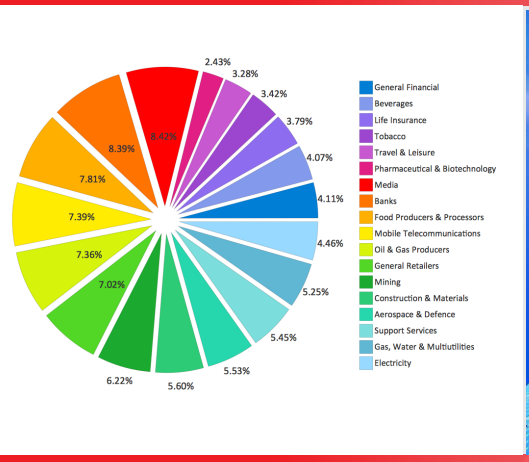
ENERGY
REGULATION
BOARD

STATISTICAL BULLETIN 2016



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OUR MANDATE
The mandate of the Energy Regulation Board is to regulate the energy sector in line with the provisions of the Energy Regulation Act Cap 436 of the Laws of Zambia.

OUR VISION
A proactive, firm and fair energy regulator.

MISSION STATEMENT
To regulate the energy sector in order to ensure efficient provision of reliable and quality energy services and products.

EDITORIAL TEAM

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LIST OF ABBREVIATIONS

COMESA	Common Market for Eastern and Southern Africa
ERB	Energy Regulation Board
HFO	Heavy Fuel Oil
INDENI	INDENI Petroleum Refinery Company Limited
NFT	Ndola Fuel Terminal
OMC	Oil Marketing Company
SAPP	Southern African Power Pool
TAZAMA	TAZAMA Pipelines Limited
ZESCO	ZESCO Limited

UNITS OF MEASUREMENT

Bbl	Barrels of oil (159 litres)
GWh	Giga-Watt hour (1,000 MWh)
K	Zambian Kwacha (ZMW)
Km	Kilometre
kV	Kilo Volt
kVA	Kilo Volt Amperes (1,000 Volt Amps)
kW	Kilo Watt
kWh	Kilo Watt Hour
MW	Mega Watt
MWh	Mega Watt Hour (1,000 kWh)
MT	Metric Tonne (in this document means a mass equivalent to 1,000 kg)
m^3	Cubic Meters
US$	United States of America dollar

FOREWORD

I am pleased to present the 2016 Energy Regulation Board (ERB) statistical bulletin. This is the third publication of the annual statistical bulletin and builds from the previous two publications. The publication is in line with the ERB's mandate to regulate the energy sector in an efficient manner by providing energy statistics. It highlights statistics on licensing, electricity generation, petroleum consumption and other energy related statistics which are accompanied by graphics that give detailed technical commentaries, notes and descriptions for easy understanding.

The statistics provided are of great interest to Government, investors, regulators and other stakeholders interested in energy statistics. The report is available in electronic media and can be accessed from our website in pdf format.

I would like to express my gratitude to all stakeholders that provided strategic input and data used in the publication of the report. It's my belief that the energy statistics presented in this report will be of value to you. I would also like to encourage stakeholders to provide feedback on areas of improvement.

Langiwe H. Lungu (Ms)

Executive Director

March 2017

1.0 LICENSING STATISTICS

The Energy Regulation Board (ERB) is an autonomous statutory body established under the Energy Regulation Act, Chapter 436 of the laws of Zambia (the "Energy Regulation Act"), to regulate the provision of energy products and services in Zambia. By virtue of section 8 of the Energy Regulation Act, it is an offence to operate an energy undertaking except in accordance with the provisions of the Act and under the authority of a license issued by the ERB. The ERB is mandated to regulate the following sub-sectors:

a. Fossil Fuels;
b. Electricity;
c. Renewable Energy; and
d. Coal (Transportation).

1.1 Electricity sub-sector licensing

Thirty one licences were issued in the electricity sub-sector in 2016 of which 17 were standard licenses, while 14 were provisional as summarized in Table one.

Subsector	Type of Licence	Standard	Provisional
	Generation	2	3
	Generation of Electricity for own use	1	1
	Transmission	1	1
	System Operator Licence – Operation for the Zambia Interconnected Power System	1	1
	Supply	1	0
Solar	Manufacture, Supply , Installation and Maintenance[1]	11	8
Total		**17**	**14**

Table 1: Licences issued in the Electricity sub-sector in 2016

1.2 Petroleum sub-sector licensing

There were a total of 150 licences issued in the petroleum sub-sector in 2016. These comprised 79 standard and 71 provisional licenses as shown in Table 2.

[1] For Manufacturing, Supply, Installation and Maintenance of Solar Energy Systems

Sub-sector	Type of Licence	Standard	Provisional	Total Issued
Petroleum Sub-sector	Combined Licence to Distribute, Import and Export Petroleum Products	16	11	27
	Importation Of Petroleum Products (Lubricants)	6	4	10
	Combined Licence to Distribute, Import and Export Petroleum Products (LPG)	7	2	9
	Retail of Petroleum Products	11	11	22
	Retail of Petroleum Products - LPG	9	3	12
	Road Transportation of Petroleum Products	30	25	55
	Bio Ethanol production	0	1	1
	Authority to operate a filling station	0	14	14
	Grand total	**79**	**71**	**150**

Table 2: Licences issued in the petroleum sub-sector in 2016

2.0 ELECTRICITY SUB-SECTOR STATISTICS

2.1 Installed generation capacity

The total national installed electricity capacity increased from 2,411 MW in 2015 to 2,827 MW in 2016 reflecting an increase of 17.3 %. This increase was on account of the commissioning of two large power plants namely Maamba coal power plant (300 MW) and Itezhi-Tezhi hydro power plant (120 MW). In terms of installed capacity by technology, hydro generation accounted for the highest proportion at 84.5% followed by coal at 10.6%. Diesel, HFO and solar were next with 3.1%, 1.8% and 0.002% respectively. Table 3 shows a summary of the installed national generation capacity by technology in 2016.

Undertaking	Station	Machine Type	Installed Capacity (MW)
ZESCO Limited **Generation Plants**	Kafue Gorge	Hydro	990
	Kariba North	Hydro	720
	Kariba North extension	Hydro	360
	Victoria Falls	Hydro	108

Undertaking	Station	Machine Type	Installed Capacity (MW)
	Lunzua River	Hydro	14.5
	Lusiwasi	Hydro	12
	Chishimba Falls	Hydro	6
	Musonda Fals	Hydro	0
	Shiwang'andu	Hydro	1
Itezhi-Tezhi Power Corporation	Itezhi-Tezhi	Hydro	120
Zengamina Generation Plants	Ikelengi	Hydro	0.75
Lusemfwa Generation Plants	Mulunguish	Hydro	32
	Lunsemfwa	Hydro	24
	Total Hydro		**2,388.25**
Maamba Collieries Limited	Maamba Power Plant	Coal	300
	Total Coal		**300**
Copperbelt Energy Generation Plants	Bancroft	Diesel	20
	Luano	Diesel	40
	Luanshya	Diesel	10
	Mufulira	Diesel	10
ZESCO Generation Plants	Kabompo	Diesel	2.0
	Zambezi	Diesel	1.9
	Mufumbwe	Diesel	0.8
	Luangwa	Diesel	2.6
	Lukulu	Diesel	0.5
	Chavuma	Diesel	0.8
	Total Diesel		**88.6**
Ndola Energy Generation Plants	Ndola	Heavy Fuel Oil	50

Undertaking	Station	Machine Type	Installed Capacity (MW)
	Total HFO		**50**
Rural Electrification Authority Generation Plants	Samfya	Solar	0.06
	Total Solar		**0.06**
	Grand Total		**2,826.91**

Table 3: Installed national generation by capacity and technology as at 31st December 2016[2].

