

# Chapter 6

## India Country Report

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# Chapter 6

## India Country Report

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### 1. Background

The coronavirus disease (COVID-19) pandemic has significantly challenged the global economy and energy system. The pandemic has grounded economic activities, disrupted livelihoods, affected economies, and stretched health facilities. It has revealed salient lapses and lack of resilience in the design of economic and social systems. It has given rise to new practices and social norms that have greatly impacted energy supply, energy demand, and environmental emissions. Its spatial and temporal implications vary and India has not been exempt from its energy system impacts (Aruga et al., 2020). This chapter examines the short- and long-term implications of the COVID-19 pandemic on India's energy demand and supply using the India energy outlook model,<sup>5</sup> which was updated for *Energy Outlook and Energy Saving Potential in Potential in East Asia, 2019* (ERIA, 2020). The chapter highlights energy-related lessons and emerging opportunities for India's energy sector and economy in a post-COVID-19 era.

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

India's preliminary annual growth rate of gross domestic product (GDP) in 2020 is -6.5% (10.9% in the business-as-usual [BAU] scenario) and rebounds to 11% in 2021, 10.5% in 2022, and 10.5% in 2023. In 2018–2023, the growth rate is 5.7% per annum (7.6% in BAU) (Table 6.1).

In the long term (2017–2050), annual GDP growth rate is 5.6% per annum (5.7% in BAU). For 2017–2023, per annum GDP in COVID-19 scenario is 5.9% (7.5% in BAU) (Table 6.2).

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<sup>5</sup> Based on The Institute of Energy Economics, Japan model and assumptions.

**Table 6.1. Assumptions of Gross Domestic Product Annual Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 2018–2023**

	2018	2019	2020	2021	2022	2023	2018–2023
<b>BAU</b>	6.8%	4.2%	10.9%	7.7%	7.7%	7.7%	7.6%
<b>COVID-19</b>	6.8%	4.2%	–6.5%	11.0%	10.5%	10.5%	5.7%

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

Source: Authors, based on [International Monetary Fund \(2020\)](#) data.

**Table 6.2. Assumed Gross Domestic Product Annual Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**

GDP annual growth rate	2017–2023	2023–2030	2030–2040	2040–2050
<b>BAU</b>	7.5%	6.3%	5.0%	4.0%
<b>COVID-19</b>	5.9%	7.5%	5.0%	4.0%

BAU = business as usual, COVID-19 = coronavirus disease, GDP = gross domestic product.

Source: Authors, based on [International Monetary Fund \(2020\)](#) data.

**Table 6.3. Gross Domestic Product, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050 (US\$ billion, 2010)**

	2017	2023	2030	2040	2050	AAGR, 2017–2050
<b>BAU</b>	2,651	4,091	6,273	10,518	16,320	5.7%
<b>COVID-19</b>	2,651	3,738	6,190	10,378	16,103	5.6%

AAGR = annual average growth rate, BAU = business as usual, COVID-19 = coronavirus disease.

Source: Authors, based on [International Monetary Fund \(2020\)](#) data.

