Chapter 4

Cambodia Country Report

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Chapter 4

Cambodia Country Report

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1. Background

The coronavirus disease (COVID-19) pandemic has had severe socioeconomic impacts on Cambodia, affecting energy demand and supply. Official energy statistics for 2020, however, have not yet been released. This study, therefore, uses the energy outlook model in the business-as-usual (BAU) scenario, which was updated for the 2019 energy outlook (ERIA, 2019), and analyses how energy demand is reduced by COVID-19 in 2020 and how energy demand rebounds after 2020 in the COVID-19 scenario.

2. Macro Assumptions of the COVID-19 Scenario

The annual gross domestic product (GDP) growth rate in the COVID-19 scenario in 2020 decreases by about 3.5% (5.7% in BAU) and rebounds by 3.5% in 2021, 5.5% in 2022, 5.5% in 2023, 5.5% in 2024, and 6.5% in 2025.

In 2023–2030, the GDP growth rate in the COVID-19 scenario is 6.36% per annum (6.8% in BAU). In the long term (2030–2040), GDP growth rate in the COVID-19 scenario is a bit lower than in BAU (Table 4.1).

Table 4.1. Assumptions of Gross Domestic Product Annual Growth Rates, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

Scenario	2018	2019	2020	2021	2022	2023	2023–2030	2030–2040	2040–2050
COVID-19	Base year	7.1%	–3.5%	3.5%	5.5%	5.5%	6.36%	6.5%	6.5%
BAU	Base year	7.1%	6.8%	6.5%	6.5%	6.5%	6.8%	6.77%	6.5%

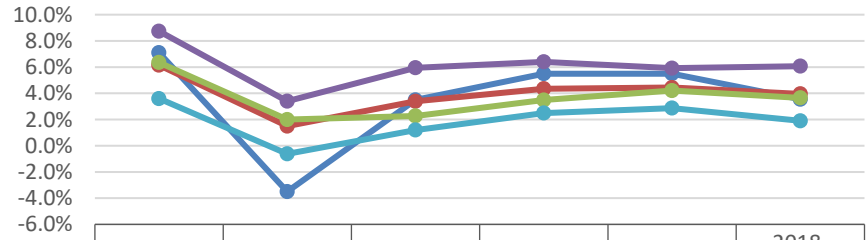
BAU = business as usual, COVID-19 = coronavirus disease.
Source: Author, based on International Monetary Fund and Ministry of Economic and Finance Cambodia data for 2020.

3. Short-term Impact (2018–2023)

3.1. Final Energy Consumption

In the COVID-19 scenario, total final energy consumption (TFEC) by sector and fuel increases on average by 3.96% per year in 2018–2023 (1.27% less than in BAU) and decreases from 4.73 million tonnes of oil equivalent (Mtoe) in BAU to 4.63 Mtoe in the COVID-19 scenario in 2020. In the COVID-19 scenario, transport has the highest growth rate of TFEC at 6.07% per year, followed by industry (3.65%) and 'others' (commercial, residential, and agricultural sectors) (1.9%) in 2018–2023 (Figure 4.1). Coal TFEC has the highest growth rate (13.06% per year), followed by oil (5.05%) and electricity (4.97%) in 2018–2023 (Figure 4.2).