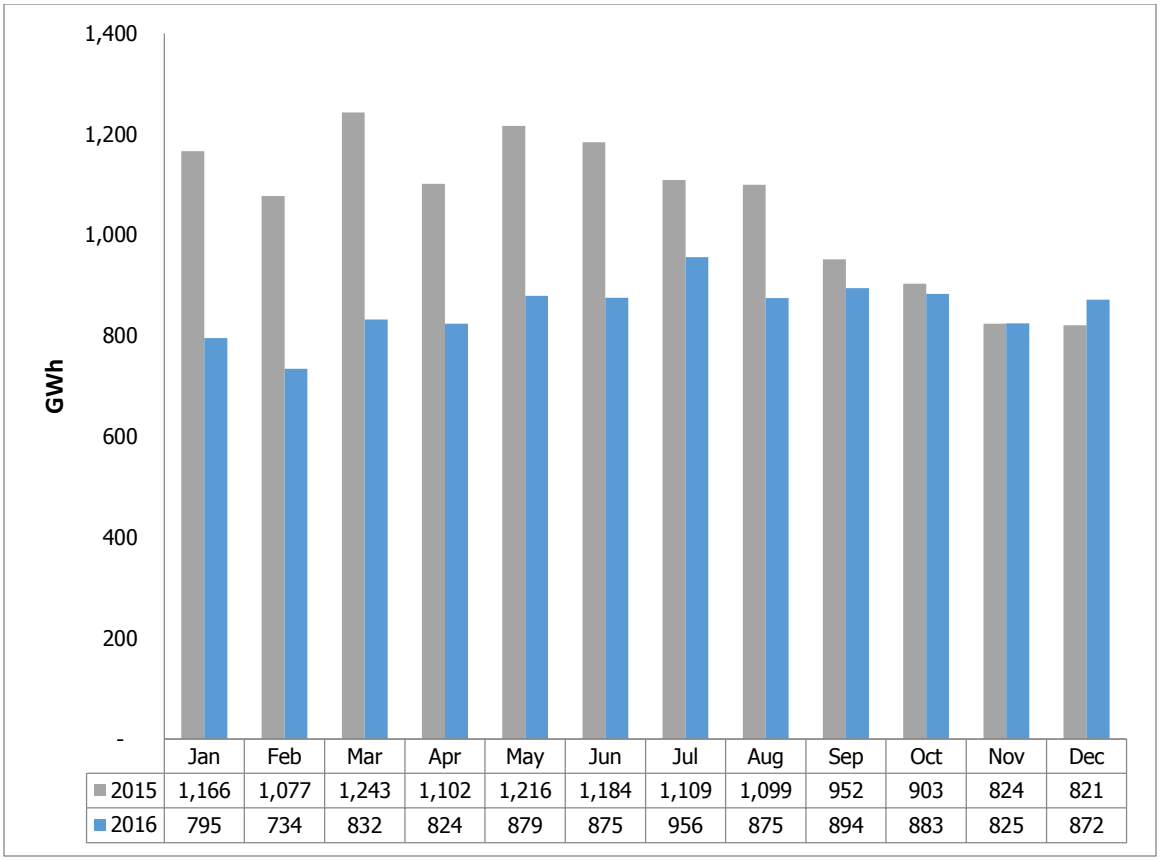
2.2 Generation sent out

The total National electricity generation sent out from ZESCO and Independent Power producers declined from 13,440 GWh in 2015 to 11,696 GWh in 2016 reflecting a percentage decrease of 13.0%. This decline was on account of the continued poor rainfall experienced during the 2014/2015 and 2015/2016 rainy seasons which resulted in low water levels, in the main water reservoirs.

2.2.1 Generation from large hydro power plants

During the period under review, the total generation sent out from ZESCO large hydro power plants reduced by 19.3% from 12, 697 GWh in 2015 to 10,244 GWh in 2016. The decline was due to the poor rainfall in the 2014/2015 rainy season that led to low water levels and consequently reduced generation capacity from hydro power plants. Figure 1 shows generation sent out from ZESCO's major hydropower plants in 2016 compared to the same period in 2015 on a month by month basis.

[2] **As at 31st December 2016, Musonda falls was being upgraded and was not operational.**

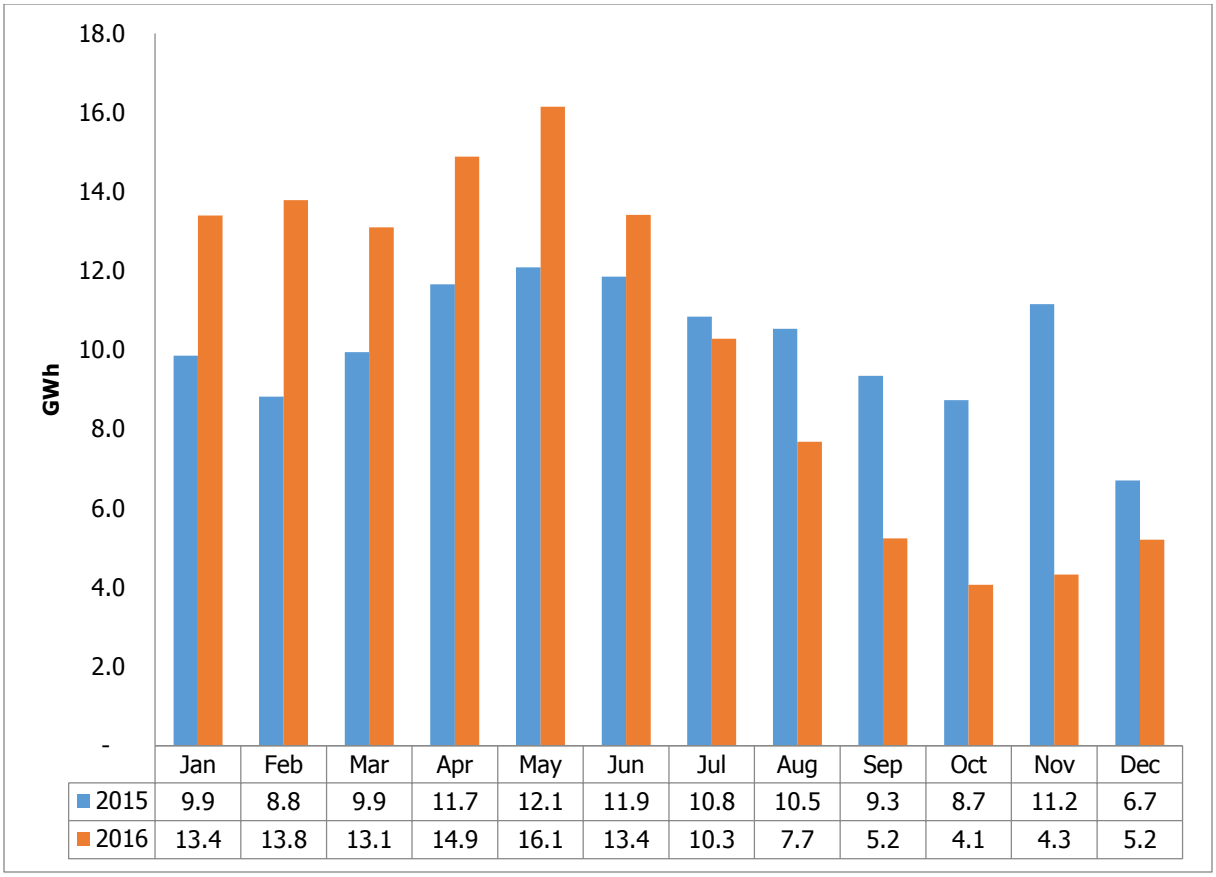


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	1,166	1,077	1,243	1,102	1,216	1,184	1,109	1,099	952	903	824	821
2016	795	734	832	824	879	875	956	875	894	883	825	872

Figure 1: Electricity generation from ZESCO's large hydro power plants, 2015 and 2016

2.2.2 ZESCO's generation from small and mini hydro power plants

Figure 2 shows the total generation sent out from ZESCO's small and mini hydro power plants in 2016 and 2015. The total generation remained the same around 121.5 GWh in 2016 as it was in 2015.

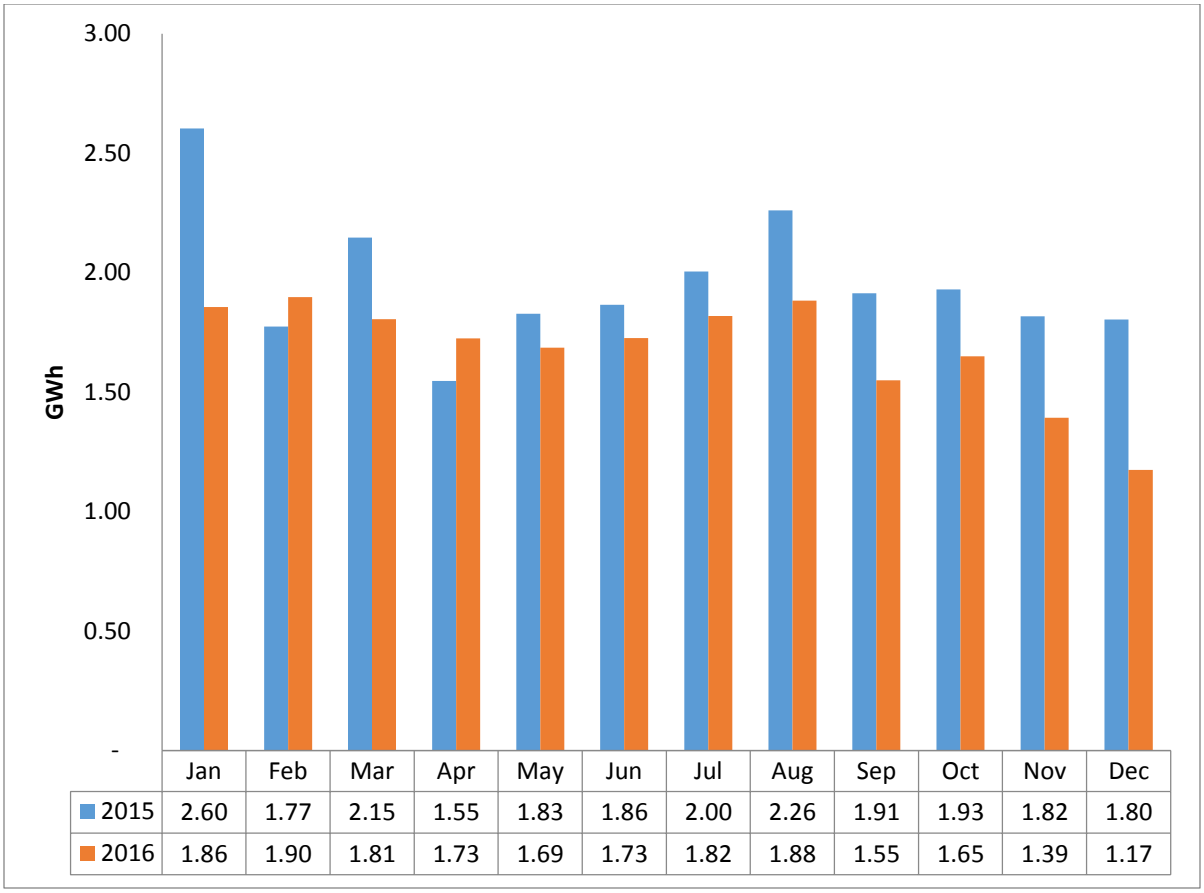


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	9.9	8.8	9.9	11.7	12.1	11.9	10.8	10.5	9.3	8.7	11.2	6.7
2016	13.4	13.8	13.1	14.9	16.1	13.4	10.3	7.7	5.2	4.1	4.3	5.2

Figure 2: Generation sent out from ZESCO's small and mini hydro power plants, 2015 and 2016.