### 3. Short-term Impact (2018–2023)

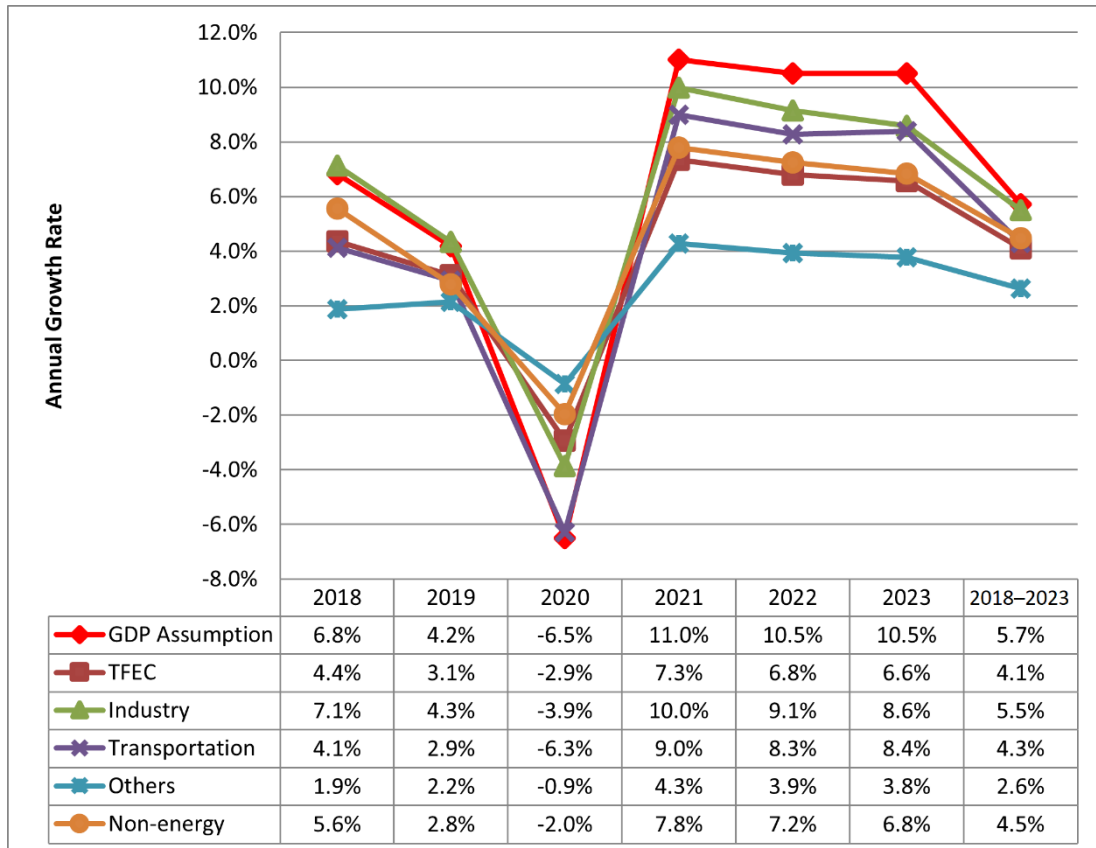
#### 3.1. Final Energy Consumption

In the COVID-19 scenario, GDP is altered relative to BAU to elucidate the negative impacts of COVID-19 on the economy. Figure 6.1 shows that total final energy consumption (TFEC) dropped by 2.9% in 2020. However, it grows at an average annual rate of 4.1% in 2018–2023, about 1 percentage point less than in BAU because of the COVID-19 pandemic’s impact in 2020, which affects earlier BAU assumptions.

The largest reduction in energy demand growth rate in 2020 is in transport (–6.3%) because a significant segment of society worked from home to combat the pandemic and, therefore, did not travel as much. Energy demand growth in industry was –3.9%, non-energy –2.0%, and residential and commercial sectors (‘others’) –0.9%. However, average annual growth rates in 2018–2023 differ from the 2020 trend because of COVID-19–induced changes in each sector. Industry has the largest growth rate per annum (5.5%), followed by non-energy (4.5%),

transport (4.3%), and 'others' (2.6%). Compared with BAU, average growth rates in 2018–2023 are reduced by about 1.5 percentage points for industry, 1.3 for transport, 0.5 for 'others', and 1 for non-energy (Figure 6.1).

