Chapter 2

Impacts of COVID-19 on Energy Demand in the Asia-Pacific Countries

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Chapter 2

Impacts of COVID-19 on Energy Demand in the Asia-Pacific Countries[2]

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1. Background and Purpose

The coronavirus disease (COVID-19) pandemic continues to have an extremely large impact on lives and the world economy. To suppress the pandemic, governments have restricted activities, imposed social distancing, and required people to work from home, resulting in significant economic stagnation.

These changes have had a profound impact on energy demand because various industries have been paralyzed, more people stay home, and mobility has been curtailed to an unprecedented extent. Although comprehensive energy statistics have not yet been released for most regions, the Economic Research Institute for ASEAN and East Asia (ERIA), in with collaboration with the ERIA Working Group for Energy Outlook and Energy-Saving Potential in ASEAN and East Asia, estimates the pandemic's impacts. Using the energy outlook model, this chapter focuses on the short-term (2020–2025) and long-term impacts up to 2050 on energy demand in the Asia-Pacific countries (excluding the Association of Southeast Asian Nations [ASEAN]) and seven other countries participating in the working group (Australia, China, India, Japan, Republic of Korea, New Zealand, and the United States [US] [+7]).

2. Methodology

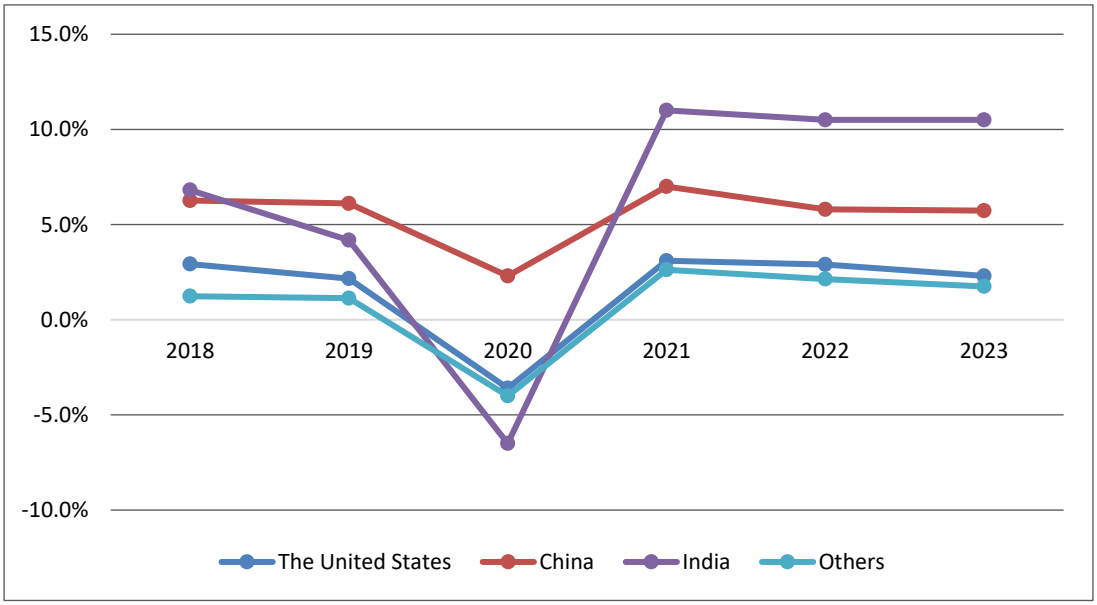
This analysis is based on the East Asia Summit (EAS) energy outlook study (ERIA, 2020). The outlook model computes the energy supply and demand structure by 2050 using econometric methods, based on technological assumptions and the policy outlook of each country. Using this modelling framework, the COVID-19 scenario is added to investigate the effect. In this scenario, assumptions such as gross domestic product (GDP) and energy prices are revised from the business-as-usual (BAU) scenario, taking account of COVID-19's effects. The GDP growth rate in 2020–2025 is revised based on COVID-19's recent impact and the change in several organizations' outlook.

[2] The authors thank all the members of ERIA working group for the helpful discussions about the energy and economic situation in the Asia-Pacific countries. This chapter is a product of ERIA Research Project 2020, Working Group on Preparation of Energy Outlook and Analysis of Energy Saving Potential in East Asia Region.