2.2.3 ZESCO's generation from diesel power plants

The total electricity generation sent out from ZESCO's diesel power plants reduced from 23.5 GWh in 2015 to 20.2 GWh in 2016, reflecting a 14.2% decrease. This was attributed to the connection of Mwinilunga district to the national grid and subsequent decommissioning of the Mwinilunga diesel power plant. Figure 3 shows generation sent out by ZESCO's diesel power plants in 2016 compared to the same period in 2015.

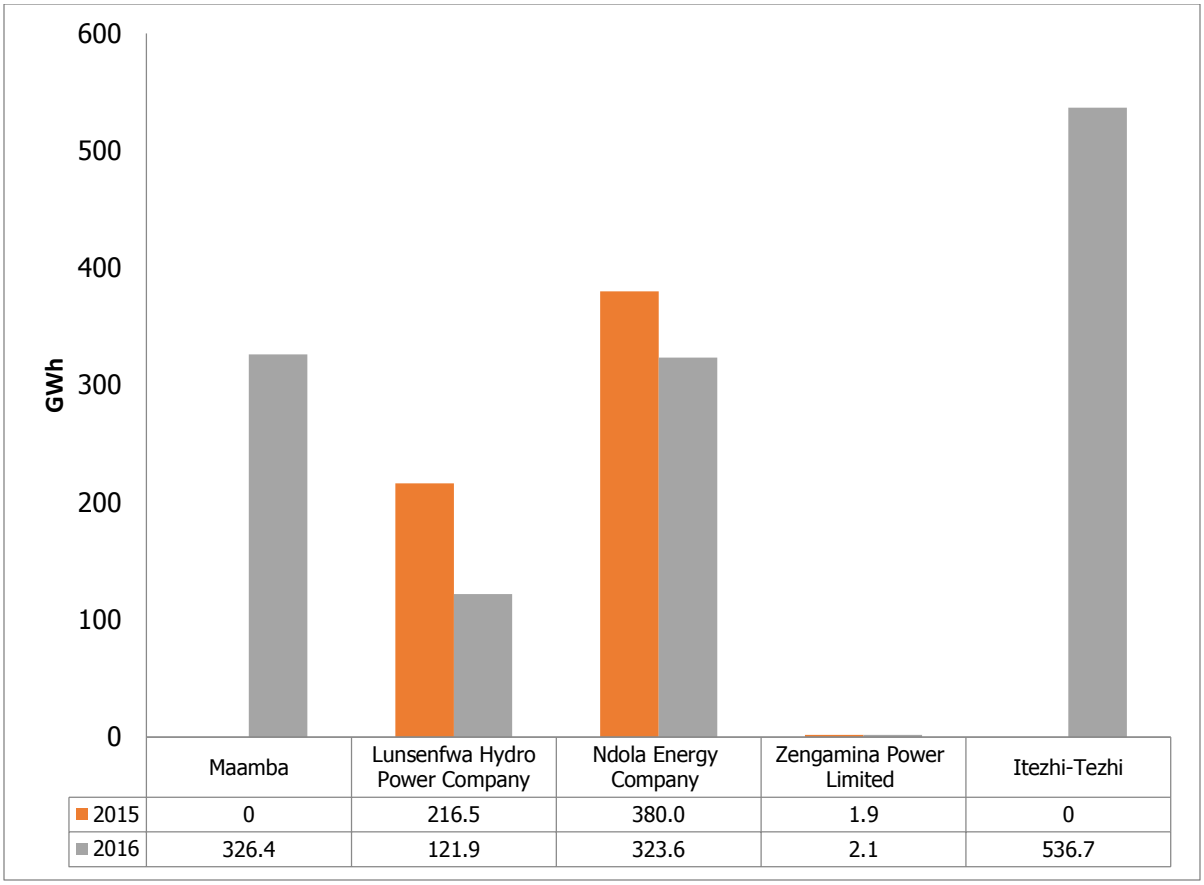


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015	2.60	1.77	2.15	1.55	1.83	1.86	2.00	2.26	1.91	1.93	1.82	1.80
2016	1.86	1.90	1.81	1.73	1.69	1.73	1.82	1.88	1.55	1.65	1.39	1.17

Figure 3: Generation sent out from ZESCO's diesel power plants, 2015 and 2016

2.2.4 Generation from Independent Power Producers

The total electricity generation sent out by Independent Power Producers increased from 598.4 GWh recorded in 2015 to 1,310.7 GWh in 2016 representing an increase of 119%. This increase in generation was on account of the commissioning of two newly constructed power plants, Maamba coal and Itezhi-Tezhi hydro. Figure 4 shows the electricity generation sent out by IPPs in 2016 compared to the same period in 2015.



	Maamba	Lunsenfwa Hydro Power Company	Ndola Energy Company	Zengamina Power Limited	Itezhi-Tezhi
2015	0	216.5	380.0	1.9	0
2016	326.4	121.9	323.6	2.1	536.7

Figure 4: Electricity generation sent out trend by IPPs, 2015 and 2016

2.3 Planned electricity generation projects

Zambia has potential hydro power capacity of about 6,000 MW. A number of electricity generation projects have commenced, while some have been planned for construction. This is expected to increase the national installed generation capacity and promote the diversification of the energy generation mix. Table 4 shows some of the planned electricity generation projects.

Project Name	Type	Owner	Capacity (MW)	Expected Completion Date
Ndola HFO expansion	HFO	Ndola Energy Company	55	2017
Kafue Gorge Lower Hydro Power Project	Hydro	ZESCO	750	2019 onwards
Batoka Hydro Power Project	Hydro	ZESCO	1,200	2019 onwards
Maamba coal fired power plant II	Thermal	Maamba Collieries Limited	300	TBA
Kabompo Gorge	Hydro	CEC	34	TBA
Musonda Falls	Hydro	ZESCO	10	TBA
EMCO Thermal Plants	Thermal	EMCO Energy Zambia Limited	340	2018
Luisiwasi Upper	Hydro	ZESCO	86	TBA
Luisiwasi Lower	Hydro	ZESCO	15	TBA
Mkushi	Hydro	Lunsemfwa	65	TBA

Table 4: Expected electricity generation projects

2.4 ZESCO electricity exports and imports

ZESCO participates in the trading of power through the Southern African Power Pool (SAPP) which is a cooperation of the electricity companies in the Southern African Development Community (SADC). During the period under review, ZESCO's exports declined by 32.5% from 1,175.9 GWh in 2015 to 794.1 GWh in 2016. Meanwhile, imports increased by 178.3% from 785.2 GWh in 2015 to 2,184.9 GWh in 2016. ZESCO's power exports and imports are summarized in Table 5.

	2015		2016	
Month	**Exports (GWh)**	**Imports (GWh)**	**Exports (GWh)**	**Imports (GWh)**
Jan	111.3	0.8	68.6	209.0
Feb	128.7	1.0	62.6	170.9
Mar	138.4	2.6	60.6	176.6
Apr	99.5	30.9	58.6	156.6
May	110.5	26.6	56.6	159.0
Jun	103.5	18.6	61.2	198.2
Jul	103.1	64.7	54.5	187.1
Aug	96.5	72.8	71.5	237.1
Sep	86.4	120.3	73.4	158.5
Oct	84.7	132.6	96.4	169.8
Nov	58.9	157.3	68.7	173.3
Dec	54.4	157.2	61.5	188.9
Total	**1,175.9**	**785.2**	**794.1**	**2,184.9**

Table 5: ZESCO electricity power imports and exports, 2015 and 2016

2.5 Electricity consumption by economic sector

In 2016, total national electricity consumption decreased to 10,857.5 GWh from 11,449.9 GWh in 2015 reflecting a reduction of 5.2%. Figure 5 depicts the proportion of electricity consumption by economic sub-sector in 2016 compared to 2015.