**Figure 6.1. Annual Growth Rate of Total Final Energy Consumption, by Sector, COVID-19 Scenario, 2018–2023**



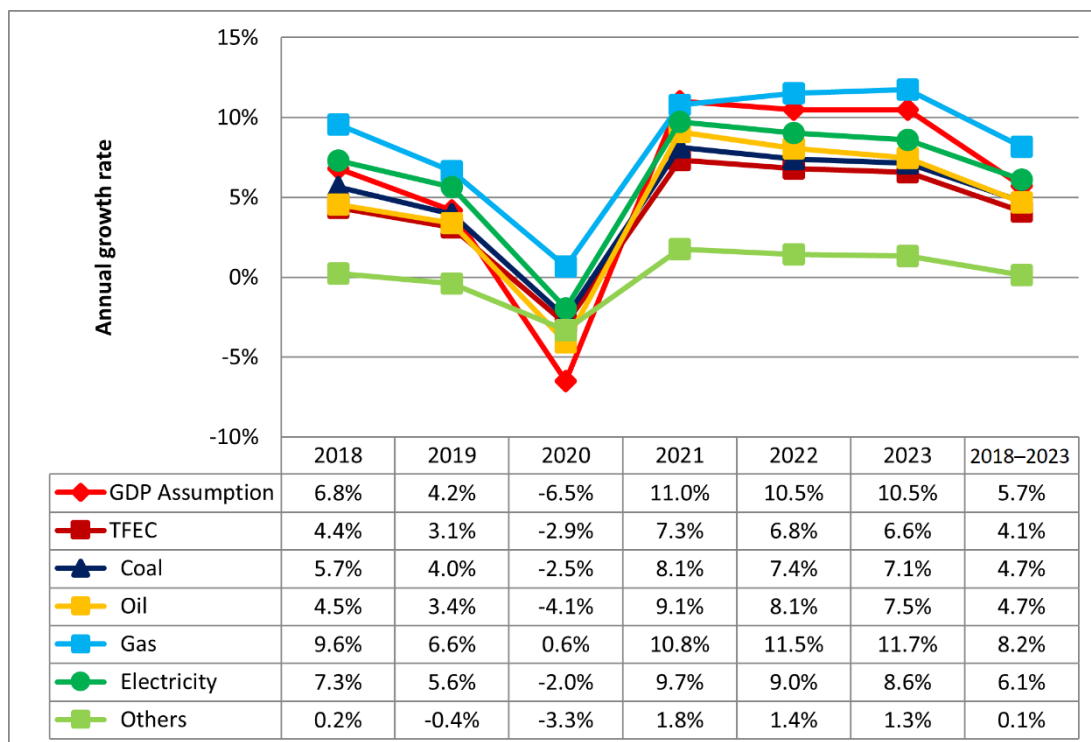
COVID-19 = coronavirus disease, GDP = gross domestic product, TFEC = total final energy consumption.

Source: Authors.

In the COVID-19 scenario, the largest decrease in energy consumption growth rate in 2020 occurs in oil (–4.1%). The automobile sector is dominated by oil-fuelled vehicles. Hence, the strong reduction in oil demand is on account of limited vehicle transport because of COVID-19 restrictions. The second-largest reduction in 2020 is in 'others' (–3.3%), followed by coal (–2.5%), and electricity (–2.0%). No negative growth rate is observed for natural gas, consumption of which grew by 0.6% because of the population increase and residential demand for natural gas irrespective of the pandemic's lockdown effects. For 2018–2023, natural gas has the strongest average growth rate per annum (8.2%), followed by electricity (6.1%) and coal and oil (4.7% each). The average annual growth rate of 'others' in 2018–2023 is about 0.1%. Compared with BAU, these values correspond to reductions of about 1.5 percentage points for coal, 0.9 for oil, 1.5 for natural gas, 1.3 for electricity, and 0.5 for 'others'. Consumption is reduced across all fuels; no energy carrier is immune to the effects of COVID-

19 in the short term. As the economic growth rate of India declines, its energy consumption follows suit (Figure 6.2).

