



# VIETNAM ENERGY STATISTICS 2020

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## Abbreviations

APERC	Asia Pacific Energy Research Centre
cust	customer
DO	Diezen Oil
EF	Emission factor
FO	Fuel oil
GDP	Gross Domestic Product
HHI	Herfindahl-Hirschman Index
IEA	International Energy Agency
IEVN	Institute of Energy, Vietnam
KTOE	Thousand Tonnes of Oil Equivalent
LPG	Liquefied Petroleum Gas
MAIFI	Momentary Average Interruption Frequency Index
MOIT	Ministry of Industry and Trade, Vietnam
N/A	Data is not Available
num	number of
Prel.	Preliminary
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
TFEC	Total Final Energy Consumption
TOE	Tonne of Oil Equivalent
TPES	Total Primary Energy Supply

## Introduction

Energy statistics is a chain of activities from collecting, analyzing, compiling, and disseminating general information related to energy types such as electricity, coal, oil & gas and renewable energies. These activities become important in serving for management, operation, development of policies, scientific research, production – trade, information exchange, energy efficient use and energy conservation related to energy areas.

Under management of the Ministry of Industry and Trade (MOIT), Institute of Energy (IEVN) had prepared annual energy statistics from 2008 to 2015. Even though there was interruption in period 2016-2018, IEVN has maintained collection of energy data from focal macro data sources such as central government agencies, big industrial groups and corporations.

For previous energy statistics publications, the IEVN study team received many valuable comments from domestic experts on contents as well as presentation styles. Apart from that, the study team also received technical assistance from the Asia Pacific Energy Research Centre (APERC, based in Tokyo, Japan). Therefore, the statistical publications were constantly changed in terms of structure and contents aiming at providing useful information to the interested readers. The structure of energy balances was changed towards being more detailed but still complying with common format recommended by the international organizations such as International Energy Agency (IEA) and APERC.

In terms of product structure, this is a continuation of the previous Energy Statistics publication. Data series is presented for period of 2015-2020. The methodology also has some changes in the approach to calculating energy consumption instead of using the top-down approach at some energy products.

The team considers that there is still much room for improvement in order to enrich contents as well as increase accuracy of statistics. With the spirit of listening and a wish for improvement in both the content and form of the publication, the team hopes to receive comments on this publication via email address: [thongkenangluong.vn@gmail.com](mailto:thongkenangluong.vn@gmail.com).

Finally, the team would like to express thanks to Vietnam National Coal - Mineral Industries Holding Corporation Limited (VINACOMIN), Vietnam Oil and Gas Group, Vietnam Electricity Group – National Load Dispatch Center, General Department of Vietnam Customs, General Statistics Office of Vietnam,... for close cooperation on collecting, compiling and sharing information related

to energy field. At the same time, we also would like to express our thanks to VNEEP Office, MOIT, as the body in charge, for facilitating the preparation of this publication./.

Institute of Energy, December 2021.

## Overview

The COVID-19 pandemic has led to substantial losses in Vietnam and worldwide in 2020. Statistics show that the gross domestic product (GDP) in 2020 only grew at a 2.91% rate, much lower than the 2015-2019 period of 6.78% per year on average. The economic growth was not as expected; the energy supply and demand have also changed significantly.

### Total Primary Energy Supply (TPES)

In 2020, Vietnam's TPES was estimated at 95,762 KTOE, increased by only 1.5% compared with the previous year. While the compound annual growth rate of TPES during 2016-2019 was as high as 10.7%, with 2020 added, the CAGR fell to 8.7%. It should be noted that Viet Nam has become a net energy importer since 2015. The below Sankey diagram summarizes the key energy flows from production, import, export, transformation to consumption in the economy in 2020.

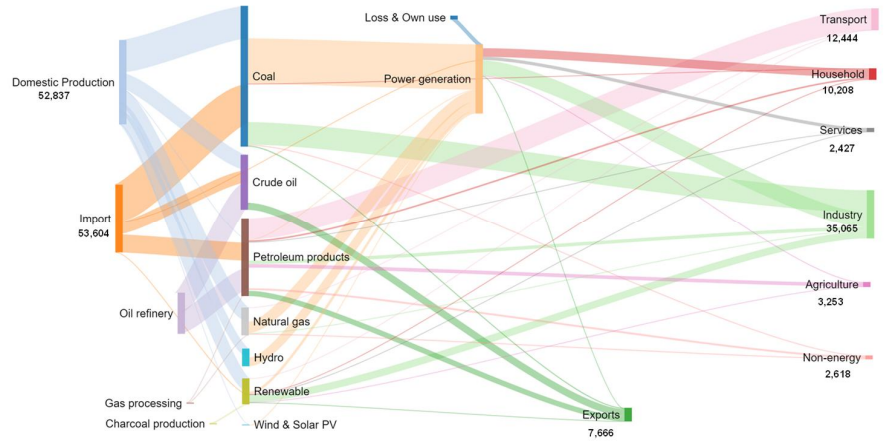


Figure 1. Sankey Diagram in 2020

Under TPES, coal's growth rate was relatively high (17.1% per year), during the period of 2016-2020. Electricity imports and exports (9.1% per year) were the second to coal, although the contribution of net electricity imports to TPES is almost negligible. Renewable energies, including biomass, with hydropower as the key source grew at 0.8% per year.

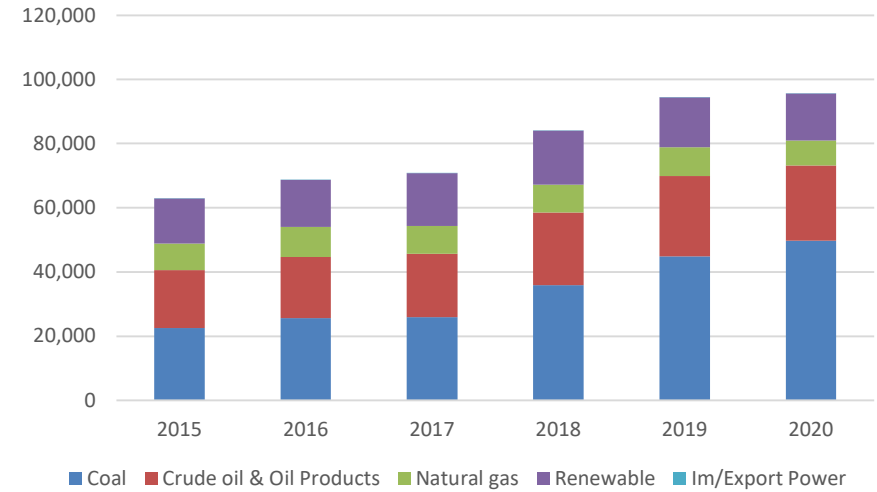


Figure 2. TPES during 2015-2020

By fuel, coal has expanded its share rapidly. In 2015, coal accounted for 35.9% of TPES, then rose to 52.0% in 2020. The COVID-19 pandemic caused a significant reduction in fuel demand; hence oil and gas share in TPES also decreased, from 28.5% and 13.1% in 2015 to only 24.4% and 8.2% respectively in 2020.

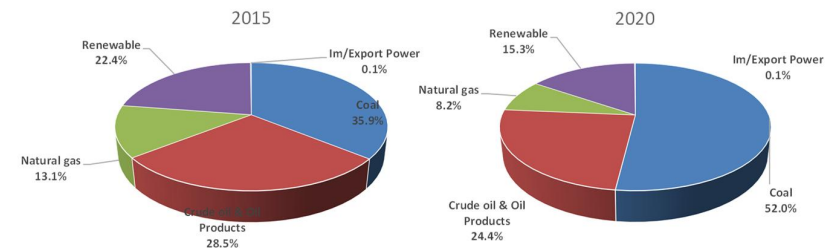


Figure 3. TPES structure by fuel

These recent years have continued to witness considerable developments for renewable power such as solar and wind. Nevertheless, the share of renewable energies in TPES declined, partly due

to unchanged hydropower, a major source for electricity production. From 22.4% in 2015, it shrank to 5.3% in 2020.

According to our calculations, HHI of TPES grew fast throughout 2015 to 2020, from 2,773 in 2015 to 3,316 in 2019 and 3,597 in 2020. This poses a warning sign that supply diversification is limited and TPES relies more and more heavily on coal.

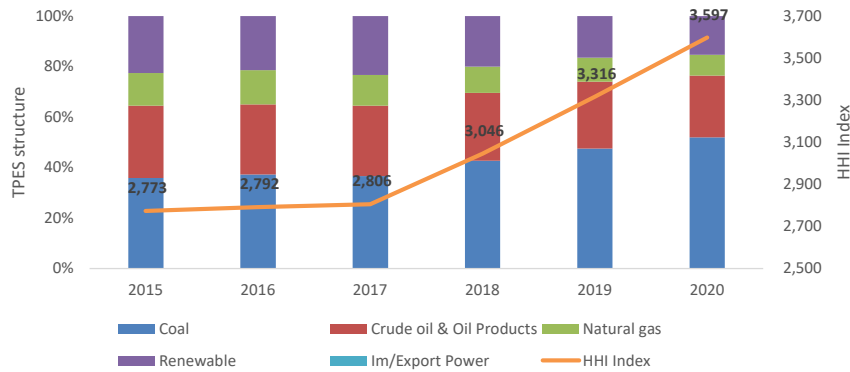


Figure 4. Structure and diversification level of TPES

TPES per capita of Vietnam in 2019 (979 kgOE) was relatively lower than many other countries and regions, including the average ASEAN of 1,053 kgOE. However, the intensity of TPES per GDP more than doubled the world average. Vietnam's energy efficiency, therefore, needs a lot of improvement.

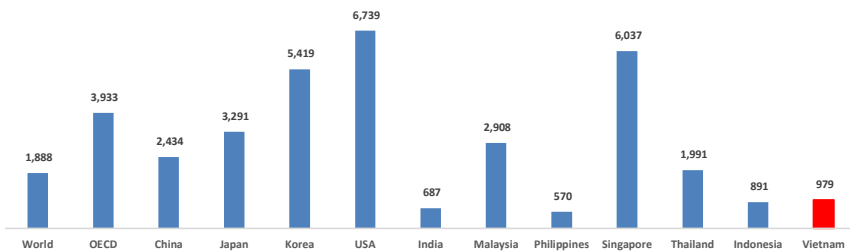


Figure 5. TPES per capita in 2019

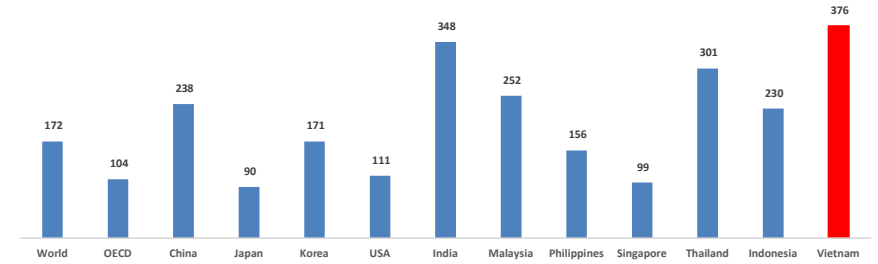


Figure 6. TPES per GDP (kgOE/1000USD) in 2019

### Domestic Production

Crude oil, coal, natural gas, hydropower and many types of renewable energies are exploited domestically. The total production of 2020 was 52,837 KTOE, much lower than the 58,137 KTOE of 2019. Regarding share change, except crude oil fell from 28.7% in 2015 to 17.0% in 2020, all others rose, especially coal (from 34.0% in 2015 to 40.2% in 2020).

