ENVIRONMENTAL ACCOUNTS STATISTICS

2018

Foreword

The National Statistics Bureau (NSB) is pleased to publish the Annual Environmental Accounts Statistics (EAS), 2018. The EAS presents green economy indicators, other environmental accounts such as electricity, fossil fuel (diesel, petrol, liquid petroleum gas or LPG and kerosene), fuelwood and briquette. It also includes asset accounts (timber, sand, stone aggregates and stone chips) and mineral accounts covering from 2010 to 2017. Further, the publication presents additional chapters on experimental energy and waste accounts for policy and planning purposes. This is the second publication by the Economic and Environment Statistics Division of the National Statistics Bureau.

The EAS is compiled using the framework of the System of Environmental – Economic Accounts (SEEA). We hope that the information in the report will be helpful in policy formulation, evaluation and monitoring of economic development plans and programs.

The National Statistics Bureau would like to sincerely thank and acknowledge all agencies, both government and private sector, for the continued support and cooperation in the publication of this report. We would appreciate any feedback or comments in improving this report for the larger benefit of data users.

Chhime Tshering
DIRECTOR
October, 2018
National Statistics Bureau

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Chapter 1: Introduction

1.1. Objective

The Annual Environmental Accounts Statistics (EAS) is intended to provide environmental related information in key economic sectors in Bhutan so that planners, policy makers, researchers and other data users can use the information for better decision and policy-making purposes.

The report aims to provide a good basis towards improved decision makings related to sustainable development and green economy. Improvement in the management of our environmental assets are critical in making sustainable use of our scarce resources and the environment has the capacity to continue providing inputs to the economy and society. It is for this reason that the state of environment and resource use needs to be monitored and reported on an annual basis to inform decision makers for long-term policy formulation relating to environmental assets.

Further, there are national requirements that provide the rationale for the development of such accounts. Bhutan places high priority for preservation and management of its nature and environment. The Article 5 of *The Constitution of the Kingdom of Bhutan* requires conserving the country's natural resources and to prevent degradation of the ecosystem, and maintain at least 60% of forest cover in the country for all times.

Environmental conservation is one of the pillars of GNH and it is integrated in every policy and developmental plans of the country. Some of our legal and policy documents such as, *The Forest and Nature Conservation Act (1995), National Forest Policy (2010), The National Environment Protection Act (2007) and The Five-Year Development Plans* emphasize sustainable utilization and management of natural resources.

Hence, the development of environmental related accounts is crucial, as it

provides primary information for improved decision making. The development and compilation of environmental economic accounts has become a core mandate of the Environmental Accounts Section of the National Statistics Bureau. ***The NSB compiles various environmental accounts in a phased manner and a full set of environmental economic accounts shall be published in the future as data and capacity issues are addressed.***

1.2. Method and Scope

The EAS adopts the System of Environmental-Economic Accounting (SEEA) Central Framework in preparing and developing environmental economic accounts.

The focus of the analyses is more on the physical quantities and values of environmental assets and explains the changes in these assets over a period of time. The physical and monetary (value) changes record additions to the stock of environmental assets due to new discoveries and reductions in the stock through extraction and natural loss.

The main focus of this report is on accounting electricity and fossil fuel (diesel, petrol, LPG gas, briquette & kerosene). Further, other accounts include asset accounts for major mineral production by type such as coal, dolomite, limestone, gypsum, marble, quartzite, stone and iron ore. In addition, fuelwood consumption account is also developed in our efforts to develop a full set of energy account. Experimental waste and energy accounts are presented as these are growing concerns for the government. As a part of additional asset accounts, timber resource account, aggregate stone, briquette, sand and stone chips supplied by the Natural Resource Development Co-operation and Department of Forest & Park Services are also compiled. The measurement scope of environmental assets is not limited to these accounts, but as and when the data are available, the NSB shall extend its effort to other natural resources accounts to help policy and planning.

1.3. Data revision

As in any other statistical organizations, the published figures are subject to revision based on the recent available information. As the publication draws information from annual reports of companies and co-operations, it undergoes revision as reported in the subsequent annual financial reports.

1.4. Reporting

The Environmental Accounts Statistics is reported on a calendar year basis.

Chapter 2: Green Economy Indicators

2.1. *Overview*

Green Economy or green growth is in the limelight of the global development agenda. There is a growing demand for green economy indicators both from policy and decision makers. Green growth economy indicators are pathway to sustainable development (WorldBank, 2012). Thus, the NSB compiles relevant core indicators that will inform and enhance our ability to sustainably manage our natural resources with minimal environmental impacts, increase resource efficiency and reduce waste.

2.2. *Demographic Indicators*

Indicators	Source	Unit	2013	2014	2015	2016	2017	Trend
*Total population, both sexes combined	PHCB/SYB/ Dzongkhag Population Projection of NSB	Nos	700,374	709,008	717,748	726,596	735,553	(+)
Population growth rate		%	1.3	1.3	1.3	1.3	1.3	(=)
Percentage of urban population		%	37.22	38.05	38.89	n.a	37.80	(+)
Growth rate of urban population		%	1.3	1.3	1.3	1.3	1.3	(=)
Population (age 65 and above), total, both sexes		Nos	36,509	37,553	38,656	36,983	36,509	(-)
Population density, inhabitant per km2		per km2	19.09	19.41	19.72	20.02	19.00	(-)
Life expectancy at birth, both sexes combined		Years	68.93	68.93	70.94	70.94	70.2	(-)

*Note: *population figures from 2013-16 are interpolated figures from PHCB 2017.*

2.3. *Economic Growth, Structure of Economy and Productivity Indicator*

Indicators	Web or table reference	Unit	2013	2014	2015	2016	2017	Trend
Real GDP, index	NAS Report, NSB	%	2.14	5.75	6.64	8.02	4.63	(-)
[base year as determined by the reporting country]		in Mil USD	1,798.57	1,944.78	2,060.23	2,219.83	2,528.95	(+)
GDP per capita		USD	2,463.8	2,610.45	2,870.41	3,055.11	3,438.16	(+)
Net Disposable Income [or Net National Income]		Mil Nu	97,873.97	108,821.87	118,172.01	137,660.20	146,708.73	(+)
Share of agriculture in GDP		%	16.10	16.69	16.71	16.64	17.37	(+)
Share of industry/manufacturing in GDP		%	8.33	8.08	7.98	7.43	7.25	(-)
Share of services in GDP		%	41.55	42.46	41.96	41.97	42.06	(+)

Proportion of cellular subscribers to total population	Annual Report of MoIC	%	74.3	88.6	94.1	96.1	99.3	(+)
Proportion of internet users of total population		%	34.3	46.9	63.5	77.8	98.7	(+)
Labour								
Labour force participation	DoE, MoLHR	%	65.3	62.6	63.1	62.2	63.27	(+)
Proportion of employment by relevant economic activities		Pry	189,245	192,369	199,640	198,429	166,646	(-)
		Second	36,805	36,749	33,263	30,137	63,852	(+)
		Tertiary	109,820	110,451	111,390	118,564	101,601	(-)
		∑ (in Nos)	335,870	339,569	344,293	347,130	332,099	(-)
Unemployment rate		%	2.9	2.6	2.5	2.1	2.4	(+)
Labour productivity [GDP per person employed]		in Mil USD	5,354.96	5,768.49	5,978.54	n.a	n.a	
Green jobs	No official publication	Nos	n.a	n.a	n.a	n.a	n.a	
Poverty, income distribution and other social issues								
Income inequality: GINI coefficient	Poverty Analysis Report, NSB		0.36	0.36	0.36	0.36	0.38	(+)
Percentage of population living in poverty and extreme poverty [measured by National/Regional poverty lines]		%	12	12	12	12	8.2	(-)
Proportion of population below $1.25 (PPP) per day		%	2.4	2.4	2.4	2.4	1.5	(-)
Educational attainment: at least completed lower secondary (ISCED 2 or higher), population 25+ years (%)	Annual Education Statistics, MoE	%	74.2	74.2	74.2	74.2	74.2	(=)
Total net enrolment ratio in primary education [both sexes]		%	96	95	95.2	95	96.6	(+)
Total public expenditure on education as a percentage of GDP	NAS Report, NSB	%	n.a	4.87	3.86	2.19	1.88	(-)
Total expenditure on health per capita (PPP)	NAS Report, NSB	Nu	n.a	n.a	2,576.50	2,028.50	2,212.70	(+)
Inflation and commodity prices								
Consumer price index		%	8.77	8.3	4.58	3.22	4.96	(+)
Export prices of three major commodity groups [as determined by the reporting country]	Trade Statistics & DGPC	Nu	1. Electricity = 2.12	1. Electricity = 2.12	2.12	2.12	THP/KHP=2.12, CHP=2.55	(+)
			2. > 55% Silicon = 69.92			61.6		(-)
			3. Other cross section= 31.9			22.68		(-)
International trade and tourism								
Relative importance of trade: (exports + imports)/GDP	NAS Report, NSB	Mil Nu	1.03	0.94	0.93	0.83	0.54	(-)
International tourist arrivals in % to population	Annual Report, TCB	%	6.04	9.14	6.45	7.10	9.71	(+)

International tourism, receipts	Annual Report, TCB	in Mil USD	63.5	73.2	71.04	73.74	79.81	(+)

*Note: * Based on population projection figures of NSB. The crude death rate has been adjusted.*

2.4. *Environmental and Resource Productivity Indicator*

Indicators	Web or table reference	Unit	2013	2014	2015	2016	2017	Trend
Carbon emissions								
Carbon dioxide emissions (CO2), thousand metric tons of CO2	UNFCC Report	Mt.	1,559,560	1,559,560	1,559,560	1,559,560	1,559,560	(=)
Carbon dioxide emissions (CO2), metric tons of CO2 per capita		Tons/Capita	2.13	2.09	2.06	2.03	2.12	(=)
Carbon dioxide emissions (CO2), kg CO2 per $1 GDP (PPP)		Mt/GDP	1.74	1.72	1.69	n.a	n.a	
Energy								
Energy productivity [Nu. per ktoe]	Env. Accounts Statistics, NSB	Nu./ktoe	0.0003	0.0003	0.0003	0.0004	0.0003	(-)
Energy consumption per capita [total or final]		ktoe/person	0.0004	0.0004	0.0005	0.0005	0.0006	(+)
Energy intensity [ktoe per Nu.]		ktoe/Nu.	3,772.58	3,510.22	3,377.36	3,534.06	3,335.86	(-)
Renewable energy supply		Gwh	7,549.84	7,163.79	7,745.89	5,959.29	7,721.43	(+)
Renewable electricity [% total electricity generation]		%	100	100	100	99.99	99.99	(=)
Fuelwood, production [thousand cubic metres]		1000 m^3	108.66	103.40	125.49	140.29	132.20	(-)

2.5. *The Natural Asset Base Indicator*

Indicators	Web or table reference	Unit	2013	2014	2015	2016	2017	Trend
Renewable resources								
Forest area	Forestry Facts & Figure, MoAF	Sq. km	27,053	27,053	27,053	27,053	27,053	(=)
Proportion of land area covered by forest [percentage]		%	70.5	70.5	70.5	70.5	71.00	(=)
Natural forest as % of total forest area		n.a	n.a	n.a	n.a	n.a	99.25	
Planted forest as % of total forest area		ha	n.a	n.a	n.a	n.a	0.75	(-)
Deforestation [Ha and % of forest area per year]			n.a	n.a	n.a	n.a	0.01	
Fish catch, total [marine and freshwater]	DoL	kg	54,661	119,086	149,109	187,361	199,918	(+)
Non-renewable resources								
Mineral resources: stocks or reserves of selected minerals, including fossil fuels and critical raw materials, as		Type						

determined by the reporting country								
Extraction rates of selected minerals, including fossil fuels and critical raw materials, as determined by the reporting country	DGM	Dolomite (mt)	1,740,015.95	2,040,690.96	2,662,309.68	2,367,659	2,546,256	(-)
		Limestone (mt)	1,006,234.63	1,122,825.09	850,431.17	1,257,101	1,235,162	(+)
		Gypsum (mt)	351,420.64	414,147.54	389,364.8	317,597	328,128	(+)
		Coal (mt)	77,743.58	121,890.58	85,164.45	117,783	161,527	(+)
		Marble (sq ft)	60,708.49	61,921.1	97,647.84	75,031	96,567	(-)
		Quartzite (mt)	90,909.28	83,907.14	79,818.5	92,770	175,501	(+)
		Talc (mt)	9,584.24	12,601.37	5,807.27	2,261	1,293	(-)
		Stone (mt)	38,542.28	1,474,394.94	2,203,065.41	341,4215	38,28254	(+)
		Granite (mt)	6,463.81	4,362.21	3,889.05	n.a	26,423	
		Phyllite (mt)	13,818.4	40,076.71	40,417.25	41,800	61,910	(+)
		Calc Tufa (mt)	n.a	n.a	n.a	n.a	n.a	
		Iron Ore (mt)	20,505.81	18,997.37	43,201.96	28,065	32,974	(-)
		Clay (mt)	15,165.66	10,208.95	n.a	n.a	n.a	
Proportion of agricultural area to total land area	RNR statistics	%	2.93	2.93	2.93	2.93	2.93	(=)
Area equipped for irrigation as % of agricultural area	RNR statistics	%	94.2	94.2	94.2	94.2	94.2	(=)
Arable land, % total land area	RNR statistics	%	2.93	2.93	2.93	2.93	2.93	(=)
Pasture, % total land area		%	n.a	n.a	n.a	n.a	n.a	
Land area affected by degradation, by type of degradation, as % of total land area		%	0.54	0.54	0.54	0.54	0.54	(=)
Proportion of organic agricultural area in total agricultural area		%	n.a	n.a	n.a	n.a	n.a	
Pesticides used on crop areas [kg / ha]		kg/hec	205.23	218.35	4,876.14	n.a	n.a	
Chemical fertilizers used, kilogram per hectare of crop land		kg/hec	26.05	26.75	31.15	32.31	n.a	(+)
Natural fertilizer use, kilogram per hectare of crop land			n.a	n.a	n.a	n.a	n.a	
Biodiversity and ecosystems								
Number of known flora and fauna species by status category	NBC	Nos	5,603 Vascular plants	5,603 Vascular plants	5,603 Vascular plants	5,604 Vascular plants	5,604 Vascular plants	(=)
			400 Lichens	400 Lichens	400 Lichens	401 Lichens	401 Lichens	(=)
			200 Mammals	200 Mammals	200 Mammals	201 Mammals	201 Mammals	(=)
			700 Birds appx	700 Birds appx	700 Birds appx	701 Birds appx	701 Birds appx	(=)
Number of endemic flora and fauna species by class (mammals, reptiles, etc.)	National Paper on Biodiversity Persistence and Climate Change,	Nos	105 endemic plants	105 endemic plants	105 endemic plants	106 endemic plants	106 endemic plants	(=)
			27 Globally Threatened mammals	27 Globally Threatened mammals	27 Globally Threatened mammals	28 Globally Threatened mammals	28 Globally Threatened mammals	(=)

	2011 of NBC		18-Critically endangered & vulnerable birds	18-Critically endangered & vulnerable birds	18-Critically endangered & vulnerable birds	18-Critically endangered & vulnerable birds	18-Critically endangered & vulnerable birds	(=)
% of threatened flora and fauna species by class (mammals, reptiles, etc.)		%	n.a	n.a	n.a	n.a	n.a	
Proportion of terrestrial protected areas to total surface area, %	MoAF	%	51.32	51.32	51.32	51.32	51.32	(=)
Footprints								
Ecological footprint	GNHC	hec/capita	n.a	1.8	1.8	1.8	1.8	(=)

2.6. *The Environmental Dimension of Quality of Life Indicator*

Indicators	Web or table reference	Unit	2013	2014	2015	2016	2017	Trend
Environmental health and risks								
Concentration of particulate matter (PM10) in urban air [main cities]	NEC	Microgram/m3	37.47	44.50	45.51	43.88	40.28	(-)
Environmental services and amenities								
Proportion of total population using an improved drinking water source	BLSS Report/SYB, NSB	%	92.6	92.6	92.6	92.6	98.6	(+)
Proportion of urban population using an improved drinking water source	BLSS Report	%	99.50	99.50	99.50	99.50	99.60	(+)
Proportion of rural population using an improved drinking water source	BLSS Report	%	97.20	97.20	97.20	97.20	98.00	(+)
Proportion of total population using an improved sanitation facility	BLSS Report	%	66.30	66.30	66.30	66.30	74.80	(+)
Proportion of urban population using an improved sanitation facility	BLSS Report	%	92.60	92.60	92.60	92.60	84.72	(-)
Proportion of rural population using an improved sanitation facility	BLSS Report	%	57.90	57.90	57.90	57.90	69.00	(+)
Municipal waste collected [total]	Annual Info Bulletin, MoWHS	Tons	17246.25	17246.25	20429.05	25367.5	30966.6	(+)
Municipal waste collected [per capita]	Annual Info Bulletin, MoWHS	Tons per capita	0.066	0.064	0.07	0.09	0.11	(+)

2.7. *Policy Responses and Economic Opportunities Indicator*

Indicators	Web or table reference	Unit	2013	2014	2015	2016	2017	Trend
Regulations and management								
Annual government environment protection expenditure [as % of government expenditure and/ or as % of GDP]	Public Expenditure Review Report	% of GDP	2.6	2.6	2.6	2.6	2.6	(=)
Participation in multilateral environmental agreements [list and number of MEAs]	NEC	Nos	15	15	15	15	15	(=)
Number of regulated pollutants by media [water, air, soil, etc.]	Environmental Standards - 2010 (NEC)	Water = 5	Water = 5	Water = 5	Water = 5	Water = 5	Water = 5	(=)
		Industrial effluent = 32	Industrial effluent = 32	Industrial effluent = 32	Industrial effluent = 32	Industrial effluent = 32	Industrial effluent = 32	(=)
		Sewerage effluent = 3	Sewerage effluent = 3	Sewerage effluent = 3	Sewerage effluent = 3	Sewerage effluent = 3	Sewerage effluent = 3	(=)
		Ambient air = 5	Ambient air = 5	Ambient air = 5	Ambient air = 5	Ambient air = 5	Ambient air = 5	(=)
		Industrial emission = 4	Industrial emission = 4	Industrial emission = 4	Industrial emission = 4	Industrial emission = 4	Industrial emission = 4	(=)
		Workplace emission = 5	Workplace emission = 5	Workplace emission = 5	Workplace emission = 5	Workplace emission = 5	Workplace emission = 5	(=)
		Vehicle emission = 2	Vehicle mission = 2	Vehicle emission = 2	Vehicle emission = 2	Vehicle emission = 2	Vehicle emission = 2	(=)
		Noise level = 3	Noise level = 3	Noise level = 3	Noise level = 3	Noise level = 3	Noise level = 3	(=)
Green taxes (number and/or annual revenue)	AFS, MoF	Mil Nu	35.937	1.68	545.87	1,007.121	909.652	(-)
International financial flows								
Official Development Assistance, total	AFS, MoF	Mil Nu	9,562.636	14,236.353	9,955.02	14,890	12,987	(-)

Chapter 3: Electricity Account

3.1. *Overview*

Electricity sector is the leading contributor to growth of the economy and accounts for a major share of the total GDP of Bhutan. The share of electricity sector to the overall GDP has been increasing and accounted for almost 13.22% of the total GDP in 2017.

