ENVIRONMENTAL ACCOUNTS STATISTICS-2022

National Statistics Bureau

Royal Government of Bhutan

Thimphu: Bhutan

Foreword

The National Statistics Bureau (NSB) is pleased to publish the Annual Environmental Accounts Statistics (AEAS)-2021. The AEAS 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 timber and mineral accounts covering from 2010 to 2020. Further, the publication presents additional chapters on waste and experimental energy accounts. This is the fifth publication by the Economic and Environment Statistics Division of National Statistics Bureau.

The AEAS 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.

Phub Sangay

(Offg DIRECTOR)

National Statistics Bureau

Abbreviations & Acronyms

DGM: Department of Geology & Mines

GDP: Gross Domestic Product

GNH: Gross National Happiness

LPG: Liquefied Petroleum Gas

ATF: Aviation Turbine Fuel

MoEA: Ministry of Economic Affairs

NSB: National Statistics Bureau

SEEA*:* System of Environmental- Economic Accounting

UNSD: United Nations Statistics Division

ISIC: International Standard Industrial Classification of all Economic Activities

SEEA-CF: System of Environmental-Economic Accounting 2012-Central Framework

UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

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Chapter 1: Introduction

1.1 *Objective*

The Annual Environmental Accounts Statistics (AEAS) 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 basis towards improved decision makings related to sustainable development and green economy. Improvements 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* require 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.

Therefore, 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 over time.

1.2 *Method and Scope*

The AEAS 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 with 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. The waste account and experimental 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 efforts to other natural resource accounts which will help in policy planning.

Data revision

As in any other statistical organizations, the published figures are based on the revision of the recent available information. As the publication draws information from annual reports of companies and corporations, it may undergo revision in the subsequent publications.

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 the policy makers and development partners on the state of our environment.

Table 1: Green Economic Indicators

Indicators	Web or table reference	Ministry or Statistical Office	Methodological sheet	Unit	2017	2018	2019	2020	2021
Economic, demographic and social context for sustainable development									
Demographic patterns and trends									
Total population, both sexes combined	Population Housing Census Report (PHCB)/SYB	NSB	Available	Nos	727,145	734374	741672	748931	756129
Population growth rate		NSB	Available	%	1.3	1.30	1.30	1.30	1.30
Percentage of urban population		NSB	Available	%	37.80	37.80	37.80	37.80	37.80
Growth rate of urban population		NSB	Available	%	n.a	n.a	n.a	n.a	n.a
Population (age 65 and above), total, both sexes		NSB	Available	Nos	43064	44338	45822	47433	49085
Population density, inhabitant per km2		NSB	Available	per km2	18.94	19.13	19.32	19.51	19.69
Life expectancy at birth, both sexes combined		NSB	Available	Years	69.1	69.10	69.10	69.10	69.10
Economic growth, structure of economy and productivity									
Real GDP, index	National Accounts Statistics Report	NSB	Available	%	4.65	3.06	5.76	(10.01)	4.09
[base year as determined by the reporting country]				in Mil USD	2451.28	2446.49	2535.65	2324.95	2539.53
GDP per capita(in USD)		NSB	Available	USD	3332.56	3331.40	3418.83	3104.36	3538.59
Net Disposable Income [or Net National Income]		NSB	Available	Mil Nu	132977,52	140422.55	148834.56	170018.5	170939.21
Share of agriculture in GDP		NSB	Available	%	15.03	15.99	15.78	19.15	19.19
Share of industry/manufacturing in GDP		NSB	Available	%	7.51	7.43	7.11	5.92	5.86
Share of services in GDP		NSB	Available	%	42.12	45.81	48.16	46.13	46.61
Proportion of cellular subscribers to total population	Annual Report of MoIC	MoIC	Available	%	100.5	95.80	98.32	99.49	102.89
Proportion of internet users of total population		MoIC	Available	%	99.9	106.21	110.37	98.10	99.40
Labour									
Labour force participation	2019 Labour Force Survey report, NSB		Available	%	63.3	62.60	66.40	67.80	69.10
Proportion of employment by relevant economic activities		NSB	Available	Pry	166646	167862.24	159032.00	157015.00	158511.00
				Second	63852	35748.44	43550.00	42438.00	45560.00
				Trit	101601	107245.32	108478.00	115109.00	118052.00
				∑ (in Nos)	332099	310856.00	311059.00	314562.00	322123.00
Unemployment rate		NSB	Available	%	2.4	3.40	2.70	5.00	4.80
Labour productivity [GDP per person employed]		NSB	Available	in Mil USD	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	Available		0.38	0.38	0.38	0.38	0.38
Percentage of population living in poverty and extreme poverty [measured by National/Regional poverty lines]		NSB	Available	%	8.2	8.20	8.20	8.20	8.20
Subsistence Poverty rate		NSB	Available	%	1.5	1.50	1.50	1.50	1.50
Educational attainment: at least completed lower secondary (ISCED 2 or higher), population 25+ years (%)	Annual Education Statistics	MoE	Available	%	74.2	71.40	71.40	71.40	71.40
Total net enrolment ratio in primary education [both sexes]		MoE	Available	%	94.8	92.90	91.20	92.94	93.51
Total public expenditure on education as a percentage of GDP	Annual National Accounts Statistics	NSB	Available	%	6.72	6.49	5.32	7.39	6.12
Total expenditure on health per capita (PPP)	Annual National Accounts Statistics	NSB	Available	Nu	5,994.70	6623.52	6547.53	8592.79	8608.74
Inflation and commodity prices									
Consumer price index		NSB	Available	%	4.96	2.72	2.73	5.63	7.35
Export price of the major commodity groups [as determined by the reporting country]		DGPC	Available	Nu/unit as of Dec. 2017	THP/KHP=2.12, CHP=2.55	THP/KHP=2.12, CHP=2.55	THP/KHP=2.12 CHP=2.55	THP/KHP=2.12 CHP=2.55	THP/KHP=2.12 CHP=2.55
International trade and tourism									
Relative importance of trade: (exports + imports)/GDP	Annual National Accounts Statistics	NSB	Available	Mil Nu	0.54	0.87	0.84	0.76	8.46
Terms of trade index [base year as determined by the reporting country]		DRC, MoF	Not available		n.a	n.a	n.a	n.a	n.a
International tourist arrivals in % to population	Annual Report	TCB	Available	%	9.82	9.78	9.73	0.85	n.a
International tourism, receipts	Annual Report	RMA	Available	in Mil USD	79.81	85.41	88.63	9.49	n.a
The environmental and Resource Productivity									
Carbon emissions									
Carbon dioxide emissions (CO2), thousand metric tons of CO2	UNFCC Report	NEC	Available	Metric tons	1559560	1559560	1559560	1559560	1559560
Carbon dioxide emissions (CO2), metric tons of CO2 per capita		NEC	Available	Tons/Capita	2.14	2.12	2.10	2.08	2.06
Carbon dioxide emissions (CO2), kg CO2 per $1 GDP (PPP)		NEC	Available	Kg/GDP	n.a	n.a	n.a	(155800.1998)	381310.5134
Energy									
Energy Intensity [KToE per Million Nu.]	EAS Report	NSB	Available	ktoe/Nu	0.0003	0.00032	0.00040	0.0026782	0.0067003
Energy consumption per capita [total or final]	energy per capita consumption	NSB	Available	Ktoe/person	0.0007	0.00069	0.00070	0.00061	0.00071
Energy productivity [Million Nu. Per KToE]	NAS Report	NSB	Available	Million Nu/ktoe	338.4056	320.7602	335.8405	373.38230	350.97
Renewable energy supply [total energy supply ,TES]		NSB	Available	GWh	7,721.43	6594.31	8875.75	11390.37	10823.40
Renewable electricity [% total electricity generation]	EAS Report	NSB	Available	%	99.99	99.98	99.98	99.98	99.98
Fuelwood, production [thousand cubic metres]	Annual Report	NRDCL/DoFPS	Available	1000 m^3	132.20	80.31	37.54	86.95	84.31

Indicators	Web or table reference	Ministry or Statistical Office	Methodological sheet	Unit	2017	2018	2019	2020	2021
Renewable resources									
Forest area	Forestry Facts & Figure of FRMD, MoAF	MoAF	Available	ha	2,730,889.00	2,730,889.00	2,730,889.00	2,730,889.00	2,717,161.64
Proportion of land area covered by forest [percentage]		MoAF	Available	%	71.00	71.00	71.00	71.00	71.00
Natural forest as % of total forest area		MoAF	May be available		99.25	99.22	99.22	99.99	99.99
Planted forest as % of total forest area		MoAF	May be available	ha	0.03	0.02	0.01	0.01	0.01
Deforestation [Ha and % of forest area per year]		MoAF	May be available		0.01	0.07	0.07	n.a	
Fish Produced, total [marine and freshwater]	DoL	MoAF, DoL	Available	Kgs	199,918.00	223,623.00	223,623.00	181,645.00	192,970.00
Non-renewable resources									
Mineral resources: stocks or reserves of selected minerals, including fossil fuels and critical raw materials, as determined by the reporting country	Types	DGM, MoEA	May be available						
Extraction rates of selected minerals, including fossil fuels and critical raw materials, as determined by the reporting country	Dolomite	Available	Dolomite	MT	2546256	2821166.00	3027517.70	1232106.76	9627045.97
	Limestone		Lime stone	MT	1235162	1344038.00	1546302.14	182900.88	4308402.69
	Gypsum		Gypsum	MT	328128	461128.00	490595.50	282589.50	1562440.99
	Coal		Coal	MT	161527	186824.00	184784.48	274.07	533409.29
	Marble		Marble	MT	96567	188901.00	94318.33	0.00	379786.43
	Quartzite		Quartzite	MT	175501	145714.00	141065.90	8807.63	471088.61
	Talc		Talc	MT	1293	2042.00	1374.75	972.09	5682.04
	Stone		Stone	MT	3828254	3730975.00	n.a	n.a	n.a
	Granite		Granite	MT	26423	6080.00	3391.30	0.00	35893.99
	Phyllite		Phyllite	MT	61910	53189.00	78246.35	0.00	193345.64
	Calc Tufa		Cal Tufa	MT	n.a	12324.00	22079.14	0.00	0.00
	Iron Ore		Iron Ore	MT	32974	37843.00	36864.20	0.00	107681.57
	Clay		Clay	MT	n.a	n.a	n.a	n.a	n.a
Proportion of agricultural area to total land area					2.93	2.93	2.46	2.46	2.46
Area equipped for irrigation as % of agricultural area	RNR statistics	MoAF	Available	%	94.2	94.20	83.36	n.a	n.a
Arable land, % total land area	RNR statistics	MoAF	Available	%	2.93	2.93	2.93	2.93	2.93
Pasture and temporary meadows, % total land area		MoAF	Available		n.a	n.a	0.06	n.a	n.a
Land area affected by degradation, by type of degradation, as % of total land area		MoAF	Available	%	0.54	0.54	0.54	0.54	0.54
Proportion of organic agricultural area in total agricultural area		MoAF	May be available		n.a	n.a	n.a	n.a	n.a
Pesticides used on crop areas [kg / ha]		MoAF	Available	kg/hec	n.a	n.a	n.a	n.a	n.a
Chemical fertilizers used, kilogram per hectare of crop land		MoAF	Available	kg/hec	n.a	n.a	n.a	n.a	n.a
Natural fertilizer use, kilogram per hectare of crop land		MoAF	Available		n.a	n.a	n.a	n.a	n.a
Biodiversity and ecosystems									
Number of known flora and fauna species by status category		NBC, MoAF	Available	Nos	5603 Vascular plants	< 5,600 Vascular plants	< 5,600 Vascular plants	< 5,600 Vascular plants	n.a
					400 Lichens	287 Lichens	280 lichens	280 lichens	n.a
					200 Mammals	200 Mammals	129 Mammals	200 Mammals	n.a
					721 Birds appx	740 Birds appx	748 birds	747 birds	n.a
Number of endemic flora and fauna species by class (mammals, reptiles, etc)		MoAF/NBC	Available	Nos	144 endimic plants	145 endimic plants	145 endimic plants	145 endimic plants	n.a
					27 Globally Threatened mammal	27 Globally Threatened mammal	27 globally threatened mammal	27 globally threatened mammal	n.a
					18-Critically endangered & vulnerable birds	47-Globally threatened birds	47-Globally threatened birds	31-Globally threatened birds	n.a
% of threatened flora and fauna species by class (mammals, reptiles, etc.)		MoAF	Available	%					
Proportion of terrestrial protected areas to total surface area, %	MoAF		Available	%	51.44	51.44	51.44	43.48	43.48
Footprints									
Ecological footprint	GNHC	GNHC	Available	Hec/capita	1.8	1.80	1.80	1.80	1.80