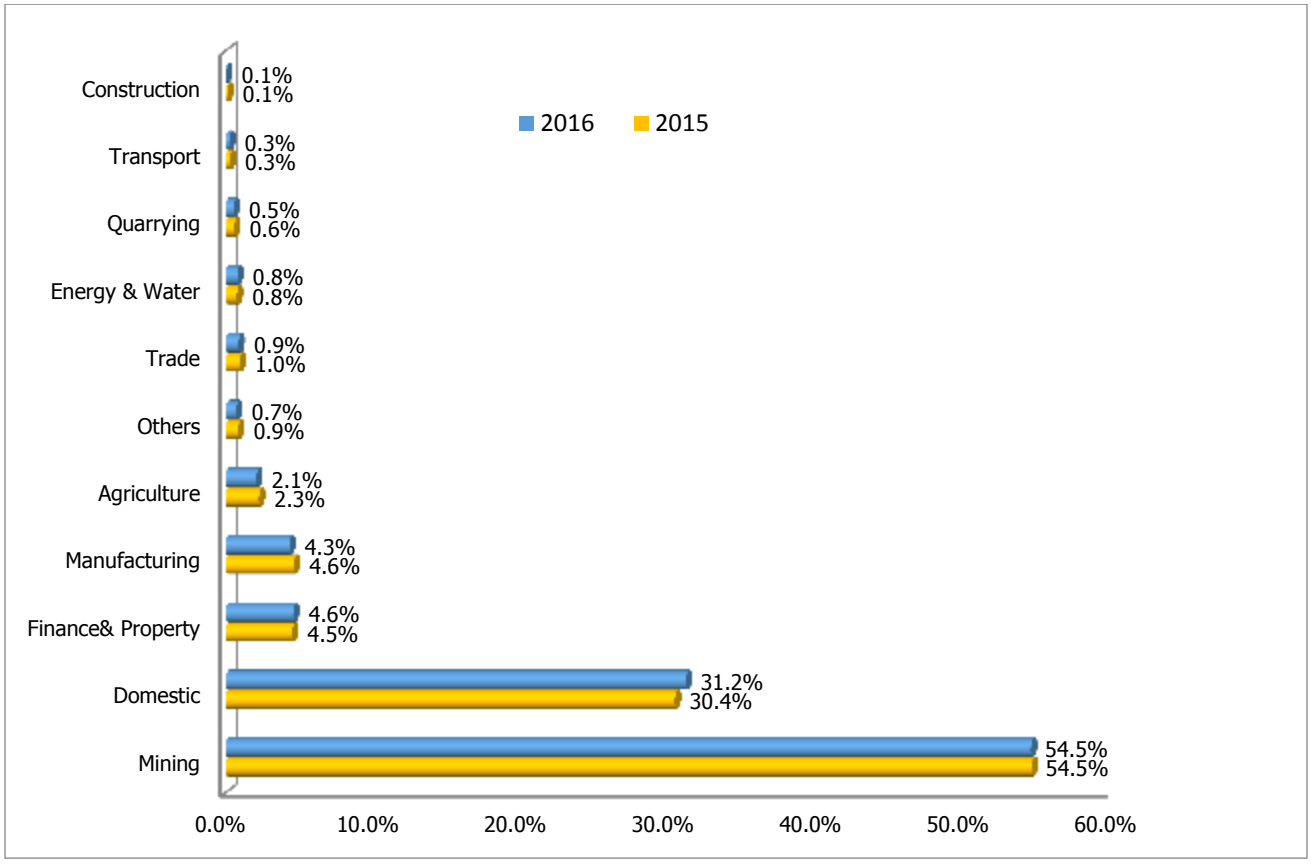


Figure 5: Electricity consumption by economic sub-sector, 2015 and 2016

2.6 Electricity tariffs and regional comparison

2.6.1 Electricity tariffs

The ERB approved electricity tariffs for the various customer categories as at 31st December, 2016 are depicted in Table 6.

Category	Consumption	Unit	Approved tariffs
Metered Residential(Prepaid) (capacity 15 kVA)	R1 - consumption band up to 100 kWh per month	Energy charge/kWh)	0.15
	R2 - consumption between 101 & 300 kWh	Energy charge/kWh)	0.31
	R3 – consumption above 300 kWh	Energy charge/kWh)	0.51
		Fixed Monthly Charge	18.23
Commercial Tariffs (capacity 15 kVA)	Commercial	Energy charge/kWh)	0.31
		Fixed Monthly Charge	55.09
Social Services	Schools, Hospitals, Orphanages, churches, water pumping & street lighting	Energy charge K/kWh	0.28
		Fixed Monthly Charge	47.91
Maximum Demand Tariffs	MD1- Capacity between 16 - 300 kVA	MD charge/kVA/Month	13.97
		Energy charge /kWh	0.20
		Fixed Monthly Charge	136.82
		Off-peak MD charge/kVA/Month	6.98

Category	Consumption	Unit	Approved tariffs
		Off-peak energy charge/kWh	0.15
		Peak MD charge/kVA/Month	17.46
		Peak Energy Charge/kWh	0.25
	MD2- Capacity 301 to 2,000 kVA	MD charge/kVA/Month	26.13
		Energy charge /kWh	0.17
		Fixed Monthly Charge	273.62
		Off-peak MD charge/kVA/Month	13.07
		Off-peak energy charge/kWh	0.13
		Peak MD charge/kVA/Month	32.67
		Peak Energy Charge/kWh	0.21
	MD3- Capacity 2,001 to 7,500 kVA	MD charge/kVA/Month	41.75
		Energy charge /kWh	0.14
		Fixed Monthly Charge	579.74

Category	Consumption	Unit	Approved tariffs
		Off-peak MD charge/kVA/Month	20.87
		Off-peak energy charge/kWh	0.1
		Peak MD charge/kVA/Month	52.19
		Peak Energy Charge/kWh	0.17
	MD4-Capacity above 7500 kVA	MD charge/kVA/Month	41.98
		Energy charge /kWh	0.12
		Fixed Monthly Charge	1,159.50
		Off-peak MD charge/kVA/Month	20.99
		Off-peak energy charge/kWh	0.09
		Peak MD charge/kVA/Month	52.48
		Peak Energy Charge/kWh	0.14

Table 6: ERB approved electricity tariffs as at 31st December 2016

2.6.2 Regional comparison

Figure 6 shows a comparison of the regional average end user electricity tariffs for Zambia and selected countries in the SADC and the Common Market for Eastern

and Southern Africa (COMESA) regions. Average end user electricity tariffs ranged from USc 3.17/kWh to USc 13/kWh.

Namibia had the highest average tariffs at USc 13/kWh followed by Tanzania at USc 11.05/kWh. Meanwhile, Angola had the lowest average tariffs at USc 3.17/kWh.

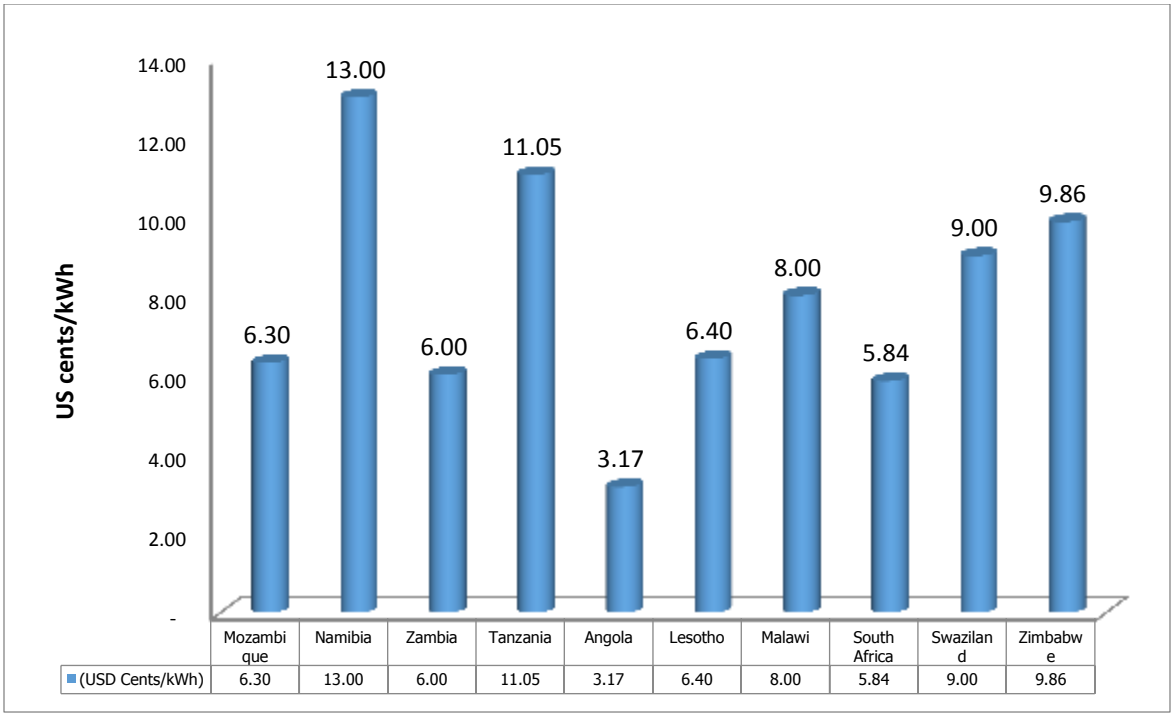


Figure 6: Regional average electricity tariffs in 2016[3]

[3] Source RERA (June, 2016) Note: Tariffs are for comparative purposes only as the actual end user tariffs depend on the market structure in each country. Namibia and South Africa tariffs relate to wholesale tariffs.

3.0 PETROLEUM SUB-SECTOR STATISTICS

The Zambian national fuel supply system can be classified into two categories: upstream and downstream. The upstream comprises of TAZAMA Pipelines, INDENI Refinery, Ndola Fuel Terminal and Government fuel storage depots. The downstream on the other hand comprises of Oil Marketing Companies (OMCs), transporters, dealers and consumers. The role of TAZAMA Pipelines is to transport petroleum feedstock, while INDENI Refinery processes the petroleum feedstock into different petroleum products.

The Ndola Fuel Terminal and Government storage depots receive and distribute the refined products to different OMCs while the role of transporters is to transport refined products to different OMCs and dealers. The role of OMCs and dealers is to distribute and sell refined petroleum products to commercial customers and retail consumers. In all the various roles performed by the industry players, the ERB is at the center of activities as it issues licences which enable the players in the industry to discharge their respective roles. Figure 7 shows the players in the fuel supply chain.

