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Energy Demand and Supply of the Lao People's Democratic Republic 2010-2018

Prepared by

Ministry of Mines and Energy, the Lao People's Democratic
Republic (Lao PDR)

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Energy Demand and Supply of the Lao People's Democratic Republic 2010-2018

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1. Introduction

This paper on the Energy Demand and Supply of the Lao PDR in 2010–2018 was prepared as an update to the *Lao PDR Energy Statistics 2019* publication that covered the period between 2010 and 2018. The paper was produced by the staff of the Department of Energy Policy and Planning and the Department of Planning and Cooperation, the Ministry of Energy and Mines, the Lao PDR, through the energy internship programme organised from 22 July to 16 August 2019 at the Economic Research Institute of ASEAN and East Asia (ERIA) office, Jakarta, Indonesia. The Ministry of Energy and Mines appreciates ERIA’s support in improving the energy data quality of the Lao PDR.

2. Social and Economic Situation

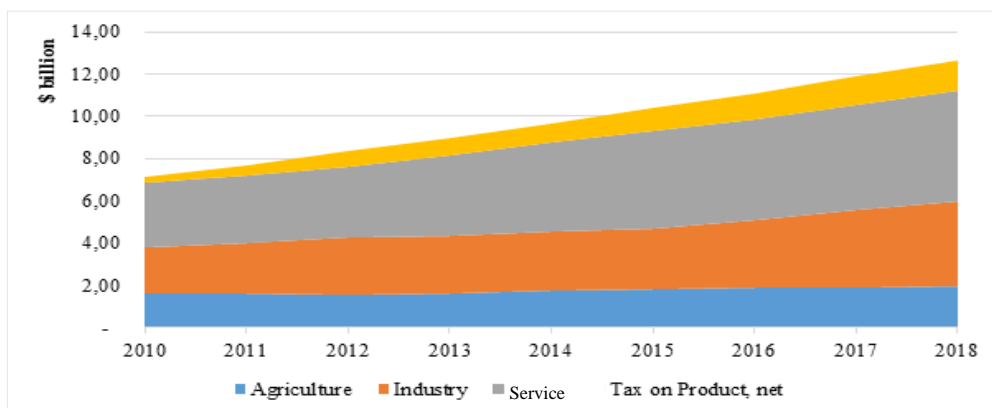
This section described the social and economic situation of the Lao PDR during the periods from 2010 to 2018 and from 2017 to 2018. The later was done to specifically show the social and economic conditions of the 2017–2018 period, and its impact to the growth throughout the 2010–2018 period.

2.1. 2010 to 2018 Period

The Lao PDR’s gross domestic product (GDP) grew at 7.4% per year over the 2010–2018 period (Figure 1 in ktoe unit). The service sector was the main contributor to the country’s economy, but its share slightly decreased from 44% to 42%. Although the service sector had the largest share, the industry sector indicated the largest growth rate at 7.9 %, followed by the service sector at 6.8% over the 2010–2018 period. The agriculture sector contribution was around 23% in 2010 and decreased to 16% in 2018 with an average growth rate of 2.6 % per year.

The biggest share of the service sector was constituted by wholesale and retail trade, repairs, and property whilst for the industry sector, it was mining, quarrying, and power generation. The biggest contributor in the agriculture sector was cropping, followed by fishing and livestock production.

Figure 1. GDP in Constant 2010 US Dollars



GDP =gross domestic product.

Source: World Bank (2019).

The population in the Lao PDR had been increasing steadily from 2010 to 2018 with an average growth rate of 1.5% per year. The population in the urban areas had grown by 3.5% per year due to urbanisation. However, the population share in the rural areas was around 65% in 2018, higher than the share of the urban population

The consumer price index increased at an average rate of 3.5% per year and the GDP deflator at 4.9% per year. In 2018, the labour force ratio was around 53% of the total population and the unemployment ratio was very low (0.6% of total labour force). Foreign direct investment has been at its highest level, namely around 9.5 % of GDP in 2018 and its share in total investment was around 25% in 2017 (World Bank, 2019).

2.2. 2017 to 2018 Period

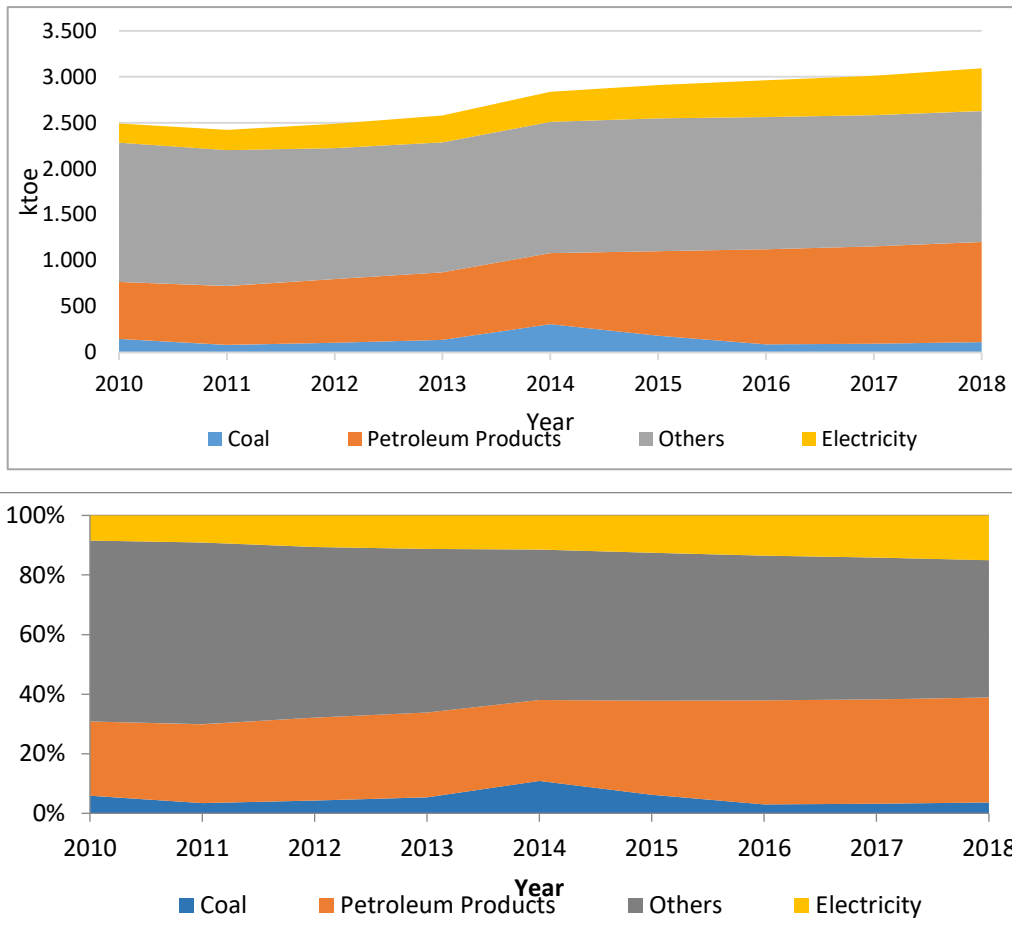
The Lao PDR's GDP grew 6.5% over the 2017–2018 period. With a share of around 42%, the service sector was the main contributor in the country's economy. Although the service sector had the largest share, the industry sector experienced the fastest growth at 8.7%, followed by the service sector (6.7%). The agriculture sector's contribution was around 16% with an average growth rate of 3.2 % per year.