Hydropower is the major source of energy resources in Bhutan. Apart from hydropower and solar, most energy resources are non-renewable. Hence, it is important to understand the stock, the rate at which these types of energy resources are being tapped into. Although hydropower is the main source of energy in Bhutan, for the transport sector until such time that electric transport technologies are economically viable, Bhutan will continue to depend on fossil fuel, which is not clean energy.

3.2. *Hydro-electricity: Supply & Consumption*

The supply of electricity decreased to 7,929.53 Gwh in 2017 from 8,072.40 Gwh in 2016, which is a fall of 2%. The average growth of electricity supply was around 10% from 2001 to 2017. Import accounted for slightly more 3% of the total supply in 2017, an increase by almost 84% as compared to 2016. In monetary terms, the supply of electricity has decreased from Nu. 13,105.44 million in 2016 to Nu. 12,718.20 million in 2017, a drop by almost 3%.

The consumption of electricity by industries dropped by almost 21% in 2017 as compared to 2016. At an aggregated level, industry accounted for almost 45% of the total consumption while consumption by household accounted for the remaining 55%.

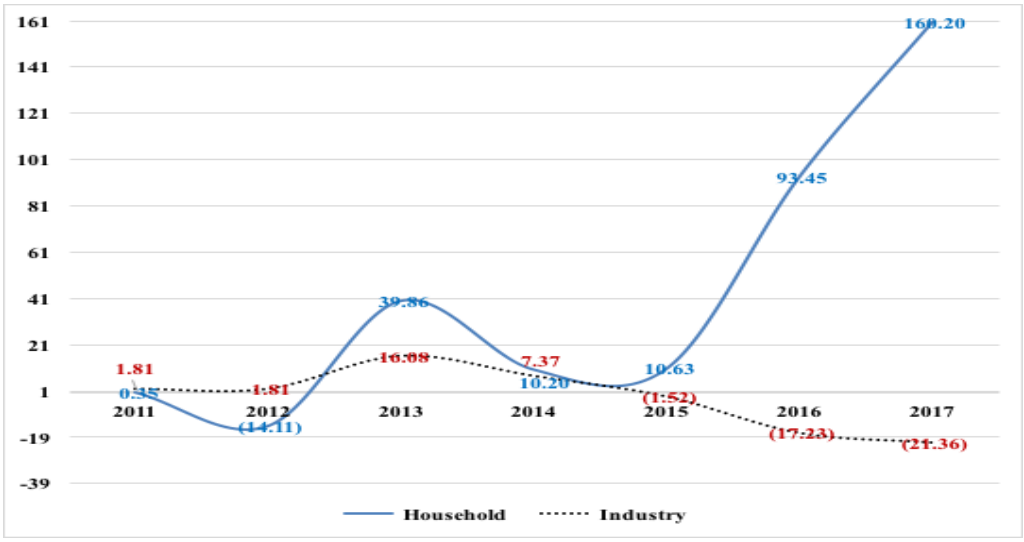

Figure 1 Consumption growth of electricity

In terms of share, manufacturing sector leads the consumption of electricity with almost 90% followed by Electricity and Water Services with 4% and the Community Social & Personal Services with 3%. The overall domestic consumption of electricity decreased by 2% in 2017 compared to 2016. The export share decreased by 8% in 2017.

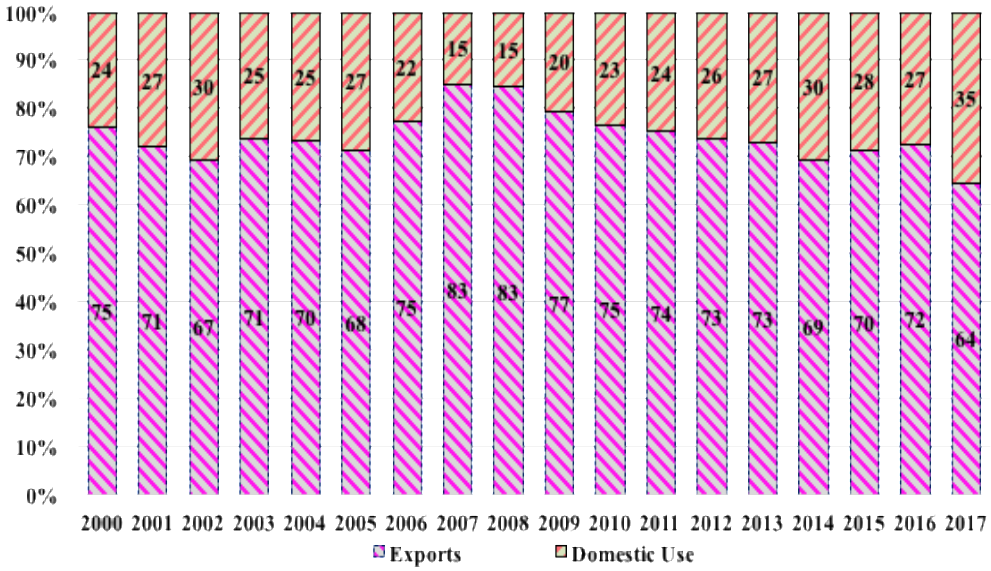

Figure 2 Share of export and domestic use

3.3. *Electricity Trade and Transmission Loss*

Although Bhutan is a net exporter of electricity, the country does import

electricity during the lean season. In 2017, export of electricity dropped by slightly more than 12% while import increased by slightly more than 84%.

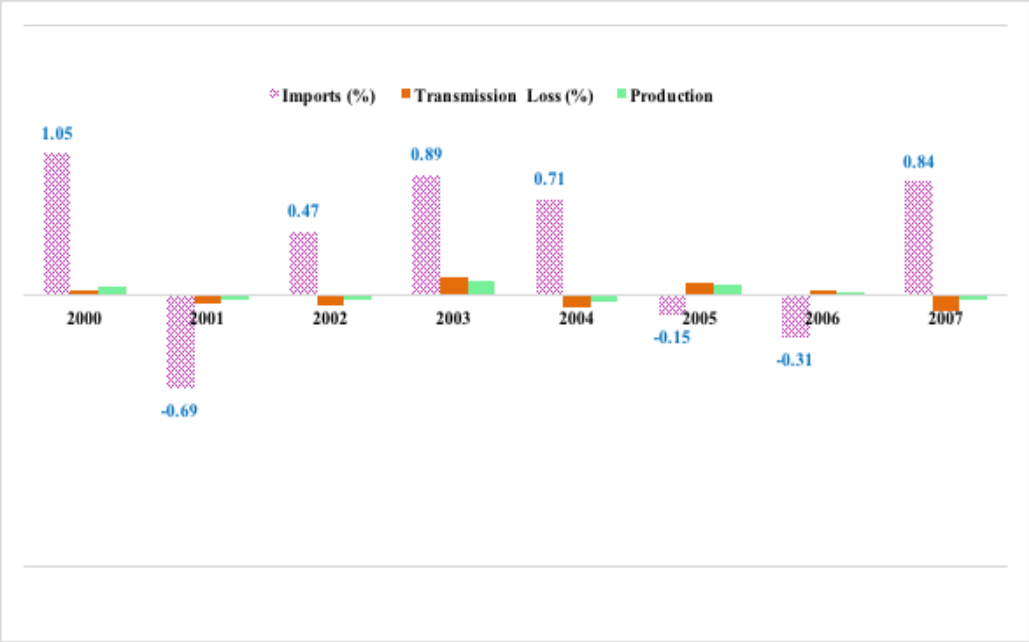

Figure 3 Growth in production, import and transmission loss

In terms of the transmission loss [1], it has remained almost constant. The transmission loss, when calculated as the percentage to total generation is not so significant. In 2017, the loss as the percentage of generation barely accounted for 1%.

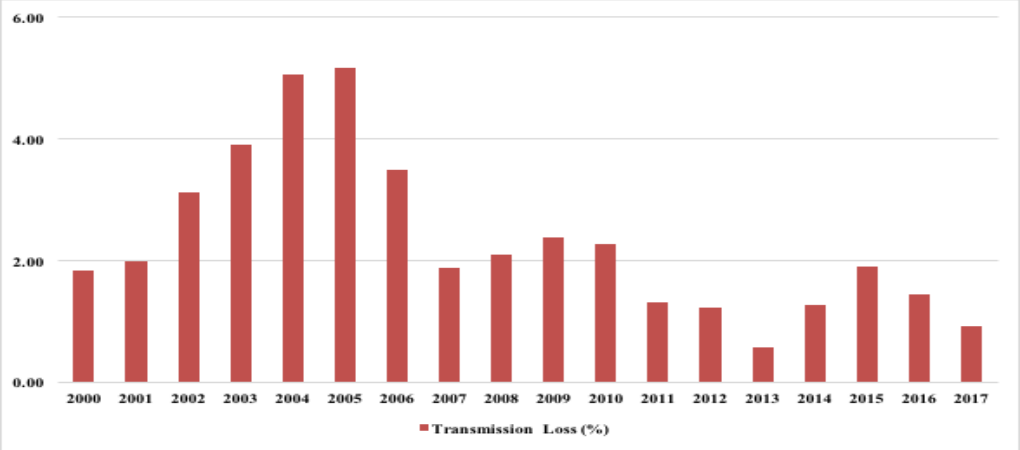

Figure 4 Transmission loss as percentage of generation

[1] *The transmission losses are the energy losses through cables.*

Chapter 4: Fuel Account

4.1. *Fossil Fuel: Supply & Consumption of Diesel & Petrol*

Bhutan does not produce any fossil fuel. Fossil fuels such as diesel, petrol & LPG gas is imported from India. India is our major trading partner. Import of diesel grew by 10% in 2017 as compared to 4% in 2016, an increase of almost 6 percentage points. Petrol import grew by 8% in 2017 compared to 6% in 2016, an increase of almost 2 percentage points.

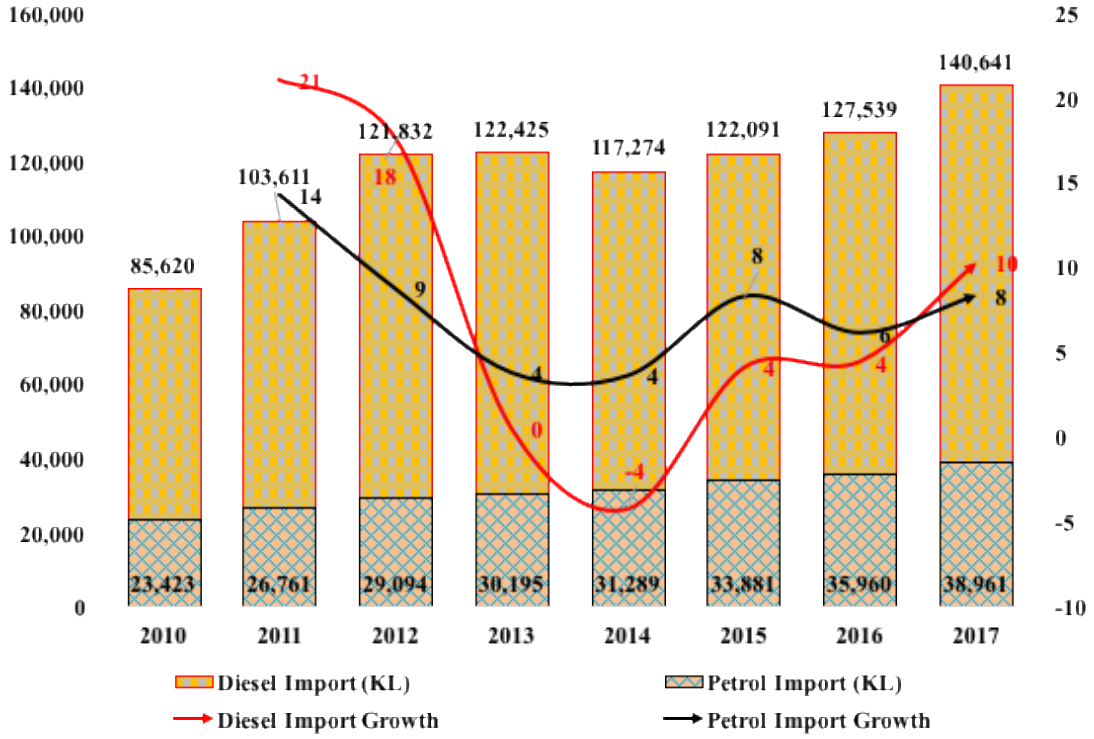

Figure 5 Fuel imports and growth trends

The total supply of fuel increased from 163,499 KL in 2016 to 179,601 KL in 2017, which translated to a total supply increase of 10%. The uses of petrol and diesel are directly proportional to import growths of 8% and 10% respectively.

In terms of consumption, service sector accounts for a little more than 38%, the highest, followed by industrial sector at 22%, household at 21%, agriculture sector at almost 13% and consumption by foreign vehicles at 7% in 2017. Further, in terms of percentage share, diesel import accounts for 78% while petrol accounts for 22%.

The consumption of fuel in values adjusting for trade and transport margin recorded at

Nu. 10,148 million from Nu. 8,977.02 million in 2016, an increase of almost 13% in 2017.

4.2. *Import of vehicles over the years by Industries and Households*

The number of vehicles imported over the years has gradually increased. In 2017 alone, 7,954 units of vehicles were imported. Import of light vehicles was the highest at 4,916 units followed by heavy vehicles at 754 units, taxi at 732 units, two wheelers at 545 units, earth moving equipment at 460 units, power tiller & tractor at 411 units, medium vehicle at 132 units and electric vehicle at 4 units. As of 31st December 2017, there were 92,008 units of vehicles in the country.

In terms of ownership, household sector owns the highest with 62% followed by service sector with 24%, and others such as industries and agriculture, livestock & forestry sector accounts for close to 15%.

4.3. *Import and re-export[2] of Fossil Fuel*

From the total import of petrol and diesel, some portion is consumed by Indian vehicles plying on Bhutanese roads transporting goods in and out of Bhutan. It also includes fuel consumed by Indian tourist vehicles and refueling by Indian vehicles in the border towns of Samdrup Jongkhar, Gelephu, Phuentsholing and Samtse.

Bhutan imported around 0.14 million kiloliters of diesel in 2017 as compared to 0.13 million kiloliters in 2016, an increase of around 10%. The import of petrol in 2017 increased to 0.04 million kiloliters from 0.035 million kiloliters in 2016, an increase of almost 8%.

The re-export of fuel decreased to 0.01 million kiloliters in 2017 from 0.013 million kiloliters in 2016, a decrease by almost 12%. The re-export of diesel was almost 38% in 2017 compared to increase in the re-export of petrol by almost 13%.

[2] *Re-export is a term used for refueling by vehicles that are not registered in Bhutan*

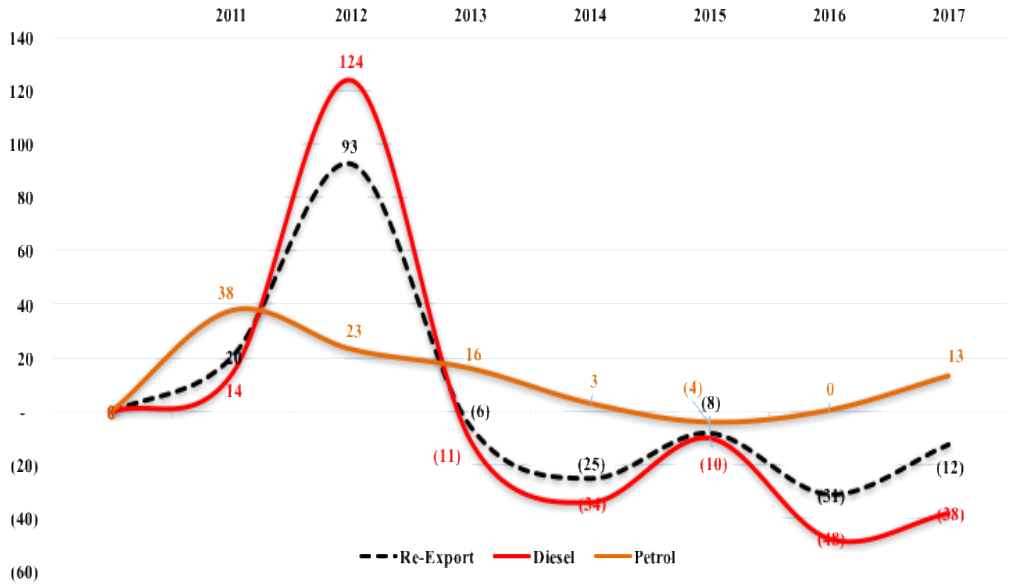

Figure 6 The growth of re-export of fuel

4.4. *Kerosene: Supply & Consumption*

Kerosene is imported from India. Import of kerosene decreased from 4,791 KL in 2016 to 4,238 KL in 2017. The import decreased by almost 12% in 2017 compared to positive growth of 4% in 2016.

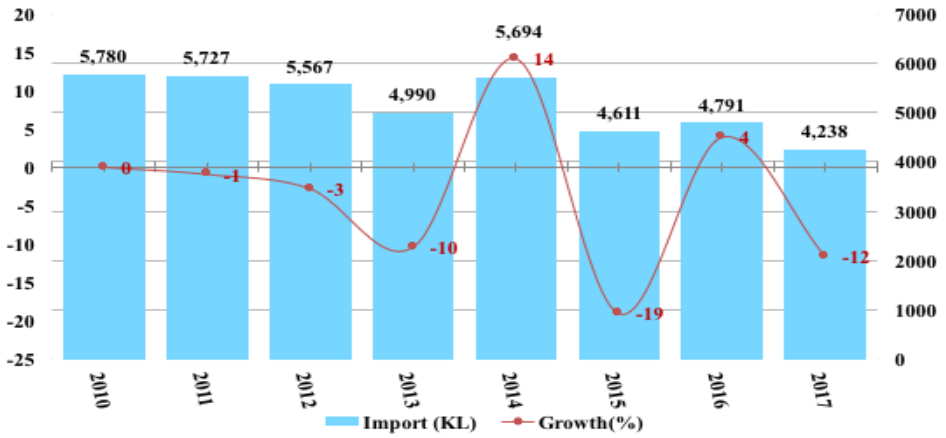

Figure 7 Import of kerosene and growth trend

Kerosene is mostly consumed by households. In the absence of reliable data on consumption, the NSB aggregated the consumption by households and industry based on the import share of kerosene (Quota) and kerosene (industrial) as provided by the Dept. of Trade, MoEA. Considering the national average household size of 3.9 and the

population of 735,553 in 2017, a household consumes an average of 23 litres a year.

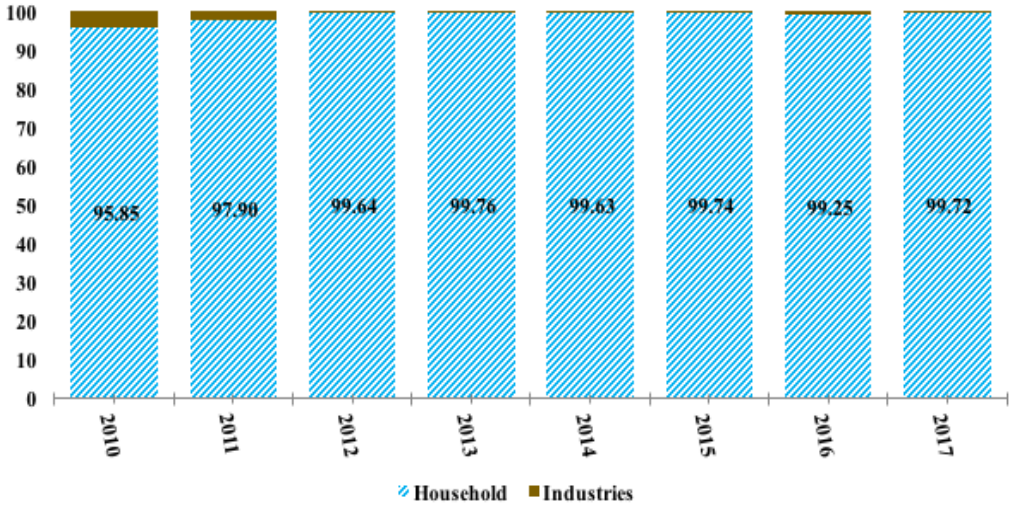

Figure 8 Consumption share of kerosene

In monetary terms, Nu. 98.41 million worth of kerosene was imported in 2017 compared to Nu. 66.06 million in 2016. The import value, which is in basic price, is re-adjusted to purchasers' price. In total, the supply of kerosene grew from Nu. 77.67 million in 2016 to Nu.103.06 million in 2017.