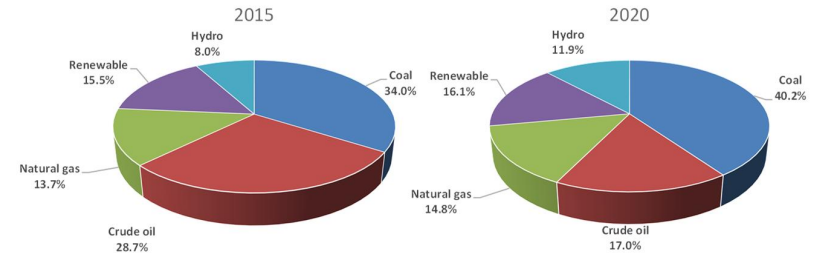


Figure 7 Domestic energy production structure

### Energy imports and exports

The purpose of energy exports is to boost the foreign currency revenues for the state budget. The purpose of energy imports is to meet supply shortages due to insufficient domestic production or energy transition.

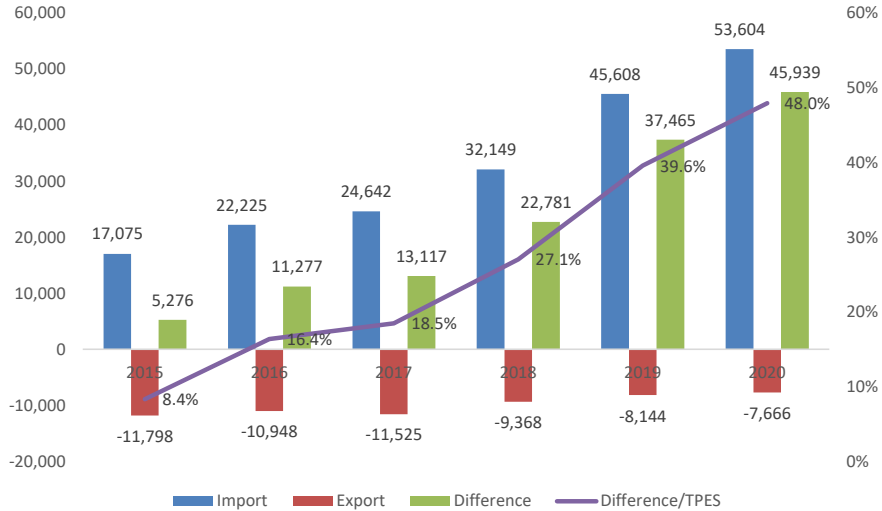


Figure 8 Energy import and export

Vietnam has become a net energy importer since 2015. Energy imports have been continuously expanding while exports are shrinking; hence the net energy imports over TPES increased sharply from 8.4% in 2015 to 48% in 2020. During 2016-2020, energy imports grew 25.7%, whereas exports lost 8.3% per year in terms of CAGR.

The 51.2% CAGR of coal import was the major contribution to total energy imports in 2016-2019. The growth of crude oil volumes alone (130.2%) was bold, but oil products showed a slight downward trend at 3.6% per year. Since the commercial operation in 2018 of Nghi Son oil refinery, the second complex to Dung Quat, Vietnam has been importing crude oil in large volumes, and therefore its refined products have partially offset import demand.

**Total final energy consumption (TFEC)**

From 2015 to 2019, the total final energy consumption (TFEC) grew as rapidly as 7.9% per year, reaching 64,542 KTOE in 2019. However, in the succeeding year due to the COVID-19 pandemic, 2020 TFEC although rose to 66,014 KTOE, the growth rate was much more moderate (2.28%). Slight economic growth of 2.91% made almost no change to the final energy intensity over GDP, from

321 to 319 kgOE/1000 USD (2010 USD nominal). Compared with the base year 2015, there was not yet a considerable improvement in the energy intensity.

After a year of the pandemic, the structure of the final energy consumption changed significantly.

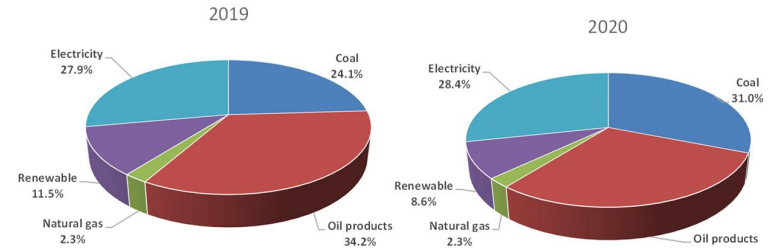


Figure 9 TFEC structure by fuel

Regarding energy consumption by fuel in TFEC, the two most apparent changes are seen in oil products (decrease) and coal (increase) (Figure 9). Regarding energy consumption by sector, industry was the only sector to expand its share, from 47.5% (2019) to 53.1% (2020). Other sectors were shrinking due to the impact of travel restrictions and reduced spending, of which the transport sector fell from 23.0% to 18.9% in share. Energy consumption in transport in 2020 returned approximately to the 2016 level of 12,444 KTOE.

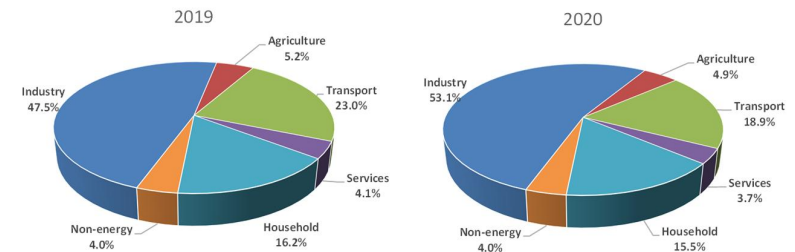


Figure 10 TFEC structure by sector

**Emissions from fuel combustion**

The enormous growth of fossil fuel consumption, especially coal, has led to the rapid mounting of emissions. In 2020, total emissions from fuel combustion were 273.4 million tons of CO2 equivalent, an increase of 3.7% compared with 2019 and 1.73 times higher than the 2015 level.

Comparing emissions indicators among countries and territories, Vietnam's emissions per capita are quite low, whereas emissions over GDP remain high without any sign of improvement during the targeted period. Viet Nam's emissions intensity was in fact lower than China's in 2015, yet jumped to the top in 2019. The trend of worsening emissions intensity has been more apparent in the past few years due to the intense utilization of coal-fired power domestically. Energy development strategies for the future should pay special attention to two areas: (i) energy efficiency, to reduce energy consumption in manufacturing and supply of goods and services, and (ii) new and renewable energy development, to gradually replace fossil fuel.

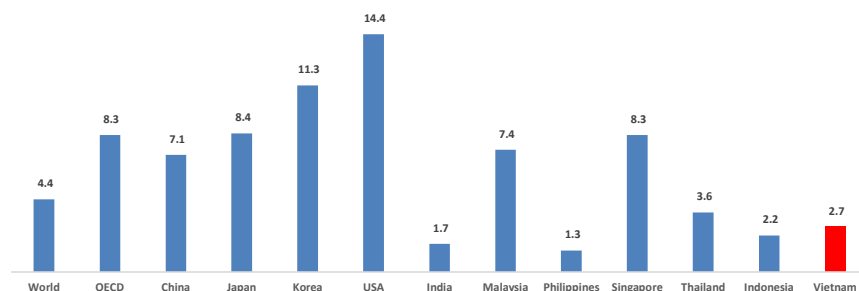


Figure 11 Emission per capita (kg-CO<sub>2</sub>/người) in 2019

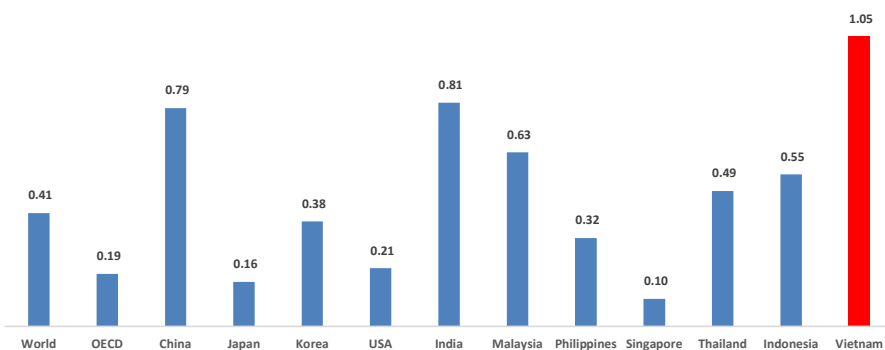


Figure 12 Emission per GDP (kgCO<sub>2</sub>/USD2015) in 2019

### Energy security

At the national level, long-term energy security can be assessed through a set of indicators. The table below provides data and preliminary assessments for each indicator for the targeted period.

Table 1 Long-term energy security

Indicator	2015	2019	2020	Notes
Reserve/Production ratio (R/P) – year	Coal reserve ~70 years, Natural gas ~40 years, Crude oil ~ 20 years			
Dependence of net import energy (%)	6.45	39.65	47.97	Tendency of increasing dependency on imported fuels
Energy import cost/ Total import cost (%)	4.79	4.81	4.82	Present share is not high but attention should be paid on increased share of fuel import in future
Energy import cost /National Export revenue (%)	4.89	4.62	4.47	
Energy import cost /GDP (%)	4.10	4.66	4.68	
Diversity of import source countries (HHI index)	1,835	1,213	1,210	Relatively diverse
Diversity of energy sources of power (HHI index)	3,209	3,580	3,605	Concentration tendency is increasing
Diversity of energy sources of TPES (HHI index)	2,773	3,316	3,597	Concentration tendency is increasing
TFEC/GDP (kgOE/1.000USD)	308	321	319	Increase during 2015-2018, then improve since 2019

In addition, a number of other indicators can be used to demonstrate the stability of power supply of the current infrastructure system. The table below shows the change in the domestically available reliable supply chain with preliminary assessments for the targeted period.

Table 2 Assessment of available domestic reliable supply chain

Indicator	2015	2019	2020	Notes
Reserve factor (%)	34.4	32.4	38.0	High power reserve rate but improvement is needed as share of renewable power sources is gradually increasing
System Average Interruption Duration Index - mins/cust	2,281	1,071	356	Reliability of electricity supply is increasing

Indicator	2015	2019	2020	Notes
System Average Interruption Frequency Index (SAIFI) - num/cust	13.36	6.57	3.11	
Momentary Average Interruption Frequency Index (MAIFI) - num/cust	2.03	0.89	0.77	
Days of on-land oil stocks (days)	62.7	91.3	92.9	Meet criteria of IEA on number of oil reserve days

In conclusion, the energy development trends in 2015-2020 can be summarized as follows:

- Energy exports fell as domestic production of coal, crude oil and natural gas passed their peaks. On the contrary, energy imports are escalating, warning about the increasing dependence of the national economy on imported energy.
- Coal accounts for a large proportion of energy imports and TPES. Imports and consumption are increasing while production capacity almost reached its limit.
- The primary energy supply has risen sharply in the last few years, coupling with CO2 and other GHGs emissions.
- There has been a massive shift from other forms of fuel to electricity, proving the competitiveness and accessibility of electricity.
- The impact of the COVID-19 pandemic caused declining energy demand for 2020 in the transport and service sector, but consumption in industry is still on the rise.

