CHAPTER 6

# ENERGY OUTLOOK

## 6.1. Future trend analysis by 2030

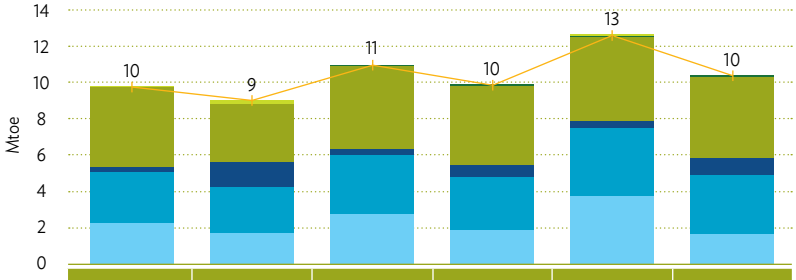
The Basic Energy Plan (BEP) outlook considers not only the business-as-usual (BAU) scenario but also the alternative policy scenario (APS), consisting of the energy efficiency and conservation (EEC) scenario (APS1) and the development of more renewable energy (APS2). These two scenarios were based on the policy intervention assumed for the BEP. Under APS1, the assumption is to reduce total final energy consumption (TFEC) in all sectors by 10% by the year 2030 relative to the BAU. Under APS2, the BEP sets the generation share from fossil-fuelled plants to be 35% in 2030, while hydro is 55% and other renewable is 10%. The APS will be the combination of APS1 and APS2.

### 6.1.1. Total primary energy supply by energy

Under the BAU, Cambodia's total primary energy supply (TPES) is projected to increase to almost 13 million tonnes of oil equivalent (Mtoe) in 2030 at an average rate of almost 4% per year (Figure 6.1). Fossil fuels will still dominate Cambodia's future TPES with a share increasing to 60% in 2030. The increasing share of fossil fuels in the TPES is due to the rapid increase of coal consumption in the country, particularly for power generation. Oil consumption will also continue to increase in the future due to the growth in the number of cars and motorbikes. The rate of increase, however, will be slower than it was during 2010–2016. Consequently, the share of oil in the TPES will decline to 30% in 2030.

Under the APS, the TPES will grow more slowly at around 3% per year, increasing to 10.5 Mtoe in 2030. The share of non-fossil fuels will be dominant in the APS (52% in 2030), while the fossil fuel share will fall to 48% in 2030. Non-fossil fuels are dominant in the TPES of the APS compared to the BAU because of the BEP assumption in APS2. The BEP sets the shares of hydro and renewable in total power generation at 55% and 10%, respectively. The remaining share of power generation in APS2 will come from coal (35%).

**Figure 6.1 Primary Energy Supply, BAU and APS**




| | BAU | APS | BAU | APS | BAU | APS |
|---|---|---|---|---|---|---|
| | 200 | | 2025 | | 2030 | |
| Electricty | 0,01 | 0,19 | 0,00 | 0,02 | 0,01 | 0,00 |
| Other renewable | 0,01 | 0,01 | 0,03 | 0,04 | 0,03 | 0,06 |
| Biomass | 4,41 | 4,24 | 4,55 | 4,34 | 4,66 | 4,46 |
| Hydro | 0,33 | 0,34 | 0,35 | 0.69 | 0,38 | 0,95 |
| Oil | 2,83 | 2,56 | 3,26 | 2,96 | 3,78 | 3,28 |
| Coal | 2,25 | 1,73 | 2,82 | 1,93 | 3,81 | 1,70 |
| Total | 9,84 | 9.08 | 11,02 | 9,98 | 12,67 | 10,46 |

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

Source: Author's calculations.