4.5. *LGP: Supply & Consumption*

Like fossil fuel, Bhutan relies on import of LPG from India. The use of electric cooking stoves is not common in Bhutan unlike in other countries. Thus, Bhutanese households use LPG for cooking and heating purposes. The import of LPG increased from 8,711.57 Mt in 2016 to 9,298.54 Mt in 2017, an increase of almost 7%.

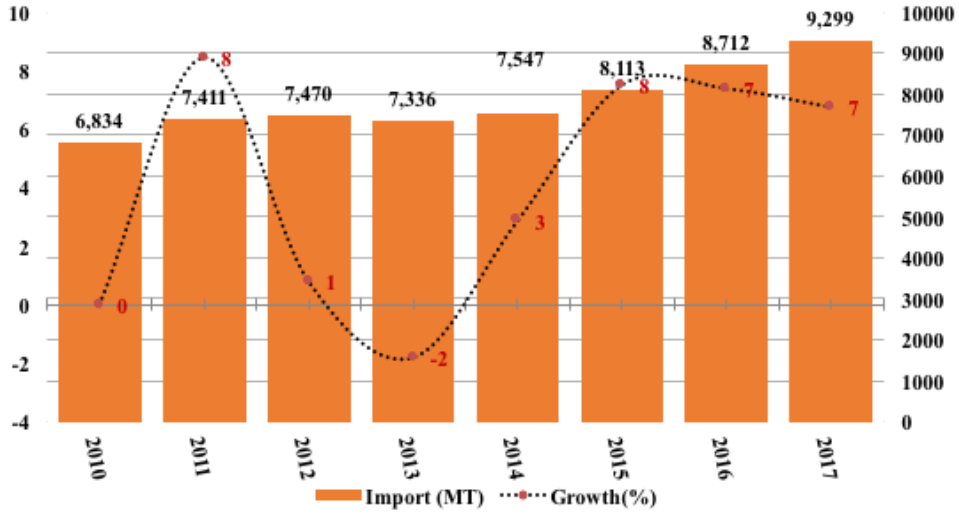

Figure 9 LPG import and growth trend

The consumption of LPG by industries increased from 1,118.34 Mt in 2016 to 1,251.72 Mt in 2017, an increase of 12%. On the other hand, consumption by households grew from 7,593.23 Mt in 2016 to 8,046.82 Mt in 2017 which was an increase of 6%.

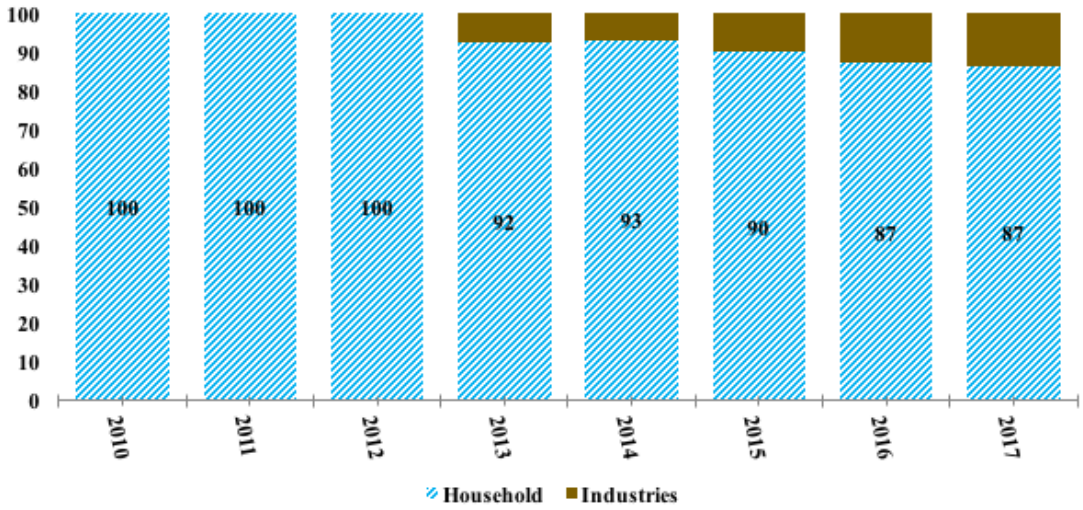

Figure 10 Consumption share of LPG

In order to estimate the number of cylinders a household consumes, the import value, which is in Mt, was converted to number of cylinders by considering the net weight of the cylinder, which is 14.2 kg per cylinder. In 2017, a total of 566,677 LPG cylinders were consumed compared to 534,735 cylinders in 2016. Thus, considering the national average household size of 3.9 and population of 735,553 in 2017, a household consumes, an average of, 3 cylinders a year.

4.6. *Fuelwood: Supply & Consumption*

Fuelwood continues to be a critical source of energy for rural households. Natural Resource Development Corporation Ltd. and Department of Forest and Park Services, Ministry of Agriculture and Forests supply fuelwood to both rural and urban population in Bhutan.

The supply of fuelwood decreased by 6% in 2017 compared to positive growth of 12% in 2016. Fuelwood supply to rural household are mostly by the DoFPS, MoAF while NRDCL supplies to industries. In terms of the overall share, fuelwood supply by NRDCL is about 26%, while supply by DoFPS, MoAF was about 74%.

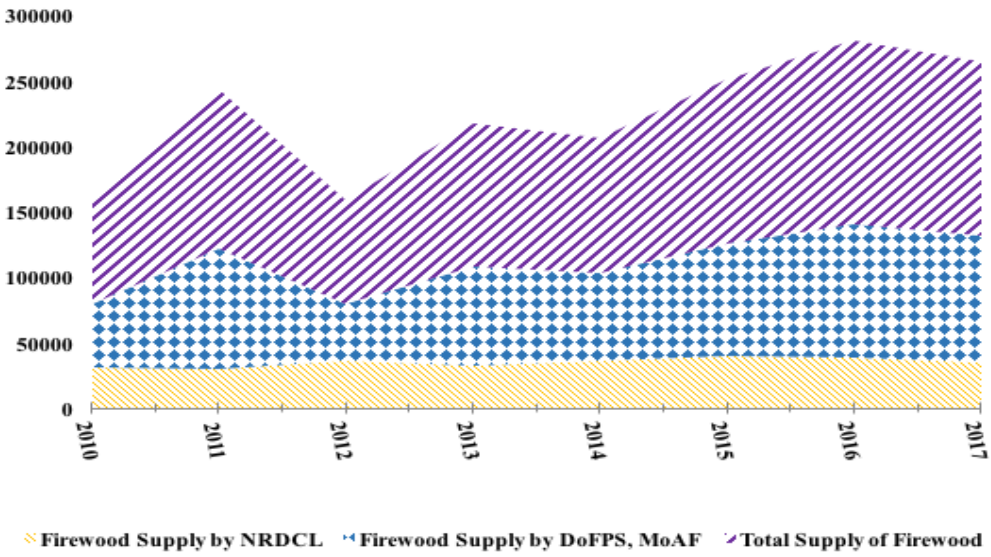

Figure 11 Fuelwood supply

The consumption of fuelwood by households was about 47% while industries consumes 53%. In terms of the monetary value, the royalty realized by DoFPS, MoAF was about Nu. 9.64 million in 2017, while the revenue from fuelwood sale by NRDCL was about Nu. 7.61 million. The overall revenue from the sale of fuelwood increased from Nu. 10.15 million in 2016 to Nu. 17.25 million in 2017.

4.7. *Briquette: Supply & Consumption*

The demand for briquette is provisioned through NRDCL. Although there may be some

private sawmills that produce briquette, the figure is insignificant. The stock of briquette decreased by 1% in 2017 while disposal fell by 30%.

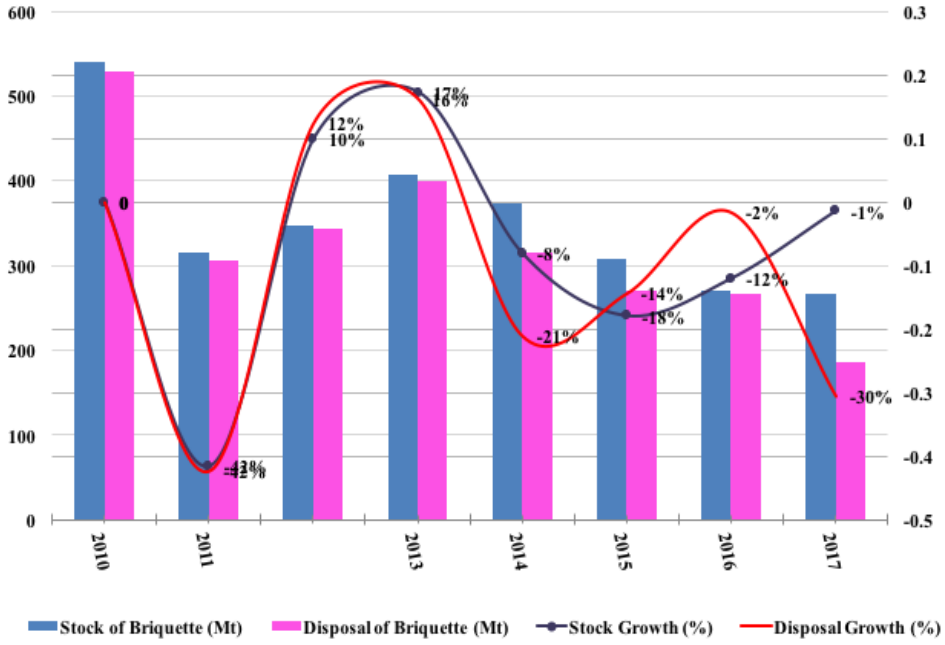

Figure 12 Briquette production, disposal and growth trend

Chapter 5: Asset Account

5.1. *Introduction*

The SNA 2008 defines an asset *"as a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time*". NSB compiled asset account for natural resources such as timber, sand, stone aggregates and stone chips supplied and disposed by NRDCL and the Department of Forest and Park Services, MoAF. In addition, NSB included mineral resources. The mineral resources comprised known deposits of natural resources, coal, non-metallic minerals and metallic minerals. The valuation of accounts includes valuation of stocks of the resources and the changes in stocks over the accounting periods.

The System of Environmental-Economic Accounting (SEEA) Central Framework provides that the flows of extraction, depletion and discoveries are central to asset account, which provides valuable information regarding the sustainability of individual resources.

5.2. *Timber: Supply & Consumption*

Timber is used particularly for construction purposes, renovation of Dzongs & Lhakhangs, rural constructions, etc. NRDCL supplies timber for commercial use while DoFPS, MoAF supplies both for commercial, concessional and some distributed for free.

The total timber supply in the economy decreased by 19% in 2017. The supply by NRDCL decreased by almost 11% while supply by MoAF dropped by almost 21% in 2017. In terms of monetary value, the timber production is estimated at Nu. 284.73 million in 2017 compared to Nu. 289.68 million in 2016, which is a drop of almost 2%.

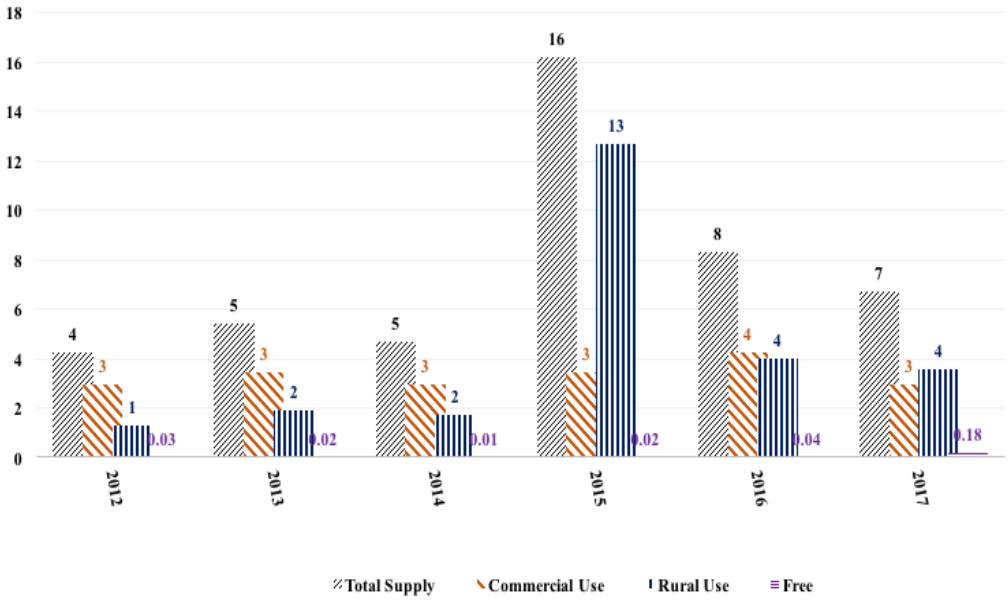

Figure 13 Supply of timber

The consumption of timber by different sectors of the economy could not be estimated, as NSB couldn't get any relevant information.

5.3. *Mineral Asset Account*

NSB compiled mineral accounts for only non-metallic mineral resources as information on metallic mineral resources in Bhutan are not available. The DGM, MoEA has the primary data to start the compilation of mineral asset account for non-metallic mineral resources. The key factors in the measurement of mineral asset accounting are understanding the mineral resources in the form of deposits or reserves and its extractions by different mining and quarrying companies. The deposits influence the likelihood and the cost of current and future extraction.

Mineral resources (non-metallic) in Bhutan are resources which are geologically known and extracted by mining and quarrying companies. The non-metallic resources include quarry recourses that are found in the country such as coal, dolomite, limestone, gypsum, quartzite, talc and iron ore.

The physical mineral asset accounts show the level of stock of individual mineral at a particular point in time and then records transactions that cause changes in the level of

stock. NSB considered reserves of minerals which are geologically known reserves and its level as the opening stock, while the extractions were recorded as depletion.

5.3.1. Mineral Reserve

The data on reserves used in developing physical accounts are gathered so that we can understand the opening stock of individual mineral resources. There are three categories of mineral resources: proved, probable and possible. *Proved are economically mineable with high degree of certainty (high confidence level). Probable are economically mineable with lower level of confidence than proved reserves. Possible minerals are part of a mineral resource for which grade and mineral content are estimated with a low level of confidence.*

Metallic reserves particularly copper, iron ore and tungsten are probable reserve, while lead-zinc reserve constitutes 86% as proven reserve. Non-metallic reserve such as Talc (100%), Dolomite (99.68%) and coal (78.68%) are possible reserve. Quartzite and gypsum are proven reserve with 100% and 85% respectively.

In terms of overall reserve, the country has 1.04 million Mt of coal, 14,542.47 million Mt of dolomite, graphite ore 48.75 million Mt, gypsum 134.22 million Mt, limestone 164.65 million Mt and quartzite 5.18 million Mt. Non-metallic mineral such as copper has reserve of 2.04 million Mt, lead-zinc 3.30 million Mt, iron-ore 2.69 million Mt and tungsten 3.87 million Mt.

5.3.2. *Extraction of Minerals*

Mining and quarrying companies extract minerals from different areas in the country. Information on extraction of minerals are compiled to ascertain whether or not mineral extractions or harvest per se, are carried out sustainably.

Coal extraction averages 0.09 million Mt annually. The extraction ranges from 0.09 million Mt to 0.16 million Mt. Extraction of dolomite on the other hand has occurred on an average of 0.95 million Mt. The extraction of dolomite in 2017 was 2.54 million Mt compared to 2.37 million Mt in 2016. Limestone and gypsum extractions have been quite

steady with an average of 0.65 million Mt and 0.25 million Mt respectively.

The talc extraction increased dramatically in 2017 with 3.83 million Mt from 1,293 Mt in 2016. The only metal accounted in this report is iron ore, averages annual extraction of 0.01 million Mt.

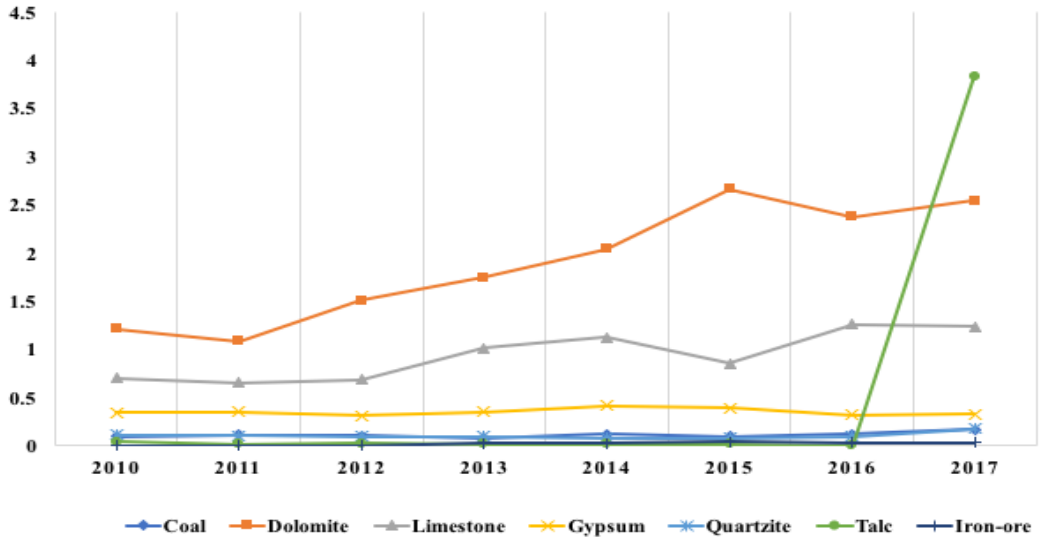

Figure 14 Trend in mineral extraction

5.3.3. *Physical Asset Account for Minerals*

The physical asset account records both the opening stock levels and the closing stock of minerals and the changes over a period of time. The changes over a period of time include both upward and downward. The total reserve of a particular mineral resource was considered as the opening stock in 2010, as it is done in many other countries. Extractions by different mining and quarrying companies are accounted and thus, subtracted from the total known reserves to ascertain the outstanding reserves of individual mineral resources. Here, the outstanding reserves does not necessarily mean reserves remaining from the known reserve, but also unknown reserve in the ground.

The physical asset account for different minerals records the opening stock: the level of coal resources at the beginning of the year; increases in stocks through discoveries and other increases; the decrease in stock through extractions and other decreases; and the closing stock at the end of the accounting year. Coal reserve as of 2017 was estimated at 0.18 million Mt; dolomite at 14,527.32 million Mt; limestone at 157.47 million Mt;

gypsum at 132.70 million Mt; quartzite at 4.45 million Mt; talc at 0.03 million Mt; and iron-ore at 2.54 million Mt.

