

Chapter 18

United States Country Report

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Chapter 18

United States Country Report

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1. Background

The coronavirus disease (COVID-19) pandemic has had a severe and pronounced effect on the United States (US). As of mid-May 2021, nearly 33,000,000 domestic cases had been reported, contributing to more than 583,000 deaths (Centers for Disease Control and Protection). In an attempt to reduce the human toll of the crisis and bring the outbreak under control, states, cities, and other communities have turned to lockdowns, social-distancing measures, and other restrictions on normal patterns of business, travel, and daily life. More recently, breakthroughs in the availability of vaccines, coupled with aggressive, nation-wide vaccination campaigns, have introduced new means for tackling the crisis, allowing for the easing of some, but not yet all, domestic restrictions.

Together, the above factors have all contributed to dramatically altering business-as-usual (BAU) expectations on a range of fronts. This chapter highlights how the COVID-19 scenario is already impacting near-term energy supply and demand outlooks and the extent to which these effects may ripple out to mid-century.

2. Macro Assumptions of the COVID-19 Scenario

The COVID-19 scenario assumes that while the economy shrank in 2020, evidence of an economic recovery is already apparent.⁹ Gross domestic product (GDP) appears to have declined by 3.6% in 2020, compared with pre-pandemic expectations of 1.9% growth, but is now expected to grow by 3.1% in 2021. Amongst other factors, the US Bureau of Economic Analysis has cited the significance of the easing of earlier lockdowns and the reopening of various establishments, as well as the ripple effects of government stimulus packages, in supporting this recovery. Still, even with this rebounded growth, GDP is expected to reach only \$18,131 billion in 2021 (4.1% less than the initial BAU projection of \$18,930 billion).

The precise date of a full economic recovery remains highly variable because of ongoing uncertainty as to when the domestic outbreak might be considered irreversibly under control – including questions about potential variants – and thus permit a safe and sustainable return to unrestricted business activity and travel. GDP growth rates are expected to outpace BAU expectations in the near term. Yet, even with the new pace of growth, the COVID-19 scenario projects that GDP will reach only \$19,798 billion, or 2.2% less than that anticipated in BAU,

⁹ Unless otherwise cited, all data in this chapter can be attributed to The Institute of Energy Economics, Japan's economic modelling results for the US, which are included in full as an appendix to this publication.

as gains continue to be offset by the overall scale of losses in 2020.

By 2030, average annual growth rates (AAGR) in the COVID-19 scenario return to what is projected in BAU for the remainder of the outlook period. Still, the economic impacts of the pandemic may linger because of the sheer severity of the outbreak and its ripple effects on activities and life itself. In 2050, actual GDP reaches \$33,170 billion, which, while suggesting notable economic growth in 2017–2050, is 2.25% less than pre-pandemic estimates (Table 18.1).

Table 18.1. Gross Domestic Product Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 1990–2050
(%)

	1990–2017	2020	2021	2022	2023	2021–2025	2025–2030	2031–2040	2010–2050
BAU	2.4	1.9	1.8	1.6	1.6	1.7	2.3	2.2	1.9
COVID-19	2.4	–3.6	3.1	2.9	2.3	2.2	2.3	2.2	1.9

