

## CHAPTER 4

# Cambodia Country Report

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## CHAPTER 4

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### 1. Background

Located in the lower Mekong region of Southeast Asia, Cambodia has an area of 181,035 square kilometres (km) and an 800 km border with Thailand in the west, Lao People's Democratic Republic (Lao PDR) in the north, and Viet Nam in the east. The landscape is dominated by lowland plains around the Mekong River and the Tonle Sap Lake. The country has about 2.5 million hectares (ha) of arable land and over 0.5 million ha of pastureland.

Gross domestic product (GDP) average annual growth rate (AAGR) was 7.2% in 2010–2018. The service sector was the largest in that period and contributed the most (38%) to economy in 2018. The AAGR of services was 7.2% in 2010–2018, however, lower than that of industry (11.1%), which indicates industry's growing importance in GDP. Agriculture's share was about 34% in 2010 and decreased to 22% in 2018, with an AAGR of 1.7%. The Ministry of Economy and Finance, Cambodia predicts that GDP will stay at about 6.0% from 2023 as a result of the coronavirus disease (COVID-19) outbreak, which could cost the global economy \$77 billion–\$347 billion or 0.1%–0.4% loss of GDP.

The population increased steadily at an AAGR of 1.6% in 2010–2018. The urban population grew by 3.4% per year, faster than the rural population. The rural population, however, was still bigger than the urban population, making up 77% of the total in 2018.

Electricity generation facilities in 2018 were hydro, coal, diesel, and solar power plants, and plants using wood and other biomass. Total installed capacity of power generation grew by

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**Table 4.1. Power Generation Facilities by Fuel**

No.	Type of Generation	Installed Capacity (megawatts)		Proportion (2018, %)
		2017	2018	
1	Hydro	979.70	1329.70	48.64
2	Diesel and heavy fuel oil	251.33	266.82	3.07
3	Renewable energy	84.27	39.27	0.82
4	Coal	538.00	551.20	31.39
5	Licensee (diesel)	13.19	0	0
6	Imported	416.50	448.50	16.09
	<b>Total</b>	<b>2,282.99</b>	<b>2635.49</b>	<b>100</b>

Source: Electricity Authority of Cambodia (2018).

13.50% during 2017–2018, whilst hydro grew by 36.00%, followed by diesel and heavy fuel oil (6.10%), coal (2.45%), and imported power (7.68%) (Table 4.1).

Final energy consumption increased steadily by 7.2% per year in 2010–2018. Electricity consumption grew the fastest, by an average of 18.3% per year, followed by oil (8.3%). Oil, however, still accounted for most of total final energy consumption, at 55.5%. Biomass increased slightly in 2010–2015 and started to decrease in 2016–2018. Although biomass consumption is declining, its share in total energy consumption remained high, at about 25.5%, in 2018.

## 2. Modelling Assumptions

### 2.1. Gross Domestic Product and Population

Based on the energy demand forecast for 2050, GDP's AAGR is assumed at 6.44% and population is at 1.5%, resulting in an AAGR of GDP per capita of 4.7% (Table 4.2).

**Table 4.2. Gross Domestic Product and Population**

Year	2018	2020	2030	2040	2050	AAGR (%) 2018–2050
GDP	52.97	55.99	108.09	208.11	390.64	6.44
Population	16.25	16.74	19.43	22.55	26.17	1.5

AAGR = average annual growth rate, GDP = gross domestic product.

Source: Author.

## 2.2. Electricity Generation

Regarding future electricity supply, liquid natural gas (LNG) is expected to dominate the fuel mix in 2050, followed by coal. Cambodia's Power Development Master Plan 2020–2030 predicts that the country will have total additional installed electricity generation capacity of 24,384 megawatts (MW), contributed mainly by LNG (9,600 MW), hydro (5,927 MW), and coal (5,140 MW) by 2050.

**Table 4.3. Installed Capacity, Business as Usual  
(megawatts)**

Technology	2020	2025	2030	2035	2040	2045	2050
HFO power plant EDC	400	400	400	400	400	400	400
Wind	0	80	180	280	380	480	580
Natural gas	0	0	3,600.00	4,800.00	6,000.00	7,200.00	9,600.00
Solar	75	525	1,725.00	1,925.00	2,125.00	2,325.00	2,525.00
Biomass	29	29	29	29	29	29	29
Hydro	2,103.00	2,103.00	4,727.00	4,727.00	5,927.00	5,927.00	5,927.00
HFO and diesel	281	183	183	183	183	183	183
Coal-fired power plant	1,000.00	3,390.00	5,140.00	5,140.00	5,140.00	5,140.00	5,140.00
<b>Total</b>	<b>3,888</b>	<b>6,710</b>	<b>15,984</b>	<b>17,484</b>	<b>20,184</b>	<b>21,684</b>	<b>24,384</b>

EDC = <>, HFO = heavy fuel oil.

Source: Author.

**Table 4.4. Installed Capacity, Alternative Policy Scenario  
(megawatts)**

Technology	2020	2025	2030	2035	2040	2045	2050
Waste-to-energy power generation	0	100	450	450	650	650	1,750.00
HFO power plant EDC	400	400	400	400	400	400	400
Wind	0	80	230	330	430	830	860
Natural gas	0	0	3,000.00	4,800.00	4,800.00	4,800.00	6,800.00
Solar	75	525	1,875.00	2,075.00	2,475.00	3,475.00	4,475.00
Biomass	29	29	29	29	29	29	29
Hydro	2,103.00	2,103.00	4,727.00	4,727.00	6,127.00	6,127.00	7,127.00
HFO and diesel	281	183	183	183	183	183	183
Coal-fired power plant	1,000.00	1,640.00	1,640.00	1,640.00	1,640.00	1,640.00	1,640.00
<b>Total</b>	<b>3,888</b>	<b>5,060</b>	<b>12,534</b>	<b>14,634</b>	<b>16,734</b>	<b>18,134</b>	<b>23,264</b>

EDC = <>, HFO = heavy fuel oil.

