

# EXECUTIVE SUMMARY

The Economic Research Institute for ASEAN and East Asia–East Asia Summit (ERIA-EAS) Energy Outlook was updated in 2017–2018 through a revision of macro assumptions, such as economic and population growth as well as crude oil prices under the current lower price situation. In addition, this outlook incorporates more recent information on the EAS17 member countries' energy-saving goals and action plans, and power development plans such as renewable electricity.

The outlook still focuses on analysing the additional energy savings that might be achieved by the individual countries above and beyond the Business-As-Usual (BAU) scenario projection. It continues to examine two scenarios, the BAU scenario and the Alternative Policy Scenario (APS), and predicts energy supply, consumption, and CO<sub>2</sub> emissions from 2015 until 2040. The APS includes not only more ambitious energy-saving targets but also rapid advances in low-carbon energy technologies, especially renewable energy.

Under the BAU scenario, sustained population and economic growth will significantly increase the total final energy consumption (TFEC) by 1.6 times in 2015–2040. The total primary energy supply (TPES) in the EAS17 region is projected to grow at a slightly slower pace of 1.5% per year. It is projected to increase from 7,488 Mtoe in 2015 to 10,943 Mtoe in 2040. Coal will remain the largest share of the TPES, but its growth is expected to be slower, increasing at 1.3% per year. Consequently, the share of coal in the TPES is forecasted to decline from 41.4% in 2015 to 38.9% in 2040. Increasing the use of clean coal technology and development of carbon capture storage technology will be critical for the coal power plants in this region to mitigate CO<sub>2</sub> emissions and become carbon free.

Fossil fuel energy consisting of coal, oil, and gas will still be dominant in 2040 and its share under the BAU scenario will be 84.1%. If EAS17 countries remain dedicated to implementing their energy efficiency and conservation (EEC) policies and increase low-carbon energy technologies, such as nuclear power generation and solar photovoltaic (PV)/wind (APS), the EAS17 region could achieve fossil fuel savings of 23.4% and the fossil fuel share could fall to 76.6%. CO<sub>2</sub> emissions would be reduced significantly about 24.2% from BAU to the APS consequently. In view of this, EAS countries need to implement their EEC and renewable energy policies (energy saving targets and action plans) as scheduled. The targets and action plans that will be applied across sectors –

industry, transport, residential, and commercial – should be appropriate and feasible. Governments of EAS17 countries are encouraged to support the activities of energy service companies as such is crucial in achieving energy efficiency and savings.

Renewable energy such as hydro, geothermal, solar PV, wind, and biomass will also contribute to the expected reduction of fossil fuel consumption, which will result in a mitigation of CO<sub>2</sub> emissions. To increase the share of renewable energy in the primary energy mix, appropriate government policies will be crucial. Policies such as net metering, Renewable Portfolio Standards, and feed-in tariff have been implemented in some EAS17 member countries and have accelerated the deployment of renewable energy at appropriate levels.

Energy supply security has become a top priority energy issue for the EAS17 region. Implementing EEC measures and increasing renewable energy shares will certainly contribute to maintaining regional energy security through the reduction of imported fossil fuel consumption and increasing the use of domestic energy. In addition, regional energy networks, such as the Trans-ASEAN Gas Pipeline and the ASEAN Power Grid, and oil stockpiling are recommended to maintain energy supply security. Nuclear power generation is another option for securing the energy supply in this region.

The ERIA-EAS17 Outlook 2018 assessed the Intended Nationally Determined Contributions (INDC)/NDC reported by EAS17 countries. Some INDC/NDC might be too ambitious because CO<sub>2</sub> emissions targets seem to be much higher than their APS targets. Governments should review their INDC/NDC applying energy outlook models and prepare appropriate CO<sub>2</sub> emission targets.

This year, 2019, the Energy Outlook includes an estimation of the investment cost required for power generation and the whole energy infrastructure, including liquefied natural gas (LNG)-receiving terminals and oil refineries. The analysis results indicate that the EAS17 region will need an investment in power generation of around US\$3.5 trillion for the BAU scenario and US\$4 trillion for the APS to meet electricity demand by 2040. The APS will be higher than the BAU scenario because of the shift to low-carbon power sources, such as nuclear and renewable energy.

The required investment cost of refinery and LNG-receiving terminals in the EAS17 will be US\$367 billion and US\$132 billion, respectively, in the BAU scenario due to the increase in oil demand especially in the road transport sector and natural gas demand in the power generation sector. Investment in the APS is expected to be reduced to US\$60 billion for refineries and US\$75 billion for LNG-receiving terminals, respectively, due to promotion of energy efficiency. These investment costs will be much lower than power generation. Power generation and refineries and LNG-receiving terminals have different capacity factors. Usually the capacity factor of power generation is much lower (around 10%–33%) than refineries and LNG-receiving terminals.