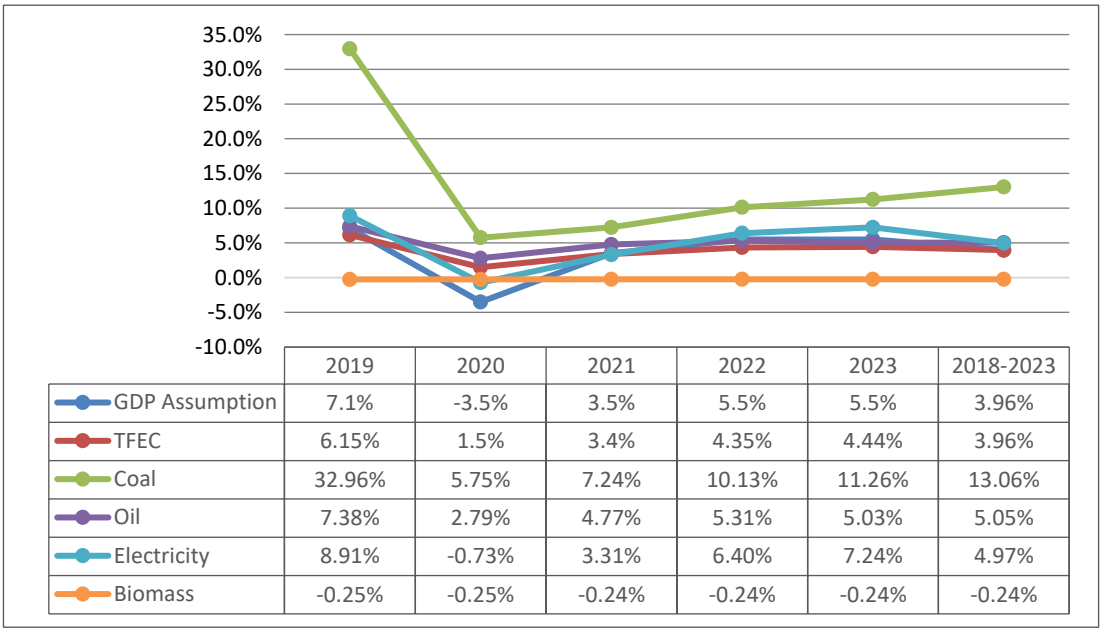
Figure 4.1. Final Energy Consumption Annual Growth Rate, by Sector, 2018–2023



	2019	2020	2021	2022	2023	2018-2023
GDP Assumption	7.1%	-3.5%	3.5%	5.5%	5.5%	3.55%
TFEC	6.15%	1.5%	3.4%	4.35%	4.44%	3.96%
Industry	6.35%	2%	2.3%	3.49%	4.21%	3.65%
Transport	8.74%	3.4%	5.95%	6.40%	5.92%	6.07%
Other sector	3.60%	-0.62%	1.2%	2.49%	2.87%	1.9%

GDP = gross domestic product, TFEC = total final energy consumption.
Source: Author.

Figure 4.2. Final Energy Consumption Growth Rate, by Fuel, 2018–2023



	2019	2020	2021	2022	2023	2018-2023
GDP Assumption	7.1%	-3.5%	3.5%	5.5%	5.5%	3.96%
TFEC	6.15%	1.5%	3.4%	4.35%	4.44%	3.96%
Coal	32.96%	5.75%	7.24%	10.13%	11.26%	13.06%
Oil	7.38%	2.79%	4.77%	5.31%	5.03%	5.05%
Electricity	8.91%	-0.73%	3.31%	6.40%	7.24%	4.97%
Biomass	-0.25%	-0.25%	-0.24%	-0.24%	-0.24%	-0.24%

GDP = gross domestic product, TFEC = total final energy consumption.
Source: Author.

3.2. Total Primary Energy Supply

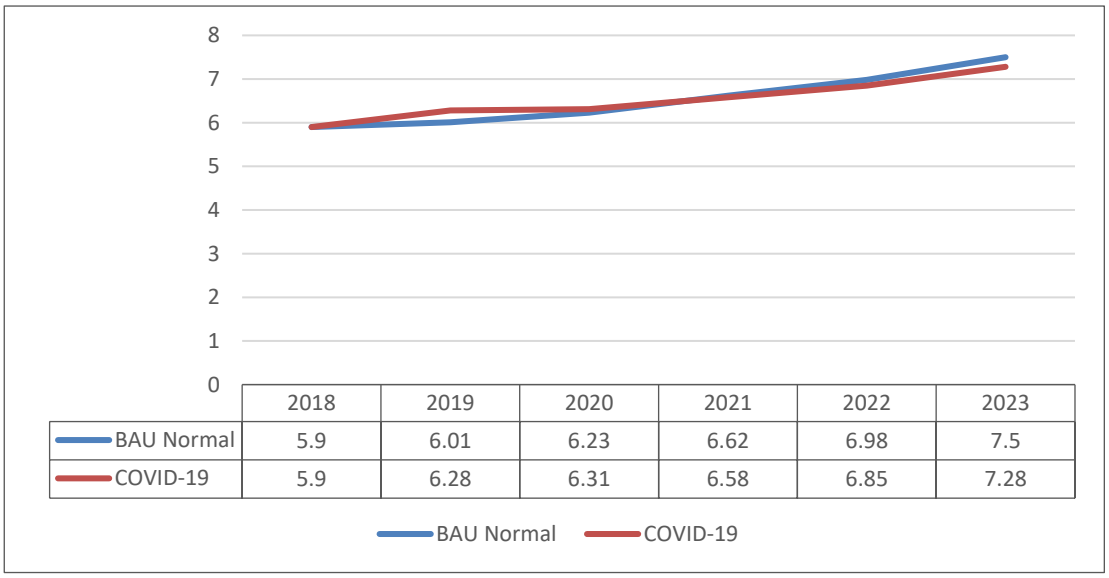
In the COVID-19 scenario, total primary energy supply (TPES) increases by an average of 4.27% per year in 2018–2023, lower only by 0.62% in BAU, reflecting economic recovery after the COVID-19 pandemic.