**Figure 6.2. Annual Growth Rate of Total Final Energy Consumption, by Fuel, COVID-19 Scenario, 2018–2023**

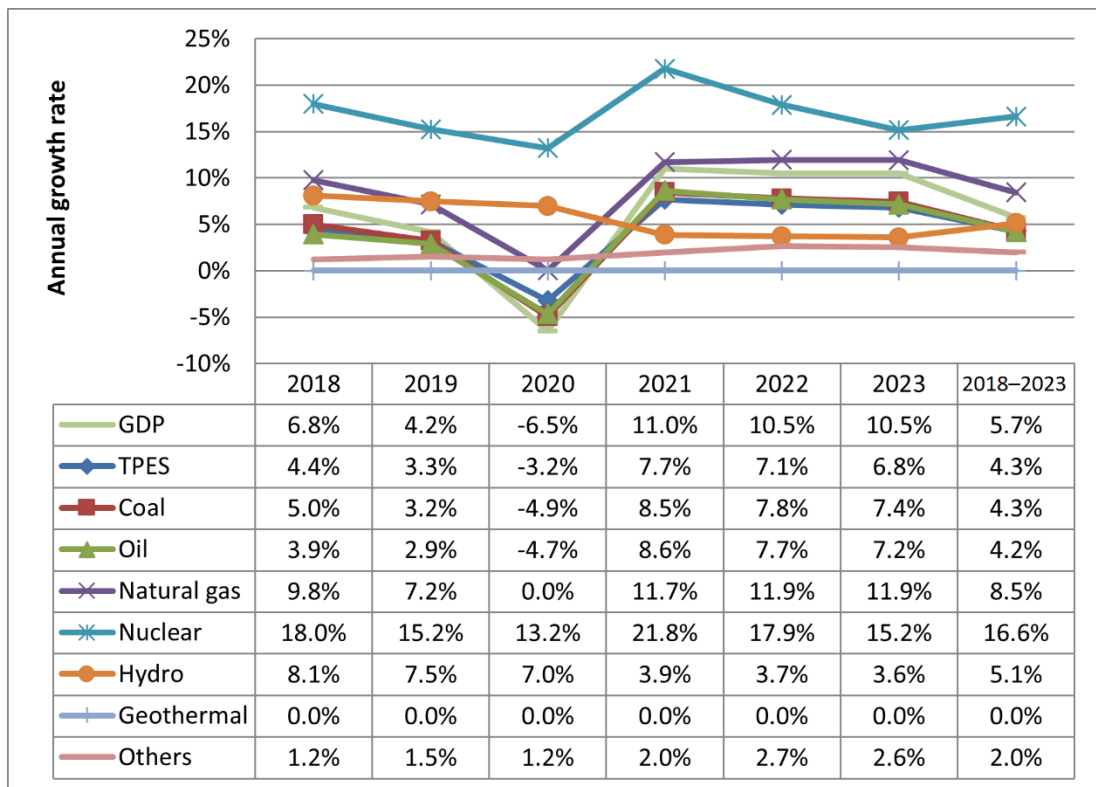


COVID-19 = coronavirus disease, GDP = gross domestic product, TFEC = total final energy consumption.  
Source: Authors.

### 3.2. Primary Energy Supply

In the COVID-19 scenario, total primary energy supply (TPES) declines by 3.2% in 2020 but increases by 4.3% per year in 2018–2023 (5.4% in BAU) (Figure 6.3). In 2020, the primary energy supply growth rate decreases the most for coal (4.9%) and rebounds to 4.3% per year in 2018–2023 (5.8% in BAU). The reason is fluctuation of electricity demand caused by the COVID-19 pandemic after 2020. The oil supply growth rate declines by 4.7% in 2020 and by 4.2% per year in 2018–2023, corresponding to about a 1 percentage point reduction in 2018–2023 compared with BAU. Other primary energy sources’ growth rates in 2020 are 0% for natural gas, 13.2% for nuclear, 7% for hydro, and 1.2% for ‘others’. In 2018–2023, their average annual growth rates are 8.5% for natural gas, 16.6% for nuclear, 5.1% for hydro, and 2% for ‘others’. ‘Others’ (mostly renewables) continuously add capacity during the pandemic and are not negatively affected by the restrictions.