## Socio-economic indicators

Items	Unit	2015	2016	2017	2018	2019	2020
<b>Gross Domestic Product</b>	<b>Bill. VND, current price</b>	<b>2.157.828</b>	<b>4.502.733</b>	<b>5.005.975</b>	<b>5.542.332</b>	<b>6.037.348</b>	<b>6.293.145</b>
Agriculture, forestry and fisheries	Bill. VND, current price	396.576	734.830	768.161	813.724	842.601	934.731
Industry and construction	Bill. VND, current price	693.351	1.473.071	1.671.952	1.897.272	2.082.261	2.122.307
Service	Bill. VND, current price	797.155	1.842.729	2.065.488	2.278.892	2.513.859	2.619.539
Tax of products less subsidies	Bill. VND, current price	270.746	452.103	500.374	552.444	598.627	616.568
<b>Gross Domestic Product</b>	<b>Bill. VND, constant 2010VND</b>	<b>2.157.828</b>	<b>3.054.470</b>	<b>3.262.548</b>	<b>3.493.399</b>	<b>3.738.546</b>	<b>3.847.182</b>
Agriculture, forestry and fisheries	Bill. VND, constant 2010VND	396.576	468.813	482.417	500.567	510.632	524.326
Industry and construction	Bill. VND, constant 2010VND	693.351	1.056.808	1.141.369	1.242.420	1.353.049	1.406.882
Service	Bill. VND, constant 2010VND	797.155	1.178.143	1.265.821	1.354.796	1.453.677	1.487.626
Tax of products less subsidies	Bill. VND, constant 2010VND	270.746	350.706	372.941	395.616	421.188	428.348
Annual GDP growth rate	% per year	6.42	6.21	6.81	7.08	7.02	2.91
<b>Gross Domestic Product</b>	<b>Mill.USD, constant 2010 USD</b>	<b>115,932</b>	<b>164,105</b>	<b>175,284</b>	<b>187,687</b>	<b>200,858</b>	<b>206,694</b>
<b>Population</b>	<b>1.000 persons</b>	<b>87,067</b>	<b>93,251</b>	<b>94,286</b>	<b>95,385</b>	<b>96,484</b>	<b>97,583</b>
Urban	1.000 persons	26,461	31,397	31,928	32,637	33,817	35,933
Rural	1.000 persons	60,607	61,854	62,358	62,748	62,667	61,650
<b>GDP per capital</b>	<b>USD/person, constant 2010 USD</b>	<b>1,332</b>	<b>1,760</b>	<b>1,859</b>	<b>1,968</b>	<b>2,082</b>	<b>2,118</b>

## Coal

Unit: 1000 tons

Items	2015	2016	2017	2018	2019	2020 (Prel.)
<b>Production</b>	<b>39,888</b>	<b>37,711</b>	<b>37,227</b>	<b>41,387</b>	<b>45,671</b>	<b>43,375</b>
Exports	1,748	1,243	2,229	2,387	1,143	910
Imports	6,927	13,199	14,677	22,749	43,786	54,810
<b>Total domestic consumption</b>	<b>43,711</b>	<b>48,941</b>	<b>49,576</b>	<b>68,256</b>	<b>85,443</b>	<b>93,850</b>
Power generation use	29,350	34,067	33,717	45,197	59,141	59,296
Residential use	1,894	1,526	1,418	1,113	827	708
Commercial use	130	115	78	66	49	15
Industrial use, of which	11,488	12,358	13,446	20,876	24,349	32,714
Mining and quarrying	117	126	355	623	719	966
Food, beverages and tobacco	511	550	582	905	1,231	1,654
Textile and leather	1,219	1,311	1,198	2,181	2,516	3,380
Wood and wood products	1	0.8	1.0	1.6	1.9	2.5
Paper, pulp and printing	253	273	361	933	1,076	1,446
Chemical and petrochemical	674	725	576	1,167	1,346	1,808
Iron and steel	1,188	1,278	1,144	1,565	1,804	2,424
Machinery	2	2.1	2.4	3.5	4.0	5.4
Non-metallic minerals	6,866	7,386	8,354	12,082	14,021	18,838
Transport equipment	3	3.2	3.8	1.0	1.2	1.6
Construction	26	28	22	48	55	74
Non-specified industries	628	675	847	1,365	1,574	2,115
Non-energy use	849	875	917	1,005	1,077	1,117

## COAL FOR POWER GENERATION

Unit: 1000 tons

Type	Heat value (kCal/kg)	2015	2016	2017	2018	2019	2020
Anthracite 4a1	6,400	113	131	111	129	136	136
Anthracite 5a1	5,600	5,829	6,766	7,062	8,335	10,590	10,618
Anthracite 5a2	5,500	-	-	4	11	24	24
Anthracite 5a3	5,350	553	642	554	557	872	874
Anthracite 5a4	5,400	924	1,073	978	1,006	1,374	1,378
Anthracite 5b1	5,250	2,738	3,178	2,707	3,110	3,789	3,799
Anthracite 5b4	5,050	296	344	329	348	386	387
Anthracite 6a1	4,800	12,135	14,085	11,259	14,784	18,135	18,183
Anthracite 6a4	4,650	-	-	-	425	1,208	1,211
Anthracite 6a6	4,550	339	393	332	386	407	408
Anthracite 6b1	4,350	1,733	2,011	2,400	2,541	3,171	3,179
Anthracite 6b3	4,150	628	729	750	844	719	721
Anthracite unspecified II	4,100	448	520	460	549	588	590
Sub-bitum	4,800	305	354	3,052	5,838	8,711	8,734
Other type	4,800	3,309	3,841	3,720	6,333	9,031	9,055
<b>Total</b>		<b>29,350</b>	<b>34,067</b>	<b>33,717</b>	<b>45,197</b>	<b>59,141</b>	
<b>Weighted Heat value (kCal/kg)</b>		<b>4,985</b>	<b>4,979</b>	<b>4,956</b>	<b>4,956</b>	<b>4,956</b>	<b>5,053</b>

## Oil and Gas

### SUPPLY AND TRANSFORMATION SIDES

Items	2015	2016	2017	2018	2019	2020
<b>Crude oil</b>	Unit: 1,000 tons					
Domestic exploitation	16,880	15,100	13,500	11,860	10,980	8,820
Imports	182	435	636	5,396	7,918	11,768
Exports	9,181	8,100	7,390	4,610	3,723	4,590
To oil refineries	6,748	7,355	6,591	12,077	15,505	15,788
<b>Gasoline</b>	Unit: 1,000 tons					
Production	2,747	3,409	3,252	4,413	4,892	5,025
Imports	2,681	2,488	3,180	2,289	1,980	1,558
Exports	243	215	252	208	202	295
<b>Jet fuel</b>	Unit: 1,000 tons					
Production	196	383	352	460	550	234
Imports	1,350	1,538	1,765	2,046	2,050	1,180
Exports	372	480	1,228	1,487	1,641	605
<b>Kerosene</b>	Unit: 1,000 tons					
Imports	41	50	49	43	32	42
Exports	0	0	0	0.60	0.36	0.63
<b>Diesel oil</b>	Unit: 1,000 tons					
Production	3,068	2,900	2,490	4,296	5,685	6,162
Imports	5,213	6,716	7,318	5,825	4,753	4,813
Exports	466	512	527	573	551	625
Power Generation use	19	41	8.7	25	159	80
<b>Fuel oil</b>	Unit: 1,000 tons					
Production	138	120	136	204	179	219
Imports	711	883	597	700	833	677
Exports	128	254	272	394	467	369

Items	2015	2016	2017	2018	2019	2020
Power Generation use	191	302	21	179	231	104
<b>Liquefied petroleum gases</b>	Unit: 1,000 tons					
Production	736	803	766	1,006	887	789
From Oil refineries	448	492	444	580	515	417
From Gas processing plants	288	311	322	426	372	372
Imports	1,083	1,231	1,364	1,445	1,843	1,810
Exports	0.03	272	163	312	426	239
<b>Natural gas</b>	Unit: Million m <sup>3</sup>					
Domestic exploitation	9,137	10,390	9,580	9,700	9,960	8,690
Power Generation use	7,480	8,481	7,569	7,519	7,852	6,559
To Gas processing plants	360	382	404	517	469	469

## DEMAND SIDE

## Year 2016

	Gasoline	Jet Fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
Unit	1,000 tons									Mill. m <sup>3</sup>
<b>TOTAL FINAL CONSUMPTION</b>	5,682	732	50	9,062	445	1,762	563	110	302	1,527
<b>Industry</b>				1,312	132	290				778
Mining and quarrying				359	2.0					
Food, beverages and tobacco				52	31	17				12
Textiles and leather				33	11	5.5				4.0
Wood and wood products				20	0.1	0.9				0
Paper, pulp and print				20	11	1.9				2.8
Chemical and petrochemical				48	6.6	17				309
Iron and steel				57	24	54				233
Machinery				20	2.0	71				14
Non-metallic minerals				123	43	61				196
Transport equipment				20	0.5	46				6.2
Construction				545		1.9				0.6
Non-specified (Industry)				15	0.4	14				0.3
<b>Agriculture/forestry, Fishing</b>	114			1,761						
<b>Transport</b>	5,501	728		5,582	221					28
Road	5,501			4,650						28
Domestic navigation				893	221					
Rail				39						
Domestic aviation		728								
<b>Commercial and public services</b>				72		162				
<b>Residential</b>			38			1,310				
<b>Non-energy use</b>	0.6		12				563	110	302	721

## Year 2017

	Gasoline	Jet Fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
Unit	1,000 tons									Mill. m <sup>3</sup>
<b>TOTAL FINAL CONSUMPTION</b>	6,179	782	49	9,272	545	1,966	619	84	229	1,607
<b>Industry</b>				1,107	115	340				848
Mining and quarrying				272	0.8					
Food, beverages and tobacco				54	13	17				12
Textiles and leather				36	1.3	10				2.6
Wood and wood products				22	0.0	0.1				0.0
Paper, pulp and print				14	7.1	3.4				3.7
Chemical and petrochemical				47	3	15				309
Iron and steel				60	28	70				273
Machinery				30	6.2	101				18
Non-metallic minerals				117	52	40				222
Transport equipment				21	3.8	58				6.6
Construction				416		0.9				0.1
Non-specified (Industry)				18	0.2	24				0.4
<b>Agriculture/forestry, Fishing</b>	119			2,009						
<b>Transport</b>	6,086	759		6,015	219					34
Road	6,086			5,031						34
Domestic navigation				944	219					
Rail				40						
Domestic aviation		759								
<b>Commercial and public services</b>				63		245				
<b>Residential</b>			38			1,382				
<b>Non-energy use</b>	0.2		11				619	84	229	725

## Year 2018

	Gasoline	Jet Fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
Unit	1,000 tons									Mill. m <sup>3</sup>
<b>TOTAL FINAL CONSUMPTION</b>	6,421	775	42	9,590	327	2,139	695	86	411	1,664
<b>Industry</b>				1,069	104	367				835
Mining and quarrying				263	0.3					
Food, beverages and tobacco				53	8.1	12				21
Textiles and leather				35	0.8	18				4.8
Wood and wood products				21	0.0	0.3				0.0
Paper, pulp and print				13	0.0	6.3				5.5
Chemical and petrochemical				45	14.8	23				320
Iron and steel				58	19.9	72				277
Machinery				29	11.1	95				25
Non-metallic minerals				113	45.1	62				165
Transport equipment				20	3.2	54				13
Construction				402		6.1				0.2
Non-specified (Industry)				18	0.2	18				2.8
<b>Agriculture/forestry, Fishing</b>	124			2,090						
<b>Transport</b>	6,296	775		6,369	224					36
Road	6,296			5,355						36
Domestic navigation				970	224					
Rail				43						
Domestic aviation		775								
<b>Commercial and public services</b>				62		315				
<b>Residential</b>			31			1,457				
<b>Non-energy use</b>	0.2		11				695	86	411	793