3. Assumptions

Assumed economic damage in the +7 countries differ, depending on COVID-19's effects (Figure 2.1). In 2020, only China maintains positive economic growth (2.3%). Remarkably, India's GDP experiences the largest drop among the +7 since the country suffers greatly from COVID-19. In 2021, all the +7 economies recover owing to vaccine penetration.

Figure 2.1. Gross Domestic Product Growth Rates, COVID-19 Scenario, 2018–2023



Source: Authors, based on International Monetary Fund (2020).

Table 2.1 shows the differences in GDP growth rates of the +7 countries between the COVID-19 scenario (–2.3%) and BAU (2.6%). Growth rates are greater in the COVID-19 scenario until 2025 as economies rebound, then economic growth continues at the same rate in both scenarios.

Table 2.1. Gross Domestic Product Growth Rate, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050

	2017-2019	2020	2020-2025	2025-2030	2040-2050	2040-2050
BAU	3.4%	2.6%	3.5%	3.3%	3.1%	2.4%
COVID-19	3.4%	-2.3%	3.9%	3.4%	3.1%	2.4%

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

COVID-19 causes a significant drop in oil prices (Table 2.2).

Table 2.2. Crude Oil Price Assumptions, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050
(nominal $)

	2018	2020	2030	2040	2050
BAU	75.1	87.7	126.9	187.2	248.1
COVID-19	72.9	42.5	110.1	157.9	202.2

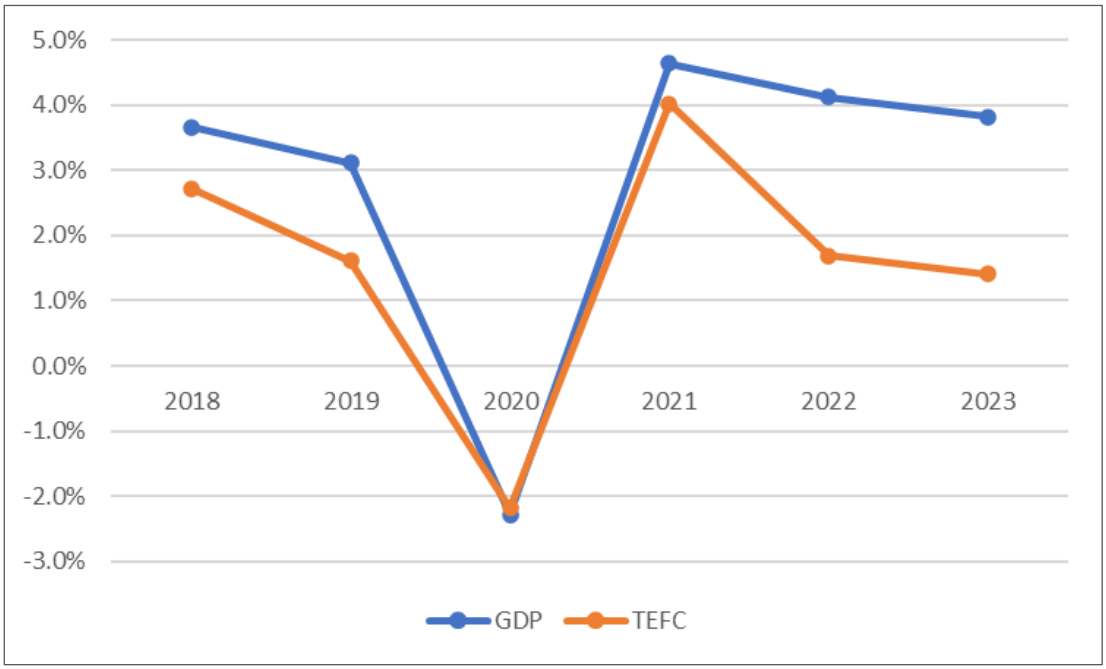
BAU = business as usual, COVID-19 = coronavirus disease.
Source: Authors, based on ERIA (2019).

4. Impacts on Final Energy Consumption

4.1. Short-term Impacts

Worldwide economic deterioration leads to a sharp drop in total final energy consumption (TFEC) in 2020 in the +7 countries, but strong economic growth causes a rebound in TFEC in 2021 (Figure 2.2). The GDP growth rate in 2020 is –2.3%, leading to TFEC growth rate of –2.2%. With 4.6% GDP growth rate, TFEC rebounds to 4.0% in 2021. Thus, the short-term impact of COVID-19 on TFEC is drastic, especially in 2020 and 2021.