Indicators	Web or table reference	Ministry or Statistical Office	Methodological sheet	Unit	2017	2018	2019	2020	2021
The environmental dimension of quality of life									
Environmental health and risks									
Concentration of particulate matter (PM10) in urban air [main cities]	UNFCC Report	NEC	Available	Microgram/ m3	40.28	40.28	40.28	40.28	40.28
Environmental services and amenities									
Proportion of total population using an improved drinking water source	BLSS Report	NSB	Available	%	98.60	99.60	99.60	99.60	99.60
Proportion of urban population using an improved drinking water source		MoH	Available	%	99.60	99.60	99.60	99.60	99.60
Proportion of rural population using an improved drinking water source		MoH	Available	%	98.00	98.00	98.00	98.00	98.00
Proportion of total population using an improved sanitation facility		MoH	Available	%	74.80	74.80	74.80	74.80	74.80
Proportion of urban population using an improved sanitation facility		MoH	Available	%	84.72	84.72	84.72	84.72	84.72
Proportion of rural population using an improved sanitation facility		MoH	Available	%	69.00	69.00	69.00	69.00	69.00
Municipal waste collected [total]		MoWHS	Available	Tons	30966.60	38076.80	62838.40	62838.40	62838.40
Municipal waste collected [per capita]		MoWHS	Available	Tons per capita per day	0.11	0.14	0.22	0.22	0.22
Policy responses and economic opportunities									
Regulations and management									
Annual government environment protection expenditure [as % of government expenditure and/ or as % of GDP]	Public Expenditure Review Report	DPA, MoF	Available	%	2.6	2.6	2.6	2.6	2.6
Participation in multilateral environmental agreements [list and number of MEAs]		NEC	May be available	Nos	15	15	15	15	15
Number of regulated pollutants by media [water, air, soil, etc]	Environmental Standards - 2010 (NEC)	NEC	Available	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 emission = 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 anuual revenue)		DPA, MoF	Available	Mil Nu	909.65	938.56	1025.52	812.46	593.79
International financial flows									
Official Development Assistance, total	AFS	DPA, MoF	Available	Mil Nu	12,986.75	14847.07	10516.48	16425.75	14882.29

Chapter 3: Electricity Account

3.1. *Overview*

In Bhutan, one of the leading contributors to growth of the economy is an electricity sector which accounts almost 15.4% of total GDP of Bhutan. Hydropower is the major source of energy resources in Bhutan. Although, Bhutan depends significantly on hydro-electricity, it also imports substantial amount of fossil fuels for the transport sector. Our dependence on fossil fuels for transport sector will continue until such time that the price of electric motor vehicles are reasonably affordable.

3.2 Hydro-electricity: Supply & Consumption

The total supply of electricity decreased to 10,920.33 Gwh in the year 2021 from 11,471.09 Gwh in 2020, which decreased by about 5%. Almost 99.0% of total electricity supply are internal generation, whereas the import accounts for barely 1.0 % of total electricity supply. In monetary terms, the supply of electricity has decreased from Nu. 31,653.02 million to Nu. 28,452.52 million in the year 2021, which is decrease of about 10 %.

The industrial consumption of electricity increased by almost 44%, whereas the consumption of electricity by household decreased by almost 11% as given in *figure 3.1*. On average, the industrial consumption accounted for almost 80% while household consumed about 20 % of the total domestic consumption.

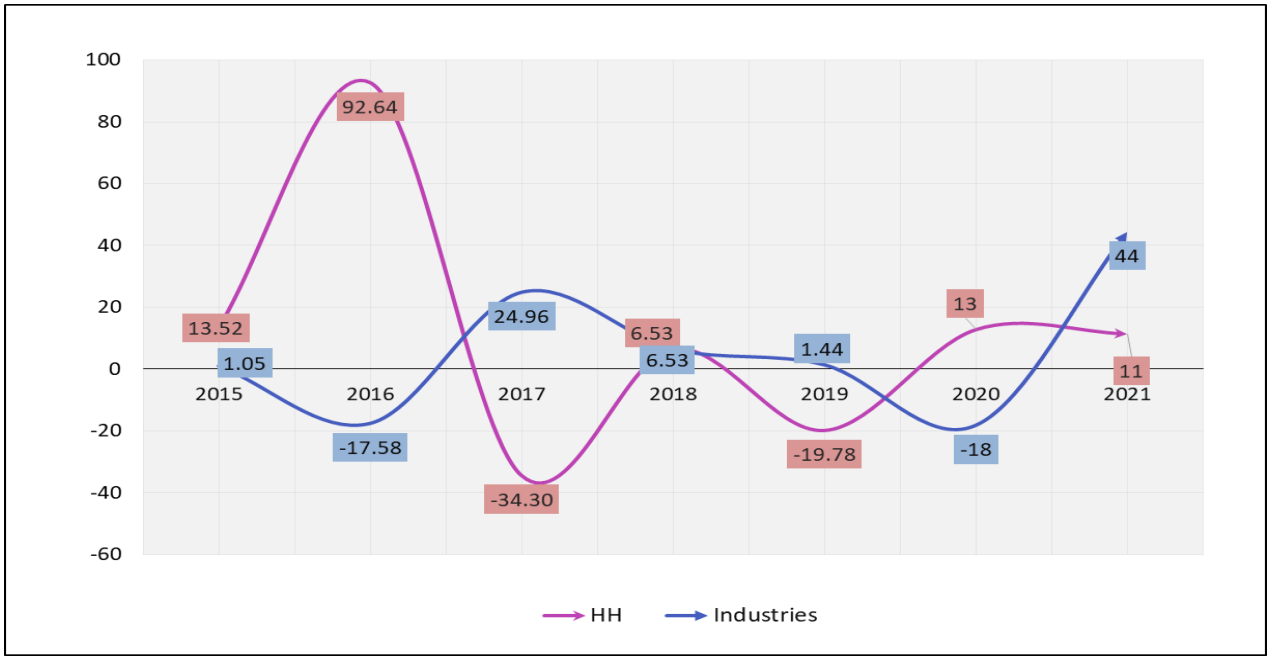


Figure3.1 Consumption growth of electricity

Amongst the economic sectors, manufacturing sector has the highest consumption with almost 64.33 % followed by construction with 14.73 %, mining and quarrying with 9.82% and Community Social & Personal Services with 5.78% , whereas remaining sectors consumed less than 5.0 %.

Of the total electricity supply, almost 73.95% is exported, while around 25.49 % is consumed domestically and around 0.56% is estimated as transmission loss. The overall domestic consumption of electricity increased by about 38% in 2021 compared to 2020.

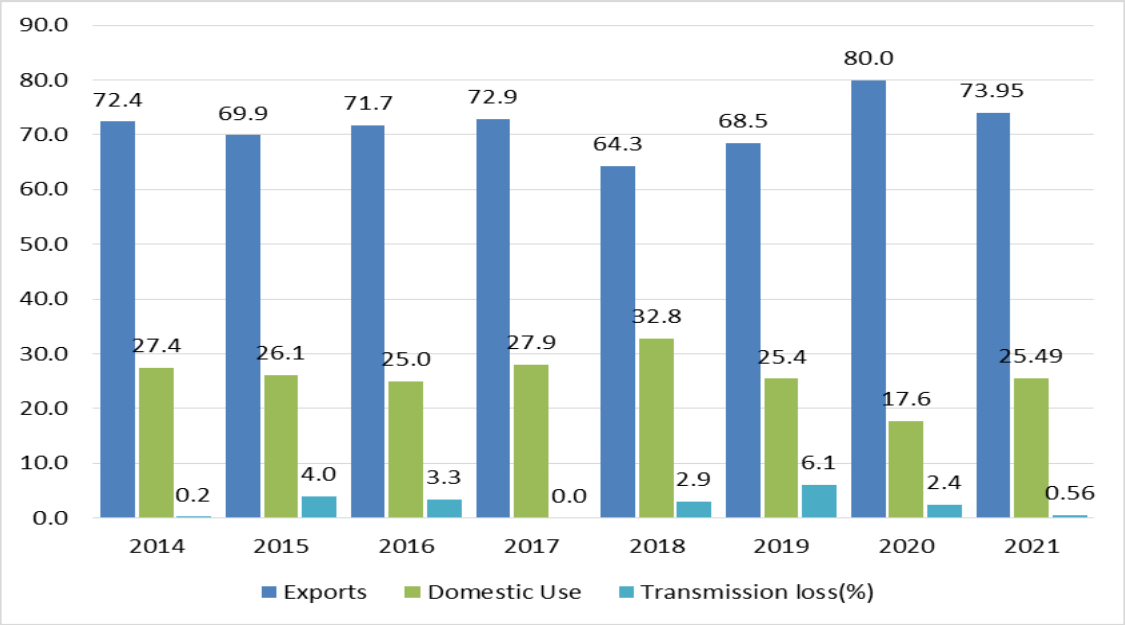


Figure3.2 Share of Export, Domestic use and Transmission Loss

3.2. *Electricity Trade*

The overall electricity production in the country has decreased by almost 5% in 2021 compared to 2020. Although Bhutan is a net exporter of electricity, the country does import electricity during the lean season. In 2021, the export of electricity is decreased by almost 12%, while import is increased by around 20%.