Source: Author.

### 2.3. Energy Efficiency and Conservation Policies

Cambodia's energy efficiency and conservation (EE&C) programs aim to achieve integrated and sustainable improvements in major energy-consuming sectors and help prevent wasteful fuel consumption. The sectors must use energy more efficiently and have increased access to energy-efficiency project financing. The government must establish energy-efficiency regulatory frameworks. Cambodia is implementing pilot projects to achieve the following:

- (i) Improve the efficiency of the overall supply chain for home lighting in rural areas by providing decentralised energy services through a new generation of rural energy entrepreneurs.
- (ii) Help transform the market for home and office electrical appliances through bulk purchase and dissemination of high-performance lamps, showcasing of energy efficient products, support to competent organisations for testing and certification of energy-efficient products, and establishment of 'green learning rooms' in selected schools to impart life-long education on EE&C. Improve energy efficiency in buildings and public facilities.
- (iii) Improve energy efficiency, in cooperation with the United Nations Industrial Development (UNIDO) and the Ministry of Mines and Energy (MME), in rice mills, brick kilns, rubber refineries, and garment factories.

Cambodia is preparing an action plan for EE&C in cooperation with the energy efficiency design sub-working group. The MME is drafting actions plans for industry, transport, and other sectors. The action plans will result in estimated reduction of existing consumer demand by 5% by 2025 and by 20% by 2050 under the business as usual (BAU) scenario. These initial estimates were used to forecast energy demand under the alternative policy scenario (APS).

The National Energy Efficiency Policy, Strategy and Action Plan identifies five priorities:

- (i) energy efficiency in industry,
- (ii) energy efficiency of end-user products,
- (iii) energy efficiency in buildings,
- (iv) energy efficiency of rural electricity generation and distribution, and
- (v). efficient use of biomass resources for residential and industrial purposes.

The energy-efficiency assumption in the Long-range Energy Alternative Planning system (LEAP) model is based on the assessment of the energy-efficiency potential of buildings,

industry, and transport. The National Energy Efficiency Policy aims to reduce energy demand by 20% by 2050 relative to BAU.

### 2.4. Intended Nationally Determined Contribution

Cambodia wishes to propose a greenhouse gas (GHG) mitigation contribution for 2020–2030, conditional upon the availability of international support. In the energy sector, the aim is to reduce 3,100 gigagrams of carbon dioxide (Gg Co2) equivalent (about 1.8 million tonnes of carbon dioxide [Mt-CO2] equivalent) compared with baseline emissions of 11,600 Gg Co2 equivalent by 2030.

**Table 4.5. Intended Nationally Determined Contribution Targets**

Sector	Priority Action	Reduction as Gg CO <sub>2</sub> eq in 2030, Compared with Baseline
Energy	<ul style="list-style-type: none"> <li>National grid-connected renewable energy generation (solar energy, hydropower, biomass, and biogas) and connection of decentralised renewable generation to the grid</li> <li>Off-grid electricity such as solar home systems, hydro (pico, mini, and micro)</li> <li>Promotion of energy efficiency by end users</li> </ul>	1,800 (16%)
Manufacturing	Promotion of renewable energy and adoption of energy efficiency for garment factories, rice mills, and brick kilns	727 (7%)
Transport	<ul style="list-style-type: none"> <li>Promotion of mass public transport</li> <li>Improvement of operation and maintenance of vehicles through motor vehicle inspection and eco-driving, and increased use of hybrid cars, electric vehicles, and bicycles</li> </ul>	390 (3%)
Other	<ul style="list-style-type: none"> <li>Promotion of energy efficiency for buildings, more efficient cook stoves</li> <li>Reduction of emissions from waste through use of biodigesters and water filters</li> <li>Use of renewable energy for irrigation and solar lamps</li> </ul>	155 (1%)
<b>Total saving</b>		<b>3,100 (27%)</b>

Gg CO<sub>2</sub> eq = <>. Source: MoE, 2016.

