

Chapter 5
Conclusion

This 2018 National Energy Statistics of the Lao PDR is the first-ever published comprehensive energy statistics in the country. The statistics in this book contain primary energy data, energy balance tables (EBTs), energy consumption surveys, and analyses of energy demand and supply situations. Since the research team encountered missing data during primary and secondary data collection, they used techniques to correct or fill in these missing data, to ensure data quality in line with the view of experts from the Ministry of Energy and Mines, the Lao State Fuel Company, and other ministries and agencies involved.

Primary energy data were mainly collected from the Department of Energy Policy and Planning (DEPP), Ministry of Energy and Mines, Lao PDR. The petroleum sales data were collected from oil companies in the country; the petroleum products import data, from the Department of Customs of the Ministry of Industry and Commerce; and energy consumption data, through surveys of industry, road transport, commercial, and residential sectors. Based on these collected data, EBTs for the Lao PDR were produced historically from 2000 to 2015. Finally, these statistics provide rich information for policy implications on energy policies and planning.

Primary energy data in the Lao PDR consists of coal, oil, hydro, and biomass. The country imports oil products to meet its domestic demand. Its coal resources are used domestically and exported at the same time. It exports electricity to Thailand and Cambodia, and but also imports electricity from Thailand, China, and Viet Nam. Hydro has been the primary source of electricity generation. Since 2015, coal has also been consumed to generate electricity only for export purposes. Other renewable energies consumed consist of biomass and, recently, solar energy. The Lao PDR classifies its coal resources as anthracite and lignite. Most of the lignite produced is exported. Some anthracite was exported from 2012. In 2015, the government stopped the country's coal export to prioritise the use of coal to meet domestic demand, which comes from the industry sector. In the same year, the Lao PDR opened the Hongsa Mine Mouth power plant to meet electricity demand in Thailand. Therefore, all of the electricity produced from this power plant is exported to Thailand. Based on DEPP data, the capacity of the Hongsa power plant is 1,878

megawatts and its coal consumption was 3,817 kiloton (kt) lignite in 2015. Except for power generation, the coal consumption data is only for the industry sector. This data is not broken down to the sub-sectors of the industry such as cement, textile, etc. Only data on coal consumption in total industry was available.

Oil data consists of import and consumption data from DEPP and sales survey data from some petroleum companies. The type of petroleum products consumed in the Lao PDR includes Jet A-1 (kerosene-type jet fuel), gasoline (motor gasoline), gas/diesel oil, fuel oil or residual oil, lubricant, and liquid petroleum gas (LPG). DEPP collected petroleum sales data from the survey of private petroleum companies in the Lao PDR in 2015. The survey involved 24 private oil companies under the Lao State Fuel Company. DEPP maintains electricity data in the Electricity Yearbook published by the Electricité du Laos, a public generation company that collects power generation data from its stakeholders. Power generation is broken down into hydropower, coal power, solar power, and biomass power. Electricity had been produced solely by hydro plants until 2013, from which time a small fraction was also generated by biomass plants. Some small solar power generation plants started operation in 2014. In 2015, the country started producing electricity from coal for export purposes. It is a net electricity exporting country since its electricity export is larger than its import.

DEPP data on biomass was available only for the production of fuelwood and charcoal and their consumption by the final sector. Production of fuelwood has always been lower than consumption while charcoal production increased rapidly after 2010. DEPP data excluded the amount of fuelwood used to produce charcoal. In addition, based on electricity data, bagasse was consumed to produce electricity. The quantity of bagasse consumed by the biomass power plant was also not available. In both cases, the missing data needed to be estimated to create the Lao PDR EBT.

This Lao PDR National Energy Statistics used an energy consumption survey that covered the industry, road transport, residential, and commercial sectors. Since this is the first energy consumption survey in the country, many improvements are needed. However, several remarkable information were extracted as follows:

- i) Meaningful transport information such as fuel economy and mileage of selected types of vehicles
- ii) Biomass use in the residential sector is lower than DEPP data (It is suggested that DEPP change the unit consumption of biomass in residential sector and apply it in a new survey)
- iii) Reasonable building energy intensity by each building type.

The team from the Economic Research Institute for ASEAN and East Asia (ERIA) and experts from the Ministry of Energy and Mines of the Lao PDR and other agencies worked together to correct and fill in those data. ERIA used a critical technique to separate jet fuel consumption for domestic use from international consumption since no aviation data or other information was available. The ERIA team estimated this information by separating domestic aviation jet fuel use in reference to other sources. Likewise, only two-thirds of private oil companies provided data and information on petroleum sales. The ERIA team deployed some techniques to extrapolate the data to national data. This was successfully conducted for the energy consumption survey. However, extrapolation of the national data was constrained due to lack of macro statistics for extrapolation. Detailed methodologies were discussed in each section of this book as each section had its own technique and methodology to interpret and extrapolate data. However, the historical data could provide some analysis using the EBTs.

The following are the key findings and policy implications:

1. Total Final Energy Consumption by energy and sector – Elasticity was less than 1 but commercial energy increased by more than 10%.
2. Total Primary Energy Supply (TPES) by energy – Biomass was dominant but its share sharply declined. Hydro share followed biomass but electricity generated was mainly exported to neighbouring countries.
3. The TPES/capita indicator increased at an average annual growth rate of 5.9% from 0.3 to 0.72 ton of oil equivalent (toe)/person while the TPES per gross domestic product (GDP) remained at around 0.1 toe thousand \$ (at constant 2011 PPP) over 2000–2015. Energy intensity (TPES/GDP) showed small improvement from 2000 to 2015. The intensity showed a declining trend from 2000 to 2014, with a slight increase in 2008. The increase in 2015 indicates a faster growth of TPES compared to GDP due to the drastic increase in coal consumption for power generation.

4. Combustion of fossil fuels, particularly coal, was the main contributing factor in the increased carbon dioxide (CO₂) emission in the Lao PDR. In 2000, the share of coal in the fuel mix was very small, lower than that of petroleum products. As coal use in the country increased faster than other fuels, the share of coal also increased. In 2015, coal started to be consumed by the power sector. Consequently, the CO₂ emission of the country increased very sharply in 2015. Due to changes of coal share in the TPES, CO₂ emission increased by 18% per year from 852 kt CO₂ in 2000 to 10,066 kt CO₂ in 2015. The CO₂ intensity (CO₂/GDP) increased at 9.8% per year, from 68 kg CO₂/thousand PPP \$ to 278 kg CO₂/thousand PPP \$.