**Figure 6.3. Annual Growth Rate of Primary Energy Supply, by Source, COVID-19 Scenario, 2018–2023**

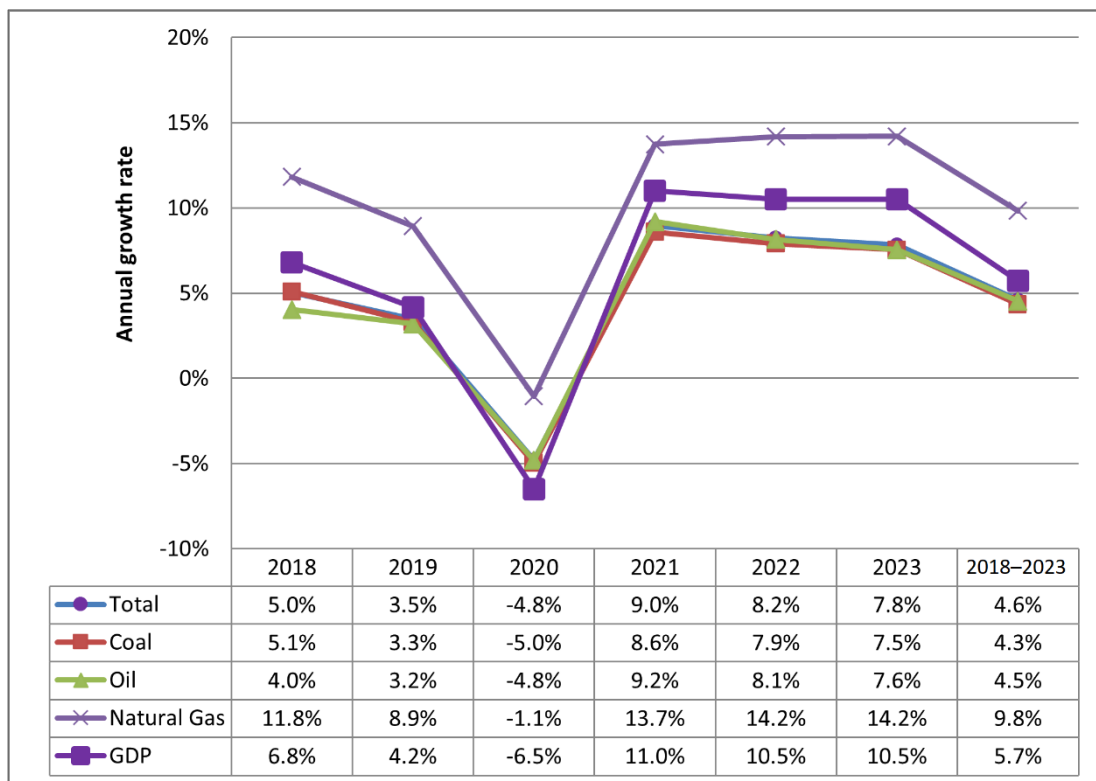


COVID-19 = coronavirus disease, GDP = gross domestic product, TPES = total primary energy supply.  
Source: Authors.

### 3.3. CO<sub>2</sub> Emissions

In the COVID-19 scenario, CO<sub>2</sub> emissions in 2020 fall by 4.8% and then grow by 4.6% per annum in 2018–2023 (about 1.4% less than in BAU) (Figure 6.4 ). In 2020, coal has the strongest reduction rate, with 5%, followed by oil (4.8%) and natural gas (1.1%). As expected, as coal and oil consumption drop, so do their associated CO<sub>2</sub> emissions. However, in 2018–2023, the growth rate per annum of CO<sub>2</sub> emissions is positive, with natural gas having the strongest growth rate (9.8%), followed by oil (4.5%) and coal (4.3%) These values correspond to reductions in BAU of about 2.1% for natural gas, 1% for oil, and 1.6% for coal. The CO<sub>2</sub> emission reduction is mostly derived from COVID-19’s impact. While COVID-19’s impact may be negative for economies, it may be climate-friendly.