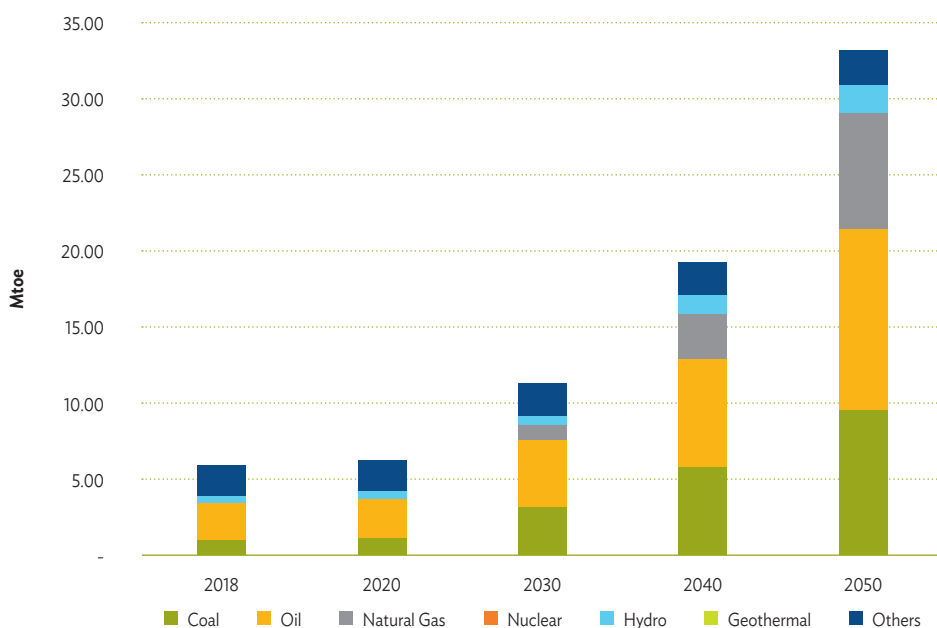
## 3. Outlook Results

### 3.1. Business as Usual

#### 3.1.1. Primary Energy Supply

AAGR for primary energy supply will be 5.6% in 2018–2050. Primary energy supply will increase from 5.9 million tonnes of oil equivalent (Mtoe) in 2018 to 33.27 Mtoe in 2050, which is slightly faster than final energy consumption, from 4.3 Mtoe in 2018 to 22.33 Mtoe in 2050. The fastest-growing energy source is solar and wind, with AAGR of 18% in 2018–2050 (Figure 4-1).

**Figure 4.1. Primary Energy Supply by Source, Business as Usual**



Mtoe = million tons of oil equivalent.

Source: Authors.

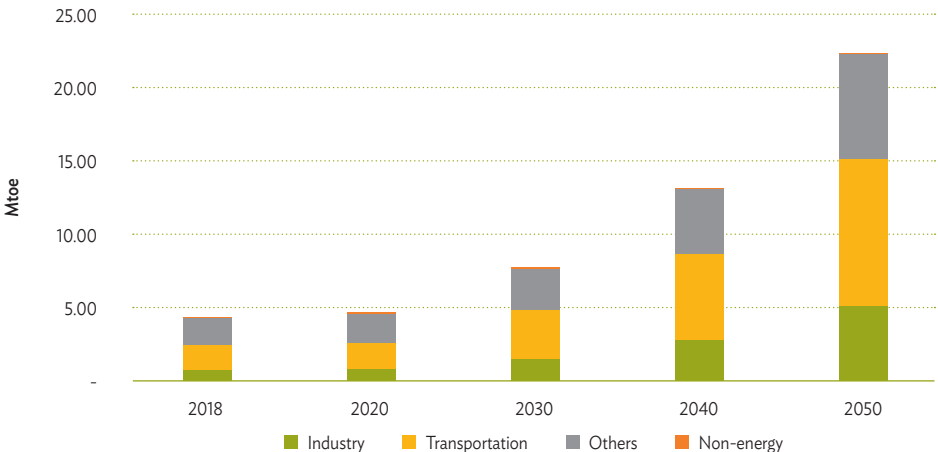
Under BAU, primary energy supply is projected to increase by 5.6% per year or 2.9 times, from 5.9 Mtoe in 2018 to 33.27 Mtoe in 2050. The fastest growth is expected in solar and wind power, increasing at an annual average rate of 18.0% in 2018–2050, followed by coal and oil at 7.4% and 5.0%, respectively. The share of solar and wind is projected to increase by 18% by 2050 to comply with the policy to promote renewable energy. The LNG share is projected to increase from 7.60% in 2030 to 21.31% in 2050 due to global limitations on using coal.

### 3.1.2. Final Energy Demand

#### 3.1.2.1. By Sector

Final energy consumption will have an AAGR of 5.3% in 2018–2050. Final energy consumption by sector will increase from 4.3 Mtoe in 2018 to 22.33 Mtoe in 2050 (Figure 4-2).

**Figure 4.2. Final Energy Consumption by Sector, Business as Usual**



Mtoe = million tons of oil equivalent.  
Source: Authors.

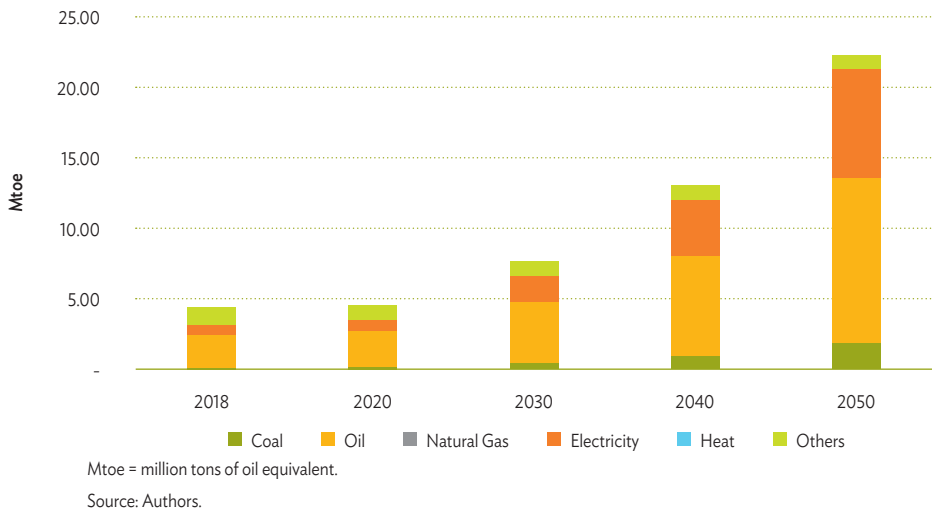
The strongest growth in demand is projected in industry, at an annual average rate of 6.2% in 2018–2050 or 5.9 times, from 0.72 Mtoe in 2018 to 5.04 Mtoe in 2050. Transport is projected to grow at an annual rate of 5.6% or 4.78 times, from 1.75 Mtoe in 2018 to 10.12 Mtoe in 2050, followed by ‘others’ at 4.4%, from 1.81 Mtoe in 2018 to 7.15 Mtoe in 2050.