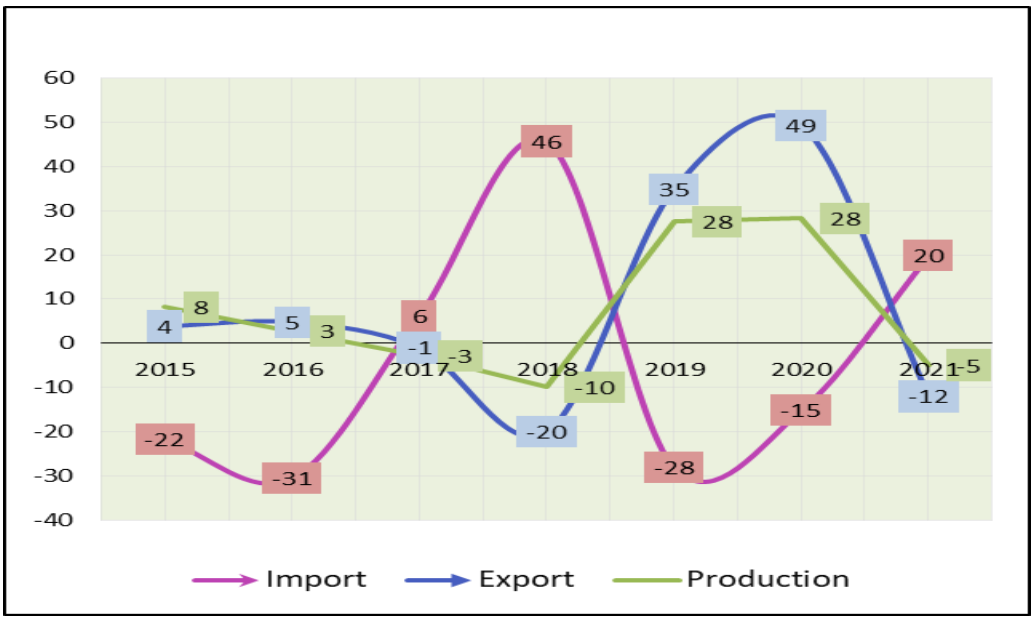


Figure3.3 Growth in production, export, and import (in %)

Chapter -4: Fuel Account

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

Bhutan has no natural petroleum or natural gas reserves. For domestic consumption, fossil fuels such as diesel, petrol & LPG are all imported from India. Bhutan imported oil at around 143,169.0 KL in the year 2021. By and large most oil imports are supplied as fuel for automobiles. There was a decline of about 4.0% for petrol & increase of about 9.0% for diesel import in the year. The volume of diesel & petrol imported and its growth trends for accounting period (2012-2021) is depicted in *figure4.1.*

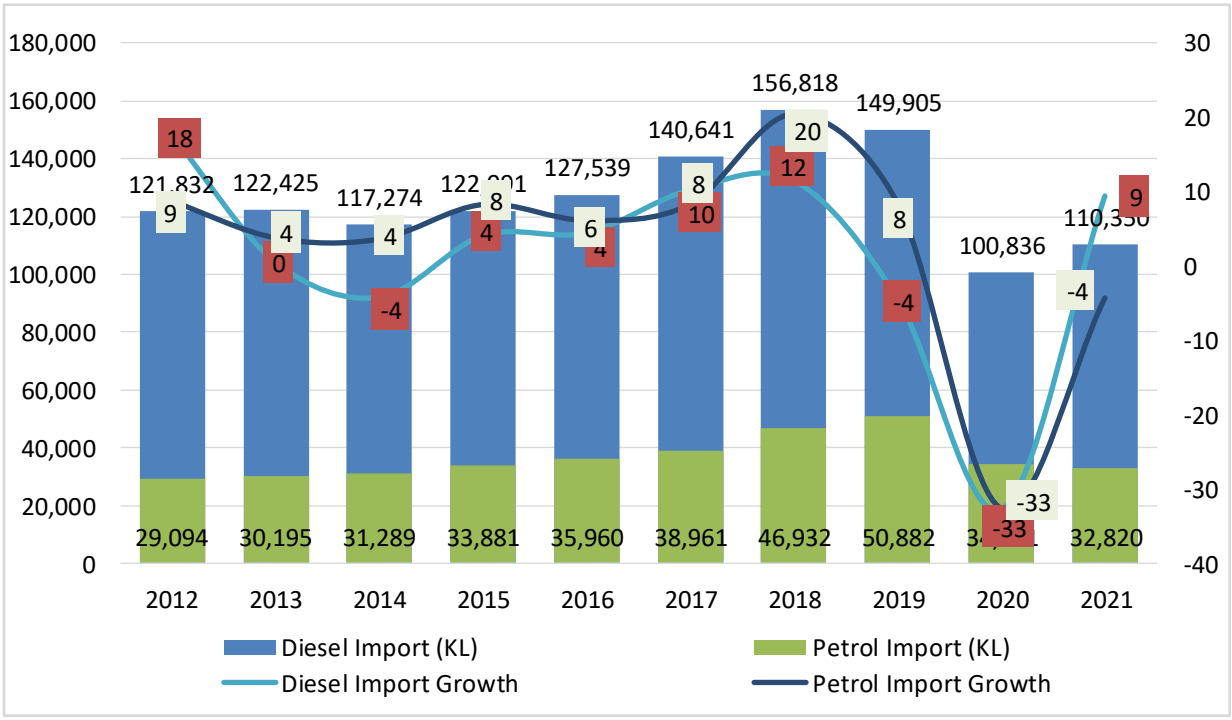


Figure 4.1: Fuel Imports and growth trends

In terms of volume, the total supply of diesel increased from 100,836.0 KL to 110,330.0 KL and the supply of petrol decreased from 34,291 KL to 32,820.0 KL in the year 2021.

As regards to consumption, the service sector consumed the maximum fuel at about 30.13 % followed by household sector at almost 22.57 %, industrial sector at about 21.59 %, and agriculture, livestock and forestry sector accounts almost 13.07 %. The detail tables are given in appendix table as *Table 8(Supply and Use table for fuel*).

4.2. Re-export 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, Gomtu, Samtse, etc.

The re-export of fuel increased significantly from 7,263.06 KL in 2020 to 18,083.97 KL in 2021, which is an increase of almost 148.9 %. In particular, the re-export of diesel has increased from 2838.64 KL in 2020 to 13,326.89 KL in 2021, whereas, the re-export of petrol has increased from 4,424.42KL to 4,757.09 KL. Thus, it accounts for inclined of about 369.0 % and 8 % respectively for diesel and petrol.

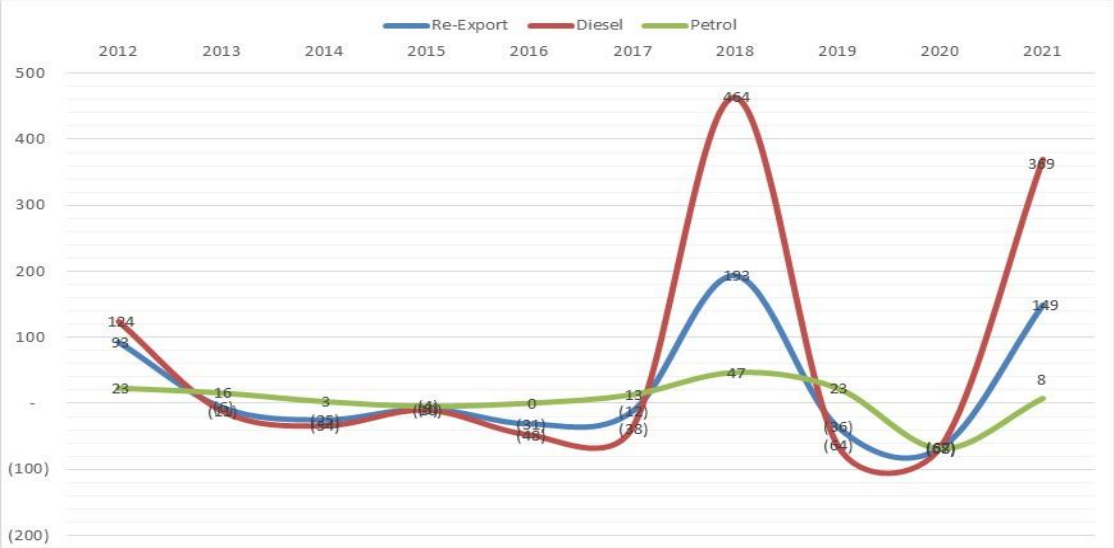


Figure 4.2: The growth of re-export of fuel

4.4 Kerosene: Supply & Consumption

The import of kerosene decreased from 1,794 KL in 2020 to 1,654 KL in the year 2021, which is a decreased of about 8%.

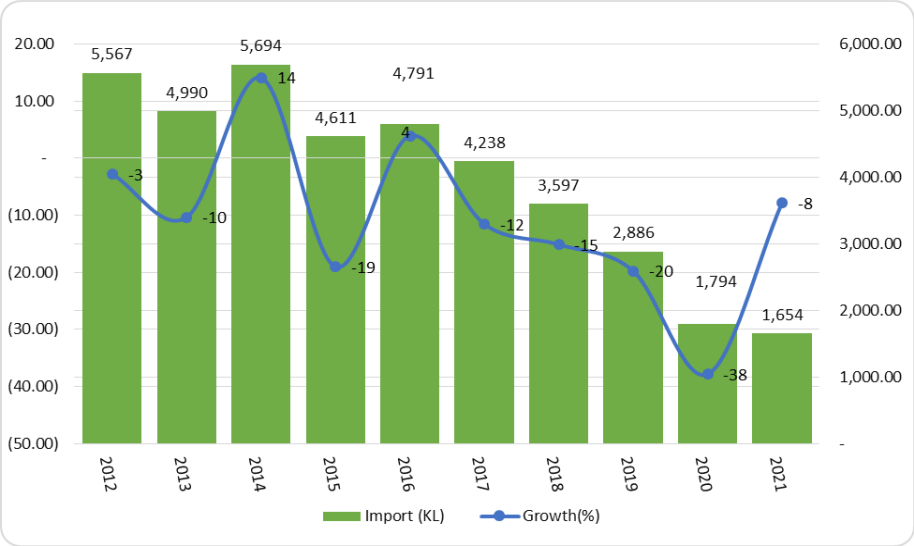


Figure 4.3: Import of kerosene and growth trend

Kerosene is used by households for heating and cooking. In 2021, almost 100% of the total import were used by households and nil used by industrial purposes.

4.5 LGP: Supply& Consumption

Bhutanese household commonly uses LPG for cooking purpose, the import of LPG from India is seen considerably increasing till 2019. However, from 2020 the import of LPG started decreasing. It further decreased to 9,176 MT in 2021, which was a decrease of about 5% compared to 2020.

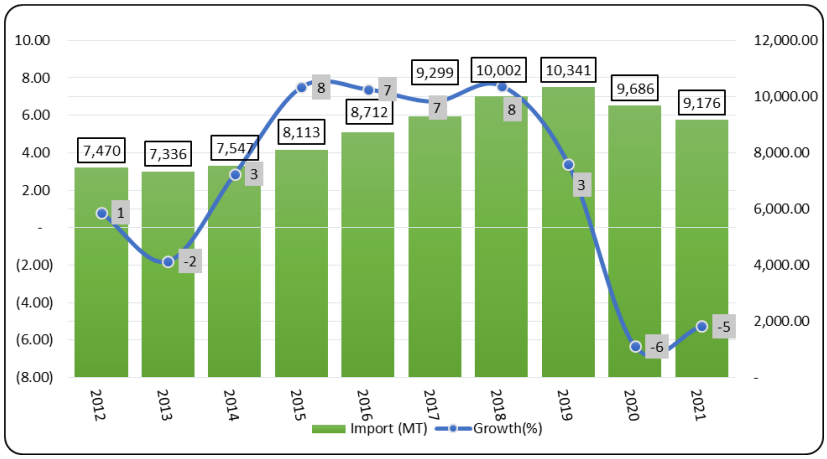


Figure4.4 LPG Import and Growth (%) trend

4.6 Fuelwood: Supply & Consumption

One of the common sources of energy for rural households in Bhutan is fuelwood. Natural Resource Development Corporation Ltd. and Department of Forest and Park Services, Ministry of Agriculture & Forests supply fuelwood to both rural and urban households. The report includes only those fuelwoods supplied by NRDCL and DoFPS, MoAFs. It is based on the permits issued by these two agencies and it doesn't include the fuelwoods collected by the households without permit.