Table 4.2. Average Annual Growth Rate of Total Primary Energy Supply

TPES (Mtoe)	2018	2019	2020	2021	2022	2023	AAGR, 2018–2023
BAU	5.9	6.01	6.23	6.62	6.98	7.5	4.89%
COVID-19	5.9	6.28	6.31	6.58	6.85	7.28	4.27%

AAGR = annual average growth rate, BAU = business as usual, COVID-19 = coronavirus disease, Mtoe = millionntonnes of oil equivalent.
Source: Author.

Figure 4.3. Annual Growth Rate of Primary Energy Supply, by Source, COVID-19 Scenario, 2018–2023



GDP = gross domestic product, BAU = business as usual, COVID-19 = coronavirus disease, TPES = total primary energy supply.
Source: Author.

3.3. CO_2 Emissions

In the COVID-19 scenario, CO_2 emissions increase by 5.30% in 2018–2023, 0.09% higher than in BAU.

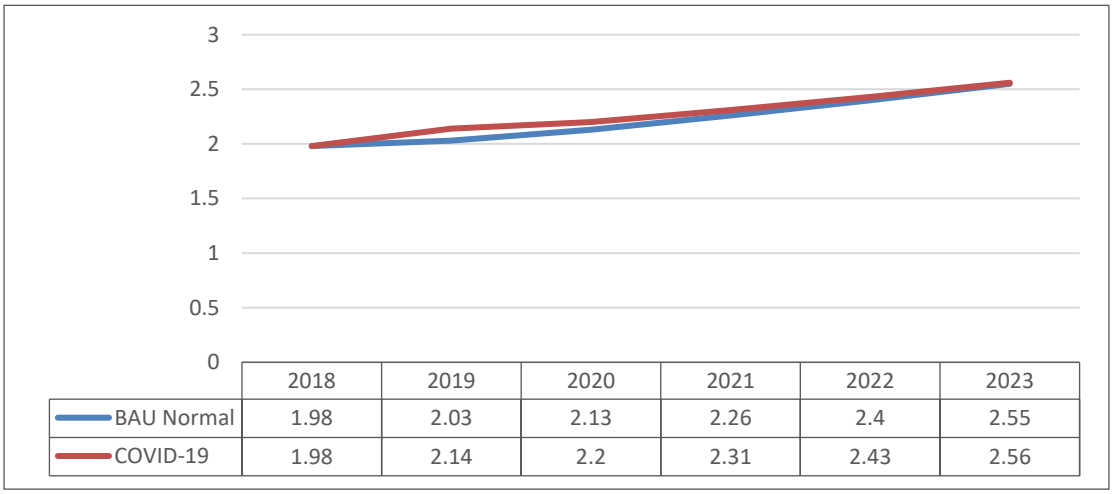
Table 4.3. Average Annual Growth Rate of CO_2 Emissions
(million tonnes carbon equivalent)

	2018	2019	2020	2021	2022	2023	AAGR (2018–2050)
BAU Normal	1.98	2.03	2.13	2.26	2.40	2.55	5.21%
COVID-19	1.98	2.14	2.20	2.31	2.43	2.56	5.30%

AAGR = annual average growth rate, BAU = business as us COVID-19 = coronavirus disease.
Source: Author.

Figure 4.4. CO_2 Emissions, by Source, Business-as-Usual vs. COVID-19 Scenarios, 2018–2023

(million tonnes of carbon dioxide equivalent)



	2018	2019	2020	2021	2022	2023
BAU Normal	1.98	2.03	2.13	2.26	2.4	2.55
COVID-19	1.98	2.14	2.2	2.31	2.43	2.56

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

4. Long-term Impact, 2018–2050

4.1. Final Energy Consumption

In the COVID-19 scenario, TFEC increases by an average of 4.9% per year in 2018–2050, 0.59% lower than in BAU, reflecting economic recovery after the COVID-19 pandemic (Table 4.4).