#### 3.1.2.2. By Fuel

Coal is projected to exhibit the fastest growth in final energy demand, at 10.3% per year or 22.06 times, from 0.08 Mtoe in 2018 to 1.74 Mtoe in 2050. Electricity is projected to have the second-highest growth rate, at 7.6% per year or 9.35 times, from 0.74 Mtoe in 2018 to 7.7 Mtoe in 2050. Oil is projected to have the third-highest growth rate, at 5.1% per year or 3.97 times, from 2.38 Mtoe in 2018 to 11.86 Mtoe in 2050 (Figure 4-3).



**Figure 4.3. Final Energy Consumption by Fuel, Business as Usual**

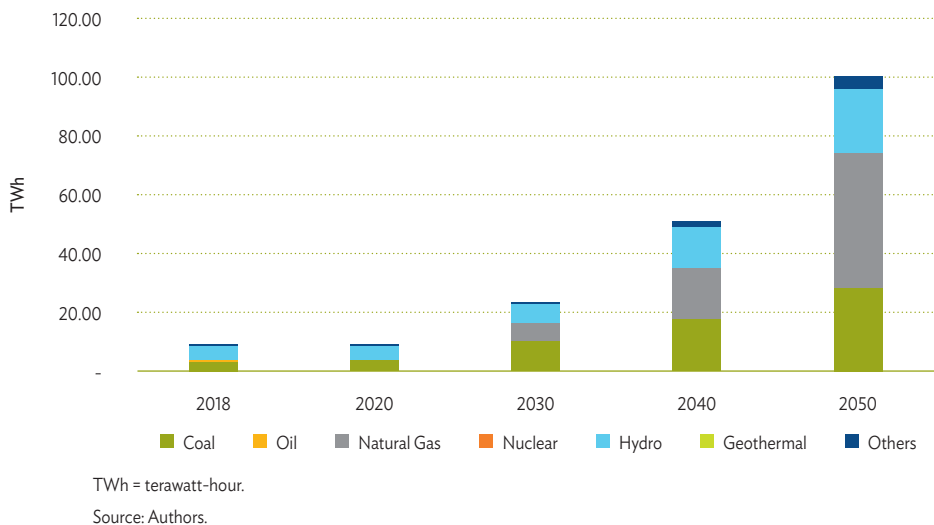


### 3.1.3. Electricity Generation

Electricity generation will increase by 8% per year, from 8.48 TWh in 2018 to 99.56 TWh in 2050. From 2030 to 2050, electricity generation will be provided mainly by LNG, 26.04%–46.02%; coal, 42.05%–28.16%; and hydro, 26.00%–22.00%.

Under BAU, power generation is projected to increase at an average rate of 8.0% in 2018–2050. The fastest growth will be in ‘others’ (12.3% per year) followed by coal (7.0%) and hydro (4.9%) (Figure 4-4). The share of oil-fired power plants will decrease by 0.8% due to high fuel cost (Figure 4-4).

**Figure 4.4. Power Generation by Fuel, Business as Usual**

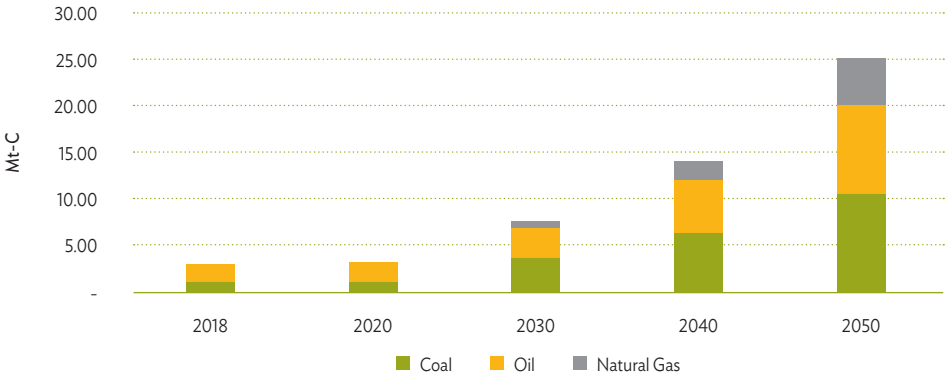


**3.1.4. Carbon Dioxide Emissions**

CO2 emissions from energy consumption are projected to increase by 6.8% per year, from 3.0 Mt-C in 2018 to 25.0 Mt-C in 2050 under BAU.

Coal is the largest source of carbon emissions, which will increase the fastest, with an AAGR of 7.4%, from 1.1 Mt-C in 2018 to 10.05 Mt-C in 2050. The second-largest source of carbon emissions is oil, with an AAGR of 5.1%, from 2.0 Mt-C in 2018 to 9.7 Mt-C in 2050 (Figure 4-5).

**Figure 4.5. Carbon Dioxide Emissions from Energy Consumption, Business as Usual**



Mt-C = million tonnes of carbon equivalent.  
 Source: Authors.