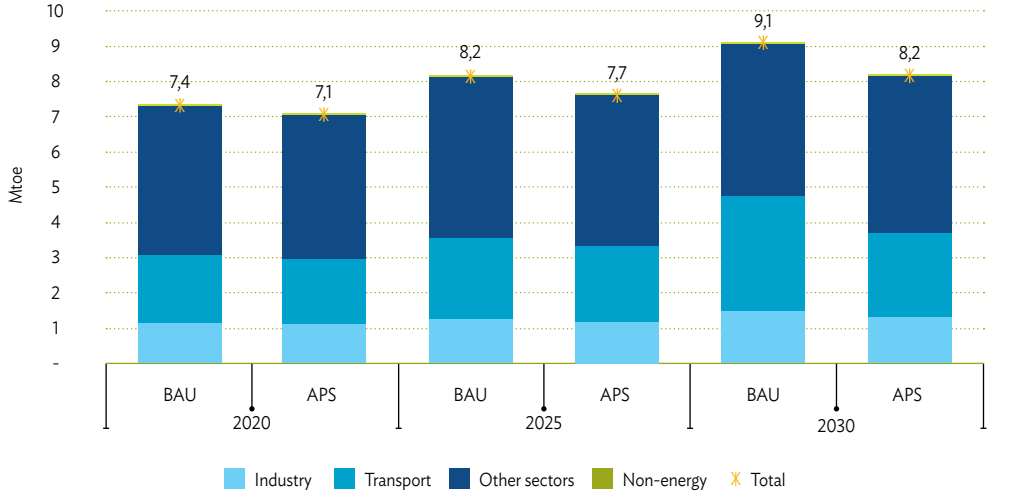
The coal supply in the TPES will be around 2.1 Mtoe (55.3%) lower than in the BAU in 2030, while oil and 'others' will be lower by only 13.2% (0.5 Mtoe) and 3.8% (0.2 Mtoe), respectively. The reductions in oil and 'others' in the TPES of the APS are not as much as for coal because the majority of these resources are consumed by the final sectors, not the power sector. 'Others' covers biomass, solar, wind, and electricity net trade. Hydro in the APS will be 2.5 times higher than in the BAU (151.1% or 0.6 Mtoe). Overall, the total saving for the TPES between the BAU and the APS in 2030 will be around 2.2 Mtoe or 17.4%

## 6.1.2. Total final energy consumption by energy and sector

Under the BAU, the TFEC in Cambodia is projected to increase at an average rate of 6.6% per year to around 9 Mtoe in 2030 (Figure 6.2). Amongst the other sectors, the strongest growth in the future will be in the 'others' sector, which consists mostly of the commercial and residential sectors, since the consumption of electricity in these sectors will increase rapidly in the future. The transport sector will still dominate Cambodia's future TFEC and also grow rapidly but at a slower rate than the 'others' sector.

Under the APS, the TFEC will grow more slowly at 5.8% per year, increasing to 8.2 Mtoe in 2030. Similar to the BAU, the 'others' sector in the APS will have the fastest growth rate, followed by the transport sector. Final energy demand savings between the APS and the BAU in 2030 will amount to 0.9 Mtoe (Figure 6.2). The bulk of the savings are expected to occur in the 'others' sector (0.5 Mtoe), followed by the transport sector (0.3 Mtoe) and the industry sector (0.1 Mtoe). Improvements in end-user technologies and the introduction of energy management systems are expected to contribute to the slower growth rate of consumption in all sectors.

**Figure 6.2 Final Energy Consumption by Sector, BAU and APS**

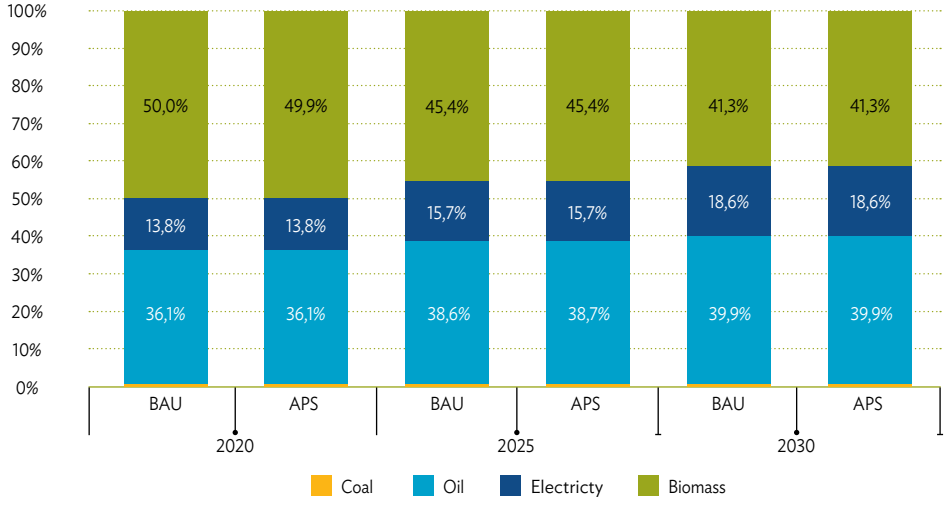



APS = alternative policy scenario, BAU = business as usual, Mtoe = million tonnes of oil equivalent.

Source: Author's calculations.

By type of fuel, electricity consumption will grow the fastest, at 8.8% per year under the BAU and 8% per year under the APS. Although electricity will have the fastest growth, biomass will have the highest share in the TPES (41% in 2030) for both the BAU and the APS (Figure 6.3). Similarly, oil will have the same share in both the BAU and the APS at around 40% in 2030.