The population in the Lao PDR increased from 2017 to 2018 at a rate of 1.6% per year. The population in the urban areas grew by 3.4%, whilst the population in the rural areas grew by 0.6%. The mobility of the rural population to the urban areas marked this evolution between 2017 and 2018.

3. Final Energy Consumption

The total final energy consumption (TFEC) of the Lao PDR grew at an average rate of 2.7% per year from 2010 to 2018 (Figure 2 in ktoe and percentage). Electricity grew the fastest at 10.5% per year, followed by petroleum products at 7.3% per year. Biomass consumption, which has the highest share in the TFEC, decreased at an average rate of 0.76% per year. A small amount of coal was consumed by the industry sector.

Figure 2. Total Final Energy Consumption by Fuel Type (ktoe and %)



ktoe = kiloton of oil equivalent.

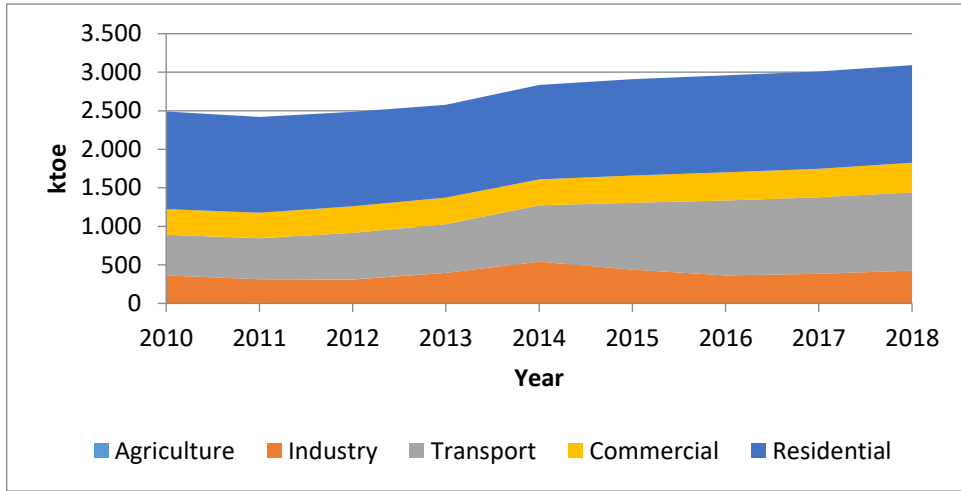
Source: Lao PDR Energy Balance Tables (EBT) 2010–2018.

The residential sector had been dominating the country's consumption of biomass (Figure 3). The industry and commercial sectors also consumed biomass, but at a smaller amount than the residential sector. Although dominant, the share of biomass consumption in the residential sector declined from 60.8% in 2010 to 46.1% in 2018. This indicates a substitution of household fuel consumption of biomass by liquefied petroleum gas (LPG) and more use of efficient biomass stoves in the rural areas.

The transport sector had the second largest share in the TFEC (33% in 2018). Its consumption, however, increased the fastest over the 2010–2018 period, at an average rate of 9.9% per year. This increase was mainly contributed by the road transport sector with the rapid growth of the number of motor vehicles. Based on the licensed vehicle statistics, the total number of vehicles increased on average at 10% per year over the 2010–2016 period.

The energy consumption share of the industry sector was around 14% of the TFEC, whilst the commercial sector's share was around 12%. The average annual growth rate of the industrial sector was 2% per year, whilst the commercial sector consumption increased at 1.8% per year (Figure 3 in ktoe).

Figure 3. Total Final Energy Consumption by Sector (ktoe)

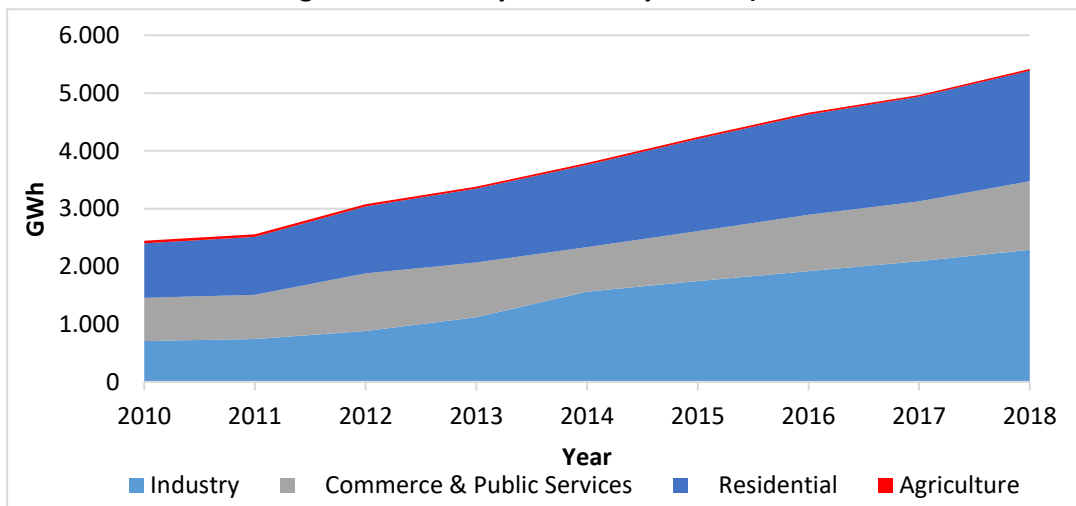


ktoe = kiloton of oil equivalent.
Source: Lao PDR EBT 2010–2018.