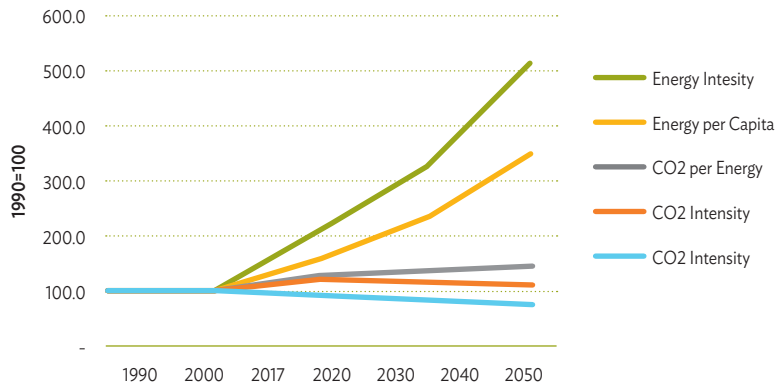
**3.1.5. Energy Indicators**

Primary energy intensity decreased from 775 toe/million 2010 US dollars in 1990 to 301 toe/million 2010 US dollars in 2018. Under BAU, energy intensity will further decrease to 230 toe/million 2010 US dollars in 2050 as a result of the EE&C program.

Primary energy per capita increased from 0.3 toe in 1990 to 0.4 toe in 2018. Under BAU, energy per capita will further increase to 1.3 toe in 2050 because living standards will improve, resulting in increasing energy demand per capita.

Figure 4-6 shows indicators of energy consumption.

**Figure 4.6. Energy and Carbon Dioxide Indicators**



CO<sub>2</sub> = carbon dioxide.  
Source: Authors.

CO<sub>2</sub> emissions per unit of primary energy consumption (ton of carbon [t-C]/toe) under BAU is projected to increase from 0.51 t-C/toe in 2018 to 0.75 t-C/toe in 2050, implying faster growth of fossil fuels in total energy consumption. However, CO<sub>2</sub> intensity increased from 95 t-C/million 2010 US dollars in 2000 to 155 t-C/million 2010 US dollars in 2018, and will increase to 173 t-C/million 2010 US dollars in 2050.

## 4. Scenario Analysis

### 4.1. Alternative Policy Scenario

APS consists of scenarios such as EE&C (APS1), improvement of energy efficiency in power generation (APS2), and development of renewable energy (APS3). The scenarios were individually modelled to determine their impact on reduction of energy consumption and CO<sub>2</sub> emissions. Below are the assumptions in each scenario:

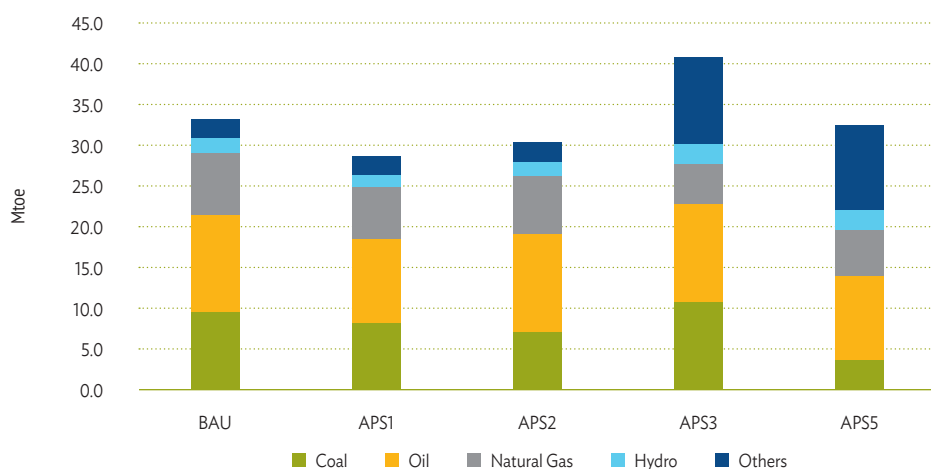
A. APS1. Focus is on EE&C on the demand side:

- (i). Energy demand in all sectors was equal in 2018 and will be reduced by 15.70% by 2050 relative to BAU.
- (ii). Efficient motorbikes and hybrid cars will be used for road transport.
- (iii) Inefficient devices will be replaced with efficient ones for commercial and residential uses, including cooking, lighting, refrigeration, air conditioning, amongst others.

- B. APS2. Thermal power plants are more energy-efficient. Energy efficiency of LNG, coal, and fuel oil thermal power plants is assumed to stay constant at 41.2% until 2050 under BAU. Under APS2, new LNG, coal, and fuel oil thermal power plants are assumed to have thermal efficiencies of 51%. APS2 is projected to improve the efficiency of thermal power generation to about 23% in 2018–2050.
- C. APS3. Under BAU, the share of renewables in the power generation mix is 37.16%, but under APS3, it is up to 55.17% by 2050. The power generation mix in 2050 will consist of hydro at 27.61%, LNG 22.08%, coal 20.49%, solar 17.34%, biomass 6.89%, and wind 3.3%.
- D. APS5 or APS. Combination of APS1 to APS3.

The APS assumptions were analysed separately to determine the individual impacts of each under APS1, APS2, APS3, and APS5. Figure 4-7 shows the changes in primary energy supply in all scenarios. APS1 and APS2 have the largest reduction in primary energy supply in 2050 due to improved energy efficiency in thermal power generation and APS1 energy-efficiency assumptions. APS1 could reduce primary energy supply under BAU by 4.64 Mtoe or 14%. Under APS2, reduction will be slower, amounting to 2.88 Mtoe or 9.5%.