**Figure 6.3 Final Energy Consumption Share by Sector and Fuel, BAU and APS**



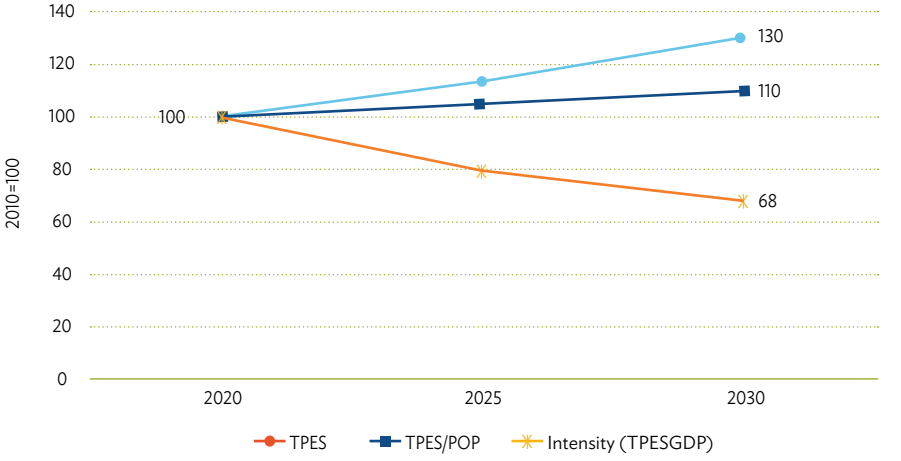

APS = alternative policy scenario, BAU = business as usual.

Source: Author's calculation.

## 6.1.3. Alternative policy scenario energy indicators

The gross domestic product (GDP) of Cambodia is assumed to grow at an average rate of 6.6% per year until 2030, with a population growth of 1.6% per year. As shown in Figure 6.4, GDP will almost double in the next decade (2020–2030), but the TPES will increase by only 1.3 times. The TPES energy intensity will decline, confirming that the BEP measure of a 10% reduction will be achieved by 2030.

**Figure 6.4 Energy Indicators, APS**



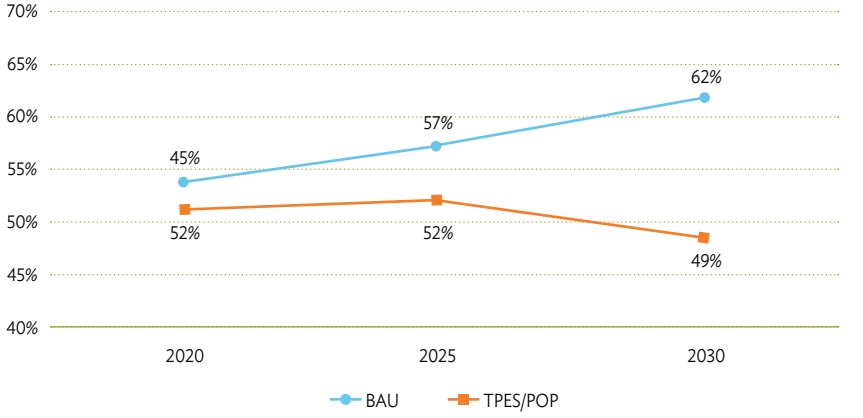

APS = alternative policy scenario, GDP = gross domestic product, POP = population, TPES = total primary energy supply.

Source: Author's calculation.

## 6.1.4. Energy security

As coal and oil will still play a major role in the future energy mix of Cambodia, the country's dependence on these fuels from international market will still be significant. Import dependency will increase from 54% in 2020 to 62% in 2030 under the BAU (Figure 6.5). Under the APS, because of the BEPC, import dependency will decline to 49% in 2030 from 52% in 2020.

**Figure 6.5 Energy Import Dependency, BAU**




BAU = business as usual, POP = population, TPES = total primary energy supply.

Source: Author's calculation.

## 6.2. Monitoring of the Basic Energy Plan implementation

The energy outlook under the BEP for Cambodia provides the future magnitudes of energy demand and supply under both the BAU and APS conditions. The APS includes the energy saving target and renewable energy expansion plans proposed under the BEP.

The energy outlook under the BEP for Cambodia provides only the projected magnitudes of the future TFEC and TPES of Cambodia. Implementation of the BEP can be monitored by collecting the actual TFEC and TPES magnitudes annually. In this regard, the Ministry of Mines and Energy of Cambodia (MME) should continuously produce the country's Energy Balance Table and compare it to the BEP outlook.

In addition to the monitoring of the TFEC and TPES, the MME should also monitor the other energy indicators (TPES/GDP, TFEC/GDP, TPES per capita, TFEC per capita, and import dependency). Assessment of these indicators will assist the MME in identifying and understanding the key drivers of trends and in prioritising policy interventions to control energy consumption growth. The indicators can also be effective for quantifying the potential impacts and benefits of policy interventions.