In 2021, a total of about 85,676.80 cubic meter fuelwoods were supplied. Of total supply, NRDCL supplied about 44,477.19 cubic meter which constitutes almost 52 % and are supplied mostly to industries. The remaining 41,199.61 cubic meter (about 48%) were supplied by DoFPS, MoAFs mostly to rural household.

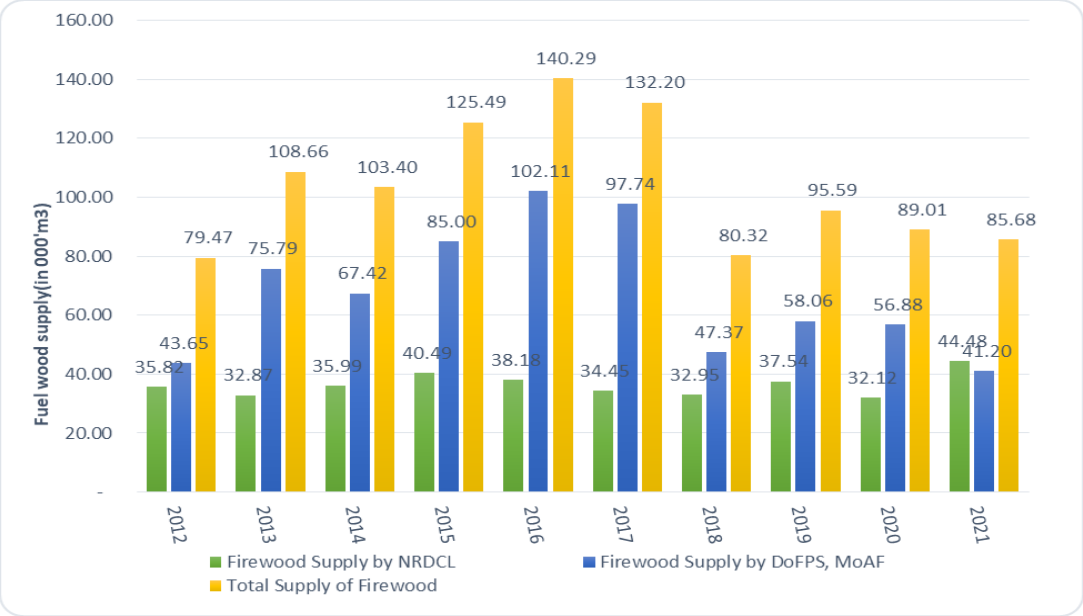


Figure 4.5 Fuelwood Supply

The consumption of fuelwood is broadly categorized under household and industries use based on the data of fuelwood distribution records with NRDCL and MoAF. Household consumption accounts for almost 29.0 %, whereas industries consumed about 71.0% in the year 2021.

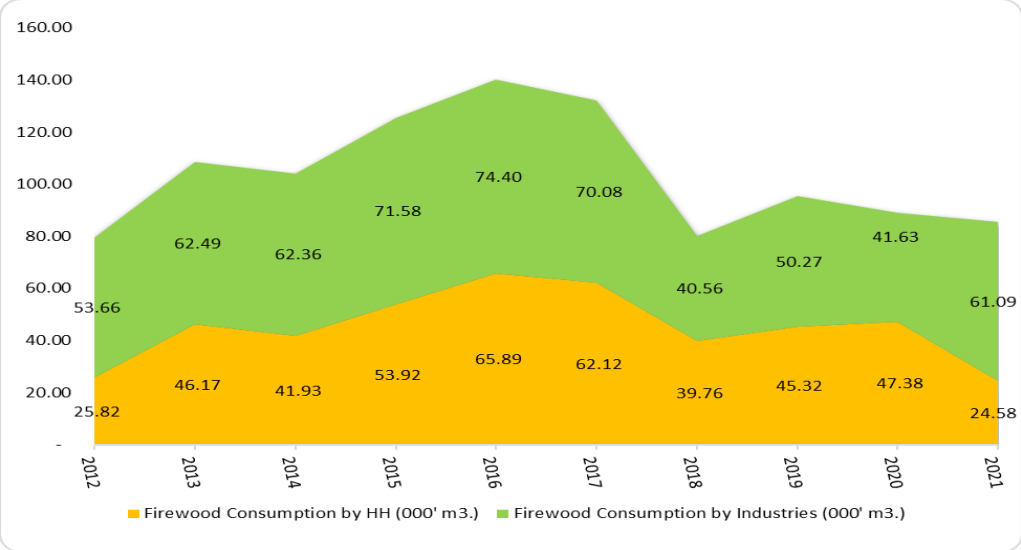


Figure 4.6 Consumption of firewood by HH & Industries (in 000' m3)

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 and there is no reliable data. Thus, this account is purely based on NRDCL's Briquette record. As per the record, stock of briquette decreased

to 175.32 MT in 2021, constitutes a decreased of about 51 % when compared to 2020. While disposal also decreased by almost 50 %, making a total disposal of 167.82 MT in the year 2021.

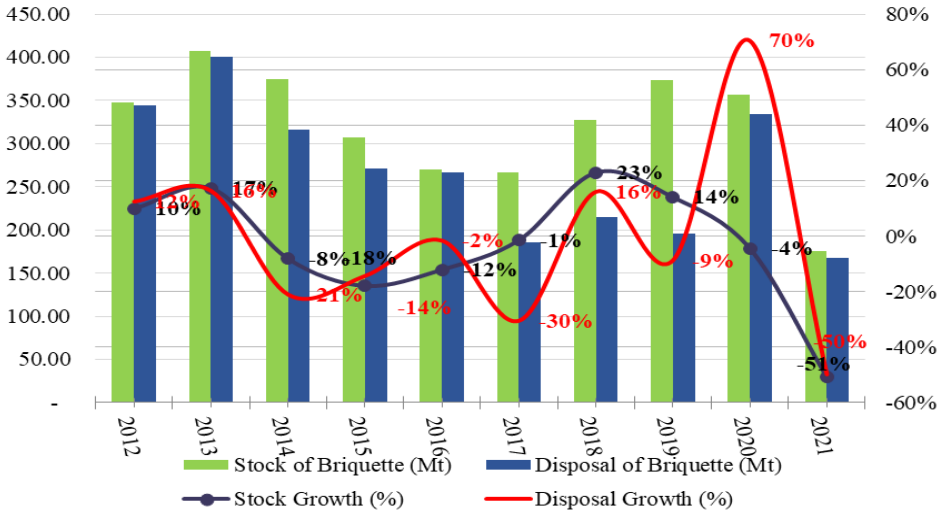


Figure 4.7 Stock, Disposal and Growth Trends for Briquette

Chapter 5: Asset Account

5.1. *Introduction*

In general, assets are defined as items that are considered to be of value to society. In economics, assets are seen as stores of value that, in many situations, also provide inputs to production processes. Asset account for minerals and 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. The relevant information is organized by levels and values of stocks of natural inputs and changes in these stocks over time.

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, and other constructions. The agencies discharged with the responsibility of timber supply are NRDCL and DoFPS, MoAF. It's either supplied for commercial use or on concessional to the households depending on its use.

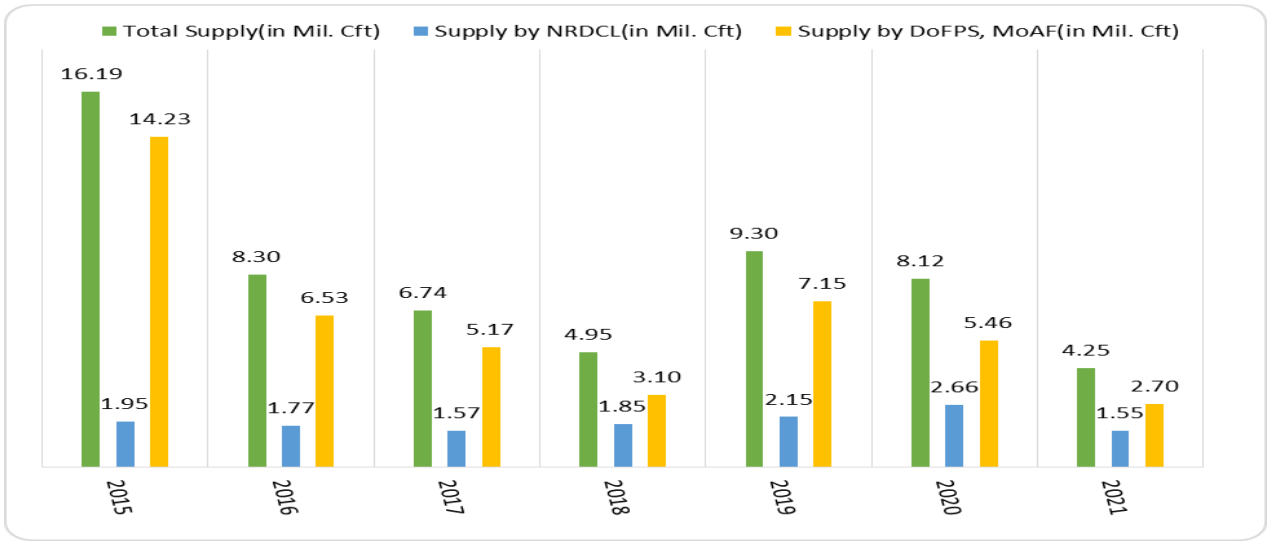


Figure 5.1 Supply of Timber (in Mil. Cu ft)

The total timber supply in the economy decreased in 2021 compared to 2020. A total of 4.25 million Cu ft. timbers were supplied in 2021, which was a decrease of about 47.7 %. Of total supply, 63.5% were supplied by DoFPS, MoAF and 36.5 % were supplied by NRDCL.

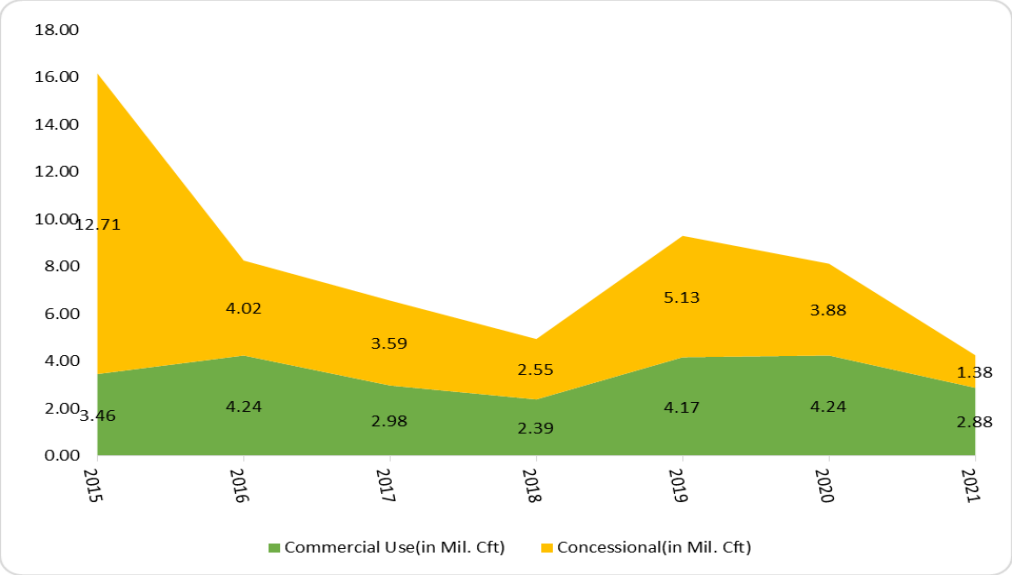


Figure 5.2 Use of Timber (in Million Cu ft.)