**Figure 4.7. Comparison of Scenarios and Total Primary Energy Supply by 2050**

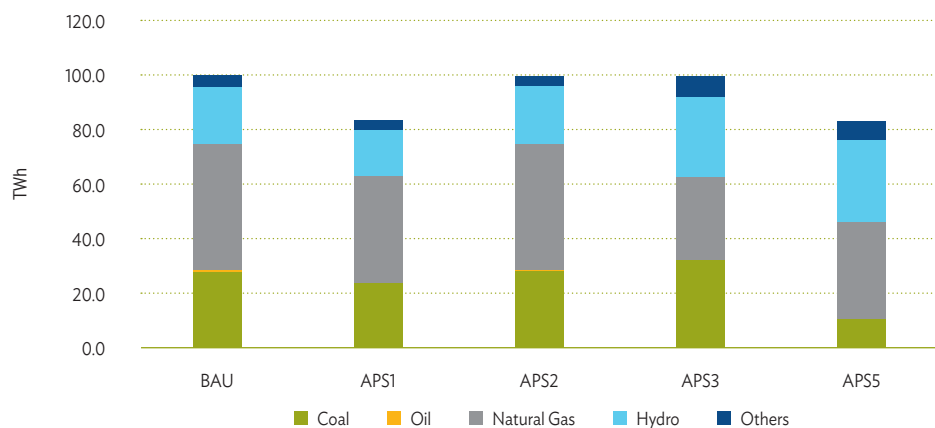


APS = alternative policy scenario, BAU = business as usual, Mtoe = million tons of oil equivalent.

Source: Author.

Figure 4-8 shows total electricity generation in 2050 under all scenarios. Under APS1, due to the lower electricity demand, the share of fossil fuel electricity generation will be lower by 19.1% than under BAU. Under APS2 and APS3, the share is the same as under BAU. Under APS5, where all scenarios are combined, the reduction in the share of fossil energy-based generation will be significant, almost 19.1% lower than under BAU.

**Figure 4.8. Comparison of Electricity Generation Scenarios by 2050**

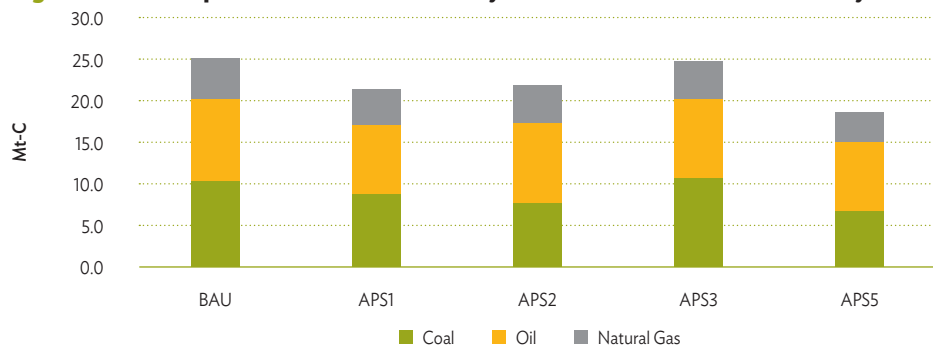


APS = alternative policy scenario, BAU = business as usual, TWh = terawatt-hour.

Source: Author.

Figure 4-9 compares all the scenarios by CO2 emissions in 2050. The energy-efficiency assumption under APS1 could reduce emissions by 17% in 2050 compared with BAU. Under APS2, the installation of more efficient power plants is projected to reduce emissions by 13.5%. Under APS 3, as the result of small contributions from solar wind and biomass to the

**Figure 4.9. Comparison of Scenarios by Carbon Dioxide Emission by 2050**



APS = alternative policy scenario, BAU = business as usual, Mt-C = million tonnes of carbon equivalent.

Source: Authors.

power generation mix, emissions could be reduced slightly, by 1%. All assumptions combined (APS5) could reduce BAU CO2 emissions by 34.1% in 2050.

**4.2. Energy Saving Potential and Carbon Dioxide Emission Reduction**

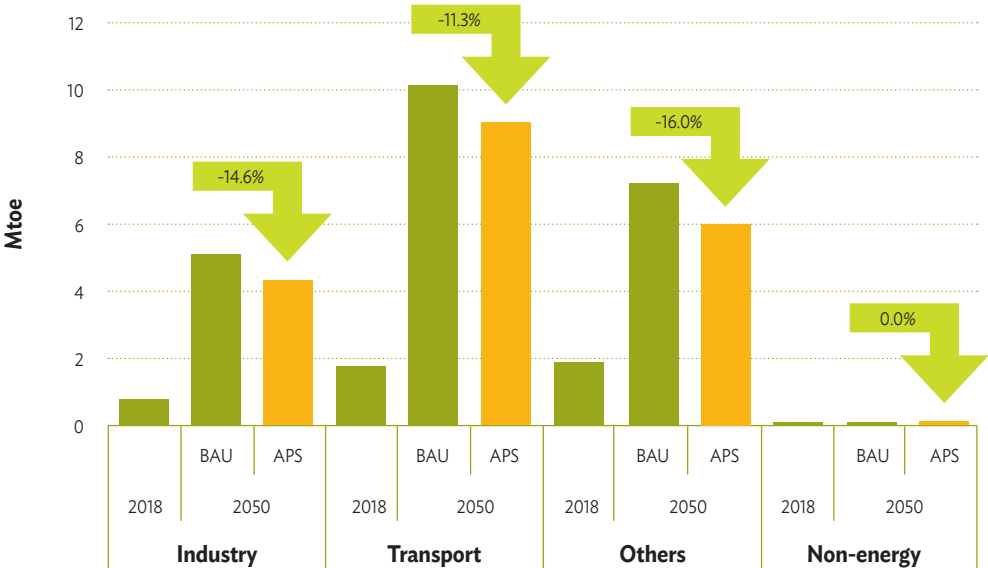
**4.2.2. Final Energy Demand**

Under APS5, final energy consumption is 19 Mtoe and under BAU 22 Mtoe. Final energy consumption under APS5 is projected to decrease by 13.5% compared with BAU in 2050 because of EE&C measures (APS1) in industry, transport, and residential and commercial (‘others’) sectors.