4. Power Generation

Electricity demand (Figure 4) increased at an average rate of 10.5% per year from 2010 to 2018. The industry and commercial sectors' electricity consumption grew at 15.8% per year and 5.9% per year, respectively. Prior to 2013, the residential sector dominated the country's total electricity consumption. Since then, the share of electricity consumption in the industrial sector become the biggest, reaching 42% in 2018. This increasing share of the industrial sector was in line with the increasing mining activity and government policy in promoting the development of the industrial and economic zone (Ministry of Planning and Development, 2019; ERIA, 2016).

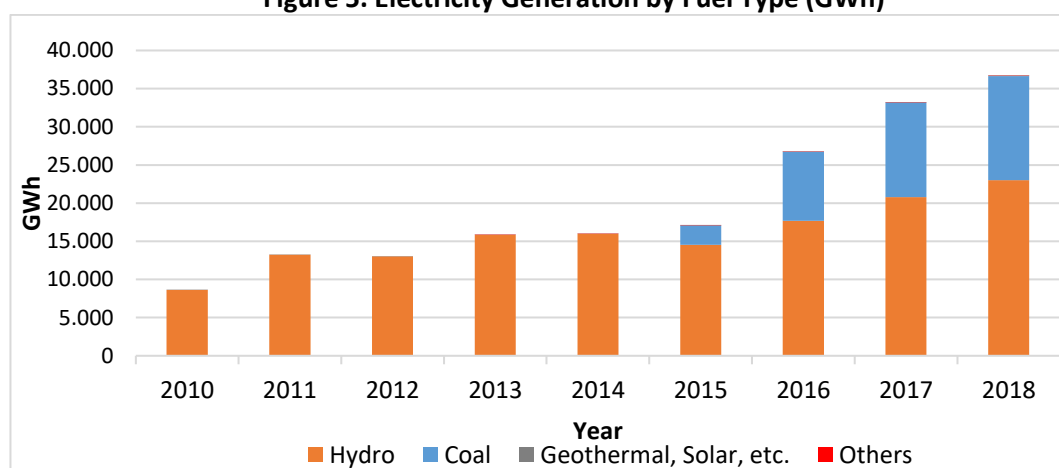
Figure 4. Electricity Demand by Sector (GWh)



GWh = gigawatt hour.
Source: Lao PDR EBT 2010–2018.

The Lao PDR's electricity in 2018 (Figure 5) was generated from hydropower, solar, biomass, and a coal-fired power plant. The total gross power generation was 34,664.5 GWh in 2018 and it grew at an average rate of 19.9% per year from 2010 to 2018. Hydro was the main power source of the Lao PDR, and its generation increased at an average rate of 13% per year. Since 2015, the Lao PDR operated the new Hongsa coal-fired power plant, which generated around 13,655.8 GWh in 2018 or equivalent to 37% of the total power supply.

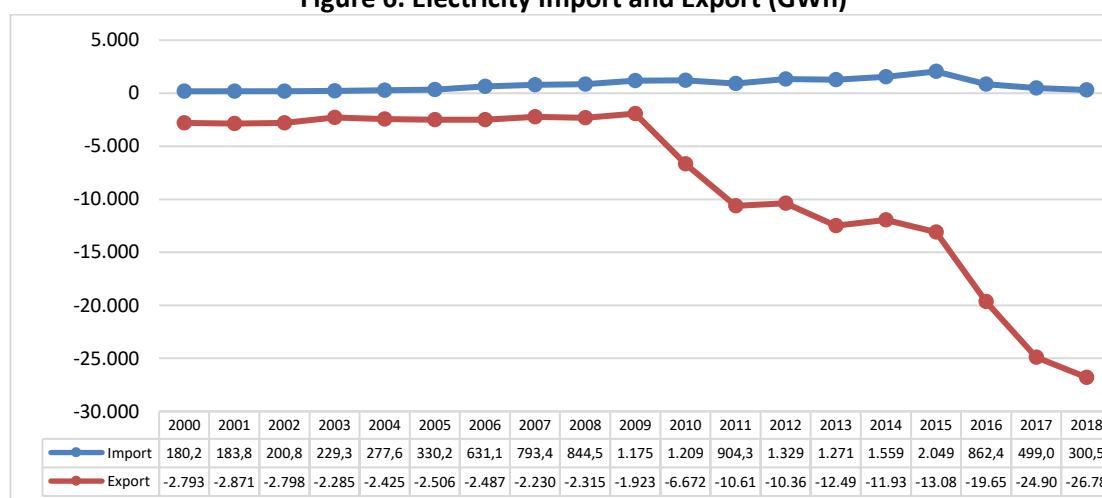
Figure 5. Electricity Generation by Fuel Type (GWh)



GWh = gigawatt hour.
Source: Lao PDR EBT 2010–2018.

Most of the electricity produced in the Lao PDR was for export (73% in 2018). The export of electricity in 2018 (Figure 6) was 26,783.5 GWh, and it grew at an average annual rate of 19% from 2010 to 2018. Significant increases in the capacity generation of hydropower and the coal-fired power plant reduced electricity imports after 2015. However, some electricity imports remained, especially during the dry season because of the decrease in the water flow. In addition, imports also occurred at some border areas due to the limited number of transmission lines.

Figure 6. Electricity Import and Export (GWh)

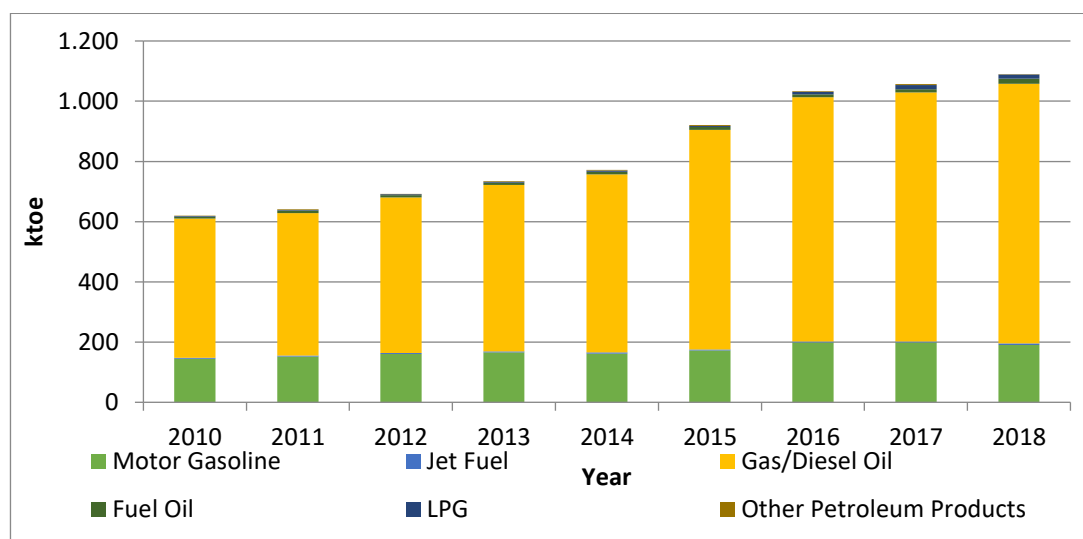


GWh = gigawatt hour.
Source: Lao PDR EBT 2010–2018.