## Year 2019

	Gasoline	Jet Fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
Unit	1,000 tons									Mill. m <sup>3</sup>
<b>TOTAL FINAL CONSUMPTION</b>	6,670	929	31.4	9,727	308	2,303	692	2.9	538	1,639
<b>Industry</b>				1,060	91	395				808
Mining and quarrying				261	0.2					
Food, beverages and tobacco				52	7.1	13				19
Textiles and leather				35	0.7	19				4.3
Wood and wood products				21	0	0.3				
Paper, pulp and print				13	0	6.8				5.0
Chemical and petrochemical				45	13	24				340
Iron and steel				57	18	78				252
Machinery				28	10	103				22
Non-metallic minerals				112	40	67				150
Transport equipment				20	2.9	58				12
Construction				399		6.5				
Non-specified (Industry)				17	0.2	19				2.6
<b>Agriculture/forestry, Fishing</b>	130			2,212						
<b>Transport</b>	6,452	929		6,610	229					38
Road	6,452			5,579						38
Domestic navigation				989	229					
Rail				42						
Domestic aviation		929								
<b>Commercial and public services</b>				58		372				
<b>Residential</b>			17.4			1,537				
<b>Non-energy use</b>	0.2		14.0				692	2.9	538	793

## Year 2020 (Prel.)

Data in physical units	Gasoline	Jet Fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
Unit	1,000 tons									Mill. m <sup>3</sup>
<b>TOTAL FINAL CONSUMPTION</b>	5,668	758	41.8	8,594	363	2,360	6.2	71	1,150	1,662
<b>Industry</b>				902	180	385				841
Mining and quarrying				222	0					
Food, beverages and tobacco				44	14	12				20
Textiles and leather				30	1	19				5
Wood and wood products				18	0	0				
Paper, pulp and print				11	0	7				5
Chemical and petrochemical				38	26	24				354
Iron and steel				49	35	76				262
Machinery				24	19	100				23
Non-metallic minerals				95	78	66				156
Transport equipment				17	6	56				13
Construction				339		6				
Non-specified (Industry)				15	0	19				3
<b>Agriculture/forestry, Fishing</b>	115			2,114						
<b>Transport</b>	5,471	758		5,541	183					24
Road	5,471			4,681						24
Domestic navigation				830	183					
Rail				30						
Domestic aviation		758								
<b>Commercial and public services</b>				37		280				
<b>Residential</b>			23			1,695				
<b>Non-energy use</b>	0.2		19				6.2	71	1,150	797

## Power

Items	2015	2016	2017	2018	2019	2020
<b>INSTALLED CAPACITY</b>						<i>MW</i>
Hydro	16,587	17,824	19,288	20,170	20,632	20,859
Coal-fired	12,903	14,595	17,089	18,945	20,267	22,077
FO fired	875	1439	1439	1579	1579	1579
Diesel	39	24	24	24	24	24
Gas fired	7,998	7,467	7,467	7,467	7,467	7,422
<i>Combined cycle gas turbine</i>	7,182	7,446	7,446	7,446	7,446	7,398
<i>Gas fired</i>	816	21	21	21	21	24
Renewable	135	114	145	504	5,237	9,715
<i>Biomass, co-generation</i>	45	24	55	175	175	325
<i>Wind</i>	90	90	90	243	377	538
<i>Solar</i>				86	4,685	8,852
Imports	800	800	1,340	1,372	1,372	572
<b>Total</b>	<b>39,337</b>	<b>42,263</b>	<b>46,792</b>	<b>50,061</b>	<b>56,578</b>	<b>62,248</b>
<b>Peak load (Pmax)</b>	25,809	28,109	30,931	35,126	38,249	38,617
Reserve factor	34.4%	33.5%	33.9%	29.8%	32.4%	38.0%
<b>POWER GENERATION</b>						<i>GWh</i>
Hydro	56,123	63,941	85,940	83,081	66,117	72,892
Coal-fired	56,469	68,351	67,714	91,654	120,157	123,177
FO fired	878	931	97	595	1,239	574
Diesel	114	251	53	156	974	489
<i>DO gas turbine</i>	105	237	42	145	921	474
<i>DO</i>	9	14	11	11	53	15
Gas fired	48,148	45,365	40,347	40,701	42,507	34,802
<i>Combined cycle gas turbine</i>	47,475	45,242	40,201	40,562	42,402	34,657

Items	2015	2016	2017	2018	2019	2020
<i>Gas turbine</i>	673	123	146	139	105	145
Renewable	191	323	558	997	5,892	10,897
<i>Biomass, co-generation</i>	70	122	208	488	350	340
<i>Wind</i>	121	201	350	487	724	982
<i>Solar</i>				22	4,818	9,575
Imports	2,393	2,736	2,361	3,124	3,316	3,067
Exports	1,416	1,409	1,650	1,509	2,067	1,555
<b>Total supply</b>	<b>164,316</b>	<b>181,898</b>	<b>197,070</b>	<b>220,308</b>	<b>240,202</b>	<b>245,898</b>
<b>DOMESTIC USES</b>						<i>GWh</i>
Agriculture, Forestry and Fishing	2,327	3,629	4,340	5,434	6,593	7,388
Industry - Construction	77,063	85,849	95,572	105,838	113,595	117,675
Commerce – Services	7,546	8,772	9,596	10,776	11,776	10,352
State & Residential	50,374	55,227	57,704	62,241	69,061	73,158
Others	5,432	6,036	6,581	7,340	8,209	8,973
<b>Total</b>	<b>142,742</b>	<b>159,513</b>	<b>173,793</b>	<b>191,629</b>	<b>209,234</b>	<b>217,546</b>
Loss (%)	7.94	7.57	7.24	7.04	6.50	6.42
<b>OTHER INDICATORS</b>						
System Average Interruption Duration Index (SAIDI) - min/cust	2,281	1,651	1,029	724	1,071	356
System Average Interruption Frequency Index (SAIFI) – num/cust	13.36	10.6	7.04	4.79	6.57	3,11
Momentary Average Interruption Frequency Index (MAIFI) – num/cust	2.03	1.51	0.94	0.78	0.89	0.77
Emission factor (EF) t-CO <sub>2</sub> /MWh	0.8154	0.9185	0.8649	0.913	0.8458	N/A

## ELECTRICITY SALES BY SEGMENT, SUB-SECTOR AND SECTOR

Unit: GWh

Code	Segment, sub-sector and sector	2015	2016	2017	2018	2019	2020
<b>1000</b>	<b>AGRICULTURE, FORESTRY &amp; FISHING</b>	<b>2,327</b>	<b>3,629</b>	<b>4,340</b>	<b>5,434</b>	<b>6,593</b>	<b>7,388</b>
1100	Irrigation activities						
1110	Irrigation pump for agriculture	391	610	640	739	1,065	1,319
1120	Operation of regulating drains	429	669	780	883	908	846
1200	Watering pumps, crop service	779	1,214	1,406	1,829	2,211	2,573
1300	Forestry	7	10	16	21	51	47
1400	Fishing	710	1,108	1,479	1,939	2,358	2,603
1500	Other agriculture activities	11	18	19	24	-	-
<b>2000</b>	<b>INDUSTRY &amp; CONSTRUCTION</b>	<b>77,063</b>	<b>85,849</b>	<b>95,572</b>	<b>105,838</b>	<b>113,595</b>	<b>118,146</b>
2100	Mining and quarrying						
2101	Coal mining	1,399	1,558	1,629	1,601	1,432	1,319
2102	Crude oil, natural gas exploitation	119	133	160	213	198	846
2103	Uranium, Thorium exploitation	539	600	537	634	434	2,573
2104	Metal, non-ferrous metal	1,587	1,768	1,719	1,950	1,479	47
2105	Building material quarrying	2,337	2,604	2,880	3,547	3,838	2,603
2200	Processing industries						
2201	Food processing	11,212	12,491	13,249	14,108	14,902	13,889
2202	Beverage	2,767	3,082	3,228	3,448	3,637	3,345
2203	Tobacco	148	165	166	183	188	190
2204	Fabric and Textile	5,191	5,783	6,297	7,023	7,583	6,622
2205	Garment and Dyeing	2,639	2,939	3,245	3,616	3,588	3,237
2206	Leather and shoe	2,477	2,759	3,141	3,599	4,125	3,545
2207	Wood processing and products	2,897	3,228	3,759	4,404	4,830	4,790
2208	Pulp and paper products	2,147	2,392	2,591	2,827	2,923	2,978
2209	Publishing and Printing	261	291	308	357	403	357
2210	Coke and petroleum production	109	122	254	259	238	182
2211	Chemical and fertilizer	1,022	1,139	1,263	1,418	1,907	2,220
2212	Rubber and Plastics products	5,136	5,722	6,379	7,203	7,627	7,639
2213	Non-metallic minerals	8,672	9,661	10,182	11,402	11,864	11,396
2214	Iron and Steel	5,232	5,829	6,952	7,334	8,553	8,571
2215	Iron and steel products	6,467	7,205	8,385	10,055	8,986	8,655
2216	Machinery	1,921	2,141	2,110	2,098	1,972	1,633
2217	Manufacture of electric equipment and tools	1,439	1,603	2,268	2,286	2,538	2,614
2218	Manufacture of radio, communication equipment	3,907	4,352	5,676	6,529	6,465	6,662

Code	Segment, sub-sector and sector	2015	2016	2017	2018	2019	2020
2219	Manufacture of household products	600	668	826	980	1,007	906
2220	Manufacture of medical tools and precision tools	216	240	281	329	378	366
2221	Manufacture of vehicles	519	578	607	707	816	757
2222	Manufacture of furniture beds	281	313	344	373	383	366
2223	Scrap recycling	611	680	727	843	790	734
2300	Fuel and water production and distribution						
2301	NG production and distribution	103	115	198	226	139	132
2302	LPG production and distribution	227	252	265	270	251	217
2303	Water production and distribution	1,398	1,558	1,678	1,819	1,929	1,904
2400	Construction						
2410	Ground filling	45	50	56	58	64	53
2420	Construction	2,016	2,246	2,305	2,251	2,125	2,136
2430	Equipment installing	302	337	364	409	502	467
2500	Other industries	522	582	614	703	4,714	13,476
3000	<b>COMMERCE, HOTEL &amp; RESTAURANT</b>	<b>7,546</b>	<b>8,772</b>	<b>9,596</b>	<b>10,776</b>	<b>11,776</b>	<b>10,352</b>
3100	Commerce						
3101	Wholesale and retail	5,265	6,121	6,657	7,391	7,885	7,375
3102	Maintain and repair goods	221	257	283	319	353	334
3200	Hotel, motel and restaurant						
3210	Hotels	1,468	1,707	1,932	2,243	2,498	1771
3220	Restaurants	461	536	559	632	639	494
3230	Motels	130	151	164	191	401	378
4000	<b>ADMINISTRATIVE OFFICES &amp; HOUSEHOLDS</b>	<b>50,374</b>	<b>55,227</b>	<b>57,704</b>	<b>62,241</b>	<b>69,061</b>	<b>73,158</b>
4100	Party and Government offices	1,291	1,416	1,479	1,587	1,812	1,924
4300	State-own enterprise office	1,784	1,956	2,051	2,230	2,450	2,275
4400	Residential use						
4401	Urban	34,983	38,354	39,647	42,547	47,499	50,753
4402	Rural, mountain area	12,315	13,501	14,526	15,877	17,297	18,200
5000	<b>OTHERS</b>	<b>5,432</b>	<b>6,036</b>	<b>6,581</b>	<b>7,340</b>	<b>8,209</b>	<b>8,973</b>
5100	Cultural and educational activities						
5101	Theaters, cinemas, circuses	85	94	106	113	132	147
5102	Cultural clubs, entertainment zones	216	240	264	298	326	339
5103	School, University	750	833	897	998	1,226	1,335
5104	Hospitals, clinics	1,057	1,174	1,306	1,468	1,636	1,828
5200	Public Lighting	1,196	1,329	1,483	1,706	1,942	2,297
5300	Transportation control and warehouses						
5301	Transportation control	85	95	86	98	135	114