In terms of remaining mineral reserve from the known reserve, the balance coal reserve as of 2017 is about 17%, talc 26%, dolomite 99%, gypsum 99%, limestone 96%, iron ore 97% and quartzite 86%. These are minerals that are still heavily available in the ground in relation to total known reserve.

5.3.4. *Monetary Asset Account for Minerals*

The monetary asset account for mineral resources shows the value of an individual mineral at 2017 prices. The Net Present Value (NPV) approach is adopted to value the mineral resources. The formula for the calculation of NPV using an appropriate discount rate is:

$$V_t = \sum_{r=1}^{Nt} \frac{RR_{(t+r)}}{(1 + r_t)^t}$$

where V_t is the value of the asset of time t; N is the asset life; RR is the resource rent; and r is a nominal discount rate.

In this calculation, NSB derived the harvest or actual quantity of extraction of individual mineral on the total volume of mineral resource left for future extraction dividing by the number of years, lease period provided to mining and quarrying companies. The resource rent for each mineral resource is calculated using company's books of accounts. The NPV of future extraction are discounted back to current value term using appropriate discount rate.

In most countries around the world, in the absence of any appropriate discount rate, lending or interest rate is used as the basis to estimate the discount factor. For the current initiative, NSB used Bank of Bhutan's fixed lending rate of 12 percent to Mining & Quarrying Companies as the discount rate.

The monetary asset account shows the value of mineral resources at 2017 prices. For

coal, if constant extraction of 0.10 million Mt is maintained for future years with constant per unit future resource rent of Nu. 2,248 and the constant social discount rate of 12%, the net present value (NPV) of coal for future extractions was estimated at Nu. 397 million under the above assumptions. For determining constant extraction quantity, 5-year moving average approach was applied.

Dolomite extraction was much lower as compared to the available resources. With the same assumptions, the estimated monetary value of dolomite is valued at Nu. 1,870,924.65 million. Further, the gypsum mineral was estimated at Nu. 29,041.98 million and quartzite at Nu. 1,008,494.83 million.

Chapter 6: Experimental Energy Account

6.1. Overview

Some 13% of the global population still lacks access to modern electricity. Energy is the dominant contributor to climate change and it accounts for almost 60% of the total global Ghg emission. SDG goal 7 targets that by 2030, to ensure universal access to affordable, reliable and modern energy services. Bhutan has promised to remain carbon neutral for eternity (UN Climate Change Conference, Paris).

The experimental energy accounts presented in this publication is in accordance with the principles of the System of Environmental-Economic Accounting (SEEA). It records flows of energy in physical units from the initial extraction or capture of energy resources from the environment into the economy; the flows of energy within the economy in the form of the supply and use of energy by industries and households; and flows back to the environment.

The SEEA 2012 recommends energy flow accounts as important indicators such as energy intensity, efficiency and productivity can be derived for policy purposes. The SEEA recommends physical supply and use (PSUT) approach to account for energy flows. The PSUT records flows of energy from natural inputs, energy products, energy residuals and other residual flows in physical units of measure. It is based on the principle that the total supply of energy products equals total use of energy products.

For Bhutan, hydro-electricity is the main source of energy. However, to cater energy needs of other economic sectors such as for industries and transport sector, energy products like coal and fossil fuels are imported from India. Using the latest available information from the Bhutan Trade Statistics (BTS) of Ministry of Finance and data from other administrative sources, the experimental energy accounts is compiled. It adopts the ***Standard International Energy Product Classification*** (SIEC) and uses ***Intergovernmental Panel on Climate Change (IPCC)*** Conversion Factor (CF). The CF used is as follow:

Fuel	Basic Unit	Terajoules	Tonnes of Oil Equivalent (ToE)	Petajoules
ATF (Jet Kerosene)	kl	0.03561	0.8505	0.000036
Coal (Anthracite)	MT	0.02670	0.6377	0.000027
Coal (Sub-bituninous)	MT	0.01890	0.4514	0.000019
Other Coal (Lignite)	MT	0.01190	0.2842	0.000012
Coke of Coal	MT	0.02820	0.6735	0.000028
Diesel (Gas Diesel Oil)	kl	0.03741	0.8935	0.000037
Electricity	GWh	3.60000	85.9845	0.003600
Wood (fuelwood and Briquette)	MT	0.01560	0.3726	0.000016
Kerosene	kl	0.03590	0.8578	0.000036
LPG	MT	0.04730	1.1297	0.000047
Petrol (Motor Gasoline)	kl	0.03411	0.8147	0.000034
Bio-gas	MT	0.05040	1.2038	0.000050
Light Diesel Oil (LDO)	kl	0.03655	0.8730	0.000037
Units	**Abbreviation**	**Terajoules**		**Petajoules**
Tonnes of Oil Equivalent	TOE	0.041868		0.000041868
Terajoules	TJ	1		0.001
Megawatt Hour	MWh	0.0036		0.0000036
Kilowatt Hour	kWh	0.0000036		3.6E-09
Kilocalorie	Kkcal	4.19E-09		4.19E-12
Joule	J	1E-12		1E-15
Gigawatt Hour	GWh	3.6		0.0036

The NSB intends to develop emission account in future once the full set of energy accounts has been compiled. The energy sector is the primary source of CO_2 emission and therefore energy accounts and statistics are important.

6.2. Bhutan's Energy at a Glance

- ✓ In 2016-17 a total of 772.86 kilotonne of oil equivalent (ktoe) of energy were produced within the economy.
- ✓ In gross terms, Bhutan's energy production increased by almost 31% between 2015/16 and 2016/17.
- ✓ The energy intensity measured in Ktoe/Nu. increased by almost 19% between 2015/16 and 2016/17. The energy use per person increased by almost 9% between 2015/16 and 2016/17.
- ✓ In terms of the energy trade, export fell by almost 11% and import grew by almost 10% between 2015/16 and 2016/17.

6.3. *Energy indicators*

Indicators	Unit	2010	2011	2012	2013	2014	2015	2016	2017
Energy-GDP relationship									
Population	Persons	453,822.00	456,227.00	458,355.00	460,165.00	461,610.00	462,640.00	768,577.00	735,553.00
GDP	Million Nu.	72,496.64	84,950.01	97,452.96	105,378.35	119,545.75	132,140.72	149,151.78	164,627.92
Energy use per capita	ktoe per person	0.0004	0.0004	0.0005	0.0005	0.0006	0.0005	0.0006	0.0007
Energy Intensity	ktoe per Nu.	3,772.58	3,510.22	3,377.36	3,534.06	3,335.86	2,981.01	2,835.70	3,104.62
Energy Productivity	Nu. per ktoe	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003
Bhutan Energy Balance									
Production	Ktoe	689.39	681.21	653.62	701.72	698.24	723.52	591.87	772.86
Consumption		273.50	298.19	329.13	372.41	398.79	393.91	422.95	511.11
Net Export		328.55	314.98	260.11	287.45	246.89	259.83	274.84	192.21

6.4. *Energy: Supply & Use*

The supply of energy increased by 25%, an approximately 1,034 ktoe in 2017 from 828.31 ktoe in 2016. The supply was predominantly the extraction from the environment with 772.86 ktoe with a little over 261.12 ktoe of energy from imports of energy products. The hydro-electricity remains the predominantly the main source of renewable energy.

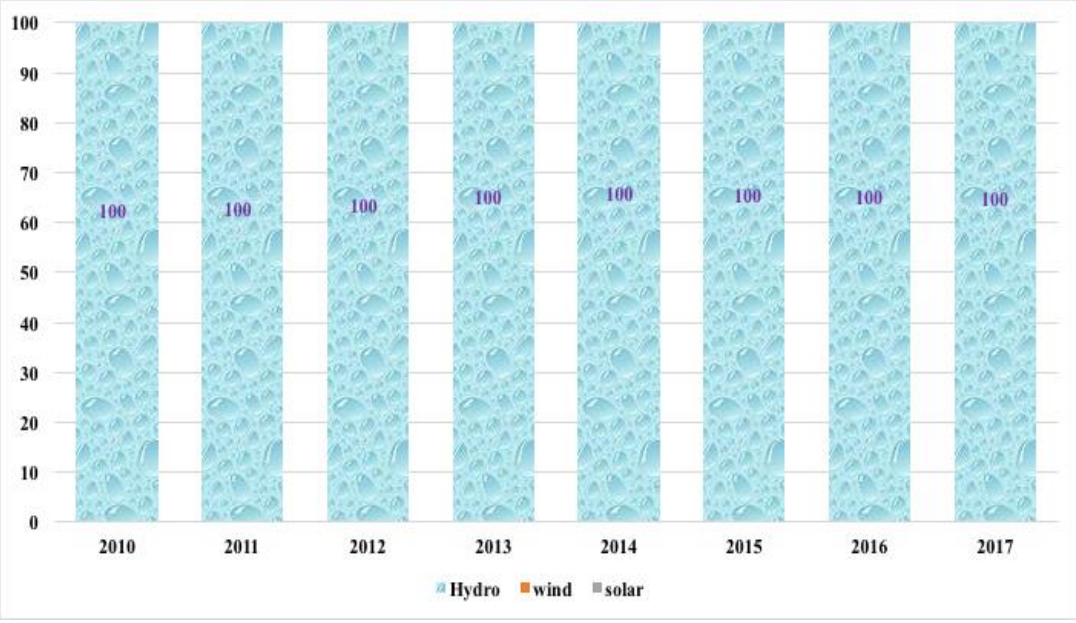

Figure 15 Renewable energy share to total energy generation

On the use side, use by industry is about 324.43 ktoe, households with 176.44 ktoe,

changes in inventory or accumulation with 79.72 ktoe and exports with 453.33 ktoe. The energy loss through distribution which flows back into environment as residual barely accounts for 6.11 ktoe. The energy loss captured here pertains to loss of hydroelectricity reported to NSB by BPC.

6.5. Energy: Trade

Bhutan imports varied energy products such as fossil fuel (diesel & petrol), aviation turbine fuel, kerosene, furnace oil, LPG, coal, etc. Import of diesel accounts for 40-50% of the total energy import for transport sector followed by coal for industry sector with 26-30%, petrol with 10-12% for transport sector. Bhutan import electricity during lean season in winter and this accounted for almost 2-7% of the total energy import.

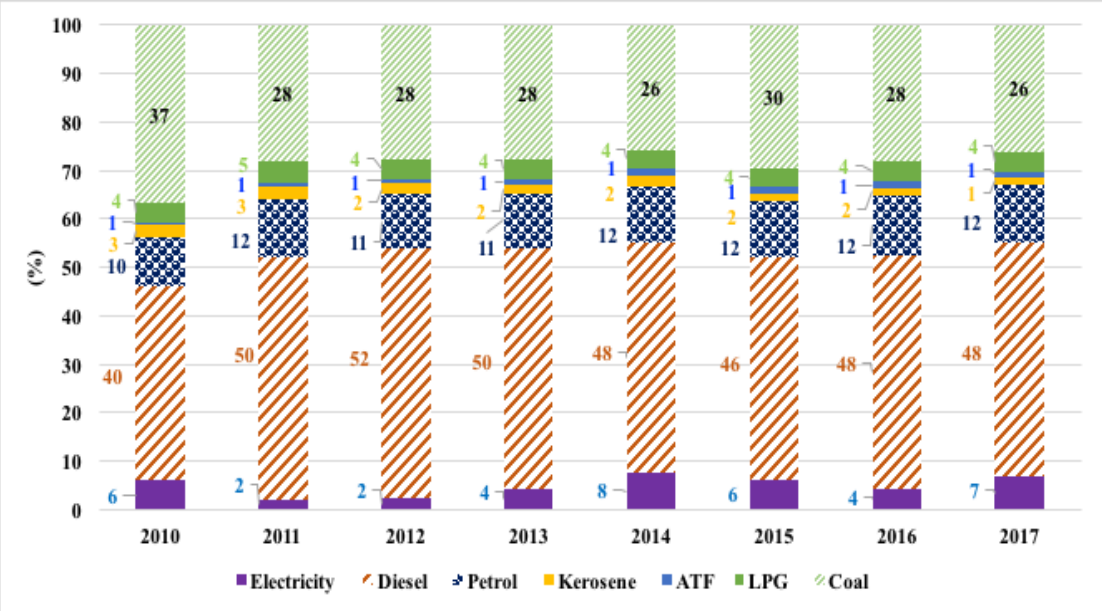

Figure 16 Share of energy import from RoW

The share of energy export to the rest of the world (RoW) is mainly hydro-electricity and coal. Hydro-electricity accounts for almost 89-97% of the total energy export and coal with the remaining share.

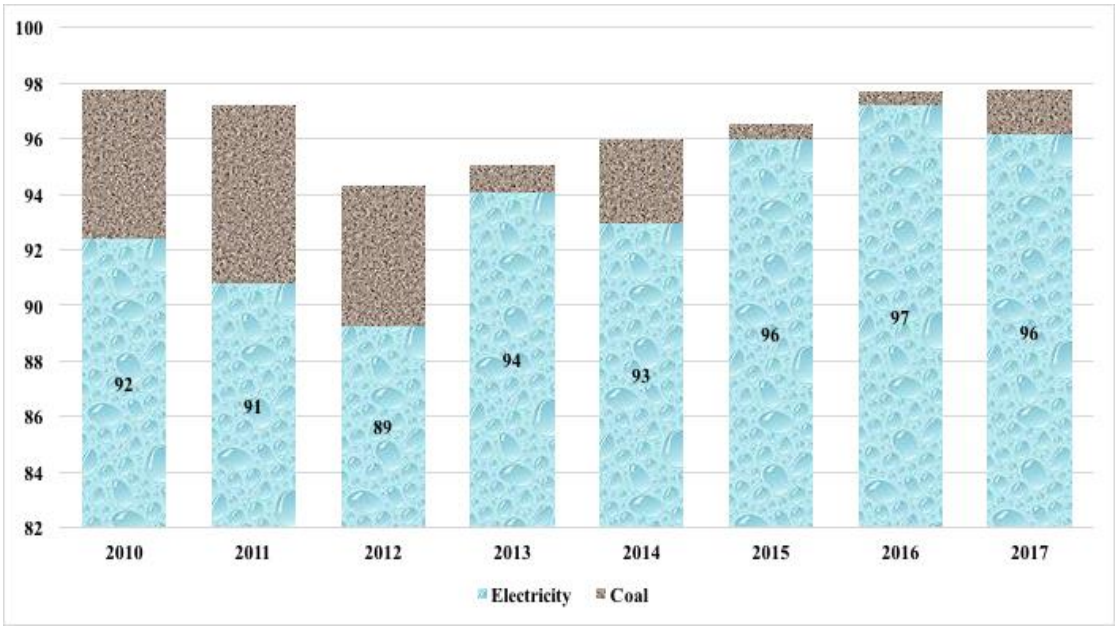

Figure 17 Share of energy export to RoW

Chapter 7: Experimental Waste Account

7.1. *Background and Policy*

The importance of our environment is articulated in the profound wisdom of ***His Majesty the King*** at the inaugural of the Royal Bhutan Flower Exhibition in April 2015, said that "*Where we live must be clean, safe, organized and beautiful, for national integrity, national pride, and for our bright future. This too is nation building*". In addition, there are number of national policies and requirements which provide the rationale for the development of waste accounts.

Bhutan's 12th Five-Year Development Plan (2019-2023) emphasizes effective waste management at national level as one of the key performance indicators (KPI). It sets out clear performance indicators to be measured by the absolute amount of solid waste (in tonnes) recycled at national level. It envisages to measure the efficiency of Municipality services through the percentage of urban population that are satisfied with the effectiveness and efficiency of waste collection services.

The Constitution of the Kingdom of Bhutan provides constitutional right to every Bhutanese as a trustee of the Kingdom's natural resources and environment for the benefit of the present and future generations. The Article 5.1 of the Constitution empowers every citizen with fundamental duty to contribute to the protection of the natural environment, conservation of the rich biodiversity of Bhutan and prevention of all forms of ecological degradation including noise, visual and physical pollution through the adoption and support of environment friendly practices and policies.

The National Environment Protection Act of 2007 requires anyone taking natural resources or deriving economic benefits from them to ensure that they are sustainably used and managed.

The Waste Prevention and Management Act 2009 provides:

- Reducing the generation of waste at source;
- Promoting the segregation, reuse and recycling of wastes; and

- Disposal of waste in an environmentally sound manner.

The Waste Prevention and Management Regulation 2012 stipulates:

- Promotion of the principles of 3Rs (Reduce, Re-use & Recycle);
- Consumption habits of the people should help promoting the principles; and
- Waste segregation at source is essential.

In Bhutan, proper waste management system across the country is yet to be put in place. To address the issue of waste, an integrated waste system needs to be implemented and this would require meetings and consultations amongst key stakeholders such as legislators, policy-makers, private partners, local communities, CSOs, and government authorities. Efforts are being made by different entities to this end. For example, Thimphu and some urban towns are already implementing Public Private Partnership (PPP) for integrating waste management. The habit of waste segregation by households into dry and wet in urban town like Thimphu is picking up.

Beside the legal and policy documents listed above, Bhutan has also produced a range of policy documents, strategies and assessments that could be informed by and guide priority setting for waste management. These include:

- ***National Integrated Solid Waste Management 2014***: provides strategic goals and objectives to promote towards "*Zero Waste Bhutan*" in partnership with public, industry, CSO, government authorities both at local and central levels, municipalities, and other funding agencies. It also emphasizes to honour the principles of Gross National Happiness and Zero Waste Principles through increased citizen participation in segregation, resource conservation, processing and landfill diversion. The concept of 3Rs has been extended to 4R as prevent and reduce, reuse, recycle and responsibility. Every individual is expected to be responsible for waste management and take measures to prevent waste-related pollution through Extended Producer Responsibility (EPR), Polluter Pays Principle (PPP) and Public-private partnership models.

- ***Bhutan State of Environment***: The National Environment Commission is mandated to report the State of the Environment (SoE) annually to PM's office with detail information on the current state and trends in Bhutan's environment with underlying causes of environmental change and the responses to changes. The report identifies waste management as the major emerging environmental issue for Bhutan. The poor management practices of waste threaten public health and natural environment in terms of water pollution, air and emission of Greenhouse gases.

Policies on waste provide a lot of demand for integrated information on waste. However, there is a lot of data gaps and therefore efforts are required to strengthen waste statistics. Currently, a number of key institutions or agency stakeholders maintain or at least report a small section of waste information as hereunder. However, there is no integrated or a comprehensive waste information system.

- ***National Environment Commission (NEC)***: The Commission in its annual report on the Bhutan State of the Environment identifies waste management as the cross-cutting issues. The publication reports only solid waste survey conducted by the MoWHS in 2008. There is no further information on waste other than waste composition based on the National Solid Waste Survey of MoWHS. However, medical waste generated (aggregated figure only) from health facilities in the country as per Business Bhutan is reported. E-waste based on MoHWS 2008 survey and as per the kuensel reported are mentioned in the publication. Further, information on industrial waste are sourced from the report of the Compliance Monitoring Division, NECS.

- ***Ministry of Works & Human Settlements (MoWHS)***: As mentioned earlier, the ministry has conducted Solid Waste Survey in 2008. In addition, the annual bulletin[3] reports some information on waste generation and equipment available with Municipalities. However, information on waste are not on regular basis and even in terms of coverage it is quite limited.

Construction wastes are increasing with the growth in the construction sector. The proper management of the construction wastes poses to be an issue.