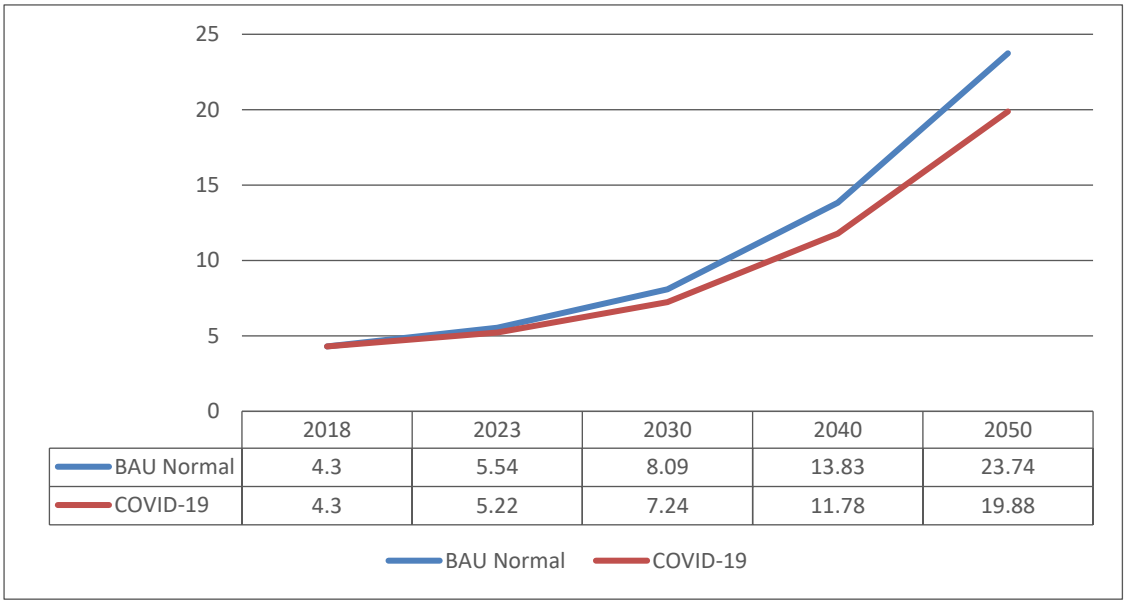
Table 4.4. Gross Domestic Product and Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

		2018	2023	2030	2040	2050	AAGR (2018–2050)
GDP (KHR trillion, 2010)	BAU	52.97	73.04	115.77	222.88	418.38	6.67%
	COVID-19	52.97	63.06	97.08	182.23	342.07	6%
	Difference	0%	–15.8%	–19.3%	–22.3%	–22.3%	0.67%
TFEC (Mtoe)	BAU	4.3	5.54	8.09	13.83	23.74	5.49%
	COVID-19	4.3	5.22	7.24	11.78	19.88	4.9%
	Difference	0%	–6.1%	–11.7%	–17.14%	–19.4%	0.59%

AAGR = annual average 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.
Source: Author.

Figure 4.5. Total Final Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

(million tonnes of oil equivalent)



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

4.2. Primary Energy Supply

In the COVID-19 scenario, TPES increases by 5.15% per year in 2018–2050, 0.61% lower than in BAU, reflecting economic recovery after the COVID-19 pandemic.

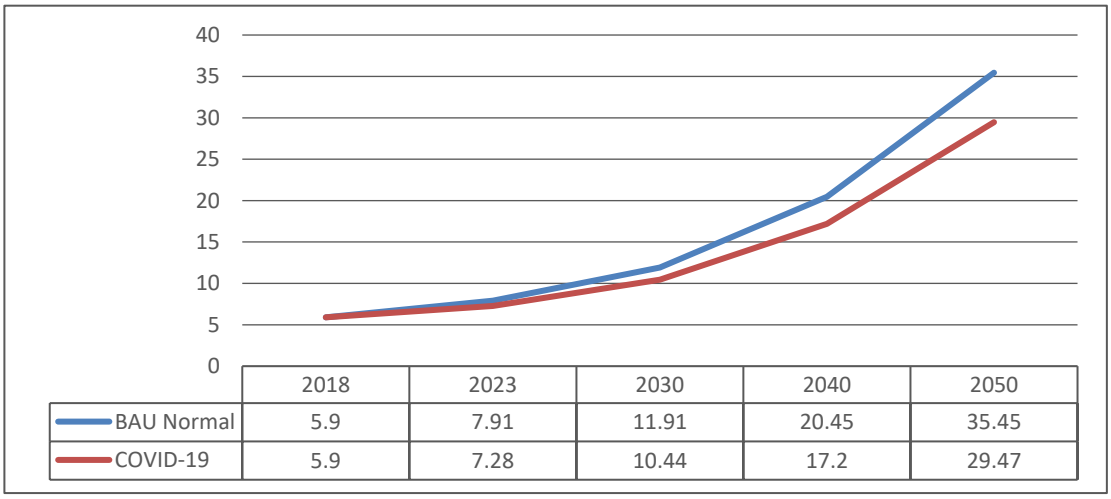
Table 4.5. Average Annual Growth Rate of Total Primary Energy Supply