Code	Segment, sub-sector and sector	2015	2016	2017	2018	2019	2020
5302	Warehouses	154	171	175	229	212	208
5400	Other activities						
5401	Banks, insurance	330	367	382	404	455	466
5402	Science institutes	58	64	66	70	80	75
5403	Information centers	86	96	108	154	118	119
5404	Telecommunications	794	882	958	1,017	1,150	1,399
5500	Others	622	691	751	786	797	646
	<b>TOTAL DOMESTIC ELECTRICITY SALE</b>	<b>142,742</b>	<b>159,513</b>	<b>173,793</b>	<b>191,629</b>	<b>209,234</b>	<b>218,017</b>

## Renewable energy

Items	2015	2016	2017	2018	2019	2020 (Prel.)
<b>Pure Ethanol</b>	<b>Unit: 1,000 tons</b>					
Production		21	26	121	125	100
Imports		0.06	0.04	0.01	0.13	0.02
Exports		0.33	0.60	0.42	4.00	0.59
Transport use		21	25	120	122	99
<b>Fuel Wood</b>	<b>Unit: KTOE</b>					
Production	4,852	4,927	5,034	5,511	5,332	4,130
Power Generation use	15	16	17	17	18	19
To Charcoal production plants	441	567	714	1,196	1,253	1,065
Industry use	2,716	2,580	2,451	2,329	2,026	1,519
<b>Bagasse</b>	<b>Unit: KTOE</b>					
Production	782	801	828	858	888	920
Power Generation use	758	781	812	845	879	914
Residential use	24	20	16	13	9	7
<b>Straw</b>	<b>Unit: KTOE</b>					
Production	264	214	171	137	99	71
Residential use	264	214	171	137	99	71
<b>Husk</b>	<b>Unit: KTOE</b>					
Production	1,849	1,881	1,932	2,004	2,032	1,672
Residential use	286	233	186	149	110	82
Industry use	1,285	1,349	1,422	1,505	1,544	1,251
<b>Agriculture waste &amp; Others</b>	<b>Unit: KTOE</b>					
Production	88	113	143	239	251	213
Residential use	5.2	8.3	9.2	9.3	9.3	6.2
Industry use	42	51	56	95	87	100
<b>Charcoal</b>	40	57	65			68
Production	11	14	31	85	95	52
Imports	88	113	143	239	251	213

Items	2015	2016	2017	2018	2019	2020 (Prel.)
Exports	5.2	8.3	9.2	9.3	9.3	6.2
Residential use	42	51	56	95	87	100
Commercial use	40	57	65	68	78	67
<b>Solar thermal</b>	<b>Unit: GWh</b>					
Residential use*	1.10	1.30	1.32	1.45	1.62	1.82
<b>Renewable Generation</b>	<b>Unit: GWh</b>					
Biomass, co-generation	70	122	208	488	350	340
Wind	121	201	350	487	724	982
Solar Photovoltaic	0	0	0	22	4,818	9,575
Hydro	56,123	63,941	85,940	83,081	66,117	72,892

\*For solar water heater.

## Energy Commodity Table - 2015

Physical unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 ton											Mill. m <sup>3</sup>
Production	39,888	16,880										9,137
Imports	6,927	182	2,681	1,350	41	5,213	711	1,083	501	353	500	
Exports	-1,748	-9,181	-243	-372		-466	-128	-0.03	-1.0	-24	-27	
Stock Changes	-1,357	-951		-585		11	-1.0					
<b>Total Primary Energy Supply</b>	<b>43,711</b>	<b>6,930</b>	<b>2,438</b>	<b>393</b>	<b>41</b>	<b>4,758</b>	<b>582</b>	<b>1,083</b>	<b>500</b>	<b>328</b>	<b>473</b>	<b>9,137</b>
Oil refineries		-6,930	2,747	196		3,068	138	448			170	
Gas processing								288				-360
Power Plants	-29,350					-19	-191					-7,480
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>14,360</b>		<b>5,185</b>	<b>589</b>	<b>41</b>	<b>7,807</b>	<b>529</b>	<b>1,819</b>	<b>500</b>	<b>328</b>	<b>644</b>	<b>1,297</b>
Industry	11,488					1,174	314	299				549
Agriculture/forestry, Fishing			107			1,575						
Transport			5,078	589		4,994	215					12
Commercial and public services	130					64		167				
Residential	1,894				31			1,353				
Non-energy use	849		0.5		10				500	328	644	736

Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Physical unit
1,000 tons	KTOE					GWh						
	4,852	782	1,849	264	1,574		1.10	56,123	121			Production
						5.2					2,393	Imports
											-1,416	Exports
						-42						Stock Changes
	<b>4,852</b>	<b>782</b>	<b>1,849</b>	<b>264</b>	<b>1,574</b>	<b>-37</b>	<b>1.1</b>	<b>56,123</b>	<b>121</b>		<b>977</b>	<b>Total Primary Energy Supply</b>
												Oil refineries
												Gas processing
	-15	-758						-56,123	-121		161,923	Power plants
	-441					88						Charcoal production
											-12,934	Losses
											-7,574	Own-use
	<b>4,396</b>	<b>24</b>	<b>1,849</b>	<b>264</b>	<b>1,574</b>	<b>51.4</b>	<b>1.1</b>				<b>142,742</b>	<b>Total Final Energy Consumption</b>
	1,680		1,285		373						77,063	Industry
			278								2,327	Agriculture/forestry, Fishing
												Transport
						11					15,497	Commercial and public services
	2,716	24	286	264	1,201	40	1.1				47,855	Residential
												Non-energy use

## Energy Balance Table - 2015

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	20,383	17,218										8,223	
Imports	3,879	186	2,815	1,390	42	5,317	704	1,180	500	355	495		
Exports	-979	-9,365	-255	-383		-475	-126	0	-1.0	-24	-26.5		
Stock Changes	-693	-970		-602		11	-1.0						
<b>Total Primary Energy Supply</b>	<b>22,590</b>	<b>7,069</b>	<b>2,560</b>	<b>405</b>	<b>42</b>	<b>4,853</b>	<b>576</b>	<b>1,180</b>	<b>499</b>	<b>331</b>	<b>468</b>	<b>8,223</b>	
Oil refineries		-7,069	2,884	202		3,129	136	489			169		
Gas processing								314				-324	
Power Plants	-14,630					-19	-189					-6,732	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>7,960</b>		<b>5,445</b>	<b>607</b>	<b>42</b>	<b>7,963</b>	<b>524</b>	<b>1,983</b>	<b>499</b>	<b>331</b>	<b>637</b>	<b>1,167</b>	
Industry	6,464					1,197	311	326				494	
Agriculture/forestry, Fishing			113			1,607							
Transport			5,332	607		5,094	213					11	
Commercial and public services	73					65		182					
Residential	877				32			1,474					
Non-energy use	477		0.6	10					499	331	637	662	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
4,852	782	1,849	264	1,574		0.09	4,827	10			59,981	Production
					5					206	17,075	Imports
					-42					-122	-11,798	Exports
											-2,256	Stock Changes
<b>4,852</b>	<b>782</b>	<b>1,849</b>	<b>264</b>	<b>1,574</b>	<b>-37</b>	<b>0.09</b>	<b>4,827</b>	<b>10</b>		<b>84</b>	<b>63,002</b>	<b>Total Primary Energy Supply</b>
											-60	Oil refineries
											-10	Gas processing
-15	-758						-4,827	-10		13,925	-13,254	Power plants
-441					88						-353	Charcoal production
										-1,112	-1,112	Losses
										-651	-651	Own-use
<b>4,396</b>	<b>24</b>	<b>1,849</b>	<b>264</b>	<b>1,574</b>	<b>51</b>	<b>0.09</b>				<b>12,246</b>	<b>47,561</b>	<b>Total Final Energy Consumption</b>
1,680		1,285		373						6,627	18,758	Industry
		278								200	2,197	Agriculture/forestry, Fishing
											11,256	Transport
					11					1,333	1,664	Commercial and public services
2,716	24	286	264	1,201	40	0.09				4,116	11,030	Residential
											2,617	Non-energy use

## Energy Commodity Table - 2016

Physical unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 ton											Mill. m <sup>3</sup>
Production	37,711	15,100										10,390
Imports	13,199	435	2,488	1,538	50	6,716	883	1,231	564	133	137	
Exports	-1,243	-8,100	-215	-480		-512	-254	-272.4	-1.0	-23	-1.6	
Stock Changes	-726	-80		-709				-1.0				
<b>Total Primary Energy Supply</b>	<b>48,941</b>	<b>7,355</b>	<b>2,273</b>	<b>349</b>	<b>50</b>	<b>6,203</b>	<b>628</b>	<b>959</b>	<b>563</b>	<b>110</b>	<b>135</b>	<b>10,390</b>
Oil refineries		-7,355	3,409	383		2,900	120	492				167
Gas processing								311				-382
Power Plants	-34,067					-41	-302					-8,481
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>14,874</b>		<b>5,682</b>	<b>732</b>	<b>50</b>	<b>9,062</b>	<b>445</b>	<b>1,762</b>	<b>563</b>	<b>110</b>	<b>302</b>	<b>1,527</b>
Industry	12,358					1,312	132	290				778
Agriculture/forestry, Fishing			114			1,761						
Transport			5,501	728		5,582	221					28
Commercial and public services	115					72		162				
Residential	1,526				38			1,310				
Non-energy use	875		0.6		12				563	110	302	721

Physical unit	Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV power	Electricity
	1,000 ton	KTOE					GWh					
Production	21.3	4,927	801	1,881	214	1,371		1.30	63,941			
Imports	0.1						8.3					2,736
Exports	-0.3						-51					-1,409
Stock Changes												
<b>Total Primary Energy Supply</b>	<b>21</b>	<b>4,927</b>	<b>801</b>	<b>1,881</b>	<b>214</b>	<b>1,371</b>	<b>-43</b>	<b>1.3</b>	<b>63,941</b>			<b>1,327</b>
Oil refineries												
Gas processing												
Power plants		-16	-781						-63,941			178,961
Charcoal production		-567					113					
Losses												-13,648
Own-use												-7,127
<b>Total Final Energy Consumption</b>	<b>21</b>	<b>4,344</b>	<b>20.0</b>	<b>1,881</b>	<b>214.2</b>	<b>1,371.2</b>	<b>70.4</b>	<b>1.3</b>				<b>159,513</b>
Industry		1,764		1,349		410						85,849
Agriculture/forestry, Fishing				300								3,629
Transport	21											
Commercial and public services							14					18,180
Residential		2,580	20	233	214	961	57	1.3				51,855
Non-energy use												

## Energy Balance Table - 2016

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	19,270	15,402										9,351	13.6
Imports	7,391	444	2,612	1,585	51	6,850	874	1,342	563	134	135		0.0
Exports	-696	-8,262	-226	-495		-523	-251	-297	-1	-23	-1.6		-0.2
Stock Changes	-371	-82		-730			-1.0						
<b>Total Primary Energy Supply</b>	<b>25,594</b>	<b>7,502</b>	<b>2,386</b>	<b>360</b>	<b>51</b>	<b>6,327</b>	<b>622</b>	<b>1,045</b>	<b>562</b>	<b>111</b>	<b>134</b>	<b>9,351</b>	<b>13.5</b>
Oil refineries		-7,502	3,579	394		2,958	118	536			165		
Gas processing								339				-344	
Power Plants	-16,981					-42	-299					-7,633	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>8,613</b>		<b>5,896</b>	<b>750</b>	<b>51</b>	<b>8,900</b>	<b>349</b>	<b>1,920</b>	<b>562</b>	<b>111</b>	<b>299</b>	<b>1,374</b>	<b>13</b>
Industry	7,324					1,338	131	316				700	
Agriculture/forestry, Fishing			119			1,796							
Transport			5,776	750		5,693	219					25	13.5
Commercial and public services	64					73		176					
Residential	706				39			1,428					
Non-energy use	518		0.6		12				562	111	299	649	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
4,927	801	1,881	214	1,371		0.11	5,499				58,731	Production
					8					235	22,225	Imports
					-51					-121	-10,948	Exports
											-1,184	Stock Changes
<b>4,927</b>	<b>801</b>	<b>1,881</b>	<b>214</b>	<b>1,371</b>	<b>-43</b>	<b>0.11</b>	<b>5,499</b>			<b>114</b>	<b>68,825</b>	<b>Total Primary Energy Supply</b>
											249	Oil refineries
											-5	Gas processing
-16	-781						5,499			15,391	-15,860	Power plants
-567					113						-454	Charcoal production
										-1,174	-1,174	Losses
										-613	-613	Own-use
<b>4,344</b>	<b>20</b>	<b>1,881</b>	<b>214</b>	<b>1,371</b>	<b>70</b>	<b>0.11</b>				<b>13,718</b>	<b>50,460</b>	<b>Total Final Energy Consumption</b>
1,764		1,349		410						7,383	20,715	Industry
		300								312	2,527	Agriculture/forestry, Fishing
											12,477	Transport
					14					1,563	1,891	Commercial and public services
2,580	20	233	214	961	57	0.11				4,460	10,697	Residential
											2,153	Non-energy use