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

3. Short-term Impact (2018–2023)

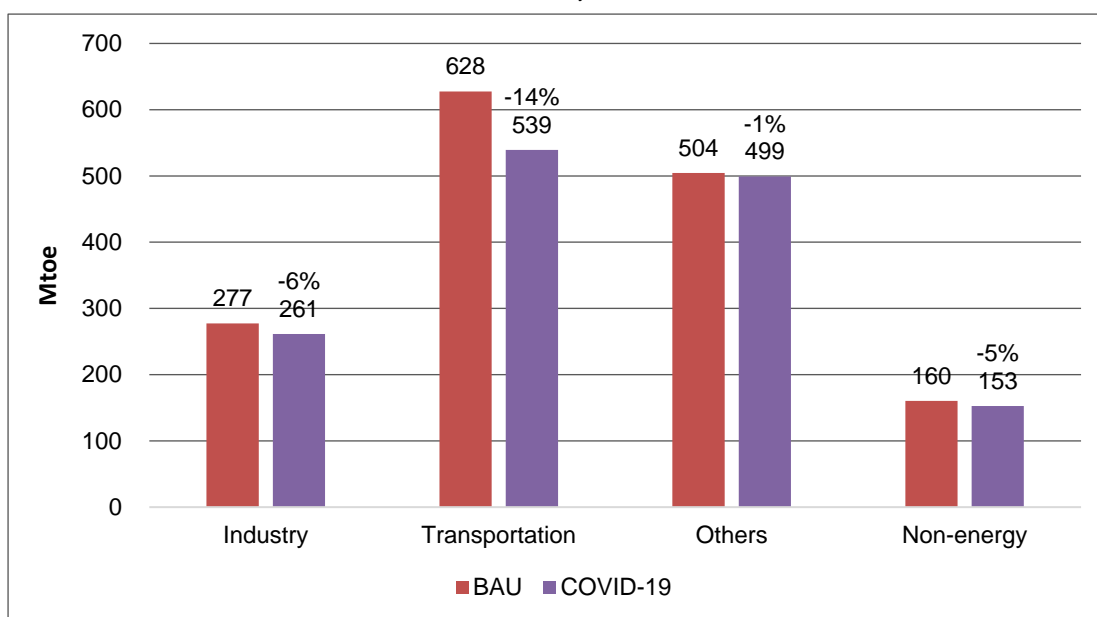
3.1. Final Energy Consumption

In the COVID-19 scenario, total final energy consumption (TFEC) shrinks by 6.9% in 2020 (grows by 0.6% in BAU). However, with the tentative economic recovery driving a return to prior consumption levels, TFEC grows by an average of 0.5% per year in 2018–2023, which approaches (but does not catch up with) expected slightly higher rates (0.7% in BAU).

The effects of the pandemic on energy consumption are felt differently across sectors. Transport energy consumption, for example, decreases the most in the COVID-19 scenario, by 14.1% in 2020 (flat growth in BAU). Still, growth is flat in 2018–2023 because the rapid shift to working from home and other disruptions to mobility altered expectations for 2020 in the COVID-19 scenario. Factors closely linked to emergency measures taken during the height of the crisis are assumed to be disproportionately temporary, allowing for the near-term recovery of suppressed demand.

Industrial energy consumption drops in 2020, declining by 4.3% (increasing by 1.4% in BAU). However, in contrast with transport, industry sees energy consumption growth rates that stay lower than anticipated in 2018–2023 given tentative economic recovery, with only 1.2% growth per year in the COVID-19 scenario (1.5% in BAU). ‘Others’ (residential and commercial sectors) decline by 0.9% in 2020 (0.2% in BAU), growing only 0.4% per year in 2018–2023 (0.6% in BAU). Non-energy use decreases by 1.9% to a modest 2.5% per year in 2018–2023 (2.7% in BAU) (Figure).

Figure 18.1. Total Final Energy Consumption, by Sector, Business-as-Usual vs. COVID-19 Scenarios, 2020



BAU = business as usual, COVID-19 = coronavirus disease, others = residential and commercial sectors. Mtoe = million tonnes of oil equivalent.

Source: Author.

Each of these trends has corresponding impacts on TFEC. In the COVID-19 scenario, the strongest decrease in energy consumption growth is, unsurprisingly, in oil, by 12.4% in 2020 (0.1% in BAU); oil grows on average by 0.2% per year in 2018–2023 (0.5% in BAU). Coal, too, sees decreased consumption – by 6.5% in 2020 – wiping out expected growth in 2018–2023 and further accelerating anticipated declines. Heat declines by 4.3% and ‘others’ by 3.2% in 2020, reducing their 2018–2023 growth to virtually flat growth for heat and 0.4% per year for ‘others’. Natural gas consumption remains relatively more resilient: although it decreases by 1.8% in 2020, it grows by 0.9% in 2018–2023, bringing it close to BAU expectations of 1.2% growth. Electricity sees a 1.1% decrease in 2020 (1.2% increase in BAU) and 1.2% growth per year in 2018–2023 (1.4% in BAU) (Figure 18).

3.2. Primary Energy Supply

In the COVID-19 scenario, total primary energy supply (TPES) declines by 134.30 million tonnes of oil equivalent (Mtoe) in 2020 or 6.1% (3.4% in BAU). Supply grows by only 17.55 Mtoe in 2018–2023, less than a third of that expected in BAU.

Primary energy supply growth decreases the most in oil, with –12.6% AAGR in 2020, although coal closely trails at –11%. Yet, while oil modestly rebounds by 0.2% in 2018–2023, coal’s already anticipated decline accelerates, dropping from –3.4% growth in BAU to –4.4% in the COVID-19 scenario. Natural gas growth in 2020 slows dramatically in the COVID-19 scenario to 0.1% (3.4% in BAU), but edges slightly higher than modelled in BAU in 2018–2023 as production that was delayed or interrupted restarts alongside slowly recovering global

demand.

Most notable, however, is the marked divergence in how COVID-19 has impacted renewable energy supply projections more than other energy types. Wind, solar, and ocean energy not only grow dramatically in 2020 – at 10% – but collectively represent one of only two categories (the other being geothermal) to not see a decline in growth rates in the COVID-19 and BAU scenarios. Although wind and solar projects were also hit with challenges and delays that other supply sources faced, the International Energy Agency noted that declining costs and novel adaptations to pandemic circumstances helped them weather near-term disruptions, while developers raced to complete projects to meet several federal tax incentive deadlines. In the COVID-19 scenario, this resilience, coupled with downturns elsewhere, at least modestly shifts other near-term expectations for declining rates of growth, with these sources now growing 9.1% in 2018–2023 (8% in BAU).