5. Petroleum Products

The Lao PDR imported 100% of the petroleum products to meet its domestic demand (Figure 7 in ktoe), mostly from Thailand and some from Viet Nam. The average annual growth rate of imported petroleum products was 7.3% per year from 2010 to 2018. The import of diesel oil has been the largest, around 79% of the total petroleum imports in 2018, with a growth rate of 8% per year. The major consumer of diesel is the transport sector and its demand increased significantly. On the other hand, diesel consumption by industry is declining. As a result, diesel imports grew only by 8% per year. Motor gasoline imports were around 17% of the total petroleum imports and increased at an average growth rate of 4% per year.

Figure 7. Petroleum Production Demand (ktoe)

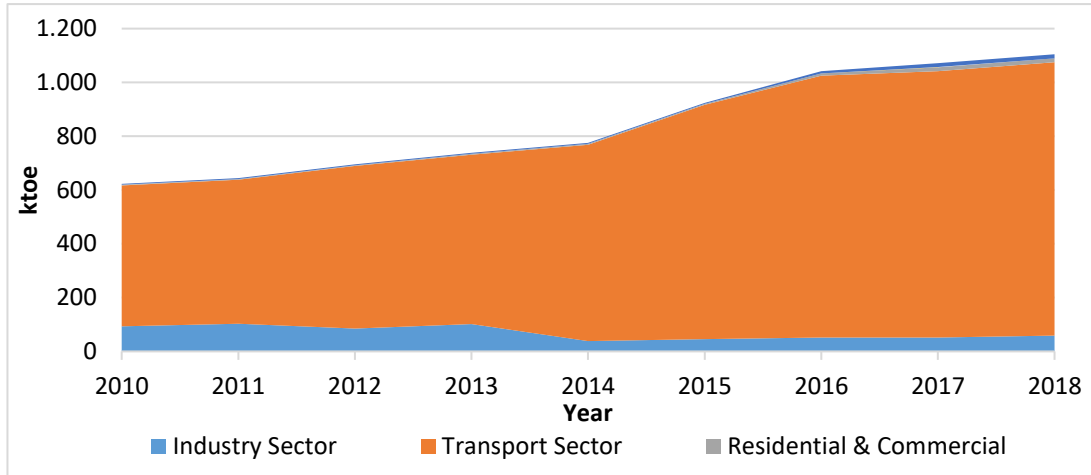


ktoe = kiloton of oil equivalent.

Source: Lao PDR EBT 2010–2018.

The main consumer of petroleum products (Figure 8) was the transport sector, with 92% of the total consumption in 2018. The industry sector was only around 5% and the remaining 3% was in the residential, commercial, and agriculture sectors. Although the residential and commercial sectors' shares were the lowest, their LPG use experienced the fastest growth, (26% per year from 2010 to 2018).

Figure 8. Petroleum Consumption by Sector (ktoe)

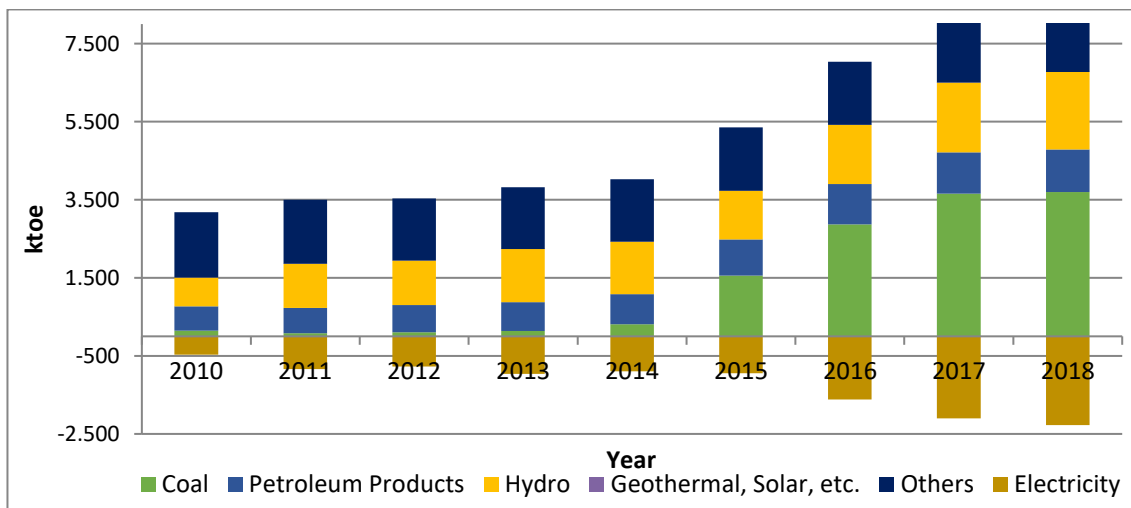


ktoe = kiloton of oil equivalent.
Source: Lao PDR EBT 2010–2018.

6. Primary Energy Supply

The growth rate of the total primary energy supply (TPES) was around 10.7% per year between 2010 and 2018 (Figure 9 in ktoe); with coal having the highest growth rate at 50% per year. This rapid growth of coal tends to saturate from 2017 onwards due to the stable operation of the coal-fired power plant. Up to 2015 hydropower plants had the biggest share in the total primary energy supply mix. Since 2016 coal has been dominating the supply mix with its share reaching 39% in 2018. This coal increase was caused by the Hongsa coal-fired power plant that started operating in 2015. The remaining supply mix in 2018 were hydropower (20.8%), petroleum products (11.5%), biomass (17.1%), and solar (0.05%).