## Energy Commodity Table - 2017

Physical Unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 tons											Mill. m <sup>3</sup>
Production	37,227	13,500										9,580
Imports	14,677	636	3,180	1,765	49	7,318	597	1,364	621	106	87	
Exports	-2,229	-7,390	-252	-1,228		-527	-272	-163	-2.2	-22	-1.8	
Stock Changes	-100	-155		-107			105.0					
<b>Total Primary Energy Supply</b>	<b>49,576</b>	<b>6,591</b>	<b>2,927</b>	<b>430</b>	<b>49</b>	<b>6,790</b>	<b>430</b>	<b>1,200</b>	<b>619</b>	<b>84</b>	<b>85</b>	<b>9,580</b>
Oil refineries		-6,591	3,252	352		2,490	136	444			144	
Gas processing								322				-404
Power Plants	-33,717					-8.7	-21					-7,569
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>15,858</b>		<b>6,179</b>	<b>782</b>	<b>49</b>	<b>9,272</b>	<b>545</b>	<b>1,966</b>	<b>619</b>	<b>84</b>	<b>229</b>	<b>1,607</b>
Industry	13,446					1,107	115	340				848
Agriculture/forestry, Fishing			119			2,009						
Transport			6,086	759		6,015	219					34
Commercial and public services	78					63		245				
Residential	1,418				38			1,382				
Non-energy use	917		0.2		11				619	84	229	725

Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Physical unit
1,000 tons	KTOE						GWh					
25.6	5,034	828	1,932	171	1,220		1.32	85,940				Production
0.04						9.2					2,361	Imports
-0.6						-56					-1,650	Exports
												Stock Changes
25	5,034	828	1,932	171	1,220	-46	1.3	85,940			711	<b>Total Primary Energy Supply</b>
												Oil refineries
												Gas processing
	-17	-812						-85,940			194,359	Power plants
	-714					143						Charcoal production
											-14,123	Losses
											-7,154	Own-use
25	4,303	16.0	1,932	171	1,220	96	1.3				173,793	<b>Total Final Energy Consumption</b>
	1,852		1,422		452						95,572	Industry
			324								4,340	Agriculture/forestry, Fishing
25												Transport
						31					19,708	Commercial and public services
	2,451	16	186	171	769	65	1.3				54,173	Residential
												Non-energy use

## Energy Balance Table - 2017

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	19,023	13,770										8,622	16.4
Imports	8,219	649	3,339	1,818	50	7,464	591	1,486	620	107	86		0.0
Exports	-1,248	-7,538	-265	-1,265		-538	-269	-178	-2	-23	-1.8		-0.4
Stock Changes	-51	-158		-111			104						
<b>Total Primary Energy Supply</b>	<b>25,943</b>	<b>6,723</b>	<b>3,074</b>	<b>443</b>	<b>50</b>	<b>6,926</b>	<b>425</b>	<b>1,308</b>	<b>618</b>	<b>84</b>	<b>85</b>	<b>8,622</b>	<b>16.0</b>
Oil refineries		-6,723	3,415	363		2,540	135	484			143		
Gas processing								351				-364	
Power Plants	-16,789					-9	-21					-6,812	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>9,154</b>		<b>6,516</b>	<b>782</b>	<b>50</b>	<b>9,378</b>	<b>331</b>	<b>2,143</b>	<b>618</b>	<b>84</b>	<b>227</b>	<b>1,446</b>	<b>16</b>
Industry	7,969					1,129	114	371				763	
Agriculture/forestry, Fishing			125			2,049							
Transport			6,391	782		6,136	217					31	16
Commercial and public services	44					64		267					
Residential	598				39			1,506					
Non-energy use	543		0		12				618	84	227	653	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
<b>5,034</b>	828	1,932	171	1,220		0.11	7,391				58,008	Production
					9					203	24,642	Imports
					-56					-142	-11,525	Exports
											-216	Stock Changes
<b>5,034</b>	<b>828</b>	<b>1,932</b>	<b>171</b>	<b>1,220</b>	<b>-46</b>	<b>0.11</b>	<b>7,391</b>			<b>61</b>	<b>70,909</b>	<b>Total Primary Energy Supply</b>
											355	Oil refineries
											-13	Gas processing
-17	-812						-7,391			16,715	-15,136	Power plants
-714					143						-571	Charcoal production
										-1,215	-1,215	Losses
										-615	-615	Own-use
<b>4,303</b>	<b>16</b>	<b>1,932</b>	<b>171</b>	<b>1,220</b>	<b>96</b>	<b>0.11</b>				<b>14,946</b>	<b>53,432</b>	<b>Total Final Energy Consumption</b>
1,852		1,422		452						8,219	22,291	Industry
		324								373	2,871	Agriculture/forestry, Fishing
											13,572	Transport
					31					1,695	2,101	Commercial and public services
2,451	16	186	171	769	65	0.11				4,659	10,460	Residential
											2,137	Non-energy use

## Energy Commodity Table - 2018

Physical unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 tons											Mill. m <sup>3</sup>
Production	41,387	11,860										9,700
Imports	22,749	5,396	2,289	2,046	43	5,825	700	1,445	698	112	56	
Exports	-2,387	-4,610	-208	-1,487	-0.6	-573	-394	-311.6	-3	-25	-11.2	
Stock Changes	6,507	-569		-243			3.0					
<b>Total Primary Energy Supply</b>	<b>68,256</b>	<b>12,077</b>	<b>2,081</b>	<b>316</b>	<b>42</b>	<b>5,251</b>	<b>308</b>	<b>1,133</b>	<b>695</b>	<b>86</b>	<b>45</b>	<b>9,700</b>
Oil refineries		-12,077	4,413	460		4,296	204	580			365	
Gas processing								426				-517
Power Plants	-45,197					-25	-179					-7,519
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>23,060</b>		<b>6,421</b>	<b>775</b>	<b>42</b>	<b>9,590</b>	<b>327</b>	<b>2,139</b>	<b>695</b>	<b>86</b>	<b>411</b>	<b>1,664</b>
Industry	20,876					1,069	104	367				835
Agriculture/forestry, Fishing			124			2,090						
Transport			6,296	775		6,369	224					36
Commercial and public services	66					62		315				
Residential	1,113				31			1,457				
Non-energy use	1,005		0.2		11				695	86	411	793

Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Physical unit
121	5,511	858	2,004	137	1,112		1.45	83,081	487	22		Production
0.01						9					3,124	Imports
-0.4						-95					-1,509	Exports
												Stock Changes
<b>120</b>	<b>5,511</b>	<b>858</b>	<b>2,004</b>	<b>137</b>	<b>1,112</b>	<b>-86</b>	<b>1.5</b>	<b>83,081</b>	<b>487</b>	<b>22</b>	<b>1,615</b>	<b>Total Primary Energy Supply</b>
												Oil refineries
												Gas processing
	-17.5	-845						-83,081	-487	-22	217,184	Power plants
	-1,196					239						Charcoal production
											-15,403	Losses
											-11,767	Own-use
<b>120</b>	<b>4,297</b>	<b>12.8</b>	<b>2,004</b>	<b>137</b>	<b>1,112</b>	<b>153</b>	<b>1.5</b>				<b>191,629</b>	<b>Total Final Energy Consumption</b>
	1,969		1,505		497						105,838	Industry
			350								5,434	Agriculture/forestry, Fishing
<b>120</b>												Transport
						85					21,933	Commercial and public services
	2,329	12.8	149	137	615	68	1.5				58,424	Residential
												Non-energy use

## Energy Balance Table - 2018

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	21,149	12,097										8,730	77.3
Imports	12,739	5,504	2,403	2,107	44	5,941	693	1,575	696	112	56		0.0
Exports	-1,337	-4,702	-218	-1,531	-0.6	-585	-390	-340	-3	-25	-11.1		-0.3
Stock Changes	3,325	-580		-250.7			3.0						
<b>Total Primary Energy Supply</b>	<b>35,877</b>	<b>12,319</b>	<b>2,185</b>	<b>325</b>	<b>44</b>	<b>5,356</b>	<b>305</b>	<b>1,235</b>	<b>694</b>	<b>87</b>	<b>45</b>	<b>8,730</b>	<b>77.1</b>
Oil refineries		-12,319	4,634	473		4,381	202	632			362		
Gas processing								464				-465	
Power Plants	-22,398					-26	-177					-6,767	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>13,478</b>		<b>6,742</b>	<b>799</b>	<b>44</b>	<b>9,781</b>	<b>324</b>	<b>2,331</b>	<b>694</b>	<b>87</b>	<b>407</b>	<b>1,498</b>	<b>77</b>
Industry	12,356					1,090	103	400				752	
Agriculture/forestry, Fishing			131			2,132							
Transport			6,611	799		6,496	221					32	77
Commercial and public services	37					63		343					
Residential	490				32			1,588					
Non-energy use	595		0.2		12				694	87	407	714	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
5,511	858	2,004	137	1,112		0.12	7,145	42	1.9		58,863	Production
					9					269	32,149	Imports
					-95					-130	-9,368	Exports
											2,497	Stock Changes
5,511	858	2,004	137	1,112	-86	0.12	7,145	42	1.9	139	84,140	<b>Total Primary Energy Supply</b>
											-1,634	Oil refineries
											-1	Gas processing
-17	-845						-7,145	-42	-1.9	18,678	-18,742	Power Plants
-1,196					239						-957	Charcoal production
										-1,325	-1,325	Losses
										-1,012	-1,012	Own-use
4,297	13	2,004	137	1,112	153	0.12				16,480	60,457	<b>Total Final Energy Consumption</b>
1,969		1,505		497						9,102	27,773	Industry
		350								467	3,080	Agriculture/forestry, Fishing
											14,237	Transport
					85					1,886	2,414	Commercial and public services
2,329	12.8	149	137	615	68	0.12				5,024	10,445	Residential
											2,508	Non-energy use

## Energy Commodity Table - 2019

Physical unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 tons											Mill. m <sup>3</sup>
Production	45,671	10,980										9,960
Imports	43,786	7,918	1,980	2,050	31.8	4,753	833	1,843	701	30	84	
Exports	-1,143	-3,723	-202	-1,641	-0.4	-551	-467	-426.4	-9.1	-27	-10.5	
Stock Changes	-2,871	330		-30			-6.1					
<b>Total Primary Energy Supply</b>	<b>85,443</b>	<b>15,505</b>	<b>1,778</b>	<b>380</b>	<b>31.4</b>	<b>4,202</b>	<b>360</b>	<b>1,416</b>	<b>692</b>	<b>2.9</b>	<b>73</b>	<b>9,960</b>
Oil refineries		-15,505	4,892	550		5,685	179	515			465	
Gas processing								372				-469
Power Plants	-59,141					-159	-231					-7,852
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>26,301</b>		<b>6,670</b>	<b>929</b>	<b>31.4</b>	<b>9,727</b>	<b>308</b>	<b>2,303</b>	<b>692</b>	<b>2.9</b>	<b>538</b>	<b>1,639</b>
Industry	24,349					1,060	91	395				808
Agriculture/forestry, Fishing			130			2,212						
Transport			6,452	929		6,610	229					38
Commercial and public services	49					58		372				
Residential	827				17.4			1,537				
Non-energy use	1,077		0.2		14.0				692	2.9	538	793