3.3. CO₂ Emissions

In the COVID-19 scenario, CO₂ emissions fall from 4,759.1 metric tonnes of CO₂ (Mt-CO₂) to 4,345.0 Mt-CO₂ in 2019–2020, representing an 8.7% decrease (0.9% in BAU). Slightly lower overall final energy consumption also drives a slightly lower emission profile in 2018–2023, with a 0.5% decrease (0.1% in BAU).

The strongest decrease in CO₂ emissions in 2020 is in oil, by 283.5 Mt-CO₂ or 14.1% (0.2% in BAU). A likely strong rebound in domestic demand for oil in 2021 may ultimately drive total oil-linked emissions slightly higher in 2018–2023 than in BAU, although both scenarios project essentially flat growth.

Although growth in natural gas-linked CO₂ emissions is flat in 2020, modest growth during the remainder of the outlook period pushes them to 2.1% growth in 2018–2023 (2.6% in BAU). A more notable shift appears in coal-linked emissions. After falling 10.9%, emissions continue to tumble, declining by 4% in 2018–2023 (3.3% in BAU).

The COVID-19 scenario suggests that while some of the CO₂ emission savings linked to the pandemic have been pronounced, the bulk of these effects have already been experienced. As energy demand recovers in the near term, these gains may be largely reversed by 2023.

4. Long-term Impact (2025–2050)

4.1. Final Energy Consumption

In the COVID-19 scenario, TFEC increases by an average of 0.1% per year in 2017–2050 (0.1% in BAU) (Table 18.2).

Table 18.2. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

		2017	2025	2030	2040	2050	AAGR (2017– 2050)
TFEC (Mtoe)	BAU	1,520.46	1,584.24	1,597.01	1,610.70	1,613.44	0.1%
	COVID-19	1,520.46	1,563.52	1,577.43	1,592.16	1,594.10	0.1%
	COVID-19 vs. BAU	0.0	-1.33%	-1.24%	-1.16%	-1.21%	

AAGR = average annual growth rate, BAU = business as usual, COVID-19 = coronavirus disease, Mtoe = million tonnes of oil equivalent.

Source: Author.

TFEC in the COVID-19 scenario does not catch up to that in BAU up to 2050, although energy savings are relatively modest at 1.21%.

4.2. Primary Energy Supply

In the COVID-19 scenario, TPES increases at an average annual growth rate of 0.1% per year in 2017–2050 (0.1% in BAU). Like TFEC, TPES in 2050 is lower in the COVID-19 scenario than in BAU by roughly 2.75% (Table 18.3).

Table 18.3. Total Primary Energy Supply, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

		2017	2025	2030	2040	2050	AAGR (2017– 2050)
TPES (Mtoe)	BAU	2,155.23	2,214.38	2,242.61	2,265.79	2,254.78	0.1%
	COVID-19	2,155.23	2,171.22	2,192.37	2,210.40	2,194.43	0.1%
	COVID-19 vs. BAU	0.0	-1.99%	-2.29%	-2.51%	-2.75%	

AAGR = average annual growth rate, BAU = business as usual, COVID-19 = coronavirus disease, Mtoe = million tonnes of oil equivalent, TPES = total primary energy supply.

Source: Author.

4.3. CO₂ Emissions

In the COVID-19 scenario, CO₂ emission AAGR decreases to 0.5% in 2017–2050 (0.4% in BAU). The result is that CO₂ emissions in the COVID-19 scenario are 4,010.1 Mt-CO₂ (4,191.7 Mt-CO₂ in BAU), representing a CO₂ emission reduction of 181.6 Mt-CO₂ in the COVID-19 scenario, savings of roughly 4.3% of BAU.

5. Implications and Policy Recommendations

- (i) Given the severity of the COVID-19 outbreak, although the country's economic recovery was already underway as of 2021, some of the crisis' impacts appear likely to ripple out through mid-century, including in driving TPEC and TPES lower than in BAU.
- (ii) The surprising resilience of renewable energy during the pandemic – particularly the growing role played by wind and solar in meeting requirements for power generation amidst declines elsewhere – represents a notable and potential watershed development. Nonetheless, oil and natural gas dominate energy mixes in both BAU and COVID-19 scenarios, with implications for larger policy and technology needs in the context of accelerating overall clean energy transition and CO₂ reduction.
- (iii) Previous analyses by the Economic Research Institute for ASEAN and East Asia have suggested that, although the US has made substantial progress towards the goal of reducing its CO₂ emissions by 26%–28% from 2005 levels by 2025 (its original intended nationally determined contribution), fully realising the target likely requires more robust policy action. The COVID-19 scenario continues to affirm that finding, as 2020 emission declines related to the pandemic are expected to be largely wiped out by increases during 2021–2023, particularly as suppressed demand for oil and natural gas rebounds.

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