Figure 9. Primary Energy Supply (ktoe)

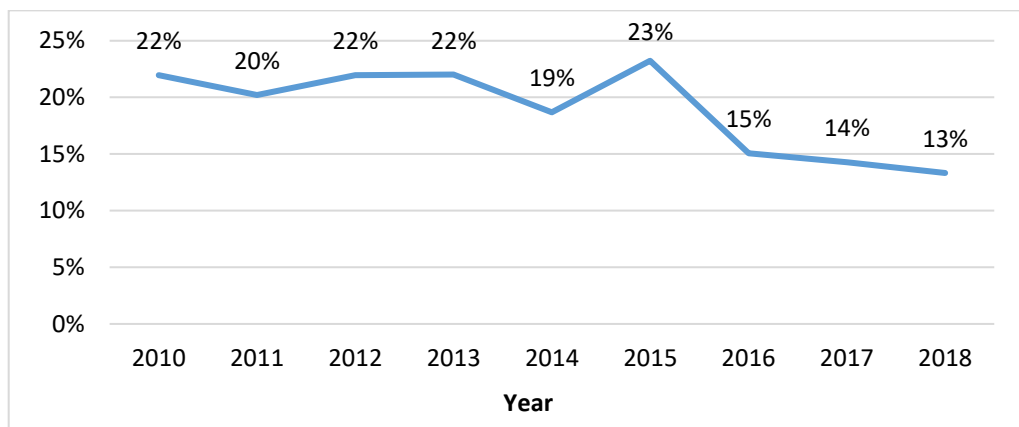


ktoe = kiloton of oil equivalent.
Source: Lao PDR EBT 2010–2018.

7. Energy Indicators

The import dependency ratio (Figure 10) is defined as the ratio of the total energy import to the total energy production. The import dependency ratio showed a declining trend from 2010 to 2018 due to the increase in domestic production, especially of coal.

Figure 10. Import Dependency Ratio

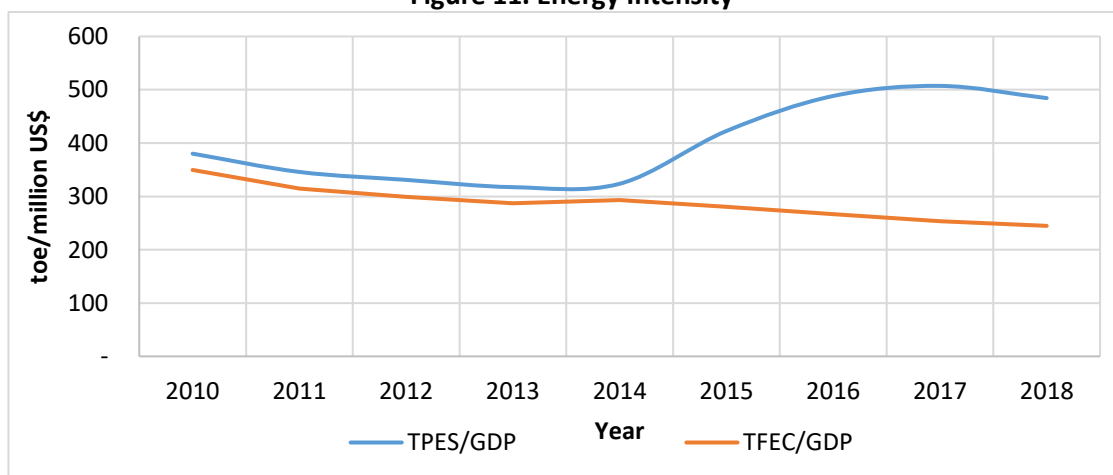


Source: Lao PDR EBT 2010–2018.

Energy intensity is defined (Figure 11) as the total primary energy supply (TPES) divided by the gross domestic product (GDP). The graph below showed that the growth rate decreased to 3.9% from 2010 to 2014. After that period, the rate increased to 4.2% until 2017 and saturated in 2018. The increased in intensity from 2014 to 2017 was due to the high increased of coal use for power generation as the Hongsa coal-fired power plant started operating. The overall result indicated that energy intensity increased from 380 to 484.33 toe/million US\$ over the 2010 to 2018 period.

The total final energy consumption intensity (TFEC/GDP), on the other hand, showed a declining trend due to the dominance of biomass consumption (from 349.59 to 244.76 toe/million US\$).

Figure 11. Energy Intensity



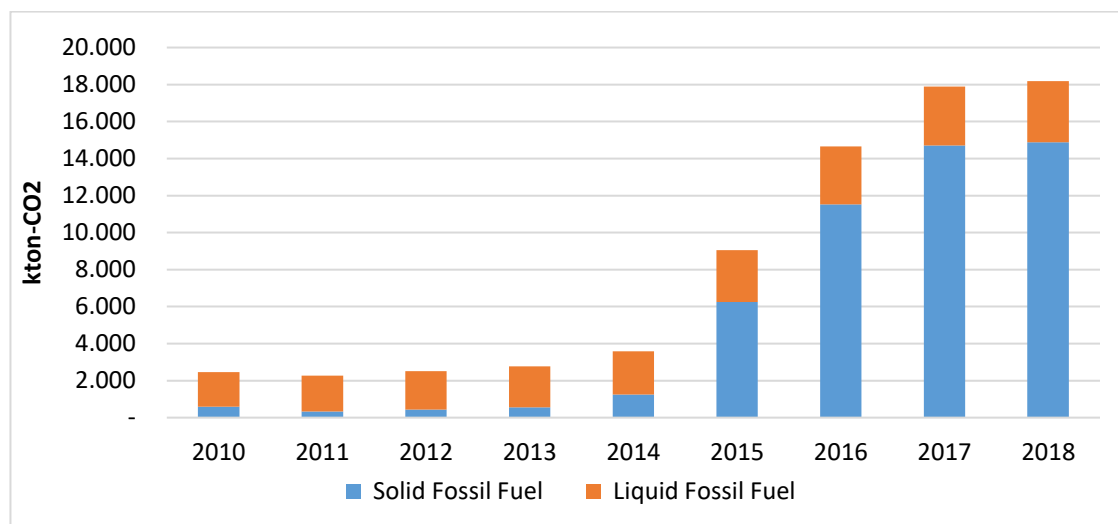
GDP = gross domestic product, TFEC = total final energy consumption, toe = ton of oil equivalent, TPES = total primary energy supply.
Source: Lao PDR EBT 2010–2018.

Energy elasticity which is the ratio of percentage growth in energy and GDP shifted from 0.74 over the 2000–2010 period to 1.45 over the 2010–2018 period for the TPES. In regard to the TFEC, the elasticity improved from 0.72 over the 2000–2010 period to 0.37 over the 2010–2018 period.

8. CO₂ Emissions

The Lao PDR’s CO₂ emissions increased at an average rate of 28% per year from 2010 to 2018. The total amount of CO₂ emissions was 18,193 kiloton-CO₂ in 2018. During the 2010–2014 period, emissions grew only by 10% per year. The use of more lignite at the Hongsa coal-fired power plant increased CO₂ emissions rapidly by 50% per year after 2014.

Figure 12. CO₂ Emissions from Fuel Combustion by Fuel Type



kton = kiloton.