Physical unit	Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity
	1,000 tons	KTOE						GWh				
Production	125	5,332	888	2,032	99	1,001		1.62	66,117	724	4,818	
Imports	0.1						9.3					3,316
Exports	-4.0						-87					-2,067
Stock Changes												
<b>Total Primary Energy Supply</b>	<b>122</b>	<b>5,332</b>	<b>888</b>	<b>2,032</b>	<b>99</b>	<b>1,001</b>	<b>-78</b>	<b>1.6</b>	<b>66,117</b>	<b>724</b>	<b>4,818</b>	<b>1,249</b>
Oil refineries												
Gas processing												
Power plants		-18	-879						-66,117	-724	-4,818	236,886
Charcoal production		-1,253					251					
Losses												-15,479
Own-use												-13,420
<b>Total Final Energy Consumption</b>	<b>122</b>	<b>4,060</b>	<b>9.2</b>	<b>2,032</b>	<b>99</b>	<b>1,001</b>	<b>173</b>	<b>1.6</b>				<b>209,234</b>
Industry		2,035		1,544		522						113,595
Agriculture/forestry, Fishing				378								6,593
Transport	122											
Commercial and public services							95					24,250
Residential		2,026	9.2	110	99	480	78	1.6				64,796
Non-energy use												

## Energy Balance Table - 2019

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	22,379	11,200										8,964	80.3
Imports	24,520	8,076	2,079	2,112	33	4,848	825	2,008	699	30	83		0.1
Exports	-640	-3,797	-212	-1,691	-0.4	-562	-462	-465	-9.1	-27	-10.4		-2.6
Stock Changes	-1,407	337		-30.5			-6.0						
<b>Total Primary Energy Supply</b>	<b>44,852</b>	<b>15,815</b>	<b>1,867</b>	<b>391</b>	<b>32</b>	<b>4,286</b>	<b>357</b>	<b>1,544</b>	<b>690</b>	<b>2.9</b>	<b>72</b>	<b>8,964</b>	<b>77.8</b>
Oil refineries		-15,815	5,136	566		5,798	177	561			460		
Gas processing								406				-422	
Power Plants	-29,310					-162	-229					-7,067	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>15,528</b>		<b>6,911</b>	<b>957</b>	<b>32</b>	<b>10,139</b>	<b>317</b>	<b>2,511</b>	<b>690</b>	<b>3</b>	<b>533</b>	<b>1,475</b>	<b>78</b>
Industry	14,486					1,081	90	431				727	
Agriculture/forestry, Fishing			136			2,256							
Transport			6,774	957		6,743	227					34	78
Commercial and public services	27					59		405					
Residential	374				18			1,675					
Non-energy use	641		0.2		14				690	2.9	533	714	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
5,332	888	2,032	99	1,001		0.14	5,686	62	414		58,137	Production
					9.3					285	45,608	Imports
					-87					-178	-8,144	Exports
											-1,107	Stock Changes
<b>5,332</b>	<b>888</b>	<b>2,032</b>	<b>99</b>	<b>1,001</b>	<b>-78</b>	<b>0.14</b>	<b>5,686</b>	<b>62</b>	<b>414</b>	<b>107</b>	<b>94,495</b>	<b>Total Primary Energy Supply</b>
											-3,116	Oil refineries
											-16	Gas processing
-18	-879						-5,686	-62	-414	20,372	-23,455	Power Plants
-1,253					251						-1,002	Charcoal production
										-1,331	-1,331	Losses
										-1,154	-1,154	Own-use
<b>4,060</b>	<b>9</b>	<b>2,032</b>	<b>99</b>	<b>1,001</b>	<b>173</b>	<b>0.14</b>				<b>17,994</b>	<b>64,542</b>	<b>Total Final Energy Consumption</b>
											9,769	Industry
		378									567	Agriculture/forestry, Fishing
											14,813	Transport
					95						2,085	Commercial and public services
2,026	9.2	110	99	480	78	0.14				5,572	10,441	Residential
											2,595	Non-energy use

## Energy Commodity Table – 2020 (Prel.)

Physical unit	Coal	Crude oil	Gasoline	Jet fuel	Kerosine	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas
	1,000 tons											Mill. m <sup>3</sup>
Production	43,375	8,820										8,690
Imports	54,810	11,768	1,558	1,180	42.5	4,813	677	1,810	5.8	92	93	
Exports	-910	-4,590	-295	-605	-0.6	-625	-369	-238.7	-14.6	-21	-7.2	
Stock Changes	-3,441	-210	-620	-50		-345	-60.0		15			
<b>Total Primary Energy Supply</b>	<b>93,835</b>	<b>15,788</b>	<b>643</b>	<b>524</b>	<b>41.8</b>	<b>3,843</b>	<b>248</b>	<b>1,571</b>	<b>6.2</b>	<b>70.9</b>	<b>85</b>	<b>8,690</b>
Oil refineries		-15,788	5,025	234		6,162	219	417			1,065	
Gas processing								372				-469
Power Plants	-59,296					-80	-104					-6,559
Charcoal production												
Losses												
Own-use												
<b>Total Final Energy Consumption</b>	<b>34,539</b>		<b>5,668</b>	<b>758</b>	<b>41.8</b>	<b>8,594</b>	<b>363</b>	<b>2,360</b>	<b>6.2</b>	<b>71</b>	<b>1,150</b>	<b>1,662</b>
Industry	32,714					902	180	385				841
Agriculture/forestry, Fishing			115			2,114						
Transport			5,471	758		5,541	183					24
Commercial and public services	15					37		280				
Residential	708				23			1,695				
Non-energy use	1,117		0.2		19				6.2	71	1,150	797

Pure Ethanol	Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Physical unit
1,000 tons	KTOE						GWh					
100	4,130	920	1,672	71	732		1.82	72,892	982	9,575		Production
0.02						6.2					3,067	Imports
-0.6						-100					-1,555	Exports
												Stock Changes
<b>99</b>	<b>4,130</b>	<b>920</b>	<b>1,672</b>	<b>71</b>	<b>732</b>	<b>-94</b>	<b>1.8</b>	<b>72,892</b>	<b>982</b>	<b>9,575</b>	<b>1,512</b>	<b>Total Primary Energy Supply</b>
												Oil refineries
												Gas processing
	-19	-914						-72,892	-982	-9,575	242,831	Power plants
	-1,065					213						Charcoal production
											-15,687	Losses
											9,598	Own-use
<b>99</b>	<b>3,045</b>	<b>6.6</b>	<b>1,672</b>	<b>71.1</b>	<b>732</b>	<b>119.0</b>	<b>1.8</b>				<b>217,546</b>	<b>Total Final Energy Consumption</b>
	1,526		1,251		391						118,146	Industry
			340								7,388	Agriculture/forestry, Fishing
99												Transport
											23,529	Commercial and public services
	1,519	7	82	71	341	67	2				68,954	Residential
												Non-energy use

## Energy Balance Table – 2020 (Prel.)

Unit: KTOE	Coal	Crude oil	Gasoline	Jet fuel	Kerosene	DO	FO	LPG	Bitumen	Lubricants	Other oil products	Natural gas	Pure Ethanol
Production	21,254	8,996										7,821	63.9
Imports	30,694	12,004	1,636	1,215	44	4,909	670	1,973	5.8	93	92		0.01
Exports	-509	-4,682	-310	-623	-0.7	-637	-365	-260	-14.6	-21	-7.1		-0.38
Stock Changes	-1,686	-214	-651	-51.5		-352	-59.4						
<b>Total Primary Energy Supply</b>	<b>49,752</b>	<b>16,104</b>	<b>675</b>	<b>540</b>	<b>43</b>	<b>3,920</b>	<b>246</b>	<b>1,713</b>	<b>-8.8</b>	<b>71.4</b>	<b>85</b>	<b>7,821</b>	<b>64</b>
Oil refineries		-16,104	5,276	241		6,285	217	455			1,054		
Gas processing								405				-422	
Power Plants	-29,387					-81	-103					-5,903	
Charcoal production													
Losses													
Own-use													
<b>Total Final Energy Consumption</b>	<b>20,455</b>		<b>5,866</b>	<b>781</b>	<b>43</b>	<b>8,766</b>	<b>359</b>	<b>2,572</b>	<b>6.2</b>	<b>71</b>	<b>1,139</b>	<b>1,495</b>	<b>64</b>
Industry	19,462					920	178	420				757	
Agriculture/forestry, Fishing			121			2,156							
Transport			5,745	781		5,652	182					22	64
Commercial and public services	8					38		305					
Residential	320				24			1,848					
Non-energy use	664		0.2		20				6.2	71	1,139	717	

Fuel wood	Bagasse	Straw	Husk	Agriculture waste & Others	Char coal	Solar Thermal	Hydro	Wind power	PV Power	Electricity	Total	Unit: KTOE
4,130	920	1,672	71	732		0.16	6,269	84	823		52,837	Production
					6.2					264	53,604	Imports
					-100					-134	-7,666	Exports
											-3,014	Stock Changes
<b>4,130</b>	<b>920</b>	<b>1,672</b>	<b>71</b>	<b>732</b>	<b>-94</b>	<b>0.156</b>	<b>6,269</b>	<b>84</b>	<b>823</b>	<b>130</b>	<b>95,762</b>	<b>Total Primary Energy Supply</b>
											-2,576	Oil refineries
											-17	Gas processing
-19	-914						-6,269	-84	-823	20,883	-22,701	Power Plants
-1,065					213						-852	Charcoal production
										-1,349	-1,349	Losses
										825	825	Own-use
<b>3,045</b>	<b>6.6</b>	<b>1,672</b>	<b>71</b>	<b>732</b>	<b>119</b>	<b>0.156</b>				<b>18,749</b>	<b>66,014</b>	<b>Total Final Energy Consumption</b>
1,526		1,251		391						10,161	35,065	Industry
		340								635	3,253	Agriculture/forestry, Fishing
											12,444	Transport
					52					2,024	2,427	Commercial and public services
1,519	6.6	82	71	341	67	0.16				5,930	10,208	Residential
											2,618	Non-energy use

## Key indicators

Item	Đơn vị	2015	2016	2017	2018	2019	2020 (Prel.)
<b>Total Primary Energy Supply (TPES)</b>	KTOE	63,002	68,825	70,909	84,140	94,495	95,762
Total Primary Energy Supply (TPES)	KTOE	47,561	50,460	53,432	60,457	64,542	66,014
<b>TFEC per capital</b>	kgOE/persons	516	541	567	634	669	676
TPES/GDP	kgOE/1,000USD	408	419	405	448	470	463
<b>TFEC/GDP</b>	kgOE/1,000USD	308	307	305	322	321	319
<b>Energy Import /TPES</b>	%	27.1	32.3	34.8	38.2	48.3	56.0
<b>Net Energy Import/TPES</b>	%	8.4	16.4	18.5	27.1	39.6	48.0
<b>Energy Consumption per capital</b>	kWh/person	1,548	1,711	1,843	2,009	2,169	2,229
<b>Energy Consumption/TFEC</b>	%	25.7	27.2	28.0	27.3	27.9	28.4
<b>Total CO<sub>2</sub> Emissions**</b>	Mt-CO <sub>2</sub>	158	177	180	223	264	273
<b>Emission per capital</b>	kg CO <sub>2</sub> /person	1,714	1,901	1,907	2,341	2,733	2,801
<b>Emission/GDP</b>	kg CO <sub>2</sub> /SUS	1.02	1.08	1.03	1.19	1.31	1.32

\* CO<sub>2</sub> emissions from fuel combustion only. Emissions are calculated using the IEA Energy Balances and the Revised 2006 IPCC Guidelines, and emissions from non-energy use are excluded.

