Chapter 7

Conclusions and Policy Recommendations

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Total final energy consumption (TFEC) will increase at an average rate of 3.0% per year in 2016–2040. Consumption by industry will grow the fastest (4.2%), followed by transport (4.0%), the residential sector (1.8%), and the commercial sector (1.5%). Low growth in the residential and commercial sectors will be due to flat growth of biomass consumption (0.3%) as liquefied petroleum gas (LPG) and more efficient biomass stoves become more available. Electricity will grow the fastest at 7.0%, followed by coal at 5.1%, oil at 4.9%, and natural gas at 4.2%.

Electricity production will increase to 89.4 TWh by 2040 from 20.3 TWh in 2016 at an average rate of 6.4% per year. The share of hydropower will decline from 60% in 2016 to 47% in 2040. The share of natural gas will increase from 40% in 2016 to 51% in 2040, with coal accounting for 1% and solar/PV for 1% in 2040.

Total primary energy supply (TPES) will reach 40 Mtoe in 2040, increasing at an average rate of 3.5% per year from 2016. Hydropower sources will increase at an average rate of 6.3% per year over the projection period. Gas supply will be important in power generation as well as transport and industry, with an average growth rate of 5.7% per year. Oil will grow at an average rate of 4.9% per year, mainly to meet road transport demand. As a result, biomass share will rapidly decline from 51% in 2016 to 24% in 2040, and other energy sources will increase their share: coal (2%–4%), oil (24%–33%), natural gas (18%–30%), and hydropower (5%–9%).

Import dependency, defined as imported energy/(TPES+export) will worsen from 14% in 2016 to 49% in 2040 because of a large increase in oil imports for transport and natural gas imports for power generation.

Because of the increase in the TPES, especially oil and natural gas, CO_2 emissions will also increase from 5.8 million carbon tons (Mt-C) in 2016 to 19.7 Mt-C in 2040. CO_2/TPES will worsen from 0.32 t-C/toe in 2016 to 0.49 t-C/toe in 2040 because the share of biomass and hydropower will be reduced from 56% in 2016 to 33% in 2040. Thus, CO_2 emissions will surely increase.

The TPES per GDP (energy intensity) will improve from 238 toe/million US dollars in 2016 to 125 toe/million US dollars in 2040 (52%). This improvement will come from the gap between GDP growth rate (6.3% in 2016–2020) and TPES growth rate (3.5%). The gap is caused by flat growth of biomass because the growth of other energy sources shows a similar trend in GDP: coal (5.6%), oil (4.9%), natural gas (5.7%), and

hydropower (6.3%).

The case studies have the following implications:

(1) Change in GDP (plus or minus) remarkably affects energy demand. If GDP changes by 1%, energy demand increases or decreases by about 5%–7%. Energy demand will surely increase if Myanmar achieves high economic growth. GDP is highly sensitive to energy demand.

(2) The international crude oil price seems not to affect energy demand largely because most energy supply is domestic, such as natural gas and hydro, which are not affected by the international oil price. Oil demand is surely affected by change in international oil price but oil share in 2040 will be just 33%.

(3) Energy efficiency policy will surely help reduce energy TFEC and TPES as well as CO_2 emissions. The effect is the same as a change in GDP.

(4) The RE promotion scenario does not affect energy consumption but surely contributes to reducing CO_2 emissions, although not by much. Even if Myanmar increases the share of solar/PV capacity to 10% and 20%, its capacity factor is only 12%–15%, so that power generation by solar/PV is not as much as by baseload power such as coal and natural gas. To reduce CO_2 emissions using solar/PV, Myanmar needs an ambitious RE target of more than 50% of capacity basis.

(5) Important energy policies are the following:

    (a) Promote energy efficiency and conservation through an energy efficiency policy or sub-decree to curb energy demand.

    (b) Increase domestic energy such as hydropower, solar/PV, and local coal to maintain energy supply security.

    (c) Although biomass might be phased out of the energy market because of the shift to more convenient fuels, continuous use of biomass is an option to curb fossil fuel demand.