Source: Lao PDR EBT 2010–2018.

9. Conclusion

Based on the energy demand and supply situation of the Lao PDR as described above, the key findings can be summarised as follows:

1. The total final energy consumption (TFEC) increased at 2.7% per year over 2010 to 2018. The transport sector’s consumption grew the fastest (8.6%), followed by the industry sector (2%) and the commercial sector (1.8%). The low growth in the sectoral consumption, except transport, was due to the large biomass consumption. In terms of the type of energy, LPG showed the fastest growth at 26%, followed by electricity at 10.5% and diesel oil at 8.1%.
2. Net power production in 2018 was 34,664.5 GWh and power export was 26,708 GWh. Power import was 300.50 GWh and the total electricity supply became 8,257 GWh. Since the power demand was 5,416.60 GWh, there was an imbalance of power supply

and demand, at around 2,840 GWh or 34% of the total power supply. This power imbalance indicated that the transmission line and distribution losses were very high. Follow-up actions will be necessary to clarify this imbalance and improve the data quality for both the supply and demand side.

3. The total primary energy supply (TPES) increased at 10.7% per year over the 2010 to 2018 period. Coal has become dominant with its share increasing sharply from 3.9% in 2010 to 39% in 2018, followed by hydropower, whose share reached 20.8% in 2018. Most of the electricity produced is exported to neighbouring countries, particularly Thailand.
4. The TPES per GDP (energy intensity) increased at an average growth rate of 4.2% per year after 2014 to 2017 from 323.7 to 507.3 toe/million US\$ (constant 2010). This increase was due to the high increase of coal use for power generation after the Hongsa power plant started operating. Similarly, the energy elasticity shifted from 0.74 over the 2000–2010 period to 1.45 over the 2010–2018 period. The TPES per capita grew at an average rate of 9% per year from 0.43 toe/capita in 2010 to 0.87 toe/capita in 2018.
5. The TFEC per GDP (energy intensity) has been decreasing at an average annual growth rate of 4.4% per year; from 349.59 to 244.76 toe/million US\$ (constant 2010). In this regard, energy elasticity shifted from 0.72 over the 2000–2010 period to 0.37 over the 2010–2018 period. The improvement of TFEC energy intensity and elasticity was achieved by the reduction in the biomass consumption. The TFEC per capita grew at an average rate of 2.7% per year from 0.4 toe/capita in 2010 to 0.44 toe/capita in 2018.
6. The combustion of fossil fuels, particularly coal, was the main contributing factor in the increase of CO₂ emissions in the Lao PDR after 2015. This high contribution of coal in the total CO₂ emissions was due to the operation of the Hongsa power plant. The total amount of CO₂ emissions in 2018 reached around 18,193.17 kton-CO₂.
7. Although coal use has increased CO₂ emissions, import dependency has improved from 22% in 2010 to 13% in 2018.

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¹ Energy Balance Tables (EBT) are developed by ERIA.

² Energy data revisions developed by ERIA and data support from the Ministry of Energy and Mines, including raw energy data, consist of:

1. Coal Data
Coal production, sale, and export data in 2016 to 2018 are collected from the Information and Evaluation Division, Department of Mines, Ministry of Energy and Mines (Minerals production database). The 2000 to 2015 data were collected from the coal database of the Department of Energy Policy and Planning, supported by the Institute of Energy Economics, Japan (IEEJ).
2. Petroleum Data
Petroleum imports from 2016 to 2017 collected from Customs data, provided data by technical staff of the Information and Statistics Center, Department of Planning and Cooperation, Ministry of Industry and Commercial, and technical staff of the Lao State Fuel Company (LSFC). Data for 2000 to 2015 and 2018 collected from the LSFC. Petroleum consumption data collected from the LSFC.
3. Electricity Data
Electricity data collected from the *Electricity Statistics Report 2018* of the Department of Energy Policy and Planning, Ministry of Energy and Mines.
4. Biomass Data
Biomass data for 2000 to 2015 are based on an IEEJ estimation. The 2016 to 2018 data are based on an ERIA estimation.

³ Gross domestic product (GDP) (constant 2010 US\$), population, foreign direct investment, labour force, and unemployment of the Lao PDR were collected from the World Development Indicators.

Appendix 1
Energy Balance Tables of the Lao PDR 2010–2018

Appendix 1
Energy Balance Tables of the Lao PDR 2010–2018

Year: 2010, Unit (ktoe)

		1	4	4.1	4.3	4.5	4.6	4.7	4.10	6.	8.	9.	10.	12.
		Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/ Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar , Geothermal etc	Others	Electricity	Total
1	Indigenous Production	312								741	0.06	1,670		2,724
2	Imports		662	145	45	463	6	3	1				104	766
3	Exports	-164											-574	-738
4	International Marine Bunkers													
13.1	International Aviation Bunkers		-42		-42									-42
5	Stock Changes													
6	Total Primary Energy Supply	148	620	145	3	463	6	3	1	741	0.06	1,670	-470	2,710
7	Transfers													
8	Total Transformation Sector									-741	-0.06	-156	742	-156
	8.1 Main Activity Producer									-741	-0.06		742	
	8.8 Charcoal Processing											-156		-156
9	Loss & Own Use												-62	-62
10	Discrepancy		0			0		0				0	0	0
11	Total Final Energy Consumptions	148	620	145	3	463	6	2	1			1,514	210	2,492
12	Industry Sector	148	93			88	6					59	61	361
	12.13 Non-specified Industry	148	93			88	6					59	61	361
13	Transport Sector		524	145	3	374			1					524
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		520	145		374			1					520
14	Other Sector		3			0		2				1,455	149	1,607
	14.1 Residential & Commercial		2					2				1,455	145	1,603
	14.1.1 Commerce and Public Services		1					1				267	64	333
	14.1.2 Residential		1					1				1,188	81	1,270
	14.2 Agriculture		0			0							4	4
15	Non-Energy Use		1						1					1
16	Electricity Output in GWh	0								8,621	1	0		8,622

Year: 2011, Unit (ktoe)