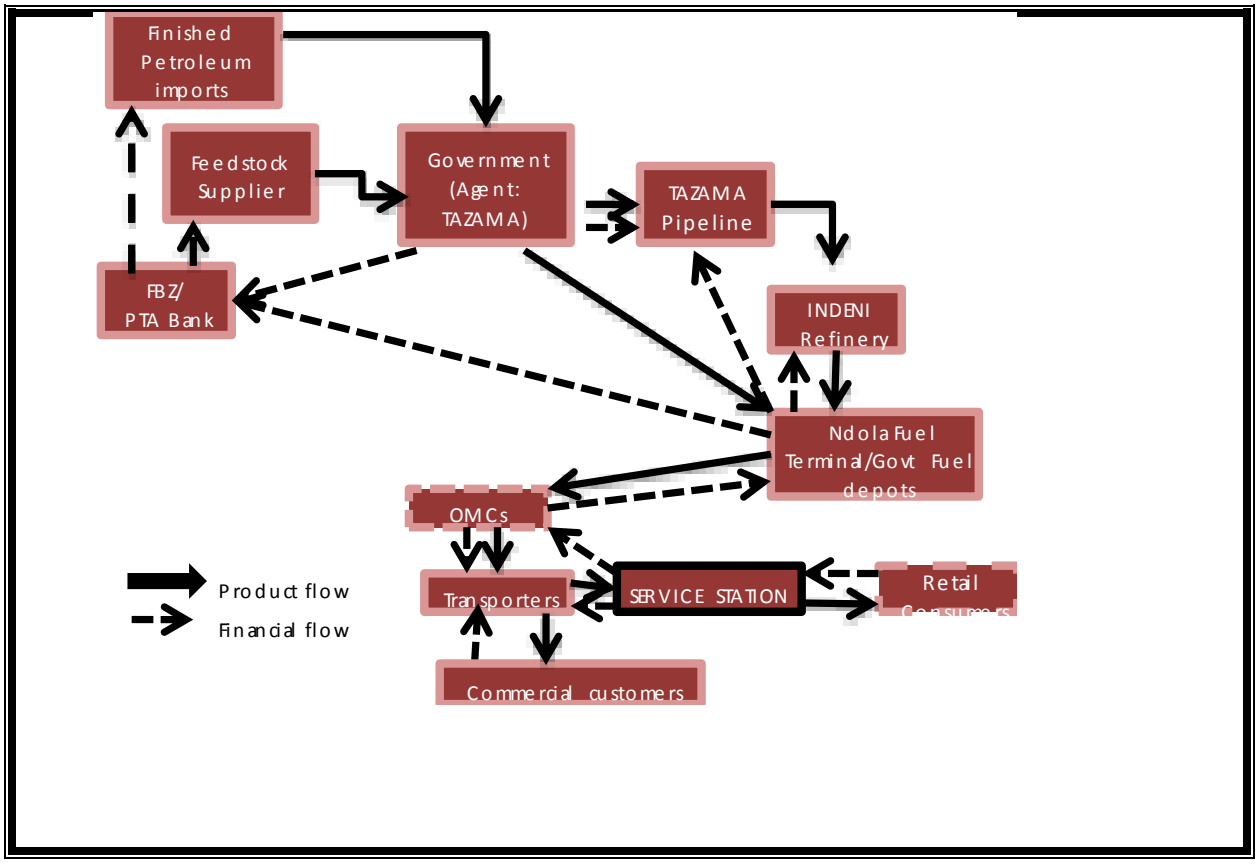


Figure 7: Players in the fuel supply chain

3.1 Retail Service stations provincial distribution

There were a total of 325 retail service stations across the country of which 305 were operational, 4 were under construction (one each in Copperbelt, Eastern, Lusaka and Muchinga provinces) and 16 were closed (four in Central, three on the Copperbelt, five in Lusaka, two in North Western and two in Southern). Among the 305 operational service stations, with the 106 (35%) were in in Lusaka province while 91 (30%) were in Copperbelt province. Muchinga, North western, Northern and Western Province had 8 service stations each accounting for 3% of the operational service stations. Figure 8 shows the distribution of retail service stations per province in the country during the period under review.

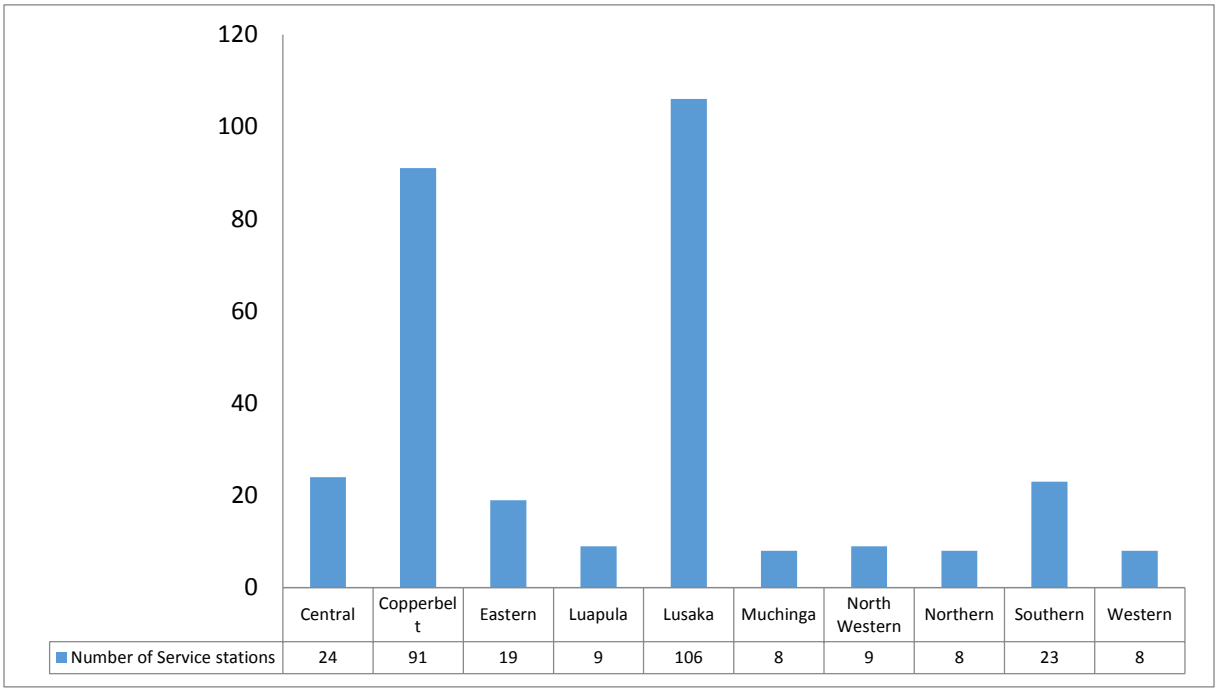


Figure 8: Retail service stations by provincial distribution in 2016

3.2 Petroleum Transportation

The refined petroleum products in the country are transported mainly via road except for isolated cases, where the rail is used. The ERB grants licences to transporters for the purposes of transporting petroleum products by road. The fuel tankers uplift petroleum products from Ndola Fuel Terminal (NFT) and Government fuel depots located in Lusaka, Mpika, and Solwezi. A total of 349,148 m^3 of petrol and 615,962 m^3 of diesel were uplifted from Government depots during the period under review. This represents an average of 27 and 48 fuel tankers of petrol and diesel daily respectively compared to 39 and 64 fuel tankers for petrol and diesel respectively in 2015. The reduction in uplifts was on account of the fact that OMCs were importing

petrol and diesel following the issuance of SI no. 21 of 2016 which suspended duty on importation of petrol and diesel for the period 1st March to 31st August 2016. The OMCs continued to import beyond the SI period. The highest number of uplifts per day was recorded in February with 97 trucks, comprising 35 trucks for petrol and 62 trucks for diesel. Meanwhile, the lowest uplift for petrol was recorded in December with 52 trucks comprising 32 trucks for diesel and 20 trucks for petrol. Table 7 shows monthly uplift volumes and average number of uplifts in terms of trucks per day from the terminal and all Government depots during the period under review.