Final energy consumption saving between APS5 and BAU is 3 Mtoe. Saving is expected to occur in ‘others’ (1 Mtoe), transport (1 Mtoe), and industry (1 Mtoe).

Improvement in end-user technologies and the introduction of energy management systems are expected to help slow consumption growth, particularly in ‘others’, industry, and transport (Figure 4-10).

**Figure 4.10. Final Energy Consumption by Sector, Business as Usual and Alternative Policy Scenario**



APS = alternative policy scenario, BAU = business as usual, Mtoe = million tons of oil equivalent.  
Source: Authors.

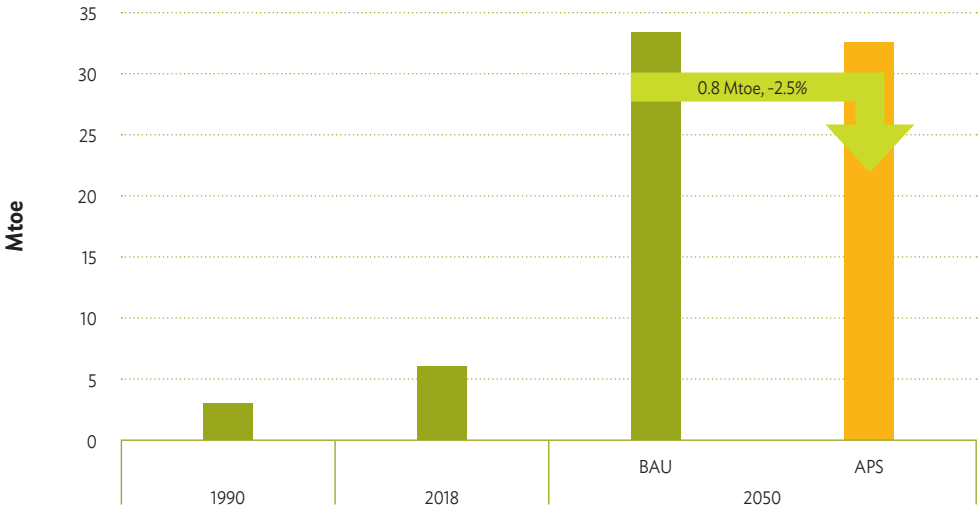
### 4.2.3. Primary Energy Supply

Under APS5, primary energy supply is projected to increase by 5.50% per year, from 5.90 Mtoe in 2018 to 32.43 Mtoe in 2050. Saving can be derived mostly from EE&C scenarios on the demand side and development of renewable energy technology (APS3).

Solar and wind energy are projected to grow the fastest, by 20.07% per year, compared with 18.00% under BAU, followed by hydro at 5.8% compared with 4.9% under BAU, and oil at 4.6% compared with 5.0% under BAU.

Total saving is equal to 0.8 Mtoe, which is equivalent to 2.5% of primary energy supply in 2040 (Figure 4-11).

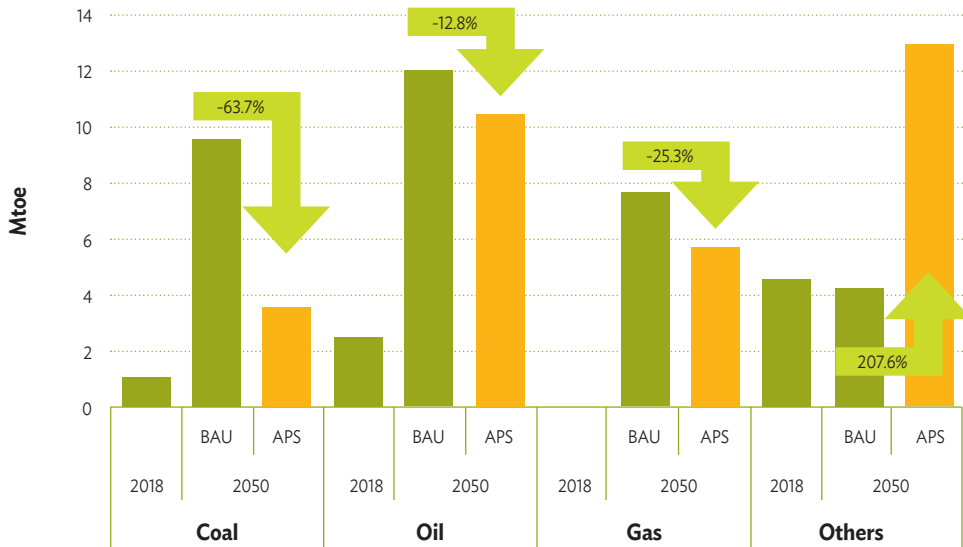
**Figure 4.11. Primary Energy Supply by Fuel, Business as Usual and Alternative Policy Scenario**



APS = alternative policy scenario, BAU = business as usual, Mtoe = million tons of oil equivalent.  
 Source: Authors.

The reduction in consumption, relative to BAU, comes from EE&C measures on the demand side (APS1), more aggressive uptake of energy efficiency in thermal power plants (APS2), and adoption of renewable energy (APS3) on the supply side. Energy-saving potential from coal is 63.7%, followed by LNG at 25.3% and oil at 12.8% (Figure 4-12).