TPES (Mtoe)	2018	2023	2030	2040	2050	AAGR, 2018–2050
BAU	5.9	7.91	11.91	20.45	35.45	5.76%
COVID-19	5.9	7.28	10.44	17.2	29.47	5.15%

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

Figure 4.6. Total Primary Energy Consumption, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050

(million tonnes of oil equivalent)



	2018	2023	2030	2040	2050
BAU Normal	5.9	7.91	11.91	20.45	35.45
COVID-19	5.9	7.28	10.44	17.2	29.47

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

4.3. CO_2 Emissions

In the COVID-19 scenario, CO_2 emissions increase by 5.28% in 2018–2050, 0.58% lower than BAU, explaining the slightly decreasing energy supply and demand during the COVID-19 pandemic.

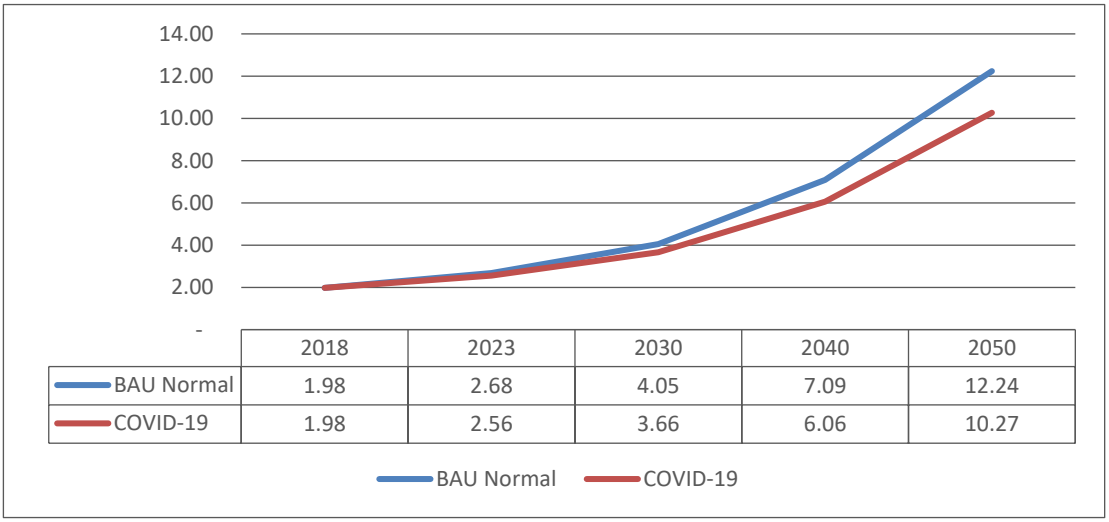
Table 4.6. Average Annual Growth Rate of CO2 emissions in COVID-19 Scenario

(million tonnes carbon equivalent)

	2018	2023	2030	2040	2050	AAGR, 2018–2050
BAU Normal	1.98	2.68	4.05	7.09	12.24	5.86%
COVID-19	1.98	2.56	3.66	6.06	10.27	5.28%

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

Figure 4.7. Total CO_2 Emissions, Business-as-Usual vs. COVID-19 Scenarios, 2018–2050
(million tonnes of carbon dioxide equivalent)



	2018	2023	2030	2040	2050
BAU Normal	1.98	2.68	4.05	7.09	12.24
COVID-19	1.98	2.56	3.66	6.06	10.27

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

5. Implications and Policy Recommendations

Despite the global pandemic and flash floods in 2020 the International Monetary Fund (IMF) anticipates that Cambodia will rebound to become the third-fastest growing economy in the Association of Southeast Asian Nations (ASEAN) in 2021 and then the region's fastest-growing, by 6.5%, in 2025. Before 2020, when the economy grew by about 7% per annum, electricity demand increased at a much higher rate (15%–23%) than in 2019. If the IMF estimate is correct, rapid growth in electricity demand might be expected and rebound to pre–COVID-19 levels or higher.