Month/ Product	**Diesel**		**Petrol**	
2016	**Quantity (M^3)**	**Average No Trucks/Day**	**Quantity (M^3)**	**Average No Trucks/Day**
January	59,929	55	40,500	37
February	63,390	62	35,191	35
March	45,433	42	31,505	29
April	38,254	36	28,769	27
May	49,499	46	22,960	21
June	54,499	52	23,933	23
July	59,176	55	32,847	30
August	52,703	49	28,601	26
September	59,693	57	29,189	28
October	57,389	53	33,947	31
November	40,842	39	19,949	19
December	35,155	32	21,757	20
Grand Total	**615,962**	**48**	**349,148**	**27**

Table 7: Actual quantities uplifts at Government fuel depots in 2016

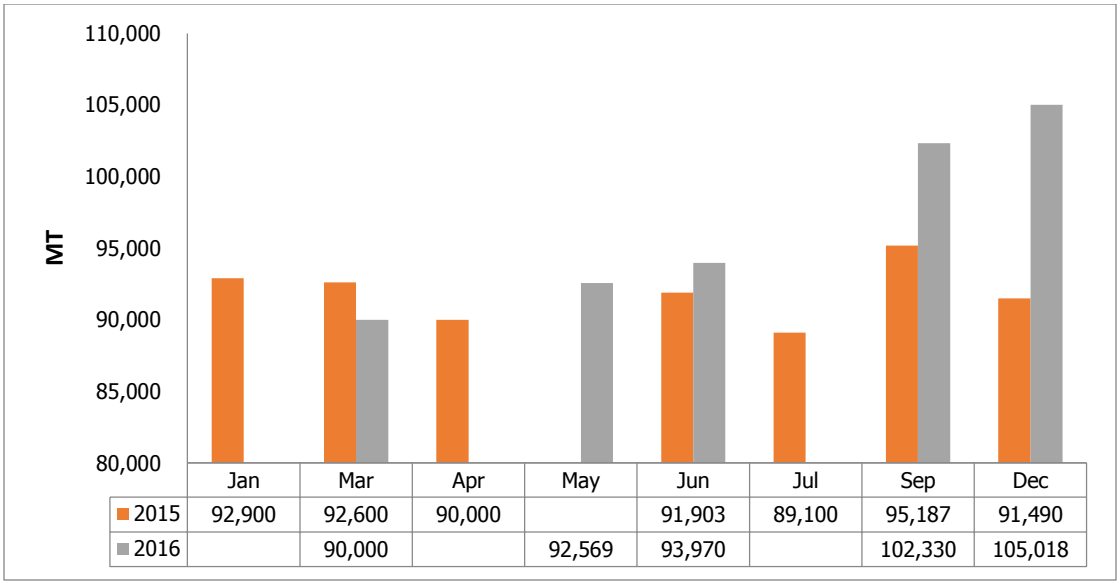
Table 8 shows the monthly uplift volumes and average number of uplifts in terms of trucks per day in 2015 from the terminal and all Government depots.

Month/ Product	Diesel		Petrol	
2015	**Quantity (M^3)**	**Average No Trucks/Day**	**Quantity (M^3)**	**Average No Trucks/Day**
January	47,084	43	37,963	35
February	49,371	50	33,506	34
March	62,119	57	42,500	39
April	61,670	59	41,350	39
May	66,460	61	39,300	36
June	71,452	68	41,780	40
July	77,561	71	42,579	39
August	74,860	69	43,161	40
September	75,442	72	41,592	40
October	78,538	72	44,776	41
November	79,971	76	43,340	41
December	76,046	70	48,617	45
Grand Total	**820,574**	**64**	**500,464**	**39**

Table 8: Actual quantities uplifted at Government fuel depots in 2015

3.3 Petroleum feedstock imports

All petroleum products consumed in Zambia are imported either as petroleum feedstock or finished petroleum products. The Government procures a cargo of petroleum feedstock on average, every six weeks. A cargo of petroleum feedstock typically comprises Crude oil, Naphtha, Condensate and Gasoil. During the period under review, the country imported a total of 483,887 MT of petroleum feedstock compared to 643,180 MT in 2015. The amount of petroleum feedstock imported per cargo varied and ranged between 90,000 MT to 105,018 MT in the period in 2016. Figure 9 shows petroleum feedstock imports for 2015 and 2016.

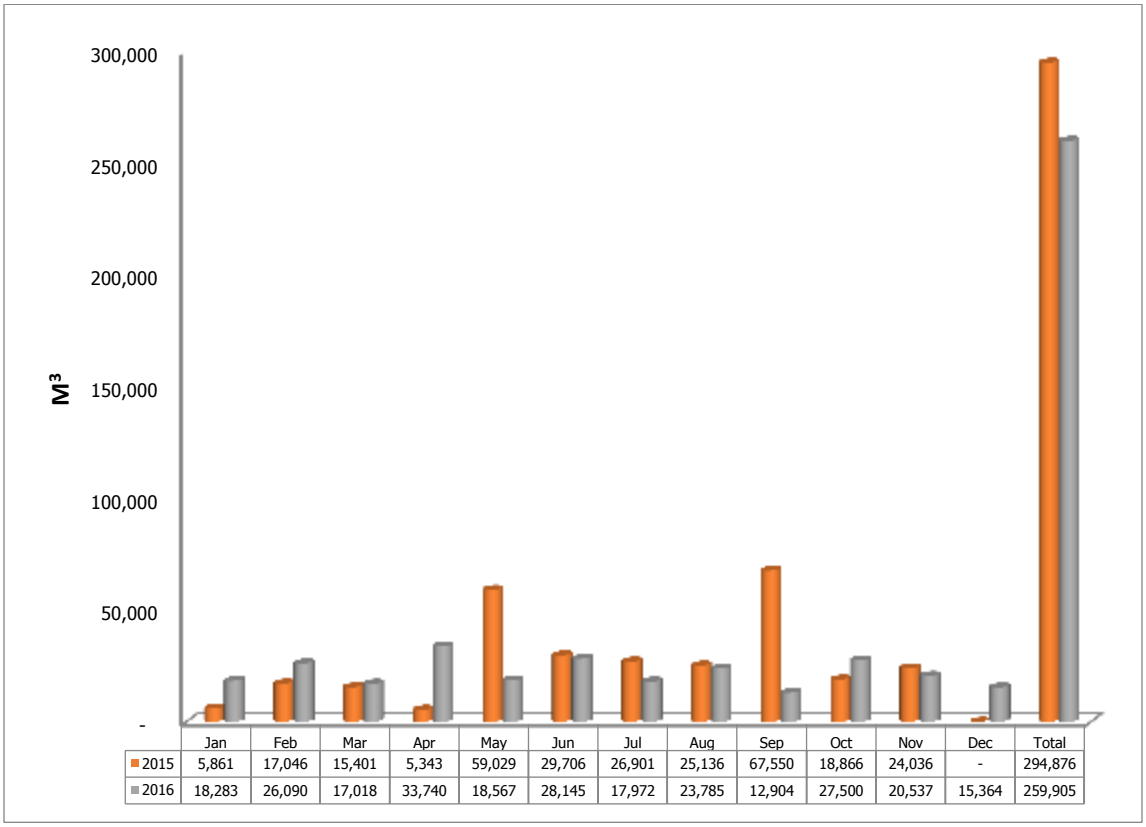


	Jan	Mar	Apr	May	Jun	Jul	Sep	Dec
2015	92,900	92,600	90,000		91,903	89,100	95,187	91,490
2016		90,000		92,569	93,970		102,330	105,018

Figure 9: Petroleum feedstock imports, 2015 and 2016

3.4 Imports of finished petroleum products

The Government through TAZAMA, imports finished petroleum products via road. Currently, only petrol and diesel are imported by the Government. Figure 10 shows the Government imports of petrol in 2016 compared to the same period in 2015.

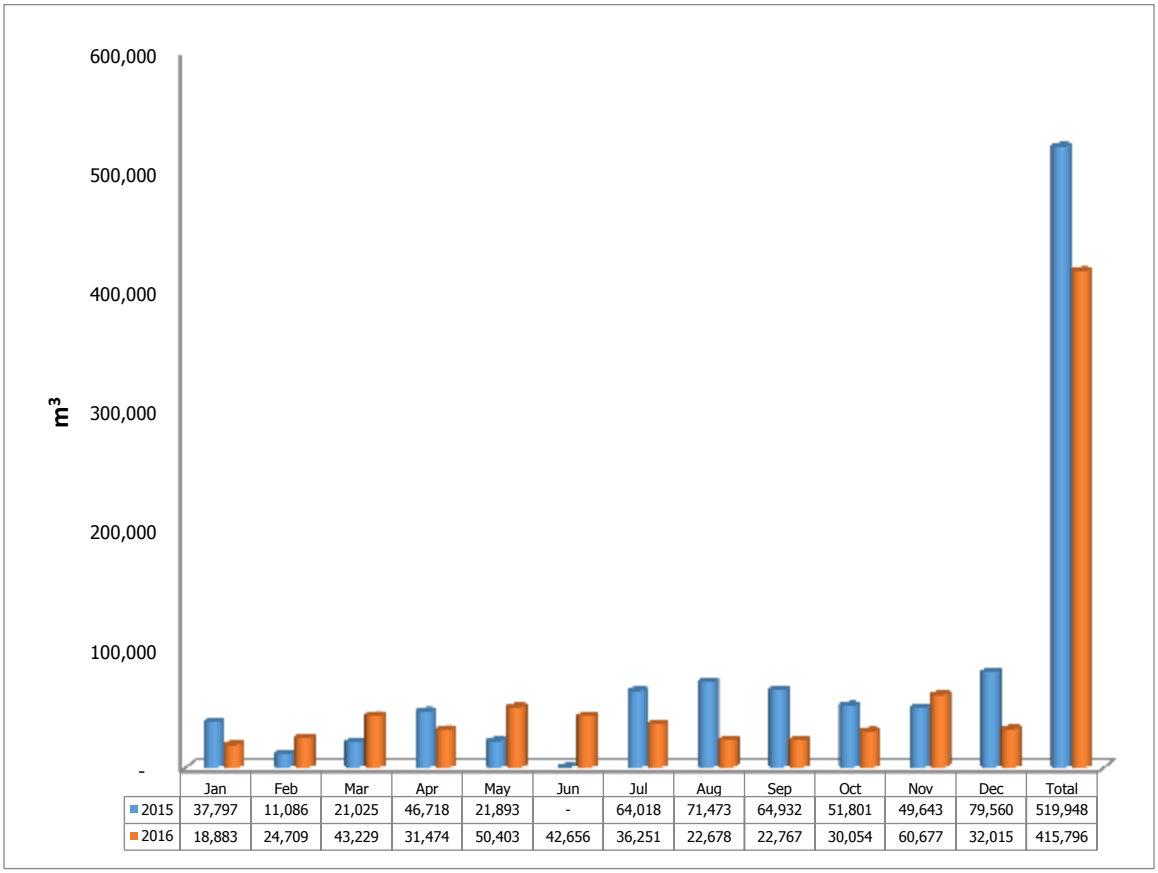


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2015	5,861	17,046	15,401	5,343	59,029	29,706	26,901	25,136	67,550	18,866	24,036	-	294,876
2016	18,283	26,090	17,018	33,740	18,567	28,145	17,972	23,785	12,904	27,500	20,537	15,364	259,905

Figure 10: Government imports of petrol, 2015 and 2016

Government imports of petrol reduced by 11.9 % in 2016 compared to 2015. During the period under review, Government imported 259,905 m^3 of petrol compared to 294,876 m^3 in 2015. The reduction can be attributed to S.I. No 21 of 2016, which allowed OMCs to import 110 million litres of petrol between March and August in 2016.