**Figure 6.4. CO<sub>2</sub> Emissions by Source, COVID-19 Scenario, 2018–2023**



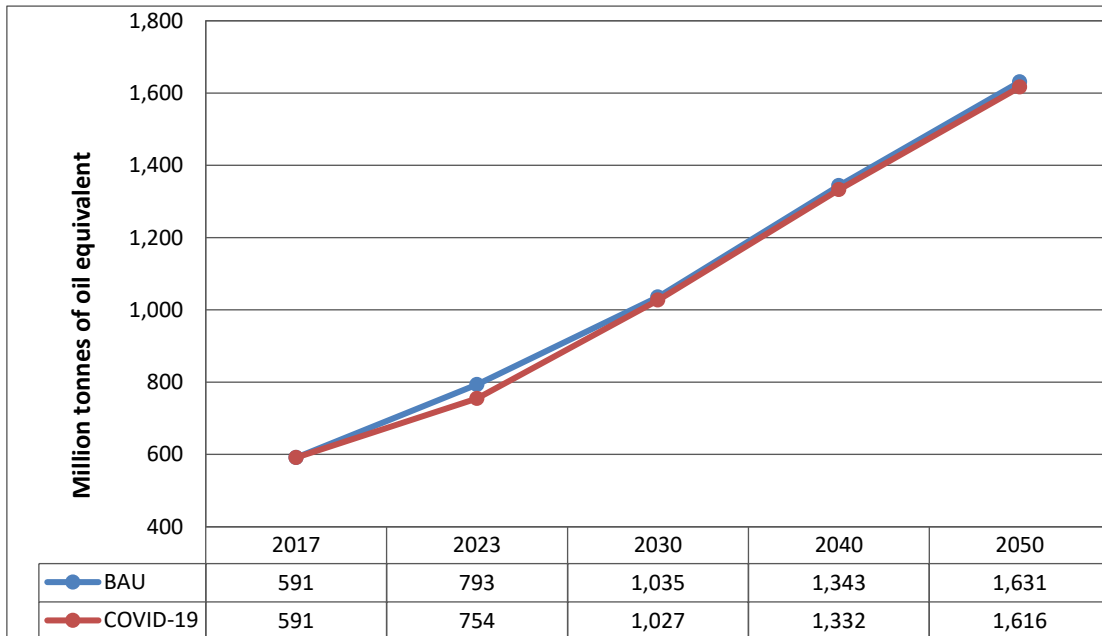
COVID-19 = coronavirus disease, GDP = gross domestic product.  
Source: Authors.

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

##### **4.1. Final Energy Consumption**

In the COVID-19 scenario, TFEC increases from 591 million tonnes of oil equivalent (Mtoe) in 2017 to 1,616 Mtoe in 2050, corresponding to an average growth rate of 3.09% per year in 2017–2050 (3.12% in BAU) (Figure 6.5). The increase results from the recovery of economic growth (after COVID-19) at 5.6% (5.7% in BAU). TFEC in the COVID-19 scenario cannot catch up with TFEC in BAU up to 2050 because GDP in the COVID-19 scenario is lower than in BAU.