The government recognizes that expanding access to modern, affordable, and reliable energy, while lowering greenhouse gas emission intensity, is essential to pursue social and economic development. In recent years, actual electricity demand has exceeded projections and, because of an unexpected drought in 2019, the country faced daily scheduled power cuts for 72 days. Because of the 2019 power shortage and because previous electricity generation planning did not match demand growth, Cambodia prepared a power development master plan in two steps: (i) a short-term master plan to identify urgent projects to generate enough power to mitigate shortages in the near future, and (ii) a development master plan to determine the long-term development vision of the power sector until 2040.

The power development plan has been prepared and steps taken to identify, plan, sign agreements on, and develop projects to prevent a power shortage in the near future. The projects include hydro, coal, and solar power plants. Given Cambodia's solar potential, and as solar power plants need less time than hydro and coal plants to be planned and built, eight solar power plants, with a total capacity of 470 megawatts (MW) were planned in 2019–2021. The first solar power plant (10 MW) was commissioned in 2017 in Svay Rieng Province. Of the

eight solar plants planned, one (90 MW) was commissioned in Kampong Speu Province in 2019. The 60 MW first stage of the 100 MW solar park planned in Kampong Chhanang Province under an Asian Development Bank (ADB)–supported project was tendered by Electricité du Cambodge. A Thailand corporation offered the lowest bid ($0.3877 per kilowatt-hour) and was awarded the contract. The government has started discussing the development of the first wind power project.

The Ministry of Mines and Energy (MME) and ADB are studying a power development plan to integrate more renewable energy and clean energy into the grid system. ADB is supporting the effort through technical assistance (Support for a Sustainable Cambodia Power Sector), funded by the Clean Energy Financing Partnership Facility and the Clean Technology Fund Business Development Facility under the Climate Investment Funds.

The energy generation mix has been based on conventional sources—coal and hydro—but, as the country looks forward to 2040, a wider range of technologies are available. Liquefied natural gas and renewable energy will be crucial after 2027. To lower greenhouse gas emissions, MME is working with ADB to develop a utility-scale battery energy storage system to open opportunities for more variable renewable energy development, while working with different partners on energy efficiency projects.

MME's goal is to maximise the utilization of clean energy and mitigate climate change. At the same time, however, the country needs to ensure that future development reliably meets maximum demand at minimum cost while maintaining energy security. This aspiration is reflected in the 2020–2040 Power Development Plan supported by ADB.

Cambodia is committed to reduce greenhouse gas emissions, including from electricity generation. MME is expecting to support more renewable energy generation and energy-efficient projects, which offer opportunities for private investors and the government to work together to mobilize investments and finance.

The following actions are recommended:

(i) **Establish targets and a road map for energy efficiency and conservation.** The targets should be set up for the short, medium, and long term and focus on buildings and industry. The long-term plan should be based on an assessment of energy-saving potential for all energy sectors, including the residential and commercial sectors, which have large potential for energy saving up to 2050. Some activities can promote energy efficiency and conservation:

(a) Support the development of energy conservation professionals responsible for energy management and operation, verification and monitoring, consultancy and engineering service provision and planning, and supervision and implementation of energy conservation measures.

(b) Support the development of the institutional capability of public and private sector agencies and organisations responsible for planning, supervision, promotion, and implementation of energy conservation measures.

(c) Support the operation of energy service companies to alleviate the technical and financial risks of entrepreneurs wishing to implement energy conservation measures.

(d) Share knowledge related to energy conservation with the public through educational institutions, and foster youth awareness.

(ii) **Require energy labelling for electrical appliances.** Annual growth of residential and commercial electricity demand is projected to be higher than in other sectors. Compulsory energy labelling for electrical appliances could be an effective management measure to generate energy savings.

(iii) **Prioritise the development of advanced hydro and coal thermal power technology.** Hydro and coal thermal power plants will be major power generators up to 2050. Advanced technologies for both resources should be prioritised for energy conservation and emission mitigation.

(iv) **Prioritise renewable energy development.** Renewable energy is important for energy independence, energy security, and greenhouse gas emission abatement. A strategy and mechanisms to support renewable energy development must be established.

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