The monthly imports trends for low sulphur gasoil are shown in Figure 11. Government imported a total 415,796 m^3 in 2016 compared to 519,948 m^3 of diesel in 2015 reflecting a 20% reduction. Similarly, the reduction can be attributed to S.I. No 21 of 2016 which authorised Oil Marketing Companies to import 200 million litres of diesel between March and August in 2016.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2015	37,797	11,086	21,025	46,718	21,893	-	64,018	71,473	64,932	51,801	49,643	79,560	519,948
2016	18,883	24,709	43,229	31,474	50,403	42,656	36,251	22,678	22,767	30,054	60,677	32,015	415,796

Figure 11: Government imports of low sulphur gasoil, 2015 and 2016.

3.5 Refinery production of petroleum products

The imported comingled petroleum feedstock is processed at INDENI Petroleum Refinery Company Limited (INDENI). In 2016, the refinery supplied 27% of petrol and diesel, and 35% of the Jet A-1 national requirement. However, most of the national requirements for the rest of the petroleum products were met through

refinery production. Tables 9 and 10 shows the production of petroleum products for 2016 and 2015 respectively.

Month/Product	PETROL	DIESEL	KEROSENE	JET A1	B UTANE/LPG	BITUMEN	HFO
	MT						
January	9,630.05	26,480.19	1,893.25	-	767.92	2.00	9,387.51
February	8,437.02	9,634.59	1,324.12	-	318.90	-	(243.74)
March	5,013.87	8,859.54	1,028.23	-	247.36	1.00	2,861.34
April	9,992.54	26,518.32	1,780.07	2,180.85	951.38	-	10,155.12
May	16,672.71	26,424.34	3,508.89	2,001.56	886.96	483.00	13,500.28
June	7,984.68	10,308.55	(755.66)	2,754.05	431.21	(386.00)	6,983.69
July	6,664.15	20,237.90	2,542.41	317.45	315.78	475.00	4,734.60
August	8,694.33	26,227.28	1,586.79	2,414.12	178.68	(457.00)	14,139.07
September	10,113.19	25,534.59	1,837.72	(203.69)	531.46	(349.00)	15,235.11
October	6,827.20	14,624.11	1,257.42	-	316.12	(1.00)	8,510.40
November	637.64	3,947.54	4.00	-	(233.00)	3.00	7,933.79
December	4,617.77	13,840.99	2,491.74	-	126.12	1.00	8,935.70
Grand Total	**95,285.15**	**212,637.94**	**18,498.98**	**9,464.34**	**4,838.89**	**(228.00)**	**102,132.87**

Table 9: Refinery monthly production trend in 2016[4]

Month/Product	PETROL	DIESEL	KEROSENE	JET A1	B UTANE/ LPG	B ITUMEN	HFO
	MT						
January	12,120.06	25,225.74	627.00	1,212.76	464.50	520.00	10,008.60
February	11,010.80	25,974.38	966.32	2,699.79	289.22	19.00	15,441.31
March	7,917.16	16,327.18	1,007.62	289.91	(306.22)	4.00	9,326.49
April	12,061.76	24,663.63	1,017.32	4,111.99	604.80	(12.00)	16,145.42
May	10,170.58	25,612.31	1,530.56	3,605.59	890.62	(2.00)	10,950.73
June	7,277.90	20,109.91	55.31	1,368.94	425.92	18.00	8,220.00
July	6,362.37	21,024.28	1,777.78	(222.00)	197.96	6.00	7,758.68
August	9,166.08	22,916.23	3,282.58	-	250.00	4.00	8,476.74
September	10,177.06	23,217.54	2,555.90	-	468.32	-	9,972.04
October	10,940.87	27,969.02	1,042.50	-	283.18	(4.00)	11,533.37
November	6,578.15	11,506.50	1,187.69	-	241.18	(199.00)	4,991.18
December	2,919.41	17,282.20	685.95	-	(69.00)	5.00	8,104.72
Grand Total	**106,702.20**	**261,828.92**	**15,736.53**	**13,066.98**	**3,740.48**	**359.00**	**120,929.28**

Table 10: Refinery monthly production trend in 2015[5]

In both 2015 and 2016, diesel was the most produced petroleum product at 261,828.92 MT and 212,637.94 MT, followed by Heavy Fuel Oil at 120,929.28 MT

[4] A negative figure indicates quantities of a product that was upgraded into another product.
[5] A negative figure indicates quantities of a product that was upgraded into another product.

and 102,132.87 MT respectively. The least produced was Butane/LPG at 3,740.48 MT in 2015 and 4,838.89 in 2016. The Refinery produced 106,702.20 MT and 95,285.15 MT of Petrol in 2015 and 2016 respectively. In 2015, 15,736.53 MT and 13,066.98 MT of kerosene and Jet A-1 were produced compared to 18,498.98 MT and 9,464.34 respectively in 2016. In 2015, a total of 359 MT of Bitumen was produced on a test basis, while and none was produced in 2016.

3.6 National consumption of petroleum products

The petroleum products mainly consumed in Zambia are diesel (ordinary and Low Sulphur Gasoil), unleaded petrol, kerosene and Jet A-1. There was a general decline in the consumption of all petroleum products from 2015 to 2016 as shown in Table 11.

Product	Total Annual Consumption		Average Daily Consumption	
	2015	2016	2015	2016
Diesel (L)	974,306,739	941,996,807	2,669,334	2,580,813
Unleaded Petrol (L)	488,699,028	463,021,018	1,338,901	1,268,551
Kerosene (L)	23,018,840	20,056,675	63,065	54,950
Heavy Fuel Oil (Kg)	129,149,452	97,881,163	353,834	268,168
Jet A1 (L)	55,546,653	34,259,885	152,183	93,863
LPG (Kg)	3,229,726	2,742,348	8,849	7,513

Table 11: Annual and average daily consumption of petroleum products in 2015 and 2016

Table 11 shows that diesel was the most consumed petroleum product, followed by unleaded petrol and the least consumed was LPG in both 2015 and 2016. The total consumption of diesel declined from 974,306,739 litres (2,669,334 litres per day) in 2015 to 941,996,807 litres (2,580,813 litres per day) in 2016 reflecting a decline of 3.3%. Similarly, petrol consumption declined by 5.3% from 488,699,028 litres in 2015 to 463,021,018 litres in 2016. The rest of the products similarly recorded declines of 12.9 % for kerosene (from 23,018,840 litres to 20,056,675 litres), 24.2% for HFO (from 129,149,452 kgs to 97,881,163 kgs), 38.3% for Jet A-1 (from 55,546,653 litres to 34,259,885 litres) and 15.1% for LPG (from 3.229,726 kgs to 2,742,348 kgs).

3.7 OMCs market share for white petroleum products

Market share refers to the percentage of the total volume of sales of an OMC to the total sales in the industry in a specified period of time. The OMCs are the distributors of petroleum products in Zambia. There were a total of 49 OMCs as at 31st December 2016. Figure 12 shows the market share for white petroleum products in 2015 and 2016.