	1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12		
	Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar, Geothermal etc.	Others	Electricity	Total		
1	Indigenous Production		233						1,138	0.06	1,635		3,007		
2	Imports	683	152	45	473	8	3	1				78	761		
3	Exports		-149									-913	-1,062		
4	International Marine Bunkers														
13.1	International Aviation Bunkers			-42	-42								-42		
5	Stock Changes														
6	Total Primary Energy Supply		84	641	152	3	473	8	3	1	1,138	0.06	1,635	-835	2,663
8	Total Transformation Sector										-1,138	-0.06	-158	1,139	-157
	8.1	Main Activity Producer									-1,138	-0.06		1,139	1
	8.8	Charcoal Processing											-158		-158
9	Loss & Own Use												-84	-84	
10	Discrepancy		0	0		0			0			0	0		
11	Total Final Energy Consumptions		84	641	152	3	473	8	3	1		1,477	220	2,422	
12	Industry Sector		84	103			95	8				58	64	308	
	12.13	Non-specified Industry	84	103			95	8				58	64	308	
13	Transport Sector			535	152	3	378			1				535	
	13.2	Domestic Air Transport		3		3								3	
	13.3	Road		531	152		378			1				531	
14	Other Sector			3			0		3			1,420	156	1,579	
	14.1	Residential & Commercial		3					3			1,420	152	1,575	
		14.1.1 Commerce and Public Services		2					2			262	66	330	
		14.1.2 Residential		1					1			1,157	86	1,245	
	14.2	Agriculture		0			0						4	4	
15	Non-Energy Use			1						1				1	
16	Electricity Output in GWh		0								13,245	1	0	13,246	

Year: 2012, Unit (ktoe)

	1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12		
	Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/ Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal, etc.	Others	Electricity	Total		
1	Indigenous Production		290						1,146	0.06	1,585		3,021		
2	Imports		735	160	46	517	8	3	2			114	850		
3	Exports		-184									-891	-1,075		
4	International Marine Bunkers														
13.1	International Aviation Bunkers			-42	-42								-42		
5	Stock Changes														
6	Total Primary Energy Supply		107	693	160	3	517	8	3	2	1,146	0.06	1,585	-777	2,753
7	Transfers														
8	Total Transformation Sector									-1,146	-0.06	-160	1,120	-186	
	8.1	Main Activity Producer								-1,146	-0.06		1,120	-26	
	8.8	Charcoal Processing										-160		-160	
9	Loss & Own Use											-78	-78		
10	Discrepancy		0	-1		0		0	-1			0	0	-1	
11	Total Final Energy Consumptions		107	692	160	3	517	7	3	2		1,424	264	2,488	
12	Industry Sector		107	86			78	7				40	76	308	
	12.13	Non-specified Industry	107	86			78	7				40	76	308	
13	Transport Sector			604	160	3	438			2				604	
	13.2	Domestic Air Transport		3		3								3	
	13.3	Road		600	160		438			2				600	
14	Other Sector			3			0		3			1,385	189	1,576	
	14.1	Residential & Commercial		3					3			1,385	185	1,573	
		14.1.1 Commerce and Public Services		2					2			258	85	345	
		14.1.2 Residential		1					1			1,127	100	1,228	
	14.2	Agriculture		0			0						3	4	
15	Non-Energy Use			2						2				2	
16	Electricity Output in GWh		0												
			0							13,021	1	0		13,021	

Year: 2013, Unit (ktoe)

	1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12	
	Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal, etc.	Others	Electricity	Total	
1	Indigenous Production	212							1,361	0.07	1,580		3,153	
2	Imports		780	169	46	552	8	4				109	890	
3	Exports	-74										-1,074	-1,148	
4	International Marine Bunkers													
13.1	International Aviation Bunkers		-42		-42								-42	
5	Stock Changes													
6	Total Primary Energy Supply	138	738	169	3	552	8	4	2	1,361	0.07	1,580	-965	2,852
8	Total Transformation Sector									-1,361	-0.07	-164	1,361	-164
	8.1 Main Activity Producer									-1,361	-0.07	-2	1,361	-2
	8.8 Charcoal Processing											-162		-162
9	Loss & Own Use											-105	-105	
10	Discrepancy		-3	-3	0			-1				0	-3	
11	Total Final Energy Consumptions	138	735	166	3	552	8	3	2			1,416	291	2,579
12	Industry Sector	138	102			94	8					59	96	395
	12.13 Non-specified Industry	138	102			94	8					59	96	395
13	Transport Sector		630	166	3	458			2					630
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		626	166		458			2					626
14	Other Sector		3			0		3				1,357	195	1,555
	14.1 Residential & Commercial		3					3				1,357	192	1,551
	14.1.1 Commerce and Public Services		2					2				263	82	346
	14.1.2 Residential		1					1				1,094	110	1,205
	14.2 Agriculture		0			0							3	3
15	Non-Energy Use		2						2					2
16	Electricity Output in GWh	0								15,823	1	6		15,829

Year: 2014, Unit (ktoe)

	1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12	
	Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal, etc.	Others	Electricity	Total	
1	Indigenous Production	1,199							1,340	0.07	1,599		4,138	
2	Imports		817	164	46	592	9	4	2			134	951	
3	Exports	-94										-1,027	-1,120	
13.1	International Aviation Bunkers		-42		-42								-42	
5	Stock Changes	-796											-796	
6	Total Primary Energy Supply	309	774	164	3	592	9	4	2	1,340	0.07	1,599	-892	3,130
8	Total Transformation Sector									-1,340	-0.07	-169	1,372	-137
	8.1 Main Activity Producer									-1,340	-0.07	-2	1,372	30
	8.8 Charcoal Processing											-167		-167
9	Loss & Own Use											-154	-154	
10	Discrepancy	0	-3	-2	0		0	-1			0	0	-3	
11	Total Final Energy Consumptions	309	772	162	3	592	9	4	2			1,430	326	2,837
12	Industry Sector	309	38			30	9					57	134	539
	12.13 Non-specified Industry	309	38			30	9					57	134	539
13	Transport Sector		729	162	3	562			2					729
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		726	162		562			2					726
14	Other Sector		4			0		4				1,373	192	1,569
	14.1 Residential & Commercial		4					4				1,373	189	1,565
	14.1.1 Commerce and Public Services		2					2				268	66	337
	14.1.2 Residential		1					1				1,105	122	1,229
	14.2 Agriculture		0			0							3	3
15	Non-Energy Use		2						2					2
16	Electricity Output in GWh	0								15,952	1	5		15,958

Year: 2015 (ktoe)