Consumptions were broadly categorized under commercial and concessional use, where 2.88 million cu ft is used for commercial purpose and 1.38 million Cu ft under concessional use. The sector wise consumption information of timber was not available and therefore, it could not be estimated.

5.3 Sand: Supply and Consumption

The NRDCL is the main agency responsible for supply of sand for public consumption, however the DoFPs, MoAF also issue permits for extraction by individuals. Therefore, the total supply includes the sand extraction through permits issued by DoFPs, MoAF also.

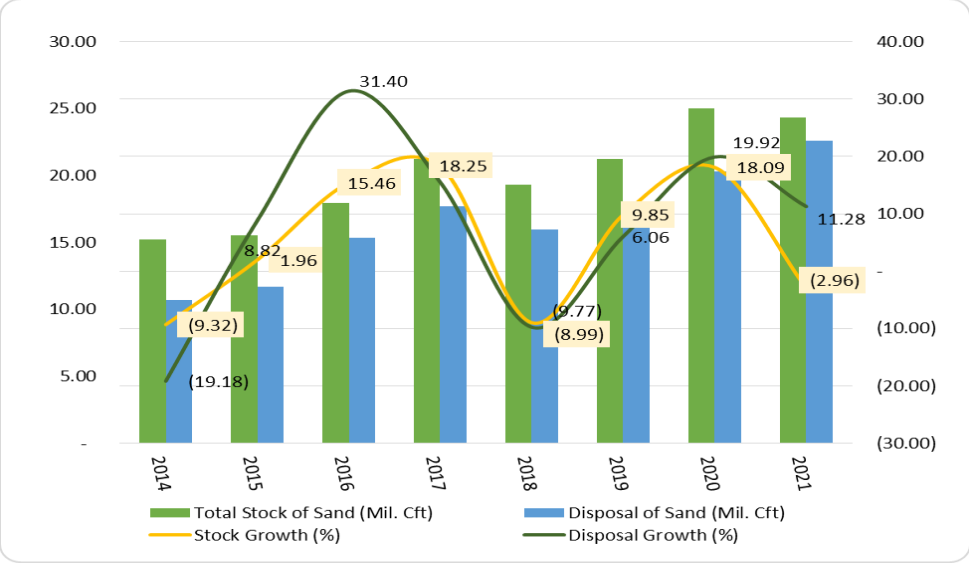


Figure 5.3 Stock, Disposal and Growth Trends of Sand

The total stock of sand has decreased in 2021 compare to 2020, whereas the disposal of sand increased in 2021 with decline of almost 2.96 % and growth of about 11.28 % respectively as reflected in *figure5.3.*

5.4 *Mineral Asset Account*

The publication compiles mostly non-metallic mineral resources as information about metallic mineral resources in Bhutan are not available. The mineral asset accounting for non-metallic minerals are purely based on the available primary data of DGM, MoEA. Mineral resources extracted are used for economic purposes and are generally considered to be nonrenewable. Therefore, it's important to understand the amount of minerals deposits by type and its rate of exploration.

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

The key factors in the measurement of mineral asset accounting include understanding the mineral resources in the form of deposits or reserves and its extractions by different mining and quarrying companies. The deposit influences the likelihood and the cost of current and future extraction.

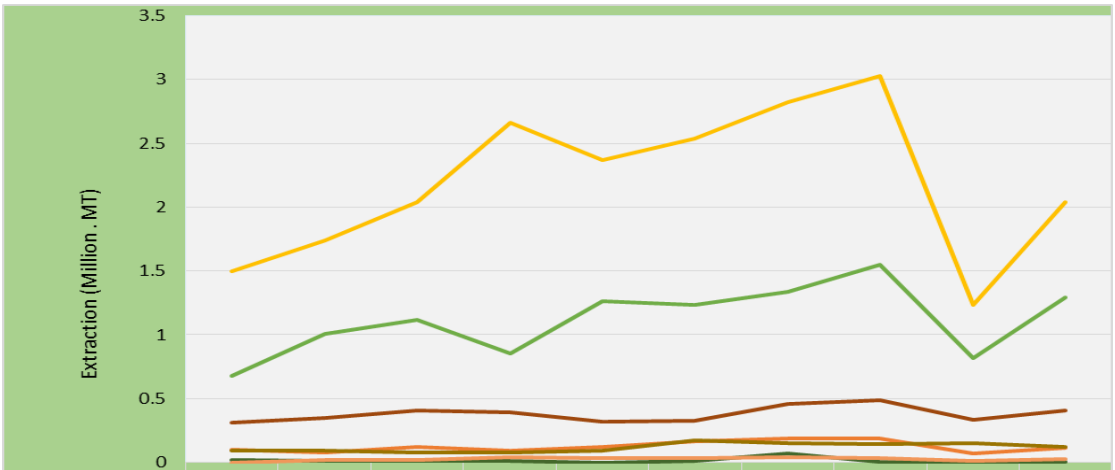
Physical asset accounts for mineral resources were compiled by type of mineral resources and it includes estimates of the opening and closing stocks of each mineral resources and changes in the stock over the accounting period. The NSB considered reserves of minerals which are geologically known reserves and its level as the opening stock, while the extractions were recorded as depletion.

5.4.1 Mineral Reserves

Data on reserves are gathered to use in developing physical accounts so as to 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.*

5.4.2 Extraction of Minerals

Minerals are extracted by mining and quarrying companies at different locations in the country. Information on extraction of minerals were compiled to ascertain whether mineral extractions or harvest are carried out sustainably.



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Coal	0.1	0.08	0.12	0.09	0.12	0.16	0.19	0.185	0.073	0.112
Dolomite	1.5	1.74	2.04	2.66	2.37	2.54	2.82	3.028	1.232	2.041
Limestone	0.68	1.01	1.12	0.85	1.26	1.24	1.34	1.546	0.817	1.296
Gypsum	0.31	0.35	0.41	0.39	0.32	0.33	0.46	0.491	0.331	0.404
Quartzite	0.09	0.09	0.08	0.08	0.09	0.18	0.15	0.141	0.150	0.123
Talc	0.02	0.01	0.01	0.01	0	0.01	0.07	0.001	0.001	0.00068
Iron-ore	0	0.02	0.02	0.04	0.03	0.03	0.04	0.037	0.015	0.02592

Figure 5.4 Trend in mineral extraction

The coal extraction averages 0.123 million MT annually from 2012 to 2021. The extraction ranges from 0.073 million MT to 0.19 million MT. The coal extraction in 2018 was highest at 0.19 million MT followed by 0.185 million MT in 2019 and the extraction was minimum at 0.073 million MT in the year 2020. Extraction of dolomite on the other hand was on an average of 2.196 million MT. with highest extraction of 3.028 million MT in 2019.

Limestone and gypsum extraction remains almost steady with an annual average extraction of 1.115 million MT and 0.379 million MT respectively. However, the talc extraction dramatically decreased in 2021 with 0.00068 million MT from 0.001 million MT in 2020. The only metal accounted in this report is iron ore with average extraction of 0.028 million MT yearly from 2013 to 2021. The detail trends are shown in *figure 5.4*

5.4.3 Physical Asset Account for Minerals

Physical asset account for minerals was compile by type of minerals and include estimates of the opening and closing stock of each mineral and the changes over a period of time. The changes in stock encompass types of changes such as discoveries, reappraisals (includes both downward and upward), extractions, catastrophic losses and reclassifications. The total reserve of a particular mineral resource was considered as the opening stock, additions to stock such as discoveries, upward reappraisals and reclassification are added to total reserve. 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, it may also include unknown reserve in the ground.

The physical asset account for different minerals records the opening stock: the level of mineral 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. Thus, by the end of accounting year 2021, closing stocks are estimated at 14,518.21 million MT Dolomite; 152.146 million MT limestone; 129.74 million MT gypsum; 3.80 million MT Quartzite; and 2.43 million MT Iron-ore. Whereas, for coal and talc are estimated as null, which means extraction of coal and talc has exceeded the known reserves from 2018 onwards. Since these two minerals falls under possible mineral category, it is difficult to estimate the exact quantity of remaining reserve.

5.4.4 Monetary Asset Account for Minerals

The monetary asset account for mineral resources shows the market-based valuation of an individual mineral resources and changes in the value of these stocks over time. The Net Present Value (NPV) for constant extraction profile approach is adopted to compute a monetary value of the mineral resources. The formula for the calculation of NPV using an appropriate discount rate is:

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

Where, V_t is the value of the asset at time t; *N* is the asset life (number of periods in which extraction takes place); *RRt* is the resource rent at period *i* as expected at the beginning of period *t*; and *r* is a nominal discount rate.

In this calculation, the 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 (i.e., 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, lending or interest rate is used as the basis to estimate the discount factor in the absence of any appropriate discount rate. We used Bank of Bhutan's fixed lending rate of 12 % to Mining & Quarrying Companies as the discount rate for this particular computation.

For accounting year 2021, Dolomite's net present value (NPV) was estimated at Nu. 284,543.81 million, provided a constant average extraction of 967.88 million MT, assumed to maintain same for future years with constant per unit future resource rent of Nu. 293.98 million. Under similar conditions, we estimated NPV for other mineral resources such as coal, limestone, gypsum, quartzite, talc and iron ore. Limestone was estimated at Nu. 50,916.63 million, provided constant average extraction of 10.5 million MT and per unit future resource rent of Nu. 5,019.86 million; Gypsum was estimated at Nu. 7,035.69 million, given constant average extraction of 8.85 million MT and per unit

resource rent of Nu. 813.46 million; Quartzite was estimated at Nu. 815.73 million, with constant average extraction of 0.29 million MT and per unit resource rent of Nu. 3,220.0 million; Iron-ore at Nu. 75.88 million, provided constant estimated average extraction of 0.17 million MT and per unit future resource rent of Nu. 468.50 million. The NPV of Talc and Coal could not be estimated as the total reserves are unknown. The detail calculation tables are attached at end in list of statistical tables, particularly *Table 28-33*.

Chapter 6: Experimental Energy Account

6.1 Overview

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 (UN Climate Change Conference, Paris). Bhutan has committed to remain carbon neutral.

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 flow back to the environment.

The SEEA-2012 recommends developing energy flow accounts to help clarify the relationship between the energy sector and some components of the environment, focusing on the role of energy-related air emissions. The data present are necessary for the derivation of important indicators such as energy intensity, efficiency, productivity, etc., and which ultimately relates to sustainable development indicators such as air quality and climate changes indicators.