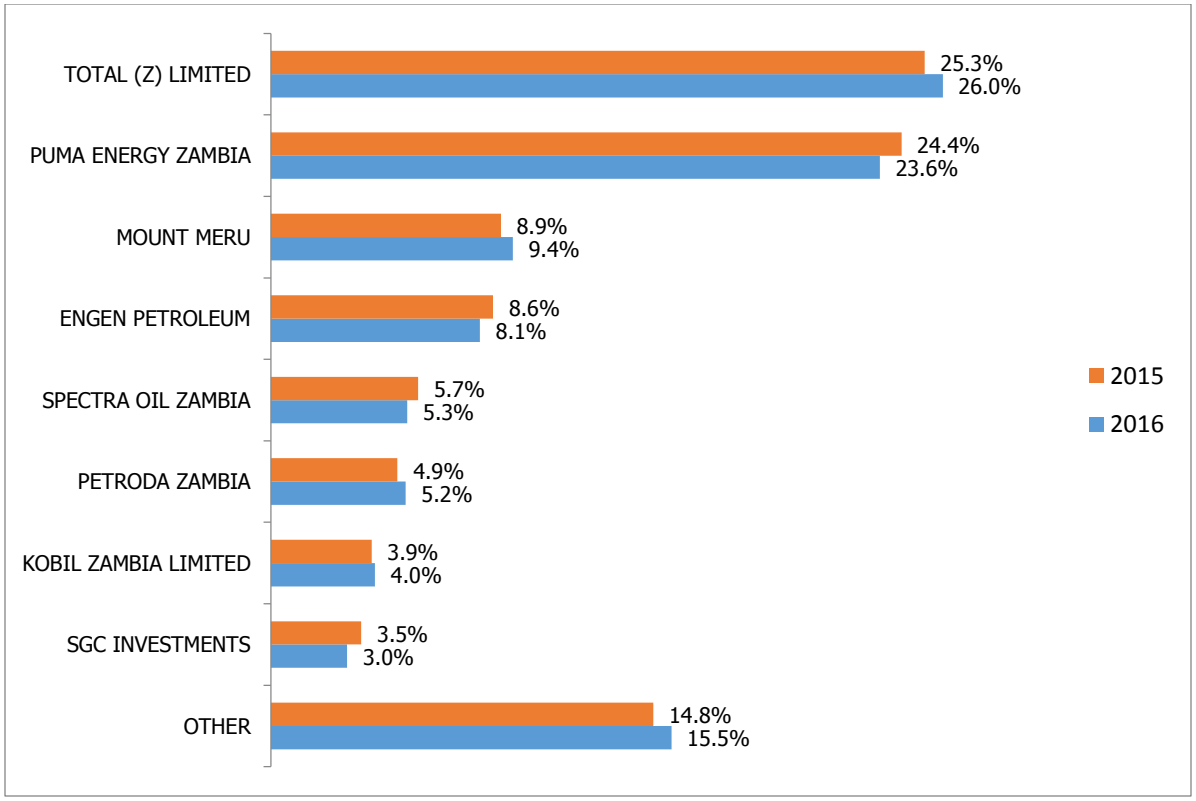


Figure 12: OMC market share for white petroleum products, 2015 and 2016

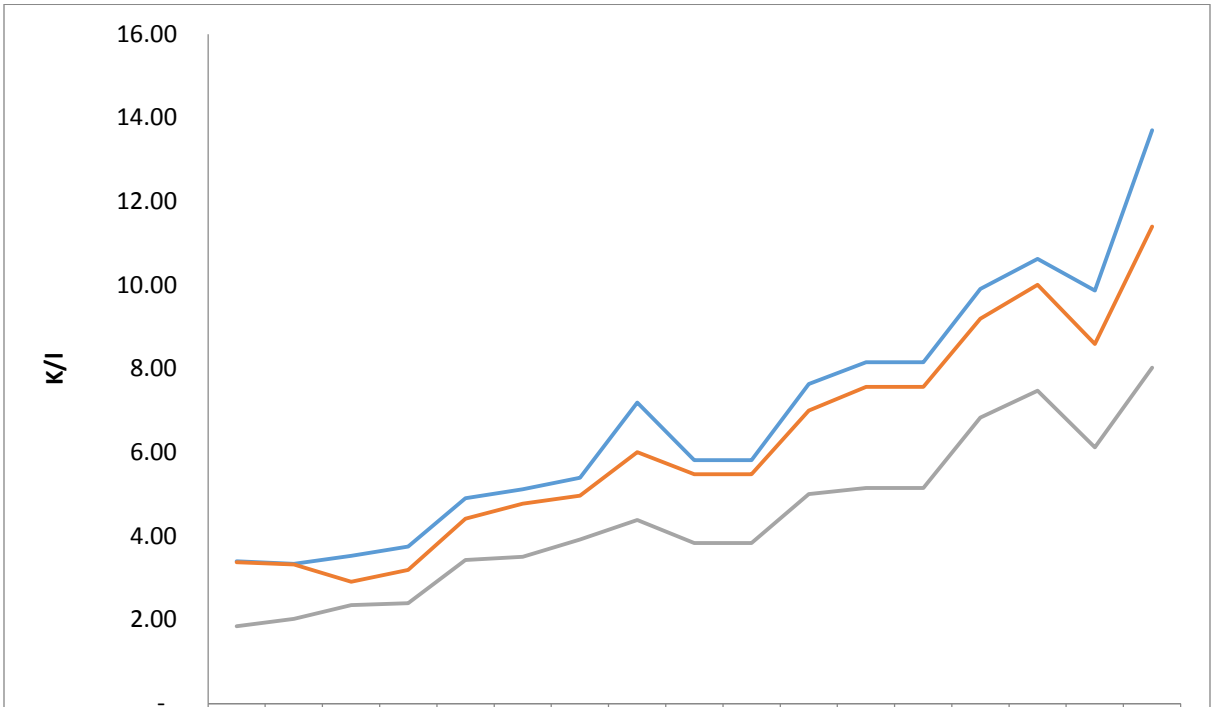
During the period under review, the combined market share for the largest two (Puma Energy and Total Limited) was 49.6%, a decrease of 0.1 percentage point from 49.7% in 2015. The rest of the top 6 OMCs had the following market shares; 9.4%, 8.1%, 5.3%, 5.2%, 4.0% and 3.0% for Mount Meru, Engen, Spectra, Petroda, Kobil and SGC respectively. The other OMCs accounted for 15.5% market share.

3.8 National fuel pump price and regional comparison

3.8.1.1 National fuel pump price

There are two major determinants of pump prices, the international oil prices and the exchange rate of the kwacha against the US dollar. Figure 13 depicts the trend in the national fuel end year prices for petrol, diesel and kerosene for the period

2000 to 2016. In general pump prices have been increasing since 2000. The year-end prices of petrol, diesel and kerosene increased from K9.87, K8.59 and K6.12 in 2015 to K13.7, K11.4 and K8.03 in 2016 respectively. The increase was mainly attributed to removal of subsidies to attain full cost recovery in the pricing.



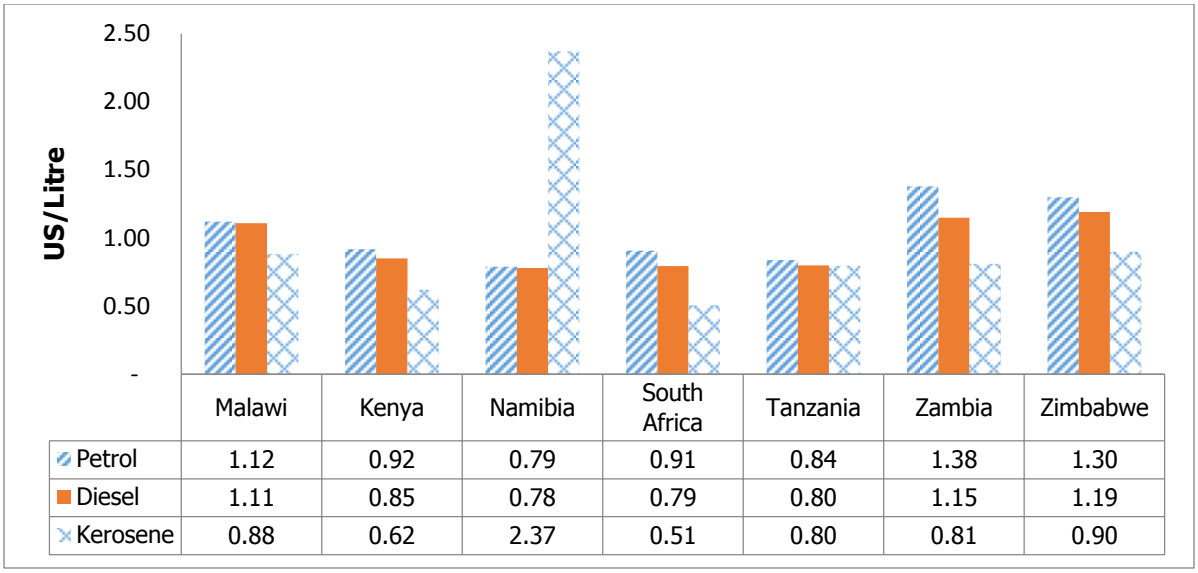
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Petrol	3.40	3.34	3.53	3.75	4.91	5.12	5.40	7.19	5.82	5.82	7.64	8.16	8.16	9.91	10.6	9.87	13.7
Diesel	3.38	3.32	2.91	3.19	4.42	4.77	4.97	6.00	5.48	5.48	7.00	7.57	7.57	9.20	10.0	8.59	11.4
Kerosene	1.85	2.02	2.35	2.40	3.43	3.51	3.92	4.39	3.83	3.83	5.01	5.15	5.15	6.83	7.48	6.12	8.03

Figure 13: National year-end fuel pump prices trend, 2000 to 2016[6]

3.8.2 Regional Comparison

The regional prices of petrol, diesel and kerosene as at 31st December 2015 are shown in Figure 14.

[6] Prices for the period 2000 to 2012 were rebased.



	Malawi	Kenya	Namibia	South Africa	Tanzania	Zambia	Zimbabwe
Petrol	1.12	0.92	0.79	0.91	0.84	1.38	1.30
Diesel	1.11	0.85	0.78	0.79	0.80	1.15	1.19
Kerosene	0.88	0.62	2.37	0.51	0.80	0.81	0.90

Figure 14: Regional prices of petrol, diesel and kerosene in US Dollars[7] as at 31st December 2016

Generally the price for petrol ranged from US$0.79/litre to US$1.30/litre, while diesel ranged from US$0.78/litre to US$1.19/litre. Zambia had the highest price of petrol at US$1.38/litre, while Zimbabwe had the highest price of diesel at US$1.19/litre. Meanwhile the lowest was Namibia at US$0.78/litre for diesel and US$0.79/litre for petrol. The prices of kerosene were highest in Namibia at US$2.37/ litre, and lowest in South Africa at US$0.51/litre.

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[7] Prices for petrol and diesel in Figure 14 are for the year end (December 2016)