**Figure 6.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050**



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

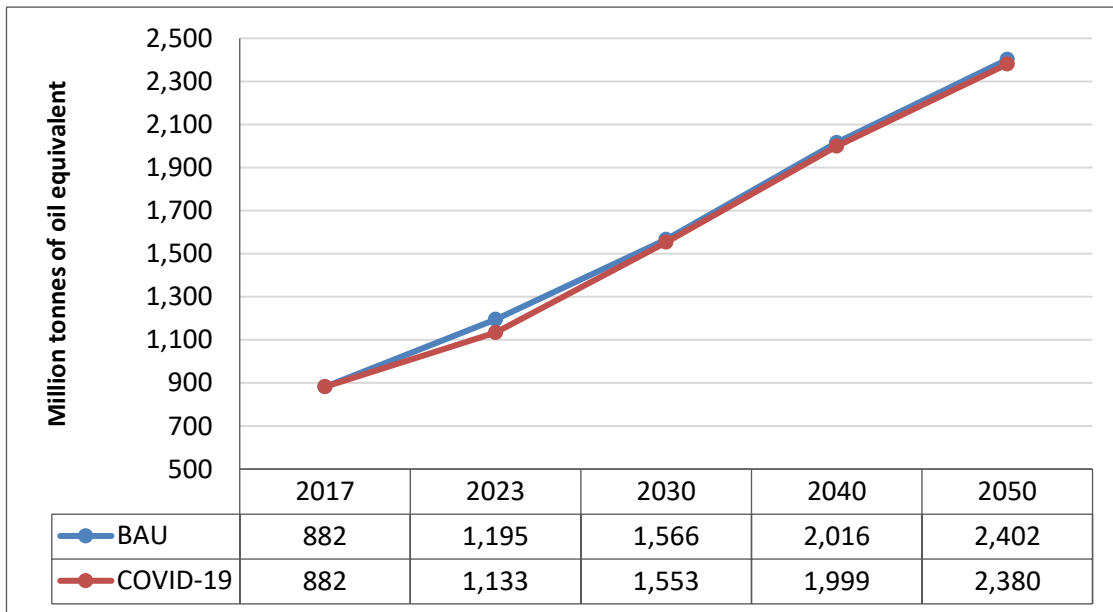
Source: Authors.

#### 4.2. Primary Energy Supply

In the COVID-19 scenario, TPES increases from 882 Mtoe in 2017 to about 2,380 Mtoe in 2050, at an average growth rate of 3.05% per year (3.08% in BAU) (Figure 6.6). The differences are on account of the long-term impacts of COVID-19 on the energy system.



**Figure 6.6. Total Primary Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2030**



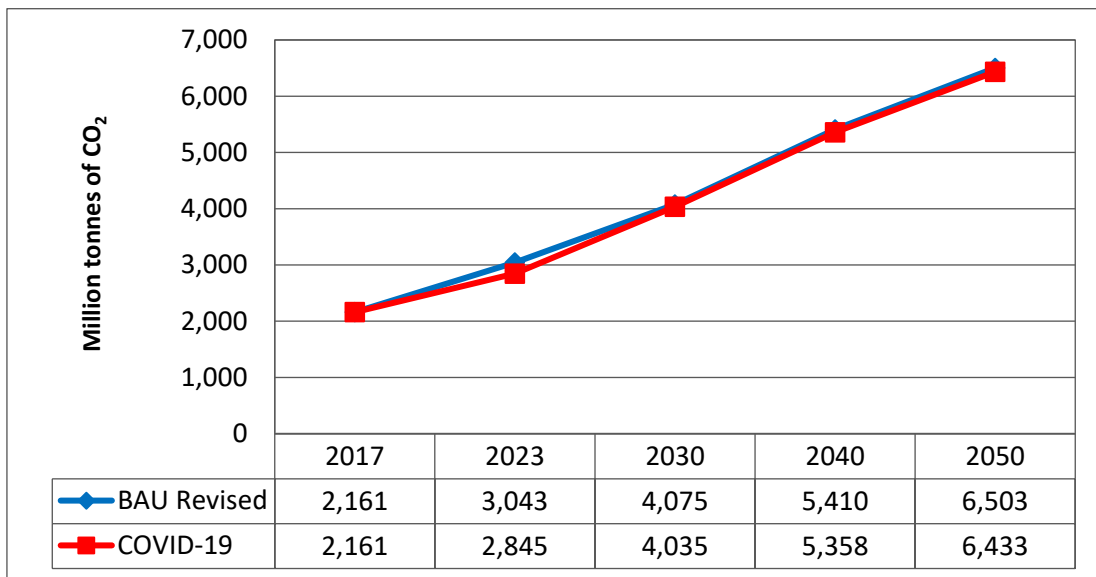
BAU = business as usual, COVID-19 = coronavirus disease.