- ***National Statistical Bureau (NSB)***: The NSB publishes annual dzongkhag statistics (ADS) covering various information on population, health, education and some information on environment. Under Construction and Housing chapter, basic information on total waste generated by the district (information mostly sourced from municipalities) are reported.

- ***Ministry* of Health (MoH)**: Medical waste is another type of waste generated from health facilities. Medical waste management is under the Department of Public Health at JDWNRH, MoH. On an average, JDWNRH generates 350kg of medical waste per day. The annual health bulletin of the ministry doesn't have any information on medical waste. Similarly, there are increasing number of private pharmacies in the country. In addition, medical hospitals in RBA and IMTART are also concerning issue. The waste generated from these pharmacies and hospitals have to be managed as well. However, as per the communication of NSB with the Environment Officer, Thimphu Thromdey, these medical wastes remain the biggest challenge and it's not managed as it should be.

7.2. *Methods for compilation*

Waste accounting (WA) as per the UN System of Environmental-Economic Accounts (SEEA) guides National Statistics Offices around the world to collect information on the generation and disposal of waste to landfills or to recycling facilities, the supply of recycled materials in the economy. It suggests using the Supply-Use framework with detail information on production, reuse, disposal and various other types of residuals generated by the different economic units in the country.

Waste accounts can be useful in many ways. It helps government to understand the extent of waste generation in the country. Waste management is a serious issue which poses a number of challenges. Every household, businesses and government are involved in waste generation in some way or the other, and if left unmanaged will eventually pose challenges. Thus, waste management is largely the responsibility of everyone. The policy makers and government therefore require waste statistics for effective modelling of waste

management policy and strategies.

Even from global prospective, solid wastes cause environmental & health impacts such as pollution, aesthetic, land use, etc. The 2030 Agenda for Sustainable Development, particularly Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable provides evidence to account for waste. By 2030, global target is to reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. Further, by 2030, it also aims to achieve the environmentally sound management of chemicals (treatment of waste, generation of hazardous waste, hazardous waste management, by type of treatment) and all other wastes. By 2030, global agenda is to substantially reduce waste generation through prevention, reduction, recycling and reuse. These will only be possible through sustainable consumption and production.

7.3. *Overview*

The Solid Waste Account presented in this release highlights the waste generation which flows back as residuals to the environment. The Account is an experimental as energy account given the limited information from the source. However, the coverage shall be expanded once other information of waste flows become available.

As the country develops, the consumption and the imports in particular are placing substantial pressure on the management of waste. The waste account therefore compiled would enable better informed decisions and policy making pertaining to solid waste management in the country.

The experimental waste account includes the proportion of waste collected and sent to landfills from four major Thromdes and other urban areas. Data for rural areas are not part of the release at the present due to data constraint. Further, the estimate does not include waste through illegal dumping and litter which is still significant and damages the environment.

An overall increasing trend in waste generation is observed over the years by the four thromdes and other urban areas. The substantial increase in the waste generated every

year could also mean growth in urban households and unsustainable consumption. This demands improved management through technologies and other facilities to collect waste. The waste is becoming an emerging issue and concern for all. The waste generation has increased by more than 50 percent in the past four years.

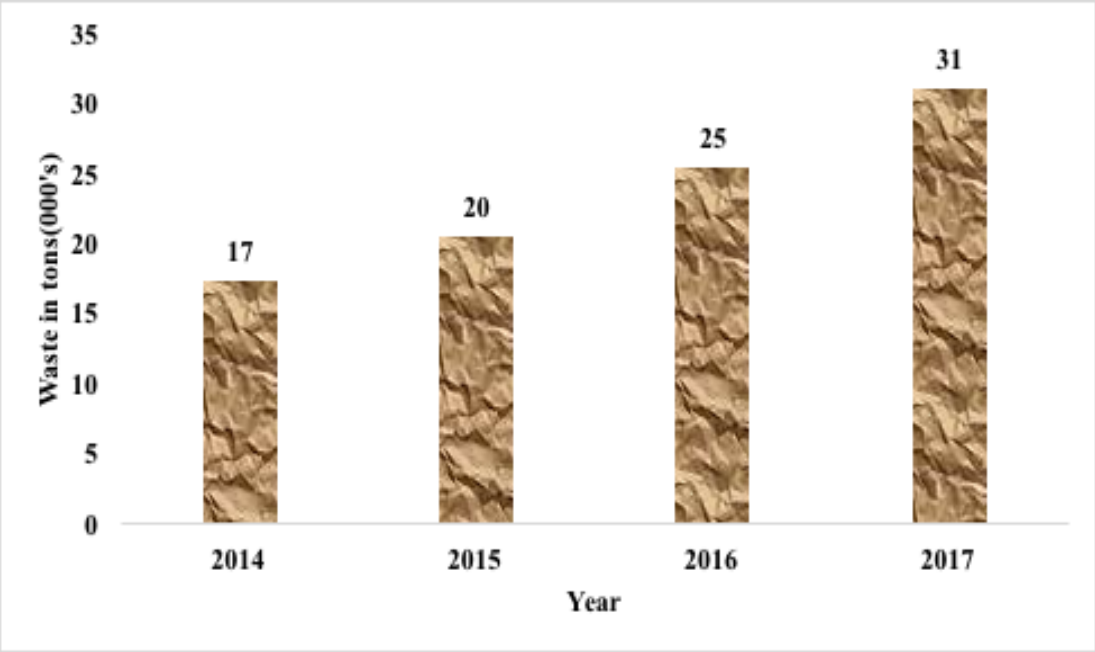

Figure 18 Waste generation

7.4. *Waste intensity*

To understand the intensity of waste relative to Gross Domestic Product (GDP), a plot of these two variables is presented. The quantity of waste generation increased by almost more than 50%, while the nominal GDP grew by almost 12% between 2014-17. If we consider the trend as representative of the country, then this indicates that the economy is becoming more waste intensive.

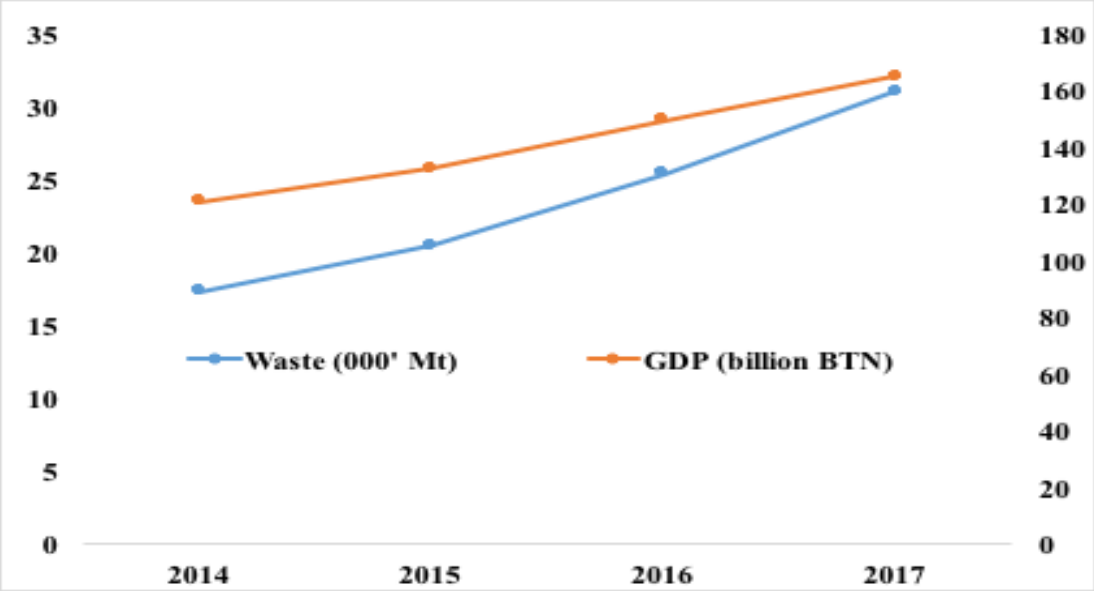

Figure 19 Waste intensity

7.5. *Waste Management Cost*

The National Statistics Bureau collected information on the cost of waste management by four thromdeys. The information on the waste management cost for other urban towns could not be included. The cost here includes the **Operational Cost** of managing solid waste and landfills through the salary payments for staff, fuel cost and maintenance of trucks and tractors, landfill management cost and other day-to-day operational costs related to waste management activities. It does not include **Up-Front Costs** such as acquisition of land, building, public education or advocacy and outreach. Further, the **Back-End Costs** such as the cost for site closure, post-service benefits of the employee, the cost of decommissioning building and equipment are excluded.

There are 218 staff including drivers and conductors working in waste management related activities in four thromdes. A total of 39 transportation facilities (trucks and tractors) are deployed in collecting and disposing waste to landfills. The annual total operational expenditure was valued at Nu. 53.61 million BTN for collection and disposition of waste to landfills. With the annual total of 14,490.5 tons of waste collected and dumped at the landfills by the four thromdes and an annual expenditure of Nu. 53.61 million BTN for waste management activities, the cost of managing waste was estimated at Nu.4 per kg of waste.

Chapter 8: Looking Ahead

Environmental-Economic Accounting has been recognized globally for its usefulness in terms of strategic and sustainable development planning. NSB has made a small beginning based on the availability of information and support by DANIDA project on environmental accounts and statistics. However, NSB plans to build a comprehensive environmental-economic accounting compendium in future to provide information for national policy planning and also to help monitor and report on SDGs and other Green Economy Indicators.

The NSB shall work towards developing priority accounts such as water, land, forest, timber resource account, carbon and selected ecosystem services. A detailed water account may not be practically possible because of information deficiency. However, pilot efforts to estimate water account in areas where hydropower activities are undertaken will be endeavored.

To address the need of information requirements, the NSB shall work to strengthen partnerships and coordination with agencies both from the government and non-governmental organization. Training and capacity building in environmental-economic accounting is another key area to be considered. This need shall be addressed with in-house capacity building through HR development, training on environmental accounts compilation, analysis and valuation, and finally conducting knowledge dissemination workshops for data users.

Chapter 9: Concepts, Definitions & Terminologies of SEEA

9.1. Green Economy

UNEP 2011 defines green economy as one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". The Green Economy Indicators are compiled based on the framework of United Nations Statistics Division (UNSD), which closely follows the OECD green growth structure. It consists of 44 core set of indicators (CS) and 53 indicators that are non-core (NCS).

9.2. SEEA

The System of Environmental-Economic Accounting (SEEA) is an international statistical standard that provides a comprehensive set of accounting tables to guides national statistics offices for compilation of consistent and comparable statistics and indicators for policymaking, analysis and research. It provides conceptual framework for understanding the interactions between the environment and the economy.

9.3. Electricity Account

The total supply as explained above is accounted as: S=DP+M; where, S=Total Supply, DP=Domestic Production and M=Import. Information on the production side (supply) are sourced from the annual reports of DGPC. The total use is computed as: U=DU+X; where U=Total Use, DU=Domestic Use (input in industries & household consumption), X=Export. The consumption data are sourced from BPCL and accordingly mapped into different sectors of economy.

9.4. SNA

The System of National Accounts is the framework of accounts which measures the level of economic development and the rate at which the economy of the country grows over time.

9.5. Depletion

SEEA defines depletion as the decrease in the quantity of the stock of a natural resource

over an accounting period due to the extraction of the natural resource by economic units.

9.6. Opening stock of minerals

The opening stock is the level of mineral resources at the beginning of the year and it should. Be equal to the closing stock of the previous year.

9.7. Closing stock of minerals

The closing stock of mineral is the level of reserve at the endo of the year and it should be equal to the opening stock of the subsequent year.

9.8. Upward changes

Upward changes are any new discoveries of new stock of minerals through exploration and evolution.

9.9. Downward changes

Downward changes are changes through extractions or any other decreases like catastrophic losses and reclassifications.

9.10. Resource Rent

The resource rent is the economic value of the mineral and it is estimated to ascertain whether mineral resources are being harvested sustainably. It is calculated based on the residual value method of SEEA which excludes operating costs, specific taxes and subsidies, and consumption of fixed capital from the output.

9.11. Social discount rate

The Net present value (NPV) method uses social discount rates to discount the value of future returns to explain in the current terms. The returns earned in the current period are worth more than returns earned in the future.

9.12. Energy accounts

Energy accounts provides information on energy supply and use. It applies the principle that supply of energy equals use. It presents information on energy production, domestic consumption and net export.

9.13. Energy from natural inputs

Energy from natural inputs encompasses flows of energy from the removal and capture of energy from the environment by resident economic units.

9.14. Energy products

Energy products are products that are used as a source of energy. They comprise fuels that are produced/generated by economic unit as a source of energy; electricity generated by economic units; and heat sold or generated by other economic units.

9.15. Energy residuals

Energy residuals are mainly energy losses through flaring and venting of natural gas and losses during transformation in the production processes, leakages of liquid fuels, loss of heat during transport, losses during distribution, electricity transmission and transport.

Statistical Tables

Table 1 Physical Account of Electricity

(GWh)

SUPPLY				USE			
Year	**Production**	**Imports**	**Total**	**Exports**	**Transmission Loss**	**Domestic Use**	**Total**
2000	1,921.70	34.39	**1,956.08**	1,460.48	35.30	460.30	**1,956.08**
2001	1,967.75	6.90	**1,974.65**	1,392.62	39.14	542.89	**1,974.65**
2002	2,173.08	24.30	**2,197.38**	1,476.37	68.06	652.94	**2,197.38**
2003	2,377.43	18.72	**2,396.15**	1,695.80	93.05	607.30	**2,396.15**
2004	2,423.27	22.80	**2,446.07**	1,707.19	122.72	616.17	**2,446.07**
2005	2,519.56	18.43	**2,537.99**	1,713.61	130.18	694.20	**2,537.99**
2006	3,354.67	34.69	**3,389.36**	2,526.15	117.20	746.01	**3,389.36**
2007	6,421.95	22.22	**6,444.17**	5,372.57	121.05	950.55	**6,444.17**
2008	7,158.17	9.38	**7,167.55**	5,922.38	150.59	1,094.58	**7,167.55**
2009	6,922.94	64.16	**6,987.10**	5,404.82	165.47	1,416.81	**6,987.10**
2010	7,327.73	131.56	**7,459.29**	5,579.49	166.99	1,712.81	**7,459.29**
2011	7,067.55	40.32	**7,107.87**	5,273.10	93.98	1,740.79	**7,107.87**
2012	6,826.48	59.36	**6,885.84**	4,895.67	84.17	1,738.98	**6,718.82**
2013	7,549.84	112.26	**7,662.10**	5,557.63	43.06	2,061.41	**7,662.10**
2014	7,163.79	191.83	**7,355.62**	5,044.33	90.90	2,220.39	**7,355.62**
2015	7,745.89	163.15	**7,909.04**	5,541.76	146.99	2,220.29	**7,909.04**
2016	7,959.29	113.11	**8,072.40**	5,779.32	115.80	2,177.28	**8,072.40**
2017	**7,721.43**	208.10	**7,929.53**	5,068.48	71.05	2,790.00	**7,929.53**

Table 2 Monetary Account of Electricity

(Mill. Nu.)

SUPPLY				USE			
Year	**Production**	**Imports**	**Total**	**Exports**	**Losses**	**Industries**	**Total**
2000	2,307.26	51.58	**2,358.85**	2,190.72	38.22	129.90	**2,358.85**
2001	2,237.78	6.90	**2,244.68**	2,097.85	48.53	98.31	**2,244.68**
2002	2,530.55	24.30	**2,554.85**	2,289.82	85.75	179.28	**2,554.85**
2003	2,867.94	18.72	**2,886.66**	2,603.33	121.62	161.71	**2,886.66**
2004	3,005.05	30.73	**3,035.78**	2,711.75	149.47	174.56	**3,035.78**
2005	3,956.64	32.77	**3,989.41**	3,479.20	209.14	301.07	**3,989.41**
2006	5,552.83	63.13	**5,615.95**	4,976.18	247.25	392.52	**5,615.95**
2007	10,962.37	37.73	**11,000.10**	10,034.33	91.71	874.06	**11,000.10**
2008	12,593.17	14.26	**12,607.43**	11,032.60	103.94	1,470.89	**12,607.43**
2009	10,889.85	111.03	**11,000.88**	10,071.00	111.57	818.31	**11,000.88**
2010	11,811.46	233.87	**12,045.33**	10,411.46	139.73	1,494.14	**12,045.33**
2011	10,948.33	67.18	**11,015.51**	9,839.21	162.12	1,014.18	**11,015.51**
2012	11,140.80	110.30	**11,251.10**	9,714.53	148.23	1,388.34	**11,251.10**
2013	13,051.66	214.93	**13,266.59**	11,013.99	149.96	2,102.64	**13,266.59**
2014	13,905.77	371.28	**14,277.05**	10,698.31	-	3,578.74	**14,277.05**
2015	14,258.09	341.51	**14,599.60**	10,991.32	-	3,608.28	**14,599.60**
2016	12,882.94	222.50	**13,105.44**	11,421.89	0.80	1,682.75	**13,105.44**
2017	12,277.25	440.95	**12,718.20**	8,267.51	1.38	4,449.31	**12,718.20**

Table 3 Gross Electricity Consumption by Household & Industry

	(GWh)			(Mill. Nu.)		
Year	**Household**	**Industry**	**Total**	**Household**	**Industry**	**Total**
2,000	64.01	396.30	**460.30**	14.54	115.36	**129.90**
2,001	72.09	470.81	**542.89**	10.50	87.81	**98.31**
2,002	91.28	561.67	**652.94**	20.16	159.11	**179.28**
2,003	88.40	518.89	**607.30**	18.96	142.75	**161.71**
2,004	87.59	528.57	**616.17**	19.98	154.58	**174.56**
2,005	93.23	600.97	**694.20**	32.48	268.58	**301.07**
2,006	90.37	655.64	**746.01**	38.12	354.40	**392.52**
2,007	110.97	839.58	**950.55**	81.86	792.20	**874.06**
2,008	126.41	968.16	**1,094.58**	136.27	1,334.62	**1,470.89**
2,009	182.47	1,234.34	**1,416.81**	84.64	733.67	**818.31**
2,010	208.80	1,504.01	**1,712.81**	146.20	1,347.94	**1,494.14**
2,011	209.53	1,531.26	**1,740.79**	97.89	916.29	**1,014.18**
2,012	179.96	1,559.03	**1,738.98**	136.23	1,252.11	**1,388.34**
2,013	251.69	1,809.72	**2,061.41**	206.31	1,896.32	**2,102.64**
2,014	277.37	1,943.02	**2,220.39**	414.54	3,164.20	**3,578.74**
2,015	306.86	1,913.43	**2,220.29**	433.97	3,174.31	**3,608.28**
2,016	593.61	1,583.67	**2,177.28**	458.78	1,223.97	1,682.75
2,017	**1,544.56**	**1,245.44**	**2,790.00**	**1,951.60**	**2,497.71**	**4,449.31**

Table 4 Gross Electricity Consumption by Economic Sectors

(GWh)

Year	Total Industry	Agriculture, Livestock & Forestry	Mining & Quarrying	Manufacturing	Electricity & Water	Construction	Trade	Hotel & Restaurant	Transport, Storage & Communication	Finance, Insurance & Real Estate	Community, Social & Personal	Private, Social & Recreational Services
2000	**396.30**	0.24	1.06	335.44	12.89	2.84	7.29	0.58	1.71	0.55	33.66	0.03
2001	**470.81**	0.27	1.26	401.93	13.44	4.05	8.91	0.77	2.04	0.62	37.48	0.03
2002	**561.67**	0.36	1.82	471.99	17.88	5.70	12.48	0.93	2.74	0.72	47.03	0.04
2003	**518.89**	0.32	1.96	432.21	19.21	5.16	11.97	0.89	2.50	0.76	43.86	0.04
2004	**528.57**	0.33	1.39	444.06	16.46	5.51	13.32	1.04	2.92	0.83	42.68	0.04
2005	**600.97**	0.35	1.75	500.88	19.54	6.01	16.24	1.31	3.47	1.08	50.30	0.05
2006	**655.64**	0.34	2.54	548.71	26.10	5.29	16.38	1.69	3.32	1.16	50.05	0.05
2007	**839.58**	0.36	2.54	704.26	48.58	5.87	17.40	2.04	3.58	1.36	53.55	0.06
2008	**968.16**	0.39	3.62	813.39	56.44	5.49	19.04	3.20	4.35	1.53	60.62	0.07
2009	**1,234.34**	0.50	4.64	1,025.91	66.65	7.58	23.95	3.49	5.61	1.92	94.00	0.08
2010	**1,504.01**	0.54	5.29	1,267.70	70.60	10.25	30.02	3.87	6.38	2.10	107.19	0.09
2011	**1,531.26**	0.56	5.79	1,288.26	60.10	12.62	33.87	5.51	7.14	2.43	114.88	0.09
2012	**1,559.03**	0.51	3.52	1,345.23	45.32	14.13	34.39	5.61	6.47	2.07	101.71	0.08
2013	**1,809.72**	0.62	5.75	1,549.77	61.01	15.75	42.44	7.42	7.62	2.52	116.71	0.10
2014	**1,943.02**	1.54	4.50	1,710.72	71.09	26.95	22.41	18.72	13.27	2.91	70.08	0.81
2015	**1,913.43**	0.73	7.56	1,673.33	72.93	4.38	9.63	21.12	13.14	0.51	109.88	0.22
2016	**1,583.67**	2.44	10.26	891.71	251.57	20.67	28.55	54.64	39.72	15.95	267.44	0.71
2017	**1,245.44**	0.80	5.25	1,116.29	49.64	7.58	6.07	9.90	6.39	1.18	41.70	0.62

Table 5 Gross Electricity Consumption by Industry by Economic Sectors

(Mill. Nu.)