## Energy Security

Item	Unit	2015	2016	2017	2018	2019	2020 (Prel.)
<b>Reserve/Production ratio (R/P)</b>	years	Coal reserve ~70 years, Natural gas ~40 years, Crude oil ~ 20 years					
<b>Dependence of net import energy</b>	%	6.45	16.39	18.50	27.07	39.65	39.12
<b>Energy import cost/ Total import cost</b>	%	4.79	3.909	4.683	5.942	4.815	4.810
<b>Energy import cost /National Export revenue</b>	%	4.890	3.869	4.619	5.776	4.617	4.471
<b>Energy import cost /GDP</b>	%	4.100	3.316	4.418	5.735	4.658	4.660
<b>Diversity of import source countries</b>	HHI index	1.835	1.587	1.425	1.328	1.213	1.210
<b>Diversity of energy sources of power</b>	HHI index	3.209	3.272	3.503	3.496	3.580	3.605
<b>Diversity of energy sources of TPES</b>	HHI index	2.773	2.792	2.806	3.046	3.316	3.597
<b>TFEC/GDP</b>	kgOE/1,000USD	308	307	305	322	321	319
<b>Reserve factor</b>	%	34.4	33.5	33.9	29.8	32.4	38.0
<b>System Average Interruption Duration Index (SAIDI)</b>	mins/cust	2.281	1.651	1.029	724	1.071	356
<b>System Average Interruption Frequency Index (SAIFI)</b>	num/cust	13.36	10.6	7.04	4.79	6.57	3.11
<b>Momentary Average Interruption Frequency Index (MAIFI)</b>	num/cust	2.03	1.51	0.94	0.78	0.89	0.77
<b>Days of on-land oil stocks</b>	days	62.7	86.7	90.8	92.4	91.3	92.9

## International Comparison 2019

Item	Unit	World	OECD	China	Japan
Population	Mill. persons	7,673	1,365	1,398	126
GDP at USD2010 price	Bill. USD	84,437	51,520	14,296	4,591
Production	MTOE	14,745	4,650	2,719	50
Net Import	MTOE	-	973	784	377
TPES	MTOE	14,486	5,369	3,403	415
Electricity consumption	TWh	22,848	9,672	6,568	928
Total CO <sub>2</sub> Emission	Mt-CO <sub>2</sub>	33,622	10,416	9,919	1,024
Renewable energy/TPES	%	10.96	11.90	12.18	8.55
Electricity per capita	kWh/person	2,978	7,086	4,698	7,351
Electricity/GDP	kWh/USD	271	188	459	202
TPES per capita	kgOE/person	1,888	3,933	2,434	3,291
TPES/GDP	kgOE/1000USD	172	104	238	90
Emission per capital	kgCO <sub>2</sub> /person	4.4	8.3	7.1	8.4
Emission/GDP	kgCO <sub>2</sub> /USD	0.4	0.2	0.7	0.2
		<b>USA</b>	<b>India</b>	<b>Malaysia</b>	<b>Korea</b>
Population	Mill. persons	328	1,366	31.6	51.7
GDP at USD2010 price	Bill. USD	19,975	2,696	364.0	1,635
Production	MTOE	2,310	580	98	48
Net Import	MTOE	-20.2	365	-2.9	247
TPES	MTOE	2,213	938	92	280
Electricity consumption	TWh	3,830	1,940	159	524
Total CO <sub>2</sub> Emission	Mt-CO <sub>2</sub>	4,286	2,310	237	571
Renewable energy/TPES	%	8.63	7.15	6.31	2.17
Electricity per capita	kWh/person	11,665	1,420	5,022	10,130
Electricity/GDP	kWh/USD	192	720	436	320
TPES per capita	kgOE/person	6,739	687	2,908	5,419
TPES/GDP	kgOE/1000USD	111	348	252	171
Emission per capital	kgCO <sub>2</sub> /person	14.4	1.7	7.4	11.3
Emission/GDP	kgCO <sub>2</sub> /USD	0.2	0.9	0.7	0.4

Item	Unit	Philippines	Singapore	Thailand	Indonesia	Vietnam
Population	Mill. persons	108	5.7	69.6	271	96.5
GDP at USD2010 price	Bill. USD	396.2	348.9	460.8	1,049	251.2
Production	MTOE	32	0.6	75	470	58
Net Import	MTOE	30	88	70	-230.4	37.5
TPES	MTOE	62	34	139	241	94.5
Electricity consumption	TWh	92	52	193	260	209
Total CO <sub>2</sub> Emission	Mt-CO <sub>2</sub>	135	47.4	251	627	264
Renewable energy/TPES	%	11.83	0.24	5.70	4.95	16.42
Electricity per capita	kWh/person	849	9,069	2,774	959	2,169
Electricity/GDP	kWh/USD	232	148	419	247	833
TPES per capita	kgOE/person	570	6,037	1,991	891	979
TPES/GDP	kgOE/1000USD	156	99	301	230	376
Emission per capital	kgCO <sub>2</sub> /person	1.3	8.3	3.6	2.2	2.7
Emission/GDP	kgCO <sub>2</sub> /USD	0.3	0.1	0.5	0.6	1.05

## Fuel price

Fuel	Unit	2019			2020		
		Import	Export	For power generation	Import	Export	For power generation
Crude oil	USD/ton	475	515		325	338	
Coal	USD/ton	87	148		69	132	
Anthracite 4b	USD/ton			85.2			83.5
Anthracite 5a	USD/ton			78.9			79.4
Anthracite 5b	USD/ton			71.4			72.7
Anthracite 6a	USD/ton			64.7			65.2
DO	USD/ton	603	613	758	383	404	615
FO	USD/ton	419	433	567	338	348	419
Natural gas*	USD/Mill. BTU			5.8-7.8			4.4-6.8
Gasoline	USD/ton	681	644		458	366	
Jet Fuel	USD/ton	627	687		451	575	
Kerosine	USD/ton	638	783		393	602	
LPG	USD/ton	526	551		492	483	

\*Price at the fields.

## Conversion factors

Fuel	Physical unit	Convert to TOE	Emission factor (kg/GJ)
Mining coal	ton	0.49÷0.51	
Coal for Import/Export	ton	0.56	
Coal for Power generation	ton	0.4956÷0.4985	26.8
Coal for residential use	ton	0.46	26.8
Coal for Industrial use	ton	0.5927÷0.5949	26.8
Crude oil	ton	1.02	
Gasoline	ton	1.05	18.9
Jet fuel	ton	1.03	19.5
Kerosine	ton	1.03	19.5
Diesel	ton	1.02	20.2
Fuel Oil	ton	0.99	21.1
LPG	ton	1.09	17.2
Bitumen	ton	1.00	
Lubricant	ton	1.01	
Other oil products	ton	0.99	
Natural gas	1000 m <sup>3</sup>	0.9	15.3
Biomass	TOE	1.0	
Wind power	MWh	0.086	
Hydro	MWh	0.086	
PV Power	MWh	0.086	
Pure Ethanol	ton	0.640	

## Description of fuel types

Fuel	Description
<b>Crude oil</b>	Crude oil is a mineral oil of natural origin comprising a mixture of hydrocarbons and associated impurities, such as sulphur. As recommended by IEA and APERC, Condensate is considered of Crude oil.
<b>Gasoline</b>	Or <b>Motor gasoline excl. biofuels</b> as defined by IEA. This does not include liquid biofuels blended.
<b>Jet Fuel</b>	Or <b>Kerosene type jet fuel excl. biofuels</b> as defined by IEA. This does not include liquid biofuels blended.
<b>Kerosine</b>	Or <b>Other Kerosine</b> as defined by IEA. This is used for residential lighting and cooking. In addition, it is also used for industrial solvent as non-energy use.
<b>Diezen Oil (DO)</b>	Or <b>Gas/Diesel oil excluding biofuels</b> as defined by IEA.
<b>Fuel oil (FO)</b>	Fuel oil defines oils that make up the distillation residue. It comprises all residual fuel oils, including those obtained by blending.
<b>Liquefied Petroleum Gas (LPG)</b>	LPG are light paraffinic hydrocarbons derived from the refinery processes, crude oil stabilisation and natural gas processing plants. They consist mainly of propane (C <sub>3</sub> H <sub>8</sub> ) and butane (C <sub>4</sub> H <sub>10</sub> ) or a combination of the two. They could also include propylene, butylene, isobutene and isobutylene. LPG are normally liquefied under pressure for transportation and storage.
<b>Bitumen</b>	Bitumen is a solid, semi-solid or viscous hydrocarbon with a colloidal structure that is brown to black in colour. It is obtained by vacuum distillation of oil residues from atmospheric distillation of crude oil. Bitumen is often referred to as asphalt and is primarily used for surfacing of roads and for roofing material. This category includes fluidized and cut back bitumen.
<b>Lubricant</b>	Lubricants are hydrocarbons produced from distillate or residue; they are mainly used to reduce friction between bearing surfaces. This category includes all finished grades of lubricating oil, from spindle oil to cylinder oil, and those used in greases, including motor oils and all grades of lubricating oil base stocks.

Fuel	Description
<b>Other oil products</b>	Other oil products not classified above (e.g. tar, sulphur and grease) are included here. This category also includes aromatics (e.g. BTX or benzene, toluene and xylene) and olefins (e.g. propylene) produced within refineries.
<b>Natural gas</b>	Natural gas comprises gases, occurring in underground deposits, whether liquefied or gaseous, consisting mainly of methane. It includes both " <b>non-associated</b> " gas originating from fields producing hydrocarbons only in gaseous form, and " <b>associated</b> " gas produced in association with crude oil as well as methane recovered from coal mines (colliery gas) or from coal seams (coal seam gas). Production represents dry marketable production within national boundaries, including offshore production and is measured after purification and extraction of NGL and sulphur. In other words, quantities of gas that are re-injected, vented or flared are excluded. It includes gas consumed by gas processing plants and gas transported by pipeline.
<b>Renewable energy</b>	It includes hydropower, grid connected wind power, solar power (Photovoltaic), solar energy used for solar water heaters (in form of Solar heat), Ethanol E100 (content of Ethanol is over 99% in gasoline E5 A92 being sold in the market). Besides, renewable energies also include types of biomass used for electric power generation (mainly in co-generation) and for industrial and agricultural application (such as substitute fuel for combustion in industrial steam boilers, drying products in industries, etc.). Therefore, only partial biomass used for civil purposes was considered as non-commercial energy.
<b>Pure Ethanol</b>	Or <b>Biogasoline</b> defined by IEA. It is produced from biomass and/or the biodegradable fraction of waste. It includes the amounts that are blended into the gasoline - it does not include the total volume of gasoline into which the biogasoline is blended.
<b>Charcoal</b>	It covers the solid residue of the destructive distillation and pyrolysis of wood and other vegetal material. It is considered of renewable energy.
<b>Solar thermal</b>	Solar energy used for solar water heaters.
<b>PV Power</b>	Or <b>Solar Photovoltaic</b> as defined by IEA. It converts sunlight into electricity by the use of solar cells usually made of semi-conducting material which exposed to light will generate electricity.



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Fuel	Description
<b>Power Plants</b>	Includes both <b>Main activity electricity plants</b> and <b>Autoproducer electricity plants</b> as classified by IEA.
<b>Gas Processing</b>	Or <b>Transfers</b> as defined by IEA.

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