The physical supply and use (PSUT) approach to account for energy flows, records flow 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 each flow is equal to the total use of the same flow (i.e the total supply of energy products equals total use of energy products)

Besides hydro-electricity being main source of energy, Bhutan also imports energy products like coal and fossil fuels from India to cater energy needs of economic sectors, particularly industry and transport sector. The experimental energy accounts were compiled purely based on latest available information from Bhutan Trade Statistics (BTS) of Ministry of Finance and data from other administrative sources. 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
Biogas	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 related statistics are important.

6.2 Energy Consumption

Energy consumption measures the amount of energy used in the Bhutanese economy. It is equal to indigenous production plus imports minus exports and changes in stocks. It includes energy consumed in energy conversion activities (such as electricity generation). It can be referred to as total net energy consumption and is also equal to total primary energy supply. The total energy consumption has increased from 448.2KToE in 2020 to 535KToE in 2021 which is an increase of about 19%.

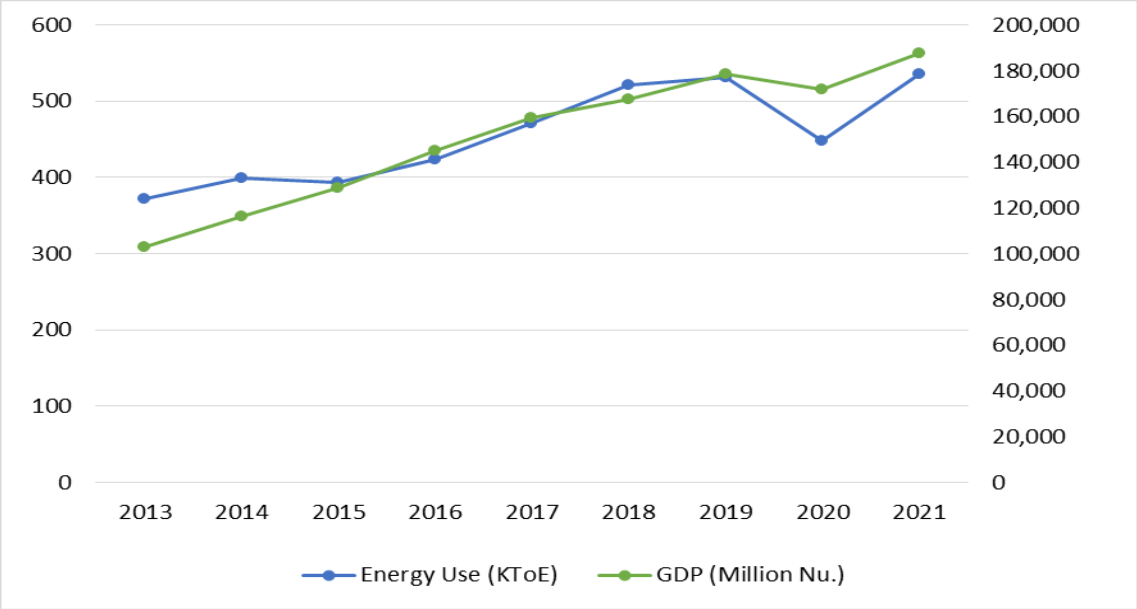


Figure 6.1: Yearly Domestic Energy Consumption and the GDP

Renewable (Electricity, wind, wood) accounts for the largest share of the energy consumption in economy at around 46%, where it consists mainly hydro energy. Coal remained the second largest accounting for about 28% of energy consumption. The Oil (Diesel, Petrol, kerosene, Aviation turbine fuel (ATF) energy consumed at around 24%, whereas gas energy consumption was minimum at around 2.0%

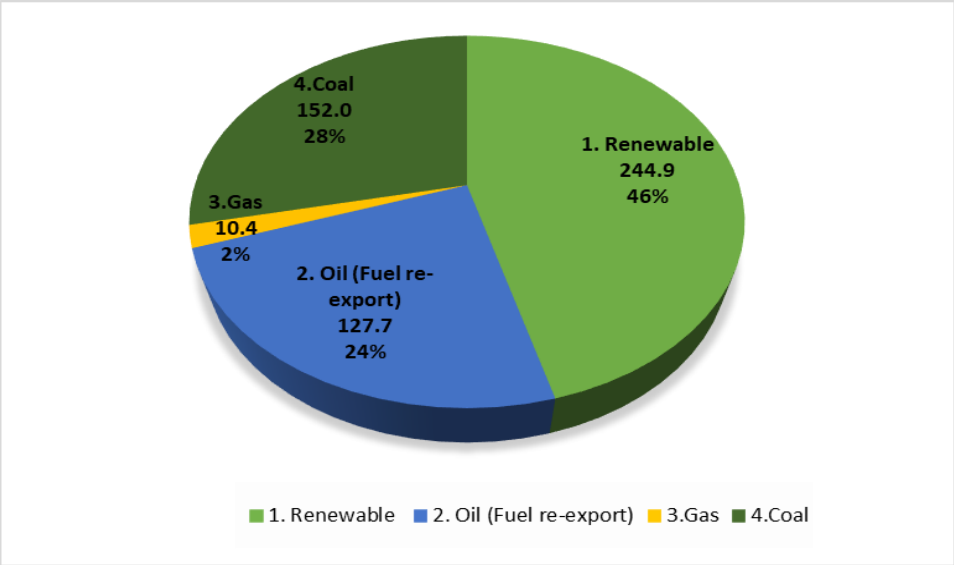


Figure6.2: Energy Consumption by fuel type (in KToE and share (%))

The consumption of Liquefied Petroleum Gas (LPG) has decreased by about 0.9%. The consumption of Coal has considerably increased by about 58%. Whereas, the consumption of Renewable and Oil energy has slightly increase of about 12% and 3.8% respectively.

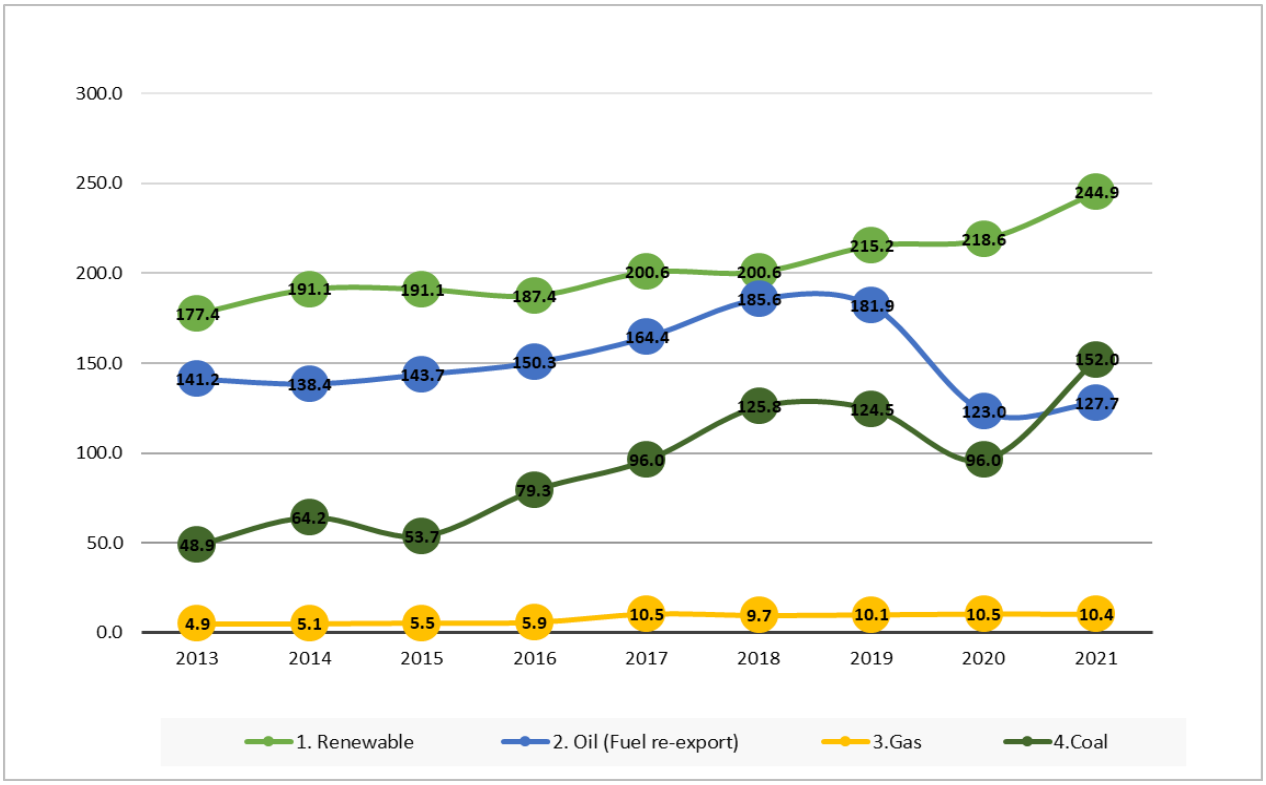


Figure 6.3: Yearly Energy Consumption (in KToE) trend by fuel type

6.3 Energy Production

Energy production is defined as the total amount of primary energy produced in the Bhutanese economy measured before consumption and transformation. Domestic production of primary energy decreased by almost 3.8% in 2022 compared to 2021, thus reached a total energy production at 1033.69KToE. Production continued to become increasingly export-oriented. Bhutan is net exporter of energy, including hydroelectricity and coal, with net exports more than one-third of the total production.

Domestic energy production in Bhutan includes renewable energies (mainly hydroelectricity) and coal. The renewable energy production decreased by almost 4.9% and whereas the coal production has increased by almost 7.2 % in the year 2021

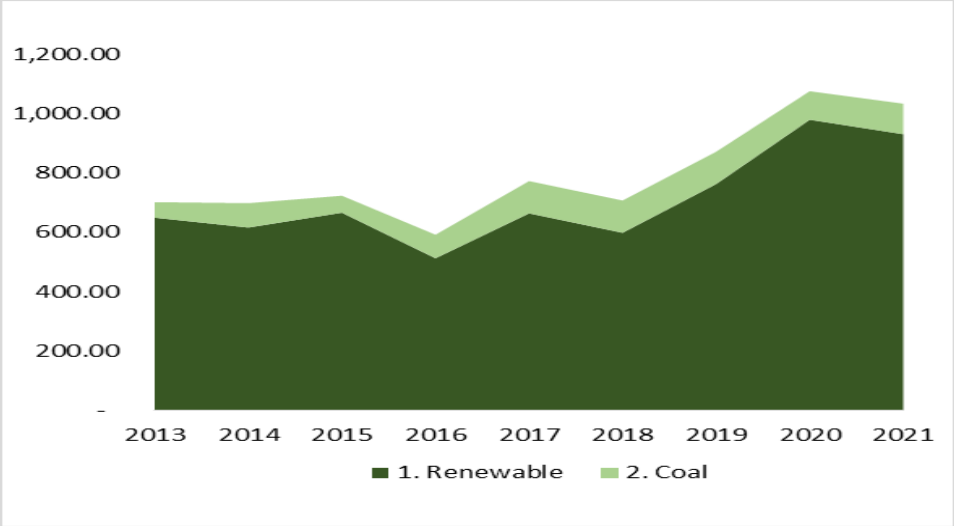


Figure 6.4: Yearly Energy Production by fuel type (KToE)

6.4 Energy Trade

6.4.1 Energy import from RoW

Bhutan imports various energy products, such as fossil fuel (diesel & petrol), aviation turbine fuel, kerosene, furnace oil, LPG, coal and hydroelectricity. Fossil fuel (diesel & petrol) import accounts for about 57 % of the total energy import, which was mainly used by transport sector. The coal energy used for industry sector remained second highest with about 35 % of total energy import. The share of gas and renewable energy was less

The overall energy import in the country decreased by more than 36 %. The Renewable and Oil energy import has declined by substantial amount, whereas Coal and Gas energy import has increased in the year 2021.