Year	Total Industry	Agriculture, Livestock & Forestry	Mining & Quarrying	Manufacturing	Electricity & Water	Construction	Trade	Hotel & Restaurant	Transport, Storage & Communication	Finance, Insurance & Real Estate	Community, Social & Personal	Private, Social & Recreational Services
2000	**115.36**	0.07	0.39	95.92	3.87	0.95	2.19	0.16	0.55	0.16	11.09	0.01
2001	**87.81**	0.05	0.29	73.69	2.59	0.87	1.71	0.14	0.42	0.11	7.92	0.01
2002	**159.11**	0.11	0.64	131.26	5.22	1.86	3.64	0.25	0.86	0.20	15.07	0.01
2003	**142.75**	0.09	0.67	116.66	5.44	1.64	3.39	0.24	0.76	0.21	13.64	0.01
2004	**154.58**	0.10	0.51	127.53	4.96	1.86	4.01	0.29	0.94	0.24	14.13	0.01
2005	**268.58**	0.16	0.97	219.69	8.99	3.10	7.47	0.56	1.71	0.47	25.42	0.02
2006	**354.40**	0.19	1.71	291.38	14.54	3.30	9.12	0.88	1.98	0.62	30.63	0.03
2007	**792.20**	0.36	2.99	653.96	47.33	6.41	16.94	1.86	3.73	1.27	57.30	0.06
2008	**1,334.62**	0.58	6.24	1,103.70	80.36	8.76	27.10	4.27	6.64	2.09	94.80	0.09
2009	**733.67**	0.32	3.45	599.08	40.84	5.20	14.67	2.00	3.68	1.13	63.26	0.05
2010	**1,347.94**	0.51	5.92	1,117.37	65.29	10.62	27.75	3.35	6.32	1.86	108.87	0.08
2011	**916.29**	0.35	4.33	757.65	37.09	8.73	20.89	3.18	4.72	1.43	77.86	0.05
2012	**1,252.11**	0.45	4.98	1,055.89	43.61	12.62	30.32	4.96	5.83	1.73	91.64	0.07
2013	**1,896.32**	0.69	7.54	1,599.14	66.05	19.11	45.93	7.52	8.84	2.62	138.78	0.11
2014	**3,164.20**	3.02	11.26	2,687.10	122.27	58.23	41.79	44.52	29.49	6.31	158.50	1.72
2015	**3,174.31**	1.42	16.69	2,670.50	125.18	9.23	20.90	44.34	29.60	1.00	255.01	0.43
2016	**1,223.97**	1.89	7.93	689.18	194.43	15.98	22.07	42.23	30.69	12.32	206.70	0.55
2017	**2,497.71**	2.96	15.00	2,112.89	105.64	29.60	29.60	22.74	24.84	4.41	147.58	2.46

Table 6 Total Supply & Use of Electricity by Sectors

(GWh.)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
(I) TOTAL SUPPLY	**2,537.99**	**3,389.36**	**6,444.17**	**7,167.55**	**6,987.10**	**7,459.29**	**7,107.87**	**6,885.84**	**7,662.10**	**7,355.62**	**7,909.04**	**8,072.40**	**7,929.53**
Production	2,519.56	3,354.67	6,421.95	7,158.17	6,922.94	7,327.73	7,067.55	6,826.48	7,549.84	7,163.79	7,745.89	7,959.29	7,721.43
Imports	18.43	34.69	22.22	9.38	64.16	131.56	40.32	59.36	112.26	191.83	163.15	113.11	208.10
(II) TOTAL USE	**2,537.99**	**3,389.36**	**6,444.17**	**7,167.55**	**6,987.10**	**7,459.29**	**7,107.87**	**6,718.82**	**7,662.10**	**7,355.62**	**7,909.04**	**8,072.40**	**7,929.53**
1. Agriculture, Livestock & Forestry	0.35	0.34	0.36	0.39	0.50	0.54	0.56	0.51	0.62	1.54	0.73	2.44	0.80
2. Mining & Quarrying	1.75	2.54	2.54	3.62	4.64	5.29	5.79	3.52	5.75	4.50	7.56	10.26	5.25
3. Manufacturing	500.88	548.71	704.26	813.39	1,025.91	1,267.70	1,288.26	1,345.23	1,549.77	1,710.72	1,673.33	891.71	1,116.29
4. Electricity & Water	19.54	26.10	48.58	56.44	66.65	70.60	60.10	45.32	61.01	71.09	72.93	251.57	49.64
5. Construction	6.01	5.29	5.87	5.49	7.58	10.25	12.62	14.13	15.75	26.95	4.38	20.67	7.58
6. Wholesale & Retail Trade	16.24	16.38	17.40	19.04	23.95	30.02	33.87	34.39	42.44	22.41	9.63	28.55	6.07
7. Hotels & Restaurants	1.31	1.69	2.04	3.20	3.49	3.87	5.51	5.61	7.42	18.72	21.12	54.64	9.90
8. Transport, Storage & Communication	3.47	3.32	3.58	4.35	5.61	6.38	7.14	6.47	7.62	13.27	13.14	39.72	6.39
9. Finance, Insurance, Real Estate & Business Services	1.08	1.16	1.36	1.53	1.92	2.10	2.43	2.07	2.52	2.91	0.51	15.95	1.18
10. Community, Social & Personal Services	50.30	50.05	53.55	60.62	94.00	107.19	114.88	101.71	116.71	70.08	109.88	267.44	41.70
11. Private Social & Recreational Services	0.05	0.05	0.06	0.07	0.08	0.09	0.09	0.08	0.10	0.81	0.22	0.71	0.62
Household	93.23	90.37	110.97	126.41	182.47	208.80	209.53	179.96	251.69	277.37	306.86	593.61	1,544.56
Export	1,713.61	2,526.15	5,372.57	5,922.38	5,404.82	5,579.49	5,273.10	4,895.67	5,557.63	5,044.33	5,541.76	5,779.32	5,068.48
Cable Losses	130.18	117.20	121.05	150.59	165.47	166.99	93.98	84.17	43.06	90.90	146.99	115.80	71.05

Table 7 Total Supply & Use of Electricity by Sectors

(Million Nu.)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
(I) TOTAL SUPPLY	**3,989.41**	**5,615.95**	**11,000.10**	**12,607.43**	**11,000.88**	**12,045.33**	**11,015.51**	**11,251.10**	**13,266.59**	**14,277.05**	**14,599.60**	**13,105.44**	**12,718.20**
Production	3,956.64	5,552.83	10,962.37	12,593.17	10,889.85	11,811.46	10,948.33	11,140.80	13,051.66	13,905.77	14,258.09	12,882.94	12,277.25
Imports	32.77	63.13	37.73	14.26	111.03	233.87	67.18	110.30	214.93	371.28	341.51	222.50	440.95
(II) TOTAL USE	**3,989.41**	**5,615.95**	**11,000.10**	**12,607.43**	**11,000.88**	**12,045.33**	**11,015.51**	**11,251.10**	**13,266.59**	**14,277.05**	**14,599.60**	**13,105.44**	**12,718.20**
1. Agriculture, Livestock & Forestry	0.16	0.19	0.36	0.58	0.32	0.51	0.35	0.45	0.69	3.02	1.42	1.89	2.96
2. Mining & Quarrying	0.97	1.71	2.99	6.24	3.45	5.92	4.33	4.98	7.54	11.26	16.69	7.93	15.00
3. Manufacturing	219.69	291.38	653.96	1,103.70	599.08	1,117.37	757.65	1,055.89	1,599.14	2,687.10	2,670.50	689.18	2,112.89
4. Electricity & Water	8.99	14.54	47.33	80.36	40.84	65.29	37.09	43.61	66.05	122.27	125.18	194.43	105.64
5. Construction	3.10	3.30	6.41	8.76	5.20	10.62	8.73	12.62	19.11	58.23	9.23	15.98	29.60
6. Wholesale & Retail Trade	7.47	9.12	16.94	27.10	14.67	27.75	20.89	30.32	45.93	41.79	20.90	22.07	29.60
7. Hotels & Restaurants	0.56	0.88	1.86	4.27	2.00	3.35	3.18	4.96	7.52	44.52	44.34	42.23	22.74
8. Transport, Storage & Communication	1.71	1.98	3.73	6.64	3.68	6.32	4.72	5.83	8.84	29.49	29.60	30.69	24.84
9. Finance, Insurance, Real Estate & Business Services	0.47	0.62	1.27	2.09	1.13	1.86	1.43	1.73	2.62	6.31	1.00	12.32	4.41
10. Community, Social & Personal Services	25.42	30.63	57.30	94.80	63.26	108.87	77.86	91.64	138.78	158.50	255.01	206.70	147.58
11. Private Social & Recreational Services	0.02	0.03	0.06	0.09	0.05	0.08	0.05	0.07	0.11	1.72	0.43	0.55	2.46
Household	32.48	38.12	81.86	136.27	84.64	146.20	97.89	136.23	206.31	414.54	433.97	458.78	1,951.60
Export	3,479.20	4,976.18	10,034.33	11,032.60	10,071.00	10,411.46	9,839.21	9,714.53	11,013.99	10,698.31	10,991.32	11,421.89	8,267.51
Cable Losses	209.14	247.25	91.71	103.94	111.57	139.73	162.12	148.23	149.96	-	-	0.80	1.38

Table 8 Supply & Use of Fossil Fuel

(in KL)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Domestic Production	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Import								
1. Diesel	85,620.00	103,610.90	121,832.00	122,424.80	117,273.80	122,091.40	127,539.00	140,640.50
2. Petrol	23,422.50	26,761.10	29,094.00	30,195.20	31,289.20	33,880.60	35,960.00	38,960.50
Total Supply	**109,042.50**	**130,372.00**	**150,926.00**	**152,620.00**	**148,563.00**	**155,972.00**	**163,499.00**	**179,601.00**
Use								
Major sectors	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
1. Agriculture, Livestock & Forestry	**7,555.83**	**10,016.58**	**11,269.47**	**11,676.31**	**12,810.17**	**16,838.55**	**19,541.30**	**23,289.57**
Diesel	7,554.64	10,015.39	11,268.28	11,675.12	12,808.97	16,827.71	19,526.48	**23,273.36**
Petrol	1.19	1.19	1.19	1.20	1.19	10.85	14.82	**16.21**
2. Industry	**18,479.83**	**23,188.34**	**24,450.98**	**24,934.18**	**25,751.13**	**26,626.96**	**31,898.70**	**38,583.40**
Diesel	18,365.15	23,040.77	24,305.61	24,771.61	25,588.21	26,409.68	31,662.22	**38,352.93**
Petrol	114.68	147.57	145.37	162.57	162.92	217.28	236.48	**230.47**
3. Services	**47,855.76**	**56,805.04**	**58,346.78**	**60,852.59**	**61,058.08**	**62,132.52**	**62,619.11**	**68,512.88**
Diesel	47,070.86	56,048.19	57,652.61	60,079.95	60,285.98	61,149.61	61,761.89	67,397.86
Petrol	784.89	756.85	694.16	772.64	772.10	982.92	857.23	1,115.03
3. HH consumption	**21,957.49**	**24,472.51**	**26,218.26**	**26,304.71**	**27,345.30**	**30,527.70**	**34,503.53**	**37,237.01**
Diesel	3,003.06	3,525.11	4,000.95	4,033.25	4,166.79	4,719.66	6,674.08	7,405.85
Petrol	18,954.43	20,947.41	22,217.31	22,271.46	23,178.51	25,808.04	27,829.45	29,831.16
4. Re-Export	**13,193.60**	**15,889.53**	**30,640.51**	**28,852.20**	**21,598.32**	**19,846.27**	**14,936.35**	**11,978.14**
1. Diesel	9,626.30	10,981.45	24,604.55	21,864.87	14,423.84	12,984.75	7,914.33	4,210.50
2. Petrol	3,567.30	4,908.08	6,035.96	6,987.33	7,174.48	6,861.52	7,022.02	7,767.64
Total use of Diesel	85,620.00	103,610.90	121,832.00	122,424.80	117,273.80	122,091.40	127,539.00	140,640.50
Total use of Petrol	23,422.50	26,761.10	29,094.00	30,195.20	31,289.20	33,880.60	35,960.00	38,960.50
Total use	**109,042.50**	**130,372.00**	**150,926.00**	**152,620.00**	**148,563.00**	**155,972.00**	**163,499.00**	**179,601.00**

Table 9 Percentage Share of the Supply & Use of Fossil Fuel

(Percentage)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Domestic Production	-	-	-	-	-	-	-	-
Import								
1. Diesel	78.52	79.47	80.72	80.22	78.94	78.28	78.01	78.31
2. Petrol	21.48	20.53	19.28	19.78	21.06	21.72	21.99	21.69
Total Supply	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Use								
Major Sectors	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
1. Agriculture, Livestock & Forestry	**6.93**	**7.68**	**7.47**	**7.65**	**8.62**	**10.80**	**11.91**	**12.97**
Diesel	8.82	9.67	9.25	9.54	10.92	13.78	15.26	16.55
Petrol	0.01	0.00	0.00	0.00	0.00	0.03	0.04	0.04
2. Industry	**16.95**	**17.79**	**16.20**	**16.34**	**17.33**	**17.07**	**19.44**	**21.48**
Diesel	21.45	22.24	19.95	20.23	21.82	21.63	24.74	27.27
Petrol	0.49	0.55	0.50	0.54	0.52	0.64	0.66	0.59
3. Services	**43.89**	**43.57**	**38.66**	**39.87**	**41.10**	**39.84**	**39.26**	**38.15**
Diesel	54.98	54.09	47.32	49.07	51.41	50.09	49.46	47.92
Petrol	3.35	2.83	2.39	2.56	2.47	2.90	3.08	2.86
3. HH consumption	**20.14**	**18.77**	**17.37**	**17.24**	**18.41**	**19.57**	**21.03**	**20.73**
Diesel	3.51	3.40	3.28	3.29	3.55	3.87	5.21	5.27
Petrol	80.92	78.28	76.36	73.76	74.08	76.17	77.11	76.57
Re-Export	**12.10**	**12.19**	**20.30**	**18.90**	**14.54**	**12.72**	**8.36**	**6.67**
1. Diesel	11.24	10.60	20.20	17.86	12.30	10.64	5.33	**2.99**
2. Petrol	15.23	18.34	20.75	23.14	22.93	20.25	19.11	**19.94**
Total use of Diesel	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**
Total use of Petrol	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**
Total use	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 10 Supply & Use of Fossil Fuel

(Nu. in million)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Production	-	-	-	-	-	-	-	-
Imports	**4201.76**	**4927.00**	**6228.71**	**7218.10**	**7731.32**	**6730.68**	**7307.19**	**8,479.01**
Diesel at basic price	3250.61	3562.81	4601.90	5471.94	5911.38	5024.82	5549.46	6,505.27
Petrol at basic price	951.15	1364.19	1626.82	1746.16	1819.94	1705.86	1757.73	1,973.74
Total Margin	**636.70**	**690.87**	**749.12**	**841.32**	**1035.00**	**1233.21**	**1669.84**	**1,668.68**
Trade and Transport margin (Diesel)	480.09	526.19	571.09	637.05	760.59	966.20	1113.18	1,272.15
Trade and Transport margin (Petrol)	156.62	164.67	178.03	204.26	274.40	267.01	556.66	396.52
Supply at market price (Diesel)	3730.70	4089.00	5172.99	6108.99	6671.97	5991.02	6662.64	7,777.42
Supply at market price (Petrol)	1107.77	1528.86	1804.85	1950.42	2094.34	1972.87	2314.39	2,370.26
Total Supply at market Price	**4838.46**	**5617.87**	**6977.83**	**8059.42**	**8766.32**	**7963.89**	**8977.02**	**10,147.69**
	Use							
Major sectors	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
1. Agriculture, Livestock & Forestry	**278.46**	**395.33**	**478.53**	**582.67**	**728.81**	**826.37**	**1021.02**	**1,288.00**
Diesel	278.41	395.26	478.45	582.59	728.73	825.74	1020.06	1,287.02
Petrol	0.06	0.07	0.07	0.08	0.08	0.63	0.95	0.99
2. Industry	**682.23**	**917.73**	**1041.03**	**1246.60**	**1466.68**	**1308.58**	**1669.25**	**2,134.94**
Diesel	676.80	909.30	1032.02	1236.10	1455.77	1295.92	1654.03	2,120.92
Petrol	5.42	8.43	9.02	10.50	10.91	12.65	15.22	14.02
3. Services	**1776.06**	**2260.06**	**2495.54**	**3064.24**	**3532.77**	**3099.31**	**3340.12**	**3,859.73**
Diesel	1738.93	2216.83	2452.47	3014.33	3481.09	3042.08	3284.95	3,791.90
Petrol	37.12	43.24	43.06	49.91	51.68	57.24	55.17	67.84
3. HH consumption	**1007.12**	**1335.84**	**1548.13**	**1639.86**	**1788.51**	**1734.40**	**2139.76**	**2,224.40**
Diesel	110.67	139.12	169.88	201.26	237.06	231.59	348.65	409.54
Petrol	896.45	1196.73	1378.25	1438.60	1551.45	1502.80	1791.10	1,814.86
Re-Export	1094.60	708.90	1414.61	1526.05	1249.54	995.24	806.88	640.61
Diesel	925.88	428.50	1040.17	1074.71	769.32	595.70	354.94	168.05
Petrol	168.72	280.40	374.44	451.34	480.22	399.55	451.94	472.56
Total use of Diesel	3730.70	4089.00	5172.99	6108.99	6671.97	5991.02	6662.64	7,777.42
Total use of Petrol	1107.77	1528.86	1804.85	1950.42	2094.34	1972.87	2314.39	2,370.26
Total use	**4838.46**	**5617.87**	**6977.83**	**8059.42**	**8766.32**	**7963.89**	**8977.02**	**10,147.69**

Table 11 Supply & Use of Kerosene

(in KL)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Domestic Production	-	-	-	-	-	-	-	-
Import	5,780.00	5,727.00	5,567.00	4,990.00	5,694.00	4,611.00	4,791.00	4,238.00
Total Supply	**5,780.00**	**5,727.00**	**5,567.00**	**4,990.00**	**5,694.00**	**4,611.00**	**4,791.00**	**4,238.00**
Use								
Household	5,540.00	5,607.00	5,547.00	4,978.00	5,673.00	4,599.00	4,755.00	4,226.00
Industries	240.00	120.00	20.00	12.00	21.00	12.00	36.00	12.00
Total Use	**5,780.00**	**5,727.00**	**5,567.00**	**4,990.00**	**5,694.00**	**4,611.00**	**4,791.00**	**4,238.00**

Table 12 Growth in Supply & Use of Kerosene

(In Percent)

Supply	2010	2011	2012	2013	2014	2015	2016	2017
Domestic Production	-	-	-	-	-	-	-	-
Import	-	(0.92)	(2.79)	(10.36)	14.11	(19.02)	3.90	(11.54)
Total Supply	**-**	**(0.92)**	**(2.79)**	**(10.36)**	**14.11**	**(19.02)**	**3.90**	**(11.54)**
Use								
Household	-	1.21	(1.07)	(10.26)	13.96	(18.93)	3.39	(11.13)
Industries	-	(50.00)	(83.33)	(40.00)	75.00	(42.86)	200.00	(66.67)
Total Use	**-**	**(0.92)**	**(2.79)**	**(10.36)**	**14.11**	**(19.02)**	**3.90**	**(11.54)**

Table 13 Supply & Use of Kerosene

(in Mil. Nu.)