Source: Authors.

#### 4.3. CO<sub>2</sub> Emissions

In the COVID-19 scenario, CO<sub>2</sub> emissions increase from 2,161 metric tonnes (Mt) in 2017 to about 6,433 Mt in 2050, at an annual rate of 3.36% (3.39% in BAU). The small decline in CO<sub>2</sub> emissions in the COVID-19 scenario results from reduced fossil fuel usage.

**Figure 6.7. Total CO<sub>2</sub> 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

As COVID-19 spread worldwide, India was not exempt from high infection rates, and the government imposed several stay-at-home restrictions (Government of India, 2021). Energy consumption plummeted in 2020 because of lockdowns. This chapter investigates the implications of COVID-19 on energy supply–demand mixes and the associated CO<sub>2</sub> emissions. The COVID-19 pandemic significantly impacts the energy system in the short term. In 2020, energy demand drops by 2.9% and supply by 3.2%, while CO<sub>2</sub> emissions fall by 4.8%.

Transport experiences the largest drop in energy consumption mainly because of decreased fuel consumption resulting from shifting to the new normal, such as limited travel and mandatory working from home to combat COVID-19. Private and public passenger vehicles are not in use much, but utilization of freight vehicles is relatively stable because of demand for food and trade. The pandemic experience shows that if India continues to improve digitalizing its economic sectors after the pandemic and promotes remote working, online business, and e-learning, it will achieve long-term energy savings (Madurai Elavarasan et al., 2020). India can reduce its CO<sub>2</sub> emissions through these new-normal practices while sustaining rapid economic growth.

In the long term, TFEC in the COVID-19 scenario will not catch up with TFEC in BAU after 2020 because assumed average annual GDP growth rate in the COVID-19 scenario in 2017–2050 is lower than in BAU despite the rebound projected after 2020. However, the differences in TPES, TFEC, and CO<sub>2</sub> emissions between the COVID-19 and BAU scenarios are not significant. The pandemic is not yet over. India is experiencing a second wave much stronger than first and the analysis here remains uncertain. Overall, it can be argued that the impact on the energy system is not significant in terms of energy supply–demand mixes and environmental

emissions.

Strategic planning of the power system in 2020 faced major impacts on the energy system amidst the lockdown. India saw one of the largest reductions of electricity demand: COVID-19 caused power demand to fall by 28% up to the end of March 2020, according to the Power System Operation Corporation. Under the strict lockdown, which started on 25 March 2020, power demand from hospitals, essential services, and the residential sector was on the rise, while industrial demand and commercial activity dropped substantially. The pandemic has affected the generation mix. Thermal power plants are running at low capacity in the absence of industrial demand, while the share of renewables in the grid has been increasing, mostly because of their must-run status. The pandemic is compelling India to strengthen its ability to maintain security of supply, boost system flexibility, and better integrate its power hardware and software to prepare for potential threats to electricity security (IEA, 2020).

Finally, while it remains uncertain how the energy system will unfold, COVID-19's impact on it seems not significant. However, the impact on job losses remains significant, especially for those in the informal economy. The pandemic's midterm economic impact is unclear and it is, therefore, uncertain how fast the economy will grow. For the time being, the government needs to improve upon the existing stimulus packages to ensure that the pandemic's negative impact is well-managed and reduces the burden on those who have lost their livelihoods.

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