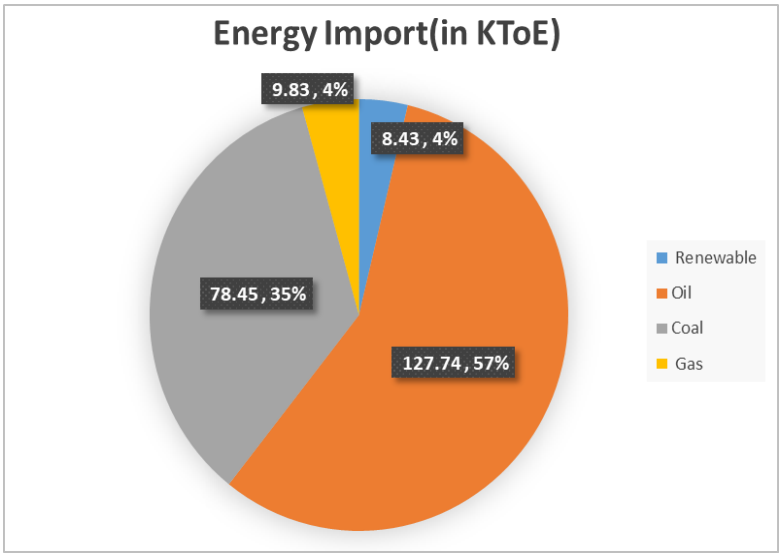


Figure 6.5 Share of energy Import

6.4.2 *Energy Export*

In terms of energy, Bhutan mainly exports hydro-electricity and coal. The hydro-electricity remains major export with almost 98% of the total energy export and the coal export being not more than 5 %. However, as shown in the *Figure6.6*, we also observe a very negligible share of petrol and diesel export which is defined as a fuel re-export, that generally includes some portion of the imported fuel consumed by Indian vehicles plying on Bhutanese roads transporting goods in and out of the country, fuel consumed by Indian tourist vehicles and refueling by Indian vehicles in the border towns.

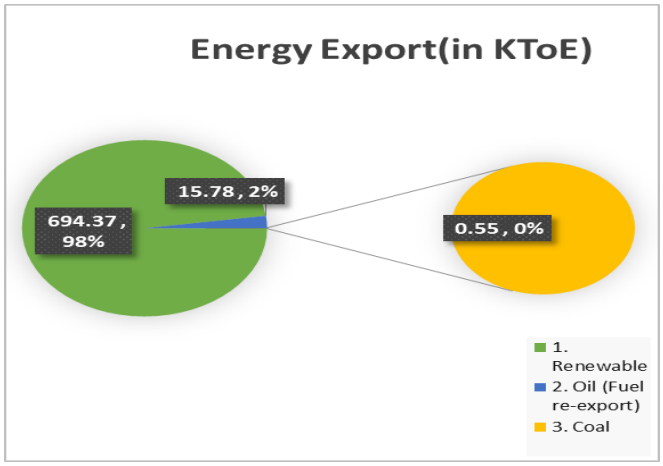


Figure6.6: Share of energy Export

Chapter 7: Waste Account

7.1 Background

Bhutan's 12th Five-Year Plan (2019-2023) includes national level waste management as a key performance area. The Plan defines a number of national level indicators including the absolute amount of solid waste (in tonnes) that is recycled. To monitor progress towards this goal of greater recycling, reliable statistics need to be developed for both total solid waste produced, as well as amounts of waste materials that are recycled. Typically, recycling is managed according to different types of materials, such as metal, plastic, paper and cardboard, and glass.

In the 2019 National Waste Management Strategy, one of the implementation obstacles identified was an 'informational barrier.' To start addressing this lack of information, a national waste survey was conducted in 2019. The focus was on waste production by different aggregated sectors. An analysis of the different types of wastes was also conducted. The waste survey data was able to be re-organized into a type of physical supply table. The survey did not include detailed information about waste collection or waste treatment. This data served as the starting point for this waste accounts project.

7.2 Introduction to waste accounts

7.2.1 Multi-purpose data systems serving user needs

Developing stakeholder relevant information is one of the responsibilities of national statistical offices. One group of stakeholder includes policy makers, but policies typically change over time so trying to identify not only current needs, but also anticipate future needs are helpful when developing statistical systems. Developing environmental-economic accounts, which take a more holistic approach of integrating statistics into accounts, can be useful. Environmental statistics are often developed to follow a specific activity. These statistics can help to evaluate the effect of environmental policies and regulations. But as policy and regulations change over time, often the statistics do not capture the newly needed information. Developing accounts that are able to track activities in a more comprehensive manner can provide the flexibility and details needed both now and in the future. With this perspective in mind, NSB has used existing waste data to develop physical waste accounts as far this was possible.

By considering one country's waste policy development, and the subsequent changes in the waste statistics and accounts which were needed, it may be possible to anticipate the developments that could also happen in Bhutan.

Waste policy in Norway developed from focusing first on amounts of waste landfilled in different geographic areas (municipalities), then there were policies focusing on different types of waste being produced, and currently there are policies focusing not only on the types of waste but also on who was producing the waste and what happens to the waste – the different treatments (recycling/landfill/incineration, etc.).

When the focus was on amounts of waste put into landfills, the approach to developing relevant statistics was to estimate the typical weight of the waste dumped into the landfill by certain types of trucks, and then count the numbers of the different types of vehicles that came to the landfill. An estimate of the total amount of waste placed in landfills was made by multiplying the number of vehicles times the typical weight of each of the loads in the different types of vehicles and summing these totals to provide information for each of the landfills. Totals for the country were made by summing over all the landfills. This approach provides information about how much mixed waste is deposited into landfills.

Then the policy makers wanted to start regulating different types of waste and the landfill focused statistics could not provide any useful information. The statistics needed to change to include different types of waste. A series of studies focusing on different types of waste fractions were conducted to provide the information the Ministry of Environment requested. A whole range of different types of waste were investigated, including wet organic waste, paper and cardboard, packaging, plastic, construction, and glass, to name a few. The problem that arose after nearly 10 years of these different types of studies was that it was not possible to determine the total amount of waste produced since a number of the categories overlapped which resulted in double counting. For example, packaging waste includes some but not all of the categories paper and cardboard, and the same for plastics. And construction waste includes some glass waste. Getting rid of the double counting was important, but then the policy focus changed again. The policy makers wanted to target regulations not only on the types of waste but on who is producing each kind of waste and then what happens to the waste, i.e. what is the final treatment.

Although some of the waste can be identified as coming from certain industries, such as wet organic waste from the fish processing industry, slaughterhouses, and meat packaging plants, this type of waste is also from restaurants, hotels, and households. There was a need to have a full accounting system where it was possible to identify which economic entities produced the different types of waste, and to be able to track, as best as possible, what happened to the waste – in other words, the different waste treatments. In addition, it was important to identify the economic aspects of waste generation, collection, and final waste treatment.

Waste accounts as described in the System of Environmental-Economic Accounts – Central Framework 2012 (UN et al., 2014, Chapter 3, section 3.6.5, pages 88-92), using the national accounts

concepts of supply and use tables are useful tools to identify and track the physical flows of waste through the economy. In the SEEA-CF manual, the example shown is only final treatment. However, in this case, we want to develop waste accounts showing who produced the waste by types of waste (supply of waste) and then how the waste is treated (if treated directly by the producers), and how much is collected and taken to another location (similar to 'intermediate consumption') for final treatment (similar to 'final use').

The three main phases of waste management i.e., production, collection, and treatment, are important to keep track of in the waste accounts since policy can be developed in different ways and having a full set of waste accounts can assist in providing the foundation for evidence-based policies, good management practices, and advocacy for improvements.

7.2.2 Developing Waste Accounts in Bhutan

Waste production and treatment is becoming more important in Bhutan due to some waste related environmental and health issues. In 2019, there was a detailed, country-wide waste survey. The data from this survey forms the data foundation for the development of these preliminary waste accounts. Needed data was lacking from the waste collection industry (ISIC 38.1). Unfortunately, due to the COVID pandemic, it was not possible to conduct any additional surveys to collect new data, although obtaining data from the waste collection entities was attempted. Estimates were made based on existing data to allow the development of preliminary physical flow waste accounts presented in a supply and use format. When additional data become available, either more detailed by industry groups (ISIC) or by treatment categories, these accounts can easily be revised since the major components of the waste SUT system have been established and the NSB has experience developing the system.

7.2.3 Bhutan's waste survey and results as main data source for waste accounts project

The 2019 national waste inventory survey (NSB Bhutan, 2019) was the first nation-wide waste survey conducted in Bhutan. There were two main aspects in the survey. One was the generation of waste (in physical units and by waste types), and the other was perceptions related to waste and waste collection services. For this project, the physical data are the ones we are able to re-use.

The survey results produced waste generation statistics developed by 12 waste types, and by 7 economic sectors. Households were also split by urban and rural categories for some of the statistics. There are also some %age data regarding waste disposal or treatment (called 'management' in the 2019 report) for some of the sectors. These data are used to help develop estimates of the waste treatment portion of the waste accounts.

The NWIS-2019 did not cover the entire waste generating sectors. Since the survey duration coincided with academic year ending, some schools although open, had no students, with the vacation

having already started. This resulted in slight downward bias in the quantity of waste collected from those schools. The survey had not estimated and analysed the non-domestic waste that were seen or dumped in open areas, river banks, roads/ drains, etc. as it was not planned, given its extensive area and limited resources and time. And also survey report did not make any adjustment for seasonal variation of waste generation.

7.3 Waste accounts development

7.3.1 Introduction to the Supply and Use System for Waste

The national accounts use a specialized system for showing the production and consumption of products in the economy which are developed into linked tables called, Supply and Use Tables (SUTs). The national accounts SUTs are developed using industries and products in the columns and rows, respectively. For the waste SUTs, the industries would be the same as in the national accounts SUTs, but the products would be replaced by the different waste types and/or treatments.

The categories used for industries in the national accounts are defined by the International Standard Industrial Classification of all economic activities (ISIC). For the waste categories, there is currently no internationally agreed upon list of waste. However, in many countries there is an official list of waste types, often established by the environmental authorities in consultation with the national statistical office. Therefore, national waste lists are used by default when developing waste statistics and accounts in countries.

To develop a fully populated SUT system for waste, the supply table shows the types of waste in the rows and the industry groupings are shown in the columns. The supply table entries are the amounts of different types of waste produced by the various industries. The next step would be to develop tables for each industry showing the types of waste in the rows, and the treatment in the columns. Many industries and households 'treat' their own waste by burning, composting, or dumping it in the environment. They also have some, or all, of their waste collected.

The next step is to figure out what happens to the waste that is collected. Some of it can be collected as separated fractions that can easily be recycled, such as paper, metal and glass, if these types of waste are separated at the source and collected in a manner that keeps them separated. The waste collection services (ISIC 38.1) often take their mixed waste to be incinerated or landfilled (ISIC 38.2). Developing a picture of how much waste is collected and then the treatment of the waste, a fuller picture of the waste management system can be obtained.