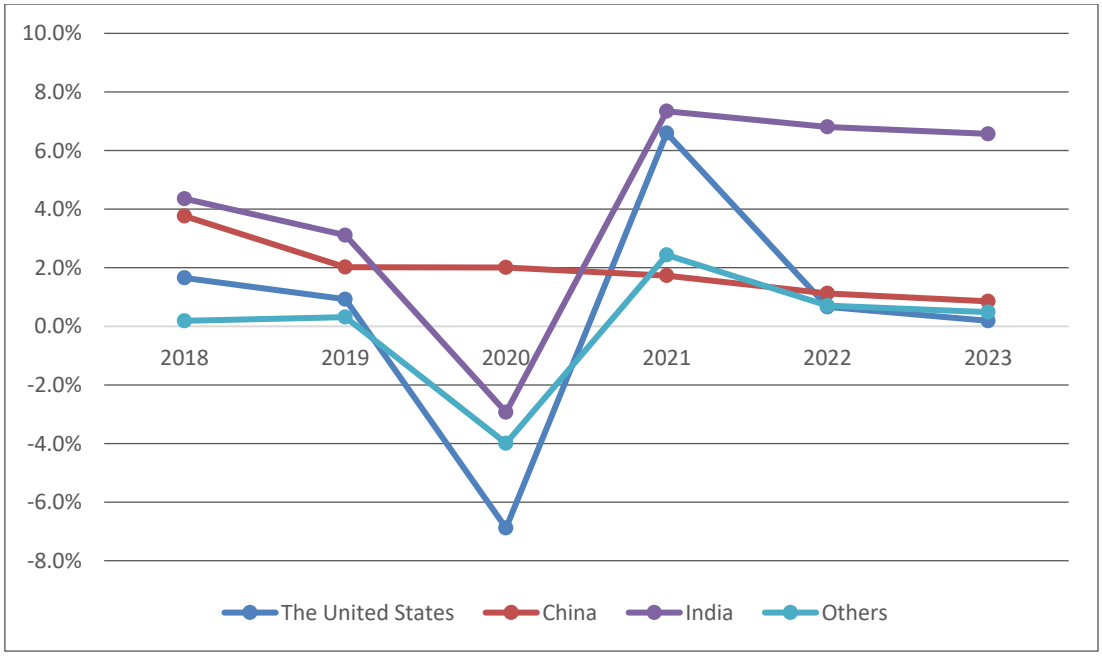
Figure 2.2. Gross Domestic Product and Total Final Energy Consumption Growth Rates, Australia, China, India, Japan, Republic of Korea, New Zealand, and the United States, 2018–2023



GDP = gross domestic product, TFEC = total final energy consumption.
Source: Authors, based on International Monetary Fund (2020).

Energy demand in the US, India, and others (Australia, Japan, Republic of Korea, and New Zealand) decreases, while that in China increases in 2020 (Figure 2.3). The TFEC growth rate of the US is –6.9%, India –2.9%, and others –4.0%, while that of China is +2.0% because it is the only country that maintains positive economic growth, at 2.3%, in 2020 with strict measures against COVID-19, such as hard lockdowns.

Figure 2.3. Total Final Energy Consumption, Australia, China, India, Japan, Republic of Korea, New Zealand, and the United States, 2018–2023



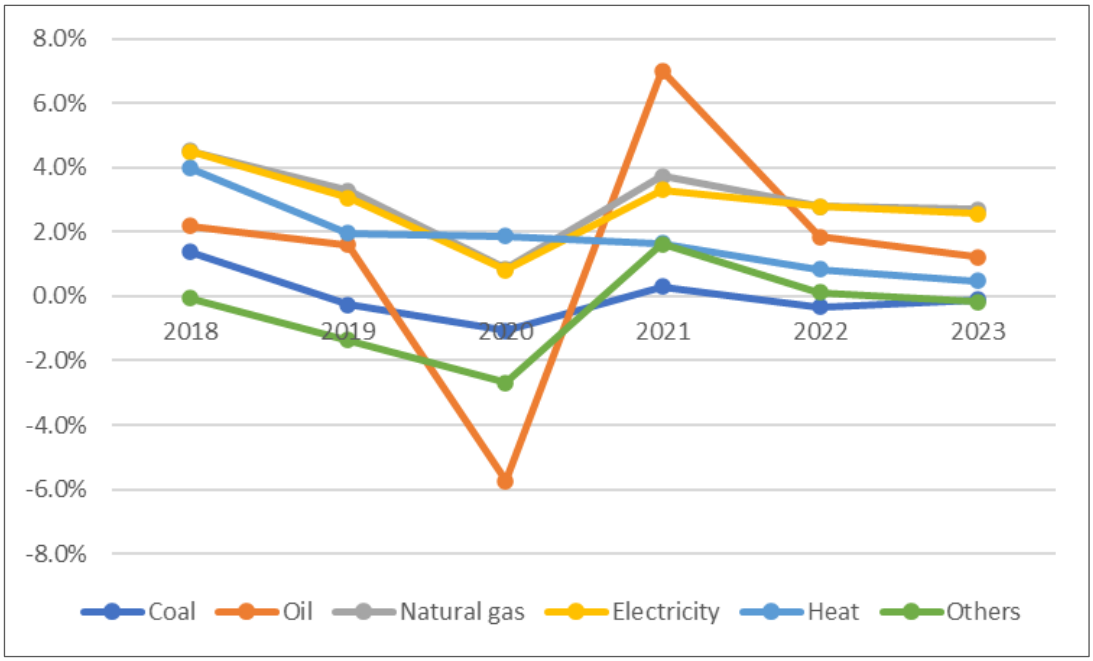
Source: Authors.