Supply	2010	2011	2012	2013	2014	2015	2016	2017
Domestic Production	-	-	-	-	-	-	-	-
Import (at basic price)	60.61	72.68	72.71	65.56	75.83	60.69	66.06	98.41
Exports	-	-	-	-	-	-	-	-
Changes in inventories	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
Trade and Transport margin (TTM)	37.65	36.13	33.06	30.98	11.18	11.77	11.61	4.65
Total Supply (at market price)	**158.87**	**181.49**	**178.49**	**162.10**	**162.84**	**133.15**	**143.73**	**201.47**
Use								
Household	94.18	106.53	105.39	96.30	86.69	72.27	77.09	102.77
Industries	4.08	2.28	0.38	0.23	0.32	0.19	0.58	0.29
Total use (3+4)	**98.26**	**108.81**	**105.77**	**96.54**	**87.01**	**72.46**	**77.67**	**103.06**

Table 14 Supply & Use of LPG

(In MT)

Supply	2010	2011	2012	2013	2014	2015	2016	2017
Domestic Production	-	-	-	-	-	-	-	
Import	6,834.16	7,410.87	7,470.22	7,335.82	7,546.54	8,113.14	8,711.57	9,298.54
Total Supply	**6,834.16**	**7,410.87**	**7,470.22**	**7,335.82**	**7,546.54**	**8,113.14**	**8,711.57**	**9,298.54**
Use	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Households	6,834.16	7,410.87	7,470.22	6,777.98	7,029.93	7,302.60	7,593.23	8,046.82
Industries*	-	-	-	557.84	516.61	810.54	1,118.34	1,251.72
Total Use	**6,834.16**	**7,410.87**	**7,470.22**	**7,335.82**	**7,546.54**	**8,113.14**	**8,711.57**	**9,298.54**

Note: *Information on imports are sourced from Dept. of Trade, MoEA. *Industrial LPG usage couldn't be estimated between 2010/12 as there are no proper record of information*

Table 15 Growth in Supply & Use of LPG

(In Percent)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Domestic Production	-	-	-	-	-	-	-	-
Import	-	8.44	0.80	(1.80)	2.87	7.51	7.38	6.74
Total Supply	**-**	**8.44**	**0.80**	**(1.80)**	**2.87**	**7.51**	**7.38**	**6.74**
Use	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Households	-	8.44	0.80	(9.27)	3.72	3.88	3.98	5.97
Industries*	-	-	-	-	(7.39)	56.90	37.97	11.93
Total Use	**-**	**8.44**	**0.80**	**(1.80)**	**2.87**	**7.51**	**7.38**	**6.74**

Table 16 Supply and Consumption of Fuelwood

(M^3)

SUPPLY	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
1. Supply by NRDCL	31,176.00	30,360.00	35,824.00	32,866.91	35,988.34	40,491.32	38,184.81	34,451.54
2. Supply by DoFPS, MoAF	48,860.00	91,270.00	43,650.00	75,791.55	67,415.00	85,002.99	102,109.87	97,744.08
Total Supply (1+2)	**80,036.00**	**121,630.00**	**79,474.00**	**108,658.46**	**103,403.34**	**125,494.31**	**140,294.68**	**132,195.62**
USE								
3. NRDCL Disposal (3.1+3.2)	31,176.00	30,360.00	35,824.00	32,866.91	35,988.34	40,491.32	38,184.81	34,451.54
3.1 Household	4,271.45	4,159.65	4,908.27	4,503.12	4,930.79	5,547.75	5,231.73	4,720.23
3.2 Industries	26,904.55	26,200.35	30,915.73	28,363.79	31,057.55	34,943.57	32,953.08	29,731.31
4. DoFPS, MoAF Disposal (4.1+4.2)	48,860.00	91,270.00	43,650.00	75,791.55	68,301.44	85,002.99	102,109.87	97,744.08
4.1 Household (4.1.1+4.1.2)	40,890.00	58,980.00	20,910.00	41,665.62	36,995.10	48,367.55	60,662.19	57,395.31
4.2 Industries	7,970.00	32,290.00	22,740.00	34,125.93	31,306.34	36,635.43	41,447.68	40,348.76
Total Household	45,161.45	63,139.65	25,818.27	46,168.73	41,925.89	53,915.30	65,893.92	62,115.54
Total Industries	34,874.55	58,490.35	53,655.73	62,489.72	62,363.89	71,579.01	74,400.76	70,080.07
Total Use	80,036.00	121,630.00	79,474.00	108,658.46	104,289.78	125,494.31	140,294.68	132,195.62

Table 17 Share of Supply and Consumption of Fuelwood

(Percentage)

SUPPLY	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
1. Supply by NRDCL	38.95	24.96	45.08	30.25	34.80	32.27	27.22	26.06
2. Supply by DoFPS, MoAF	61.05	75.04	54.92	69.75	65.20	67.73	72.78	73.94
Total Supply (1+2)	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
USE								
3. NRDCL Disposal (3.1+3.2)	38.95	24.96	45.08	30.25	34.51	32.27	27.22	26.06
3.1 Household	13.70	13.70	13.70	13.70	13.70	13.70	13.70	12.36
3.2 Industries	86.30	86.30	86.30	86.30	86.30	86.30	86.30	77.86
4. DoFPS, MoAF Disposal (4.1+4.2)	61.05	75.04	54.92	69.75	65.49	67.73	72.78	73.94
4.1 Household	51.09	48.49	26.31	38.35	35.47	38.54	43.24	43.42
4.2 Industries	9.96	26.55	28.61	31.41	30.02	29.19	29.54	30.52
Total Household	**56.43**	**51.91**	**32.49**	**42.49**	**40.20**	**42.96**	**46.97**	**44.28**
Total Industries	**43.57**	**48.09**	**67.51**	**57.51**	**59.80**	**57.04**	**53.03**	**49.95**
Total Use (3+4)	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 18 Physical Asset Account for Briquette

(KG)

SUPPLY	2010	2011	2012	2013	2014	2015	2016	2017
Total Stock (1+2)	541,190.00	316,155.00	347,610.00	407,610.00	374,390.00	307,240.00	270,210.00	266,340.00
1. Opening Stock	147,860.00	11,275.00	10,140.00	3,270.00	6,930.00	58,240.00	36,330.00	3,180.00
2. Additions to stock (via production)	393,330.00	304,880.00	337,470.00	404,340.00	367,460.00	249,000.00	233,880.00	263,160.00
Total Reductions in stock (3)	**529,915.00**	**306,015.00**	**344,250.00**	**400,410.00**	**316,150.00**	**270,910.00**	**266,580.00**	**185,340.00**
3. Disposal	529,915.00	306,015.00	344,250.00	400,410.00	316,150.00	270,910.00	266,580.00	185,340.00
Closing stock (1+2-3)	**11,275.00**	**10,140.00**	**3,360.00**	**7,200.00**	**58,240.00**	**36,330.00**	**3,630.00**	**81,000.00**

Table 19 Physical account for timber production

(Cft.)

SUPPLY	2012	2013	2014	2015	2016	2017
1. Supply by NRDCL	2,173,825.97	2,039,619.97	1,871,928.76	1,954,917.00	1,770,200.20	1,567,282.39
2. Supply by DoFPS, MoAF	2,100,034.00	3,371,686.73	2,794,325.07	14,233,257.87	6,529,630.09	5,172,512.81
Total Supply (1+2)	**4,273,859.97**	**5,411,306.70**	**4,666,253.83**	**16,188,174.87**	**8,299,830.29**	**6,739,795.20**
USE						
3. **NRDCL**	**2,173,825.97**	**2,039,619.97**	**1,871,928.76**	**1,954,917.00**	**1,770,200.20**	**1,567,282.39**
3.1. Commercial	2,173,825.97	2,039,619.97	1,871,928.76	1,954,917.00	1,770,200.20	1,567,282.39
4. DoFPS, MoAF	**2,100,034.00**	**3,371,686.73**	**2,794,325.07**	**14,233,257.87**	**6,529,630.09**	**5,172,512.81**
4.1. Commercial	784,387.00	1,418,489.34	1,068,819.59	1,506,804.07	2,472,601.66	1,408,914.38
4.2. Concessional	1,285,174.00	1,936,553.95	1,719,928.12	12,706,721.83	4,015,903.40	3,588,205.42
4.3. Free	30,473.00	16,643.44	5,577.36	19,731.97	41,125.03	175,393.01
Total Use (3+4)	**4,273,859.97**	**5,411,306.70**	**4,666,253.83**	**16,188,174.87**	**8,299,830.29**	**6,739,795.20**

Table 20 Monetary valuation for timber production

(Million Nu.)

SUPPLY	2012	2013	2014	2015	2016	2017
1. Supply by NRDCL	294.27	283.49	258.03	280.61	282.63	277.77
2. Supply by DoFPS, MoAF	25.46	27.36	7.06	17.89	7.05	6.96
Total Supply (1+2)	**319.73**	**310.85**	**265.09**	**298.50**	**289.68**	**284.73**
USE						
3. **NRDCL**	294.27	283.49	258.03	280.61	282.63	277.77
3.1. Commercial	294.27	283.49	258.03	280.61	282.63	277.77
4. DoFPS, MoAF	25.46	27.36	7.06	17.89	7.05	6.96
4.1. Commercial	23.25	24.98	5.00	4.97	5.30	4.32
4.2. Concessional	2.22	2.38	2.06	12.92	1.74	2.64
4.3. Free	-	-	-	-	-	-
Total Use (3+4)	**319.73**	**310.85**	**265.09**	**298.50**	**289.68**	**284.73**

Table 21 Metallic Mineral Reserve

(Million MT)

	Probable	Proven	Possible	Total
Non-Ferrous Metals				
Copper	2.04	-	-	2.04
Lead-Zinc	0.47	2.83	-	3.29
Ferrous Metals				
Iron Ore	2.69	-	-	2.69
Tungsten	3.87	-	-	3.87

Table 22 Non-Metallic Mineral Reserve

(Million MT)

Minerals	Probable	Proven	Possible	Total
Coal	0.22	-	0.82	**1.04**
Dolomite	-	46.57	14,495.90	**14,542.47**
Graphite Ore	35.91	5.56	7.28	**48.75**
Gypsum	0.03	113.84	20.35	**134.22**
Limestone	64.00	71.38	29.27	**164.65**
Quartzite	-	5.18	-	**5.18**
Talc	-	-	0.13	**0.13**

Table 23 Mineral Extractions

(Mil. MT)

Minerals	2010	2011	2012	2013	2014	2015	2016	2017
Coal	0.09	0.11	0.10	0.08	0.12	0.09	0.12	0.16
Dolomite	1.21	1.08	1.50	1.74	2.04	2.66	0.00	2.54
Lime stone	0.70	0.65	0.68	1.01	1.12	0.85	1.26	1.24
Gypsum	0.34	0.35	0.31	0.35	0.41	0.39	0.32	0.33
Quartzite	0.11	0.10	0.09	0.09	0.08	0.08	0.09	0.18
Stone	6.65	1.84	1.49	0.04	1.47	2.20	3.41	3.83
Talc	0.04	0.01	0.02	0.01	0.01	0.01	0.00	0.00
Iron Ore	-	-	0.00	0.02	0.02	0.04	0.03	0.03

Table 24 Physical Asset Account for Coal

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**1.04**	**0.95**	**0.85**	**0.75**	**0.67**	**0.55**	**0.46**	**0.34**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	**0.09**	**0.11**	**0.10**	**0.08**	**0.12**	**0.09**	**0.12**	**0.16**
Extractions	0.09	0.11	0.10	0.08	0.12	0.09	0.12	0.16
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**0.95**	**0.85**	**0.75**	**0.67**	**0.55**	**0.46**	**0.34**	**0.18**

Table 25 Physical Asset Account for Dolomite

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**14,542.47**	**14,541.26**	**14,540.17**	**14,538.67**	**14,536.93**	**14,534.89**	**14,532.23**	**14,529.86**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	**1.21**	**1.08**	**1.50**	**1.74**	**2.04**	**2.66**	**2.370**	**2.537**
Extractions	1.21	1.08	1.50	1.74	2.04	2.66	2.370	2.537
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**14,541.26**	**14,540.17**	**14,538.67**	**14,536.93**	**14,534.89**	**14,532.23**	**14,529.86**	**14,527.32**

Table 26 Asset Account for Limestone

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**164.65**	**163.94**	**163.32**	**162.64**	**161.63**	**160.51**	**159.66**	**158.40**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	**0.70**	**0.63**	**0.68**	**1.01**	**1.12**	**0.85**	**1.26**	**0.93**
Extractions	0.70	0.63	0.68	1.01	1.12	0.85	1.26	0.93
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**163.94**	**163.32**	**162.64**	**161.63**	**160.51**	**159.66**	**158.40**	**157.47**

Table 27 Physical Asset Account for Gypsum

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**134.22**	**133.87**	**133.52**	**134.53**	**134.17**	**133.76**	**133.37**	**133.05**
(+) Increases in stocks	-	-	1.32	-	-	-	-	-
Discoveries	-	-	1.32	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	**0.34**	**0.35**	**0.31**	**0.35**	**0.41**	**0.39**	**0.32**	**0.35**
Extractions	0.34	0.35	0.31	0.35	0.41	0.39	0.32	0.35
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**133.87**	**133.52**	**134.53**	**134.17**	**133.76**	**133.37**	**133.05**	**132.70**

Table 28 Physical Asset Account for Quartzite

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**5.18**	**5.07**	**4.98**	**4.89**	**4.80**	**4.71**	**4.63**	**4.54**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	**0.11**	**0.09**	**0.09**	**0.09**	**0.08**	**0.08**	**0.09**	**0.09**
Extractions	0.11	0.09	0.09	0.09	0.08	0.08	0.09	0.09
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**5.07**	**4.98**	**4.89**	**4.80**	**4.71**	**4.63**	**4.54**	**4.45**

Table 29 Physical Asset Account for Talc

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**0.13**	**0.09**	**0.08**	**0.08**	**0.07**	**0.05**	**0.05**	**0.05**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	0.04	0.01	0.00	0.01	0.01	0.01	0.00	**0.01**
Extractions	0.04	0.01	0.002	0.01	0.01	0.01	0.002	0.01
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**0.09**	**0.08**	**0.08**	**0.07**	**0.05**	**0.05**	**0.05**	**0.03**

Table 30 Physical Asset Account for Iron Ore

(Million MT)

	2010	2011	2012	2013	2014	2015	2016	2017
Opening stock (as of 1 January)	**2.69**	**2.69**	**2.69**	**2.69**	**2.67**	**2.65**	**2.61**	**2.57**
(+) Increases in stocks	-	-	-	-	-	-	-	-
Discoveries	-	-	-	-	-	-	-	-
Other increases	-	-	-	-	-	-	-	-
(-) Decreases in stocks	-	-	0.00	0.02	0.02	0.04	0.03	**0.03**
Extractions	-	-	0.00	0.02	0.02	0.04	0.03	0.03
Other decreases	-	-	-	-	-	-	-	-
Closing stock levels (as of 31 December)	**2.69**	**2.69**	**2.69**	**2.67**	**2.65**	**2.61**	**2.58**	**2.54**

Table 31 Monetary Asset Account for Coal

(Million Nu.)

Extraction Year	Quantity	Per unit resource rent	Total resource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
2018	0.10	2,247.83	234.96	0.12	0.89	209.79
2019	0.10	2,247.83	234.96	0.12	0.80	187.31

Table 32 Monetary Asset Account for Dolomite

(Million Nu.)

Extraction Year	Quantity	Per unit resource rent	Total resource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
2018	968.49	283.63	274,697.09	0.12	0.89	245,265.26
2019	968.49	283.63	274,697.09	0.12	0.80	218,986.84
2020	968.49	283.63	274,697.09	0.12	0.71	195,523.96
2021	968.49	283.63	274,697.09	0.12	0.64	174,574.97
2022	968.49	283.63	274,697.09	0.12	0.57	155,870.51
2023	968.49	283.63	274,697.09	0.12	0.51	139,170.09
2024	968.49	283.63	274,697.09	0.12	0.45	124,259.01
2025	968.49	283.63	274,697.09	0.12	0.40	110,945.55
2026	968.49	283.63	274,697.09	0.12	0.36	99,058.52
2027	968.49	283.63	274,697.09	0.12	0.32	88,445.11
2028	968.49	283.63	274,697.09	0.12	0.29	78,968.85
2029	968.49	283.63	274,697.09	0.12	0.26	70,507.90
2030	968.49	283.63	274,697.09	0.12	0.23	62,953.48
2031	968.49	283.63	274,697.09	0.12	0.20	56,208.47
2032	968.49	283.63	274,697.09	0.12	0.18	50,186.13

Table 33 Monetary asset account for Gypsum

(Million Nu.)

