 2050 (Figure 16.6).

Figure 16.6. Total Primary Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 1990–2050





	2017	2023	2030	2040	2050
BAU	112.0	127.6	143.9	196.2	255.7
COVID-19	112.0	107.3	118.4	157.4	198.7

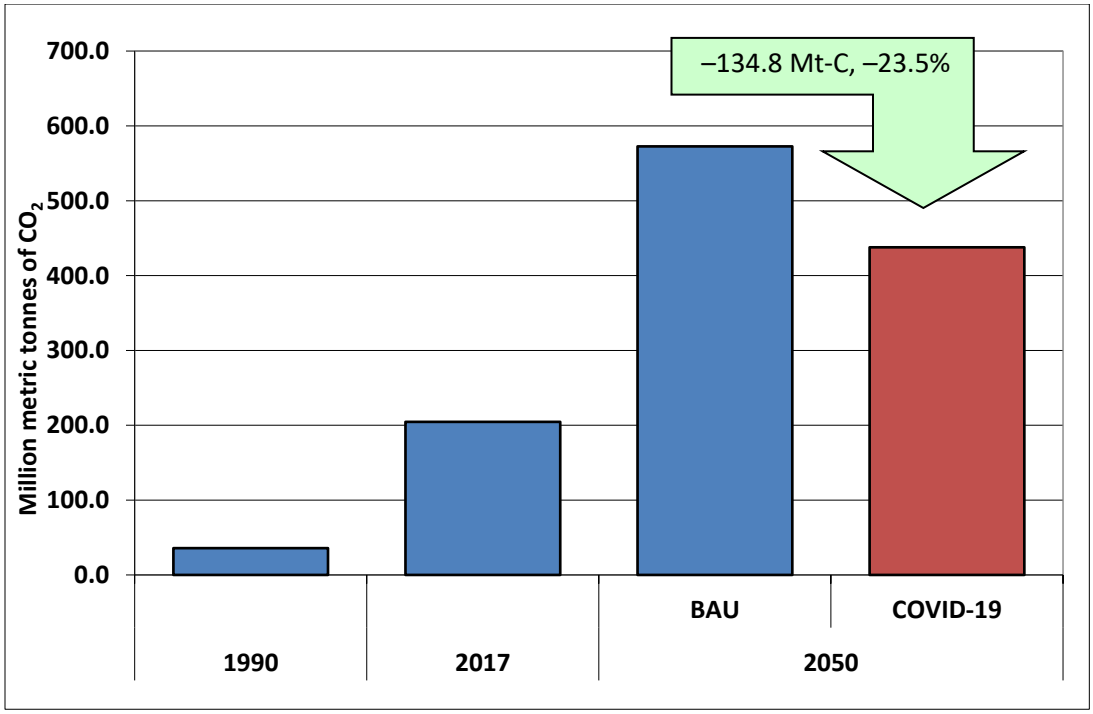
BAU = business as usual, COVID-19 = coronavirus disease.
Sources: Author.