		1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12
		Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal, etc.	Others	Electricity	Total
1	Indigenous Production	921								1,232	0	1,619		3,772
2	Imports		971	180	44	729	10	5	2				176	1,147
3	Exports												-1,126	-1,126
4	International Marine Bunkers													
13.1	International Aviation Bunkers		-41		-41									-41
5	Stock Changes	632												632
6	Total Primary Energy Supply	1,553	930	180	3	729	10	5	2	1,232	0	1,619	-949	4,384
7	Transfers													
8	Total Transformation Sector	-1,371								-1,232	0	-173	1,470	-1,306
	8.1 Main Activity Producer	-1,371								-1,232	0	-2	1,470	-1,134
	8.8 Charcoal Processing											-172		-172
9	Loss & Own Use												-157	-157
10	Discrepancy	0	-9	-8	0		0	-1			0	0	0	-10
11	Total Final Energy Consumptions	181	920	172	3	729	10	4	2			1,446	365	2,912
12	Industry Sector	181	46			37	10					56	150	433
	12.13 Non-specified Industry	181	46			37	10					56	150	433
13	Transport Sector		870	172	3	692			2					870
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		867	172		692			2					867
14	Other Sector		4			0		4				1,390	214	1,608
	14.1 Residential & Commercial		4					4				1,390	212	1,605
	14.1.1 Commerce and Public Services		2					2				274	74	351
	14.1.2 Residential		1					1				1,116	137	1,254
	14.2 Agriculture		0			0							3	3
15	Non-Energy Use		2						2					2
16	Electricity Output in GWh	2,551								14,543	1	4		17,099

Year: 2016, Unit (ktoe)

		1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12
		Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal, etc.	Others	Electricity	Total
1	Indigenous Production	3,340								1,522	0	1,615		6,477
2	Imports		1,076	199	46	811	10	8	3				74	1,150
3	Exports	-12											-1,690	-1,702
4	International Marine Bunkers													
13.1	International Aviation Bunkers		-42		-42									-42
5	Stock Changes	-461												-461
6	Total Primary Energy Supply	2,867	1,034	199	3	811	10	8	3	1,522	0	1,615	-1,616	5,421
7	Transfers													
8	Total Transformation Sector	-2,778								-1,522	0	-176	2,301	-2,176
	8.1 Main Activity Producer	-2,778								-1,522	0	-2	2,301	-2,002
	8.8 Charcoal Processing											-174		-174
9	Loss & Own Use												-284	-284
10	Discrepancy	0	0		0	0		0						0
11	Total Final Energy Consumptions	88	1,034	199	3	811	10	8	3			1,438	401	2,961
12	Industry Sector	88	51			41	10					55	165	360
	12.13 Non-specified Industry	88	51			41	10					55	165	360
13	Transport Sector		975	199	3	770			3					975
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		971	199		770			3					971
14	Other Sector		8			0		8				1,383	236	1,627
	14.1 Residential & Commercial		8					8				1,383	233	1,624
	14.1.1 Commerce and Public Services		5					5				274	84	362
	14.1.2 Residential		3					3				1,109	149	1,262
	14.2 Agriculture		0			0							3	3
15	Non-Energy Use		3						3					3
16	Electricity Output in GWh	9,046								17,703	1	5		26,754

Year: 2017, Unit (ktoe)

		1	4	4.1	4.3	4.5	4.6	4.7	4.10	6	8	9	10	12
		Coal	Petroleum Products	Motor Gasoline	Jet Fuel	Gas/Diesel Oil	Fuel Oil	LPG	Other Petroleum Products	Hydro	Solar Geothermal etc.	Others	Electricity	Total
1	Indigenous Production	3,422								1,787	1	1,619		6,828
2	Imports		1,094	199	40	828	10	14	3				43	1,137
3	Exports	-54											-2,142	-2,196
4	International Marine Bunkers													
13.1	International Aviation Bunkers		-37		-37									-37
5	Stock Changes	288												288
6	Total Primary Energy Supply	3,655	1,057	199	3	828	10	14	3	1,787	1	1,619	-2,099	6,020
7	Transfers													
8	Total Transformation Sector	-3,559								-1,787	-1	-188	2,858	-2,676
	8.1 Main Activity Producer	-3,559								-1,787	-1	-11	2,858	-2,500
	8.8 Charcoal Processing											-176		-176
9	Loss & Own Use												-332	-332
10	Discrepancy	0	0		0	0		0				0	0	0
11	Total Final Energy Consumptions	96	1,057	199	3	828	10	14	3			1,431	427	3,012
12	Industry Sector	96	51			41	10					55	179	382
	12.13 Non-specified Industry	96	51			41	10					55	179	382
13	Transport Sector		991	199	3	786			3					991
	13.2 Domestic Air Transport		3		3									3
	13.3 Road		988	199		786			3					988
14	Other Sector		15			0		14				1,376	248	1,639
	14.1 Residential & Commercial		14					14				1,376	245	1,636
	14.1.1 Commerce and Public Services		9					9				273	89	371
	14.1.2 Residential		6					6				1,103	156	1,265
	14.2 Agriculture		0			0							2	3
15	Non-Energy Use		3						3					3
16	Electricity Output in GWh	12,414								20,777	9	27		33,227

Year: 2018, Unit (ktoe)

	1.	4.							6.	8.	9.	10.	12.
	Coal	Petroleum Products	4.1 Motor Gasoline	4.3 Jet Fuel	4.5 Gas/Diesel Oil	4.6 Fuel Oil	4.7 LPG	4.10 Other Petroleum Products	Hydro	Geothermal, Solar etc.	Others	Electricity	Total
1. Indigenous Production	4,040								1,978	5	1,623		7,646
2. Imports		1,150	191	64	863	16	15	1				26	1,175
3. Exports	-95											-2,303	-2,398
4. International Marine Bunkers													
13.1 International Aviation Bunkers		-60		-60									-60
5. Stock Changes	-244												-244
6. Total Primary Energy Supply	3,701	1,090	191	5	863	16	15	1	1,978	5	1,623	-2,278	6,119
7. Transfers													
8. Total Transformation Sector	-3,589								-1,978	-5	-198	3,161	-2,608
8.1 Main Activity Producer	-3,589								-1,978	-5	-20	3,161	-2,430
8.8 Charcoal Processing											-179		-179
9. Loss & Own Use												-418	-418
10. Discrepancy	0	0		0							0	0	0
11. Total Final Energy Consumptions	112	1,090	191	5	863	16	15	1			1,424	466	3,092
12. Industry Sector	112	59			43	16					55	197	423
12.13 Non-specified Industry	112	59			43	16					55	197	423
13. Transport Sector		1,016	191	5	819			1					1,016
13.2 Domestic Air Transport		5		5									5
13.3 Road		1,011	191		819			1					1,011
14. Other Sector		15			0		15				1,370	269	1,654
14.1 Residential & Commercial		15					15				1,370	267	1,651
14.1.1 Commerce and Public Services		9					9				273	102	384
14.1.2 Residential		6					6				1,097	165	1,267
14.2 Agriculture		0			0							3	3
15. of which Non-Energy Use		1						1					1
16. Electricity Output in GWh	13,656								22,999	60	47		36,761

Appendix 2

List of Members, the Lao PDR and ERIA

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