Extraction Year	Quantity	Per unit resource rent	Total resource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
2018	8.85	482.00	4,264.07	0.12	0.89	3,807.20
2019	8.85	482.00	4,264.07	0.12	0.80	3,399.29
2020	8.85	482.00	4,264.07	0.12	0.71	3,035.08
2021	8.85	482.00	4,264.07	0.12	0.64	2,709.89
2022	8.85	482.00	4,264.07	0.12	0.57	2,419.55
2023	8.85	482.00	4,264.07	0.12	0.51	2,160.31
2024	8.85	482.00	4,264.07	0.12	0.45	1,928.85
2025	8.85	482.00	4,264.07	0.12	0.40	1,722.18
2026	8.85	482.00	4,264.07	0.12	0.36	1,537.67
2027	8.85	482.00	4,264.07	0.12	0.32	1,372.92
2028	8.85	482.00	4,264.07	0.12	0.29	1,225.82
2029	8.85	482.00	4,264.07	0.12	0.26	1,094.48
2030	8.85	482.00	4,264.07	0.12	0.23	977.21
2031	8.85	482.00	4,264.07	0.12	0.20	872.51
2032	8.85	482.00	4,264.07	0.12	0.18	779.03

Table 34 Monetary Asset account for Quartzite

(Million Nu.)

Extraction Year	Quantity	Per unit resource rent	Total resource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
2018	49.46	2,993.89	148,071.49	0.12	0.89	132,206.68
2019	49.46	2,993.89	148,071.49	0.12	0.80	118,041.68
2020	49.46	2,993.89	148,071.49	0.12	0.71	105,394.36
2021	49.46	2,993.89	148,071.49	0.12	0.64	94,102.11
2022	49.46	2,993.89	148,071.49	0.12	0.57	84,019.74
2023	49.46	2,993.89	148,071.49	0.12	0.51	75,017.62
2024	49.46	2,993.89	148,071.49	0.12	0.45	66,980.02
2025	49.46	2,993.89	148,071.49	0.12	0.40	59,803.59
2026	49.46	2,993.89	148,071.49	0.12	0.36	53,396.06
2027	49.46	2,993.89	148,071.49	0.12	0.32	47,675.06
2028	49.46	2,993.89	148,071.49	0.12	0.29	42,567.01
2029	49.46	2,993.89	148,071.49	0.12	0.26	38,006.26
2030	49.46	2,993.89	148,071.49	0.12	0.23	33,934.16
2031	49.46	2,993.89	148,071.49	0.12	0.20	30,298.36
2032	49.46	2,993.89	148,071.49	0.12	0.18	27,052.11

Table 35 Energy trend for supply, consumption and trade

(ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017
PRODUCTION	**689.39**	**681.21**	**653.62**	**701.72**	**698.24**	**723.52**	**591.87**	**772.86**
Hydro-electricity	630.07	607.70	586.97	649.17	615.97	666.03	512.35	663.83
Wind	-	-	-	-	-	-	0.06	0.10
Solar	-	-	-	-	-	-	-	-
Coal	59.14	73.35	66.50	52.36	82.09	57.36	79.33	108.79
Firewood	0.03	0.05	0.03	0.04	0.04	0.05	0.05	0.05
Briquette	0.15	0.11	0.13	0.15	0.14	0.09	0.09	0.10
CONSUMPTION	**273.50**	**298.19**	**329.13**	**372.41**	**398.79**	**393.91**	**422.95**	**511.11**
Hydro-electricity	147.28	149.68	149.53	177.25	190.92	190.91	187.21	239.90
Wind	-	-	-	-	-	-	0.06	0.10
Solar	-	-	-	-	-	-	-	-
Diesel	76.54	92.61	108.90	109.42	104.82	109.12	113.96	125.66
Petrol	19.08	21.80	23.70	24.60	25.49	27.60	29.30	31.74
Kerosene	5.16	5.12	4.96	4.46	5.09	4.12	4.28	3.64
ATF	1.13	1.24	1.76	2.69	3.02	2.83	2.81	3.39
LPG	4.60	4.99	5.03	4.94	5.08	5.46	5.87	10.50
Coal	19.53	22.60	35.11	48.86	64.20	53.72	79.33	96.04
Firewood	0.03	0.05	0.03	0.04	0.04	0.05	0.05	0.05
Briquette	0.15	0.11	0.13	0.15	0.14	0.09	0.09	0.10
EXPORT	**519.31**	**499.34**	**471.53**	**507.90**	**466.52**	**496.64**	**511.28**	**453.33**
Hydro-electricity	479.75	453.40	420.95	477.87	433.73	476.51	496.93	435.81
Diesel*	8.60	9.81	21.98	19.54	12.89	11.60	6.08	3.76
Petrol*	2.91	4.00	4.92	5.69	5.85	5.59	5.60	6.33

Coal	28.06	32.12	23.68	4.80	14.05	2.94	2.67	7.43
IMPORT	**190.76**	**184.36**	**211.42**	**220.44**	**219.63**	**236.81**	**236.44**	**261.12**
Electricity	11.31	3.47	5.10	9.65	16.49	14.03	9.73	17.89
Diesel	76.54	92.61	108.90	109.42	104.82	109.12	113.96	125.66
Petrol	19.08	21.80	23.70	24.60	25.49	27.60	29.30	31.74
Kerosene	4.96	4.91	4.78	4.28	4.88	3.96	4.11	3.64
ATF	1.13	1.24	1.76	2.69	3.02	2.83	2.81	3.39
LPG	7.72	8.37	8.44	8.29	8.53	9.17	9.84	10.50
Coal	70.02	51.96	58.74	61.51	56.40	70.11	66.70	68.29
TOTAL SUPPLY	**880.15**	**865.57**	**865.05**	**922.17**	**917.87**	**960.34**	**828.31**	**1,033.97**

Note: * Re-export figures of Diesel and Petrol are considered as the export. The re-export is the term used for fueling by non-
hicles across border towns of Bhutan.

Table 36 Physical supply table for energy, 2017

Unit: as specified in ( )	Production		Accumulation	Flows from RoW (Imports)	Flows from the Environment	Total Supply
	Industries	Households				
I. Energy from Natural Inputs						
Inputs of energy from renewable sources					7,721.43	**7,721.43**
(1) Hydro (gwh)					7,720.32	**7,720.32**
(2) Solar (gwh)					-	**-**
(3) Wind (gwh)					1.11	**1.11**
Natural resource inputs					161,922.10	**161,922.10**
(1) Coal (mt)					161,526.74	**161,526.74**
1.1) Bituminous / Sub-Bituminous					-	**-**
1.2) Anthracite					-	**-**
1.3) Coke/Semi-coke of coal					161,526.74	**161,526.74**
1.4) Other coal					-	**-**
(2) Fuelwood (mt)					132.20	**132.20**
(3) Briquette (mt)					263.16	**263.16**
Total energy from natural inputs						
II. Energy Products						
Production of energy products by SIEC* class						
(1) Coal (mt)	161,526.74			148,286.54		**309,813.28**
1.1) Bituminous / Sub-Bituminous	-			-		**-**
1.2) Anthracite	-			913.83		**913.83**
1.3) Coke/Semi-coke of coal	161,526.74			66,340.11		**227,866.85**
1.4) Other coal	-			81,032.60		**81,032.60**
(2) Diesel (kl)	-			140,640.50		**140,640.50**
2.1) Diesel	-			140,640.50		**140,640.50**
2.2) Light Diesel Oil (LDO)	-			-		**-**
(3) Petrol (kl)				38,960.50		**38,960.50**
(4) Aviation Turbine Fuel (ATF) (kl)	-			3,982.00		**3,982.00**
(5) Kerosene (kl)	-			4,238.00		**4,238.00**
5.1) Kerosene (SK Oil)	-			4,226.00		**4,226.00**
5.2) Kerosene (SK Oil-Industrial)	-			12.00		**12.00**
(6) Furnace Oil (FO) (kl)	-			-		**-**
(7) LPG (mt)	-			9,298.54		**9,298.54**
(8) Electricity (gwh)	7,721.43			208.10		**7,929.53**
(9) Biogas for cooking (mt)	-			-		**-**
(10) Fuelwood (mt)	132.20			-		**132.20**
(11) Briquette (mt)**	263.16					**263.16**
Total use of energy products						
III. Energy Residuals* **						
Losses during extraction (gwh)	-	-				**-**
Losses during distribution (gwh)	71.05	-				**71.05**
Losses during transformation (gwh)	-	-				**-**
Other energy residuals (gwh)	-	-				**-**
Total energy from residuals						

Note: **Standard International Energy Classification; **The production only pertains to those handled by NRDCL; ***Energy losses relates to only hydro-electricity*

Table 37 Physical use table for energy, 2017

Unit: as specified in ( )	Production		Accumulation	Flows from RoW (Imports)	Flows from the Environment	Total Supply
	Industries	Households				
I. Energy from Natural Inputs						
Inputs of energy from renewable sources	7,721.43					**7,721.43**
(1) Hydro (gwh)	7,720.32					**7,720.32**
(2) Solar (gwh)	-					**-**
(3) Wind (gwh)	1.11					**1.11**
Natural resource inputs	161,658.94					**161,658.94**
(1) Coal (mt)	161,526.74					**161,526.74**
1.1) Bituminous / Sub-Bituminous	-					**-**
1.2) Anthracite	-					**-**
1.3) Coke/Semi-coke of coal	161,526.74					**161,526.74**
1.4) Other coal	-					**-**
(2) Fuelwood (m3)	132.20					**132.20**
(3) Briquette (m3)	263.16					**263.16**
Total energy from natural inputs						
II. Energy Products						
Production of energy products by SIEC* class						
(1) Coal (mt)	142,596.00	-		25,529.74		**309,813.28**
1.1) Bituminous / Sub-Bituminous	-		-894.29	894.29		**-**
1.2) Anthracite	-	-	913.83	-		**913.83**
1.3) Coke/Semi-coke of coal	142,596.00	-	85,215.49	55.36		**227,866.85**
1.4) Other coal	-	-	56,452.51	24,580.09		**81,032.60**
(2) Diesel (kl)	129,024.15	7,405.85	-	4,210.50		**140,640.50**
2.1) Diesel	129,024.15	7,405.85	-	4,210.50		**140,640.50**
2.2) Light Diesel Oil (LDO)	-	-	-	-		**-**
(3) Petrol (kl)	1,361.71	29,831.16	-	7,767.64		**38,960.50**
(4) Aviation Turbine Fuel (ATF) (kl)	3,982.00	-	-	-		**3,982.00**
(5) Kerosene (kl)	12.00	4,226.00	-	-		**4,238.00**
5.1) Kerosene (SK Oil)	-	4,226.00	-	-		**4,226.00**
5.2) Kerosene (SK Oil-Industrial)	12.00	-	-	-		**12.00**
(6) Furnace Oil (FO) (kl)	-	-	-	-		**-**
(7) LPG (mt)	1,251.72	8,046.82	-	-		**9,298.54**
(8) Electricity (gwh)	1,245.44	1,544.56	71.05	5,068.48		**7,929.53**
(9) Biogas for cooking (mt)			-			**-**
(10) Fuelwood (mt)	70.08	62.12				**132.20**
(11) Briquette (mt)**	263.16	-	-	-		**263.16**
Total use of energy products						
III. Energy Residuals* **						
Losses during extraction (gwh)					-	**-**
Losses during distribution (gwh)					71.05	**71.05**
Losses during transformation (gwh)					-	**-**
Other energy residuals (gwh)					-	**-**
Total energy from residuals						

Note: **Standard International Energy Classification; **The production only pertains to those handled by NRDCL; ***Energy losses relates to only hydro-electricity*

Table 38 Physical Supply table for energy, 2017

Unit: ktoe	Production		Accumulation	Flows from RoW (Imports)	Flows from the Environment	Total Supply
	Industries	Households				
I. Energy from Natural Inputs						
Inputs of energy from renewable sources					663.92	663.92
(1) Hydro					663.83	663.83
(2) Solar					-	-
(3) Wind					0.10	0.10
Natural resource inputs					108.94	108.94
(1) Coal					108.79	108.79
1.1) Bituminous / Sub-Bituminous					-	-
1.2) Anthracite					-	-
1.3) Coke/Semi-coke of coal					108.79	108.79
1.4) Other coal					-	-
(2) Fuelwood					0.05	0.05
(3) Briquette					0.10	0.10
Total energy from natural inputs					**772.86**	**772.86**
II. Energy Products						
Production of energy products by SIEC* class						
(1) Coal	177.08			177.08		177.08
1.1) Bituminous / Sub-Bituminous	-			-		-
1.2) Anthracite	0.58			0.58		0.58
1.3) Coke/Semi-coke of coal	153.47			153.47		153.47
1.4) Other coal	23.03			23.03		23.03
(2) Diesel	125.66			125.66		125.66
2.1) Diesel	125.66			125.66		125.66
2.2) Light Diesel Oil (LDO)	-			-		-
(3) Petrol	31.74			31.74		31.74
(4) Aviation Turbine Fuel (ATF)	3.39			3.39		3.39
(5) Kerosene	3.64			3.64		3.64
5.1) Kerosene (SK Oil)	3.63			3.63		3.63
5.2) Kerosene (SK Oil-Industrial)	0.01			0.01		0.01
(6) Furnace Oil (FO)	-			-		-
(7) LPG	10.50			10.50		10.50
(8) Electricity	681.82			681.82		681.82
(9) Biogas for cooking	-			-		-
(10) Fuelwood	0.05			0.05		0.05
(11) Briquette**	0.10			0.10		0.10
Total use of energy products	1,033.97			1,033.97		1,033.97
III. Energy Residuals* **						
Losses during extraction	-	-				-
Losses during distribution	6.11	-				6.11
Losses during transformation	-	-				-
Other energy residuals	-	-				-
Total energy from residuals	6.11	-				6.11
Total SUPPLY	**778.97**	**-**	**-**	**261.12**	**-**	**1,040.08**

Note: **Standard International Energy Classification; **The production only pertains to those handled by NRDCL; ***Energy losses relates to only hydro-electricity*

Table 39 Physical Use table for energy, 2017

Unit: ktoe	Production		Accumulation	Flows from RoW (Imports)	Flows from the Environment	Total Supply
	Industries	Households				
I. Energy from Natural Inputs						
Inputs of energy from renewable sources	663.92					663.92
(1) Hydro	663.83					663.83
(2) Solar	-					-
(3) Wind	0.10					0.10
Natural resource inputs	108.94					108.94
(1) Coal	108.79					108.79
1.1) Bituminous / Sub-Bituminous	-					-
1.2) Anthracite	-					-
1.3) Coke/Semi-coke of coal	108.79					108.79
1.4) Other coal	-					-
(2) Fuelwood	0.05					0.05
(3) Briquette	0.10					0.10
Total energy from natural inputs	**772.86**					**772.86**
II. Energy Products						
Production of energy products by SIEC* class						
(1) Coal	96.04	-	73.62	7.43		177.08
1.1) Bituminous / Sub-Bituminous	-	-	-0.40	0.40		-
1.2) Anthracite	-	-	0.58	-		0.58
1.3) Coke/Semi-coke of coal	96.04	-	57.39	0.04		153.47
1.4) Other coal	-	-	16.04	6.99		23.03
(2) Diesel	115.28	6.62	-	3.76		125.66
2.1) Diesel	115.28	6.62	-	3.76		125.66
2.2) Light Diesel Oil (LDO)	-	-	-	-		-
(3) Petrol	1.11	24.30	-	6.33		31.74
(4) Aviation Turbine Fuel (ATF)	3.39	-	-	-		3.39
(5) Kerosene	0.01	3.63	-	-		3.64
5.1) Kerosene (SK Oil)	-	3.63	-	-		3.63
5.2) Kerosene (SK Oil-Industrial)	0.01	-	-	-		0.01
(6) Furnace Oil (FO)	-	-	-	-		-
(7) LPG	1.41	9.09	-	-		10.50
(8) Electricity	107.09	132.81	6.11	435.81		681.82
(9) Biogas for cooking	-	-	-	-		-
(10) Fuelwood	0.03	0.02	-	-		0.05
(11) Briquette**	0.10	-	-	-		0.10
Total use of energy products	**324.43**	**176.44**	**79.72**	**453.33**		**1,033.92**
III. Energy Residuals* **						
Losses during extraction (GWh)					-	-
Losses during distribution (GWh)					6.11	6.11
Losses during transformation (GWh)					-	-
Other energy residuals (GWh)					-	-
Total energy from residuals					6.11	6.11
TOTAL USE	**324.43**	**176.44**	**79.72**	**453.33**	**6.11**	**1,040.03**

Note: **Standard International Energy Classification; **The production only pertains to those handled by NRDCL; ***Energy losses relates to only hydro-electricity*

Table 40 Solid Waste Collection

Dzongkhag	Town	Waste Generated (Tons/day)	Method of Collection	Frequency	Types of Waste	Service Provider
Bumthang	Bumthang	3	Block Collection	6 days a week	Organic and Plastic waste	Municipality
Chukha	Gedu	0.58	Block Collection		E-waste and Municipal Solid Waste	Private Sector
	Phuentsholing	10	Block Collection	2 days a week	Construction, Medical and Municipal Solid Waste	Thromde
	Tsimasham	0.58	Block Collection	2 days a week	Municipal Solid Waste	Thromde
Dagana	Dagana	0.2	Door to Door	2 days a week	Construction, Medical and Municipal Solid Waste	Thromde
Gasa	Damji	0.1	communal collection	2 days a month	Construction, E-waste and Municipal Solid Waste	Thromde
Haa	Haa	5	Block Collection	5 days a week	Construction Waste, E-Waste, Medical Waste, and Municipal Solid Waste	Thromde
Lhuentse	Lhuentse	2	Kerb side collection and block collection	weekly	Municipal Solid Waste	Thromde
Mongar	Gyelposhing	0.95	Block Collection	2 days a week	Medical Waste and Municipal Solid Waste	Thromde
	Mongar	0.96	Kerb side collection and block collection	1 day a week	E-waste, Medical and Municipal Solid Waste	Thromde
	Yadi	0.2	Block Collection	1 day a week	E-waste, Medical and Municipal Solid Waste	Private Sector
Paro	Paro	8	Block Collection	7 days a week	Construction Waste and Municipal Solid Waste	Thromde
	Denchi	1	Door to Door	2 days a week	Construction Waste, E-waste, Medical Waste, and Municipal Solid Waste	
Punakha	Punakha	3	Block Collection	7 days a week	Municipal Solid Waste	Thromde
Samdrup Jongkhar	Samdrup Jongkhar	5	Door to Door	4 days a week	Municipal Solid Waste	Thromde
Samtse	Samtse	2	Block Collection	3 days a week	Construction Waste, E-waste, Medical Waste, and Municipal Solid Waste	Thromde
Sarpang	Sarpang	0.57	Block Collection	2 days a week	Municipal Solid Waste	Thromde
	Gelephu	4.5	Block collection and communal collection	6 days a week	Construction Waste, E-waste, Medical Waste, and Municipal Solid Waste	Thromde
Thimphu	Thimphu	20	Door to door, kerb side, and block collection	3 days a week	Municipal Solid Waste	Private Sector
Trashiyangtse	Trahiyangtse	1	Kerb side, block collection, and communal collection	once a month	Construction Waste, E-waste, Medical Waste, and Municipal Solid Waste	Thromde
Trashigang	Trashigang	6	Block collection	daily	E-waste, Medical Waste, and Municipal Solid Waste	Thromde
Trongsa	Trongsa	2	Door to door	4 days a week	Medical Waste and Municipal Solid Waste	Thromde
Tsirang	Damphu	1.5	Kerb side collection and block collection	3 days a week	Construction Waste, E-waste, and Municipal Solid Waste	Thromde
Wangdue Phodrang	WangduePhodrang	4.7	Block and communal Collection	daily	Municipal Solid Waste	Thromde
Zhemgang	Zhemgang	2	Block Collection	2 days a week	Construction Waste, Medical Waste, and Municipal Solid Waste	Thromde

Source: Water and Sanitation Information System, Water and Sanitation Division, Department of Engineering Services, MoWHS

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