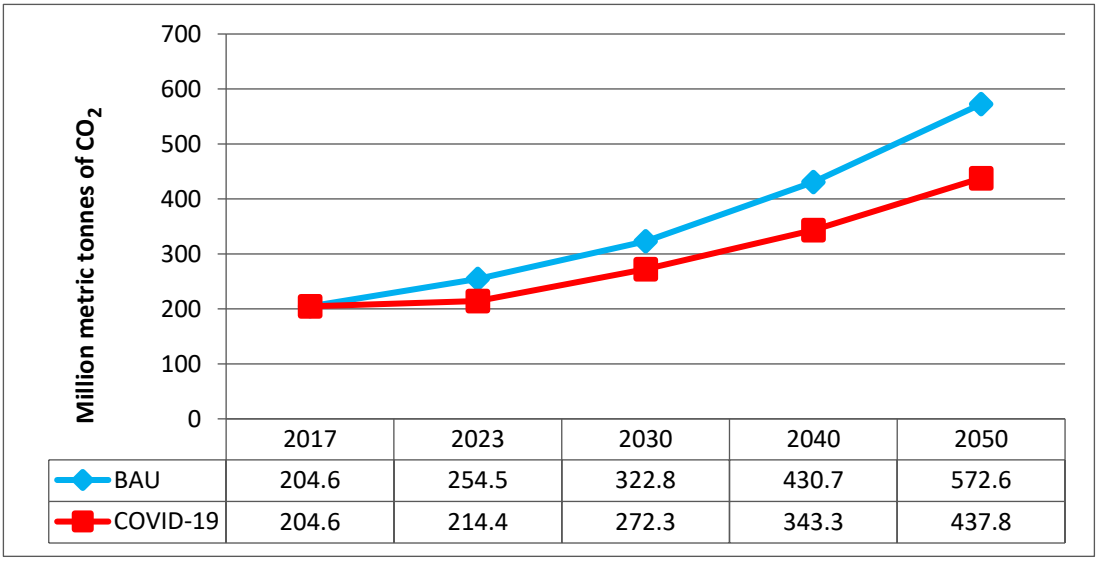
4.3. CO_2 Emissions

In BAU, CO_2 emissions from energy consumption increase by 3.2% per year on average from 204.6 $MtCO_2$ in 2017 to 572.6 $MtCO_2$in 2050. In the COVID-19 scenario, the average annual growth in CO_2 emissions in 2017–2050 increases by 2.3%, with an emission level of 437.8 $MtCO_2$ in 2050. The difference in CO_2 emissions between the BAU and COVID-19 scenarios is

134.8 million metric tonnes of CO_2 (Mt-C) or 23.5% (Figure 16.7).

Figure 16.7. Total CO_2 Emissions, Business-as-Usual vs. COVID-19 Scenarios, 1990–2050





	2017	2023	2030	2040	2050
BAU	204.6	254.5	322.8	430.7	572.6
COVID-19	204.6	214.4	272.3	343.3	437.8

BAU = business as usual, COVID-19 = coronavirus disease, Mt-C = million metric tonnes of CO_2.
Source: Author.

5. Implications and Policy Recommendations

The COVID-19 pandemic has reshaped not only Thailand's economy but also energy landscape, impacting the short- and long-term energy outlook, reducing CO_2 emissions from energy consumption. In 2020, the government attempted to restore consumption to compensate for the impact of working from home during the lockdown. For example, electricity was billed at the minimum rate for 3 months (March–May). The government ran a subsidised programme to support the natural gas for vehicles (NGV) price of THB3 per kilogram for public transport, including buses and taxis, for 3 months (April–June). Thailand strives for net-zero emissions in the near future and the negative impact of COVID-19 on energy is probably encouraging the government to achieve the target faster. Now may be right time to phase out fossil fuel subsidies and to accelerate more clean technologies and clean energy to contribute to carbon neutrality by 2060 as targeted by the government.

References

Department of Alternative Energy Development and Efficiency (2020a), *Alternative Energy Development Plan 2018*. Bangkok. https://www.dede.go.th/download/Plan_62/20201021_TIEB_AEDP2018.pdf (accessed 20 September 2021).

Department of Alternative Energy Development and Efficiency (2020b), *Energy Balance of Thailand, 2019*. Bangkok.

Department of Alternative Energy Development and Efficiency (2020c), *Energy Efficiency Plan 2018*. Bangkok. https://www.dede.go.th/ewt_w3c/ewt_dl_link.php?filename=index&nid=54495 (accessed 20 September 2021).

Department of Disease Control (2021), Thailand's COVID-19 Statistics. Bangkok. https://covid19.ddc.moph.go.th/.

Economic Research Institute for ASEAN and East Asia (ERIA) (2019), *Energy Outlook and Energy Saving Potential in Potential in East Asia, 2019*. Jakarta: ERIA.

ERIA (2021), *World Crude Oil Price Outlook 2050*. Jakarta: ERIA.

Energy News Center (2021), A Summary of Energy Measures for COVID-19 2020: The Impact Abatement. Bangkok. https://www.energynewscenter.com/15718-2/ (accessed 18 July 2021).

Energy Policy and Planning Office (2020), *Thailand's Energy Statistics 2019*. Bangkok.

Energy Policy and Planning Office (2021), *Power Development Plan 2018*. Bangkok. http://www.eppo.go.th/index.php/th/ (accessed 18 July 2021).

Office of the National Economic and Social Development Council (2018), *Thailand's GDP Outlook 2037.* Bangkok.

Office of the National Economic and Social Development Council (2020), *Thailand's Population Forecasts*. Bangkok.

Office of the National Economic and Social Development Council (2021a), *Thai Economic Performance in Q4 and 2020 and Outlook for 2021*. Bangkok. https://www.nesdc.go.th/ewt_dl_link.php?nid=11266&filename=QGDP_report (accessed 19 July 2021).

Office of the National Economic and Social Development Council (2021b), *Thailand's GDP Outlook 2037*. Bangkok. (Accessed 19 July 2021).