In contrast, all TFEC growth rates in 2021 are positive: 7.3% in India, 7.0% in China, 6.6% in the US, and 2.4% in others.

Many developing countries, including ASEAN members, experience negative economic growth rates and positive energy demand at the same time in 2020 because of the inevitable rapid increase in energy demand. India's TFEC drop in 2020, therefore, is remarkable, showing how harsh COVID-19's impacts have been on the economy and energy consumption.

Oil and coal consumption growth rates are considerably negative while natural gas and electricity growth rates are significantly positive in 2020 (Figure 2.4). Oil decreases by 5.7% in the +7 countries, especially because demand from transport drops as a result of lockdowns and telework. Coal declines by 1.1% because of decreased demand from industry. Natural gas, however, increases because of increased demand from the residential and non-energy sectors. Electricity increases mainly because of the hike in residential demand resulting from stay-home policies.

Figure 2.4. Total Final Energy Consumption, by Energy Source, 2018–2023



Source: Authors.

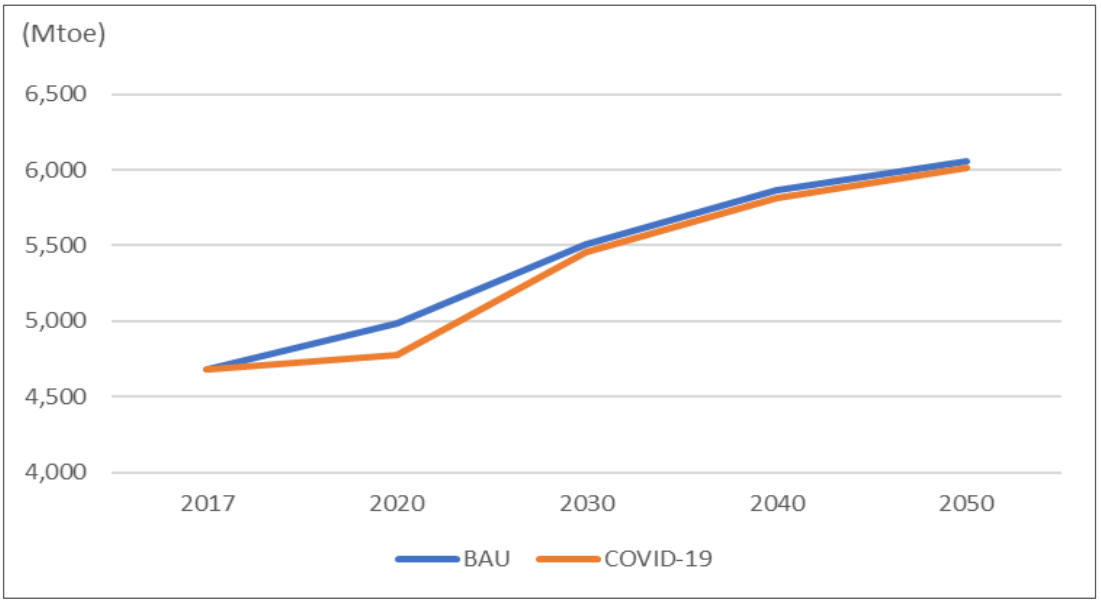
In 2021, oil is expected to rebound by 7% and coal by 0.3%, while natural gas keeps expanding at 3.7% and electricity by 3.3%, based on the +7 countries' economic recovery assumptions.