**Figure 4.12. Total Primary Energy Saving Potential by Fuel, Business as Usual and Alternative Policy Scenario**

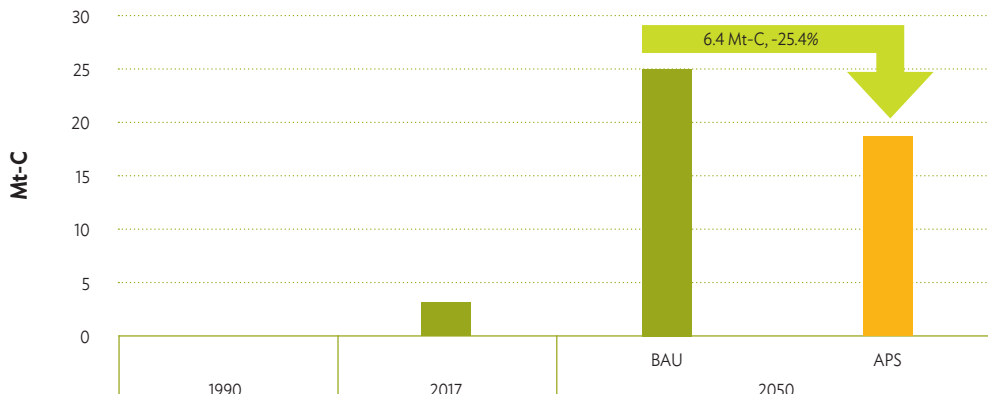


APS = alternative policy scenario, BAU = business as usual, Mtoe = million tons of oil equivalent.  
Source: Authors.

#### 4.2.4. Carbon Dioxide Emissions

CO<sub>2</sub> emissions from energy consumption under BAU are projected to increase by 6.8% per year, from 3 Mt-C in 2018 to 25 Mt-C in 2050. Under APS5, CO<sub>2</sub> emissions are projected to increase by 5.8% per year in 2018–2050, representing a 34.4% reduction from BAU.

**Figure 4.13. Carbon Dioxide Emission by Fuels, Business as Usual and Alternative Policy Scenario**



APS = alternative policy scenario, BAU = business as usual, Mt-C = million tonnes of carbon equivalent.  
Source: Authors.



The CO<sub>2</sub> emission reduction will be derived mostly from EE&C measures on the demand side (APS1). Improvement of energy efficiency in thermal power plants (APS2) and development of renewable energy technologies (APS3) can contribute significantly to CO<sub>2</sub> reduction (Figure 4-13).

#### 4.2.5. Intended Nationally Determined Contribution

CO<sub>2</sub> emissions from energy consumption under BAU are projected to increase by 6.8% per year, from 3 Mt-C in 2018 to 25 Mt-C in 2050. Under APS5, the annual increase in CO<sub>2</sub> emissions is projected to be 5.8% in 2018–2050.

**Table 4.6. Results of Carbon Dioxide Emissions by 2050**  
(million tons of carbon equivalent)

	BAU	APS <sub>1</sub>	APS <sub>2</sub>	APS <sub>3</sub>	APS <sub>5</sub>
Coal	10.51	8.93	7.80	10.76	6.80
Oil	9.66	8.39	9.66	9.66	8.39
Natural gas	4.83	4.05	4.56	4.35	3.45
<b>Total</b>	<b>24.99</b>	<b>21.37</b>	<b>22.02</b>	<b>24.77</b>	<b>18.64</b>

APS = alternative policy scenario, BAU = business as usual.

Source: Author.

## 4. Key Findings and Policy Implications

The following are the key findings:

- (i) Energy demand is expected to continue to grow at a significant rate, driven by robust economic growth, industrialisation, urbanisation, and population growth. EE&C is the new source of energy, and measures reflected in APS are estimated to have significant potential to help meet future demand in a sustainable manner.
- (ii) Energy intensity will be further reduced due to efficient use of energy.
- (iii) The annual growth of energy demand in industry is projected to be the highest, at 6.2%, under BAU, and its share will increase from 17.0% in 2018 to 22.6% in 2050,

showing that industry has large potential for energy saving.

- (iv) Coal demand is increasing, with the highest annual growth rate of 10.3% under BAU, and is projected to be slightly lower, at 9.9%, under APS5.
- (v) LNG power plants will be the major power generation source. LNG's share in total power generation output will increase from 26.4% in 2030 to 46.02% in 2050. LNG will have the largest energy saving and GHG mitigation potential.
- (vi) Coal power plants will be the second major source of power generation. Coal's share in total of power generation output will increase from 37.86% in 2018 and drop to 28.16% in 2050 due to the huge contribution of LNG.

The following actions are recommended:

- Establish targets and a road map for EE&C. The targets should be set up for the short, medium, and long term and focused on buildings and industry. The long-term plan should be based on an assessment of energy-saving potential for all energy sectors, including residential and commercial sectors, that have large potential for energy saving up to 2050. Some activities can promote EE&C:
  - (a) support for the development of energy conservation professionals to be 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 for the development of institutional capability of public and private sector agencies and organisations to be responsible for the planning, supervision, promotion, and implementation of energy conservation measures;
  - (c) support for the operation of energy service companies to alleviate technical and financial risks of entrepreneurs wishing to implement energy conservation measures; and
  - (d) sharing of knowledge about energy conservation with the public through educational institutions, and fostering of youth awareness.

- Require energy labelling for electrical appliances. Annual growth of residential and commercial (‘others’) electricity demand is projected to be higher than that of other sectors. Compulsory energy labelling for electrical appliances could be an effective management measure to generate energy saving.
- Prioritise the development of advanced hydro and coal thermal power technology. Hydro and coal thermal power plants will be the major power generators up to 2050. Advanced technologies for both resources should be prioritised for development.
- Prioritise renewable energy development. Renewable energy is important for energy independence, energy security, and GHG emission abatement. A strategy and the mechanisms to support renewable energy development must be established.

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