4.2. Long-term Impact

In the long term, the pandemic may affect energy demand in the +7 countries only slightly compared with its short-term impacts (Figure 2.5). In 2020, the COVID-19 scenario shows that demand is 4.1% less than in BAU. However, in 2050, demand in the COVID-19 scenario is only 0.9% less than in BAU. Energy demand between the two scenarios converges towards 2050.

In both scenarios, total TFEC of the +7 countries in 2050 reaches more than 6,000 million tonnes of oil equivalent or almost half the world's final energy demand in 2050, according to The Institute of Energy Economics, Japan.

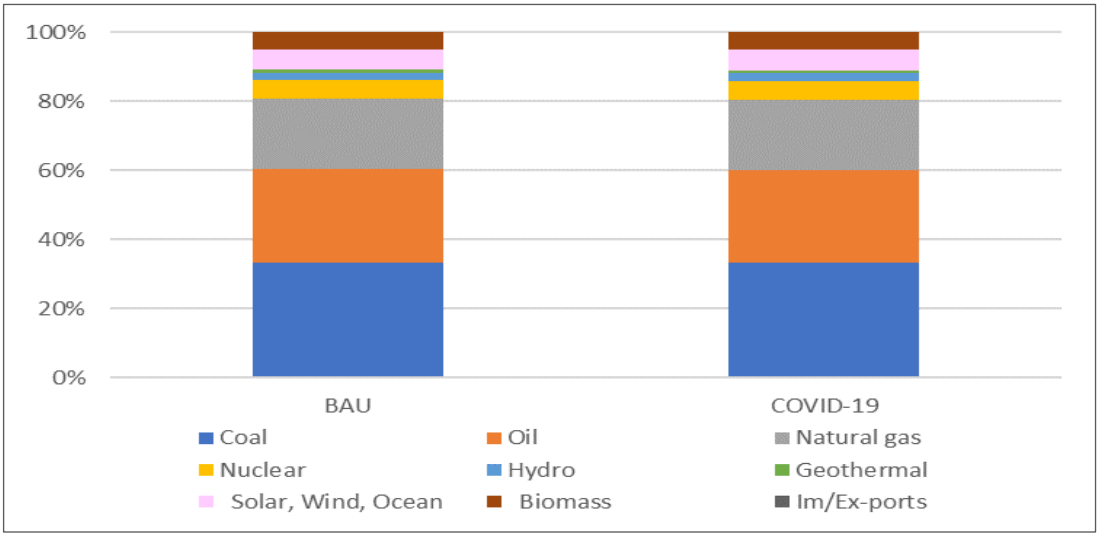
Figure 2.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2017–2050



BAU = business as usual, COVID-19 = coronavirus disease, GDP = gross domestic product, Mtoe = million tonnes of oil equivalent, TFEC = total final energy consumption.
Source: Authors.

The breakdown of total primary energy supply (TPES) in 2050 is almost the same as in the BAU and COVID-19 scenarios (Figure 2.6).

Figure 2.6. Total Primary Energy Supply Breakdown, Business-as-Usual and COVID-19 Scenarios, in 2050



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

5. Key Findings and Recommendations

5.1. Key Findings

(i) In 2020, the COVID-19 pandemic has a huge impact on GDP, TFEC, and TPES in the +7 countries. Oil demand drops substantially because of lockdowns of major cities and rapid adoption of work from home.

(ii) In the short term, however, the economy rebounds, especially in 2021, and GDP annual average growth rates in 2020–2025 in the COVID-19 scenario exceed those in BAU. Thus, the difference in energy consumption in both scenarios shrinks after 2021.

(iii) In the long term, until 2050, the pandemic's impacts on the economy, energy demand, and demand breakdown are extremely limited. Both scenarios imply that energy consumption in the +7 countries approaches half the world's total final energy demand in 2050 regardless of the COVID-19 pandemic.

5.2. Recommendations

Some may argue that the COVID-19 pandemic would contribute to future CO_2 emission reduction, but this would not be true. The pandemic was supposed to have had a huge impact on decreasing CO_2 emissions in the short term, but COVID-19 is projected to have little impact in the long term. This study shows that the pandemic's impacts would not sustainably reduce CO_2 emissions. Therefore, we need to take action if we want to reduce CO_2 emissions in the long run.

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