The separate waste treatment tables – from the individual industries plus the waste collection companies – are then aggregated to develop a 'use' table. In this case, the final treatment of the waste is thought of as it's 'final consumption' in a national account way of thinking.

This detailed supply and use system is the ideal, unfortunately obtaining this type of detailed data is seldom fully possible. Much of the time, waste is simply mixed together and following the different waste types from generation to final treatment is extremely difficult. Given these difficulties in tracking what happens to the waste, estimations are made based on the best available data.

7.3.2 Economic data related to the waste accounts

In addition to the physical flows of waste production – collection – treatment, there are expenditures connected to this activity. Costs for waste collection and treatment are considered environmental protection expenditures and identifying how much industries, households and government units are spending on waste can be of interest. If these costs can be separated out, an indicator of cost per unit of waste can be developed.

The waste collection and treatment industry (ISIC 38) often contributes significantly to employment and value added in a country, in addition to assisting in controlling pollution and preventing some public health issues. Separating out the waste management industry's contributions to the economy as part of the efforts to green the economy can also be of interest. Environmental protection expenditures have been viewed as costs, but these expenditures are also needed for a better environment and the economic activities resulting from these expenditures also contribute to employment and the GDP.

7.3.3 Procedure for developing the waste accounts

A stepwise process was used to try to figure out how to re-use existing data from the national waste survey and identify gaps that could try to be filled. The national waste inventory survey (NBS-Bhutan, 2019) data were used as the starting point.

7.3.3.1 Industry categories in waste survey vs. standard ISIC categories

Ideally, the industry groups in the physical flow waste SUTs are the same as those used in the national accounts' SUTs. The groups are defined by the international industry classification, ISIC. If the physical flow waste accounts use ISIC categories, then combining economic data and physical waste data becomes easy.

In this case, the economic activity groupings used in the waste survey were not based on ISIC. After an examination of the survey methodology, it was also determined that the number of units included in the original sample for the national survey was too small to allow the aggregated, non-standard groupings to be split according to ISIC to produce reliable estimates for the more detailed, dis-aggregated, standard ISIC groupings. The waste survey included only limited numbers of units from each ISIC, and those units were not selected in a representative manner by ISIC, but were selected according to more aggregated, non-standard categories.

The result of these limitations due to the sampling size and structure used to conduct the original waste survey, is that we are not able to restructure the data in a way that helps us developed detailed waste accounts that are compatible with the economic data (employment, turnover, value added, etc.) typically available from industry statistics and the national accounts from the NSO.

Therefore, the economic activity groupings used in the accounts remains the same as in the waste survey: Households, commercial, industries, health centres, institutes, government offices, vegetable markets.

7.3.3.2 Waste categories

Since there is no international agreed list of waste, national lists are used. In this case, the waste types used in the national waste survey published results were those used to develop the accounts.

The waste types were:

1. Food waste
2. Plastics (hard and soft)
3. Paper and cardboard
4. Glass
5. Sanitary (pads) waste
6. Metals
7. Textiles
8. Wood
9. Rubber
10. Electronic waste
11. Other
12. Green plant materials
13. Medical waste

7.3.3.3 Waste generation, collection, and treatment steps

Ideally, the waste accounts provide information about waste generation and treatment in a way that you can follow all the different flows separately. A complicating component is the collection step. Figuring out which economic units produce certain amounts of different types of waste, is usually determined by waste generation analyses, where one analyzes how much of each type of waste is produced by a representative sample of units. But what happens after it is produced is not so easy to identify, especially if it is all mixed together and picked up by a waste collection service. If a company treats its own waste

(burning, burying, recycling/selling, etc.) they can report this information. If the waste is separated at the source and the different types of waste are collected separately, then what happens to each type of waste can often be traced. However, if there is only mixed waste that is collected, then there is no good way to track the different types of waste. Another problem can be that when the waste is collected, it leaves the control of the company producing the waste.

What the waste collection services units does with the waste, can only be obtained from the waste collection companies. In many cases, the waste collected is simply collected and then landfilled or incinerated. There may be some attempt to split out items of value, such as metals, which can be sold to scrap dealers. This collection stage can be considered similar to 'intermediate consumption' in an SUT system since the waste collection companies are transporting the waste to a final treatment location where the waste is often placed back into the environment (landfilled, dumped) or burned with resulting air emissions and ash (which is then usually landfilled).

The waste survey did not include detailed information about the collection portion of the waste cycle. In this project, an attempt was made to collect additional information but due to the COVID pandemic and the unavailability of the comprehensive list of the waste collection companies'/scrap dealers, the collection of new data was not possible.

The only information available from the waste collection companies was from the waste survey. The waste survey obtained figures for total waste amounts collected by registered waste companies i.e. also by just three types of wastes; food waste, recyclable and non-recyclable wastes.

However, when coming to medical waste, amongst health centers generating pathological and infectious waste, more than half the health centers- 51 % reported either they burn or bury the pathological and infectious waste generated from their health centres. Around 25 % stated that they autoclave or do chemical treatment for pathological and infectious waste. Rest of the health centers reported that they dump in separate pits or treat with bleaching powder prior to dumping. For the E-waste, it usually sold to the recycling companies, but few reported that it is dumped in the landfill with general waste.

7.3.3.4 Estimating waste treatment or disposal ("use") based on existing data – main ideas used

Determining what happens to each type of waste can be challenging. Estimation methods need to be developed. For households, there can be marked differences for waste treatment for rural or urban locations. Often food waste from households in rural areas is used for feeding animals, whereas in urban areas food is thrown out and is collected with other types of waste. The same type of urban/rural waste treatment differences may be because of the coverage of waste collection services in urban areas is much higher than the rural areas.

7.4 Detailed explanation of the calculation model used for estimating the final treatment of waste by industry groups and households

The results of the waste survey were used to develop the waste supply table, showing the types of waste in the rows and the different aggregated sectors in the columns. Going from the supply table to the use table required information about the types of treatment of the waste.

Although it was possible to obtain the amount of waste produced according to waste types, waste treatment amounts are only able to be estimated by treatment types and not by both treatment and waste fraction. Most of the waste fractions become intermingled to the point where they cannot be traced from production to collection and further to type of treatment.

Different estimation methods were used for the various industry groupings and households to calculate the final treatment of the produced waste. In this section, the calculation methodologies for making the estimates are described in detail.

In urban areas, (National Waste Inventory Survey (NWIS-2019), almost 90 % of the households and other waste generating sectors use waste collection services to dispose of their waste. For the waste collected by waste collecting services, since there is no information on how each different type of wastes are being treated, the study assumed that two-thirds of the recyclable waste collected are assumed to be recycled within Bhutan, while one-third is assumed to be exported. (Bhutan Trade Statistics report-2019). The waste reported as sold to the scrap dealers by different sectors were also assumed to be exported. The food wastes and non-recyclable wastes collected by waste handlers were assumed to be taken to the landfills. There are also some sectors or households in urban areas resorting to waste composting, reuse and recycling within their sectors as presented in the SUT.

In rural areas where there are no waste collecting facilities, the wastes are usually dumped in a pit or burned in the surrounding and they use food wastes as either animal food or dumped in vegetable gardens directly. Some households and other sectors also sell their recyclable wastes to scrap dealers. There are also some sectors or households resorting to waste composting, reuse and recycling within their sectors. The wastes dumped in the pit by the rural flocks were assumed to be dumped in the environment as there is no treatment or further management after dumping in the pit, the food wastes used as animal foods and dumped in kitchen garden are not considered as waste. The recyclable waste sold to scrap dealers is treated as export of waste since most of the scrap goes beyond borders either for recycling or upscaling.

The 2019 Bhutan Trade Statistics report (2019, BTS, MoF) shows that Bhutan has exported little more than twenty thousand kilogram of wastes in day which is coming slightly higher than what our report shows. This could be mainly because of non-coverage of most of the scrap dealers in our survey as they operate informally.

7.4.1 Supply Table – Waste types by sectors (aggregated industries and households)

Supply table is based on the waste survey data. It is the total waste generated by types of waste and sectors. The process involved for collecting the data in the survey are as follows:

- The selected sampling units were first administered the perception questionnaires;

- Subsequently, the units were provided with the plastic bags to store the waste generated;
- The households were asked to store the waste daily waste generated for a period of one week (seven days) while establishments/units were asked to store two days' waste (since the amount of waste they generate is too large);
- The collection days were agreed with the respondents and their waste is collected based on the agreed schedule;
- The above processes were repeated for each sample area;
- This was followed by weighing waste and recording the weight in the data sheets developed for waste quantification;
- The collected wastes are taken to the waste drop off center and segregated to determine the waste composition by types following the standard procedures as in the guidelines; and
- Finally, the waste is weighed by type and recorded it in the data sheet;

7.4.2 Use (Treatment/disposal) Table

The Use table is estimated mainly from the disposal practices adopted by different sectors for different types of wastes. The information on disposal practices were obtained from the waste survey. As most of the sectors adopts different methods for different types of wastes. The assumptions are used as follows for different treatment.

7.4.2.1 Landfill

Includes food wastes and non-recyclable wastes collected by waste companies and total waste taken to drop off centre directly by different sectors. It is calculated based on the total food waste and non-recyclable waste collected by waste companies and the proportion of sectors reporting to take their waste to drop-off centre multiplied by total waste generated by respective sectors.

7.4.2.2 Environment

Includes all the waste reported to be thrown in pit and open space without any treatment. It is calculated based on the proportion of sectors reporting to dump their waste either in pit or open space multiplied by the total waste generated by respective sectors.

7.4.2.3 Recycling/reuse

Includes portion of total waste generated and are reported to be recycled or reused by different sectors. It also includes little more than three-fourth of the total recyclable waste collected by waste companies.

7.4.2.4 Composting

It is estimated based on the proportion of sectors reported to compost their waste multiplied by total waste generated by respective sectors

7.4.2.5 Export

This category includes all the recyclable waste reported to be sold to scrap dealers by different sectors and the one-fifth of the total recyclable waste collected by waste companies.

7.4.2.6 Burn

It is estimated based on the proportion of sectors reporting burn their waste multiplied by total waste generated by respective sectors.

7.4.2.7 Other Treatments

It includes medical waste where different treatment methods such as autoclave, incineration, etc are used and also the sectors using other forms of waste disposal practices than the one mentioned above.

7.5 Final physical supply and use tables for waste

The national accounts Supply and Use approach is used to organize the data. In the Supply Table, the amounts of different types of waste are presented for each economic activity. Since it was not possible to develop detailed industry categories according to the standard ISIC classification the more aggregated categories used in the waste survey are presented.

Because there was no detailed data from the waste survey that allowed for tracking the treatment of the different waste types for each economic sector, the final use table showing the final waste treatment/disposal by economic sector was developed using estimation methods.

A Supply and Use Table system has certain characteristics which allow for double checking the values entered. For the SUT system developed, the totals of the columns in the Supply Table are equal to the

totals of the columns in the Use Table. For example, the total waste for Households by waste type in the supply table (81,500.5 kg/day) is the same as the total waste for Households by type of treatment (81 500.5 kg/day). Also the grand total of the Supply table is equal to the grand total of the Use table (172 141.2kg/day

7.6 Analysis and discussion of waste accounts for Bhutan

7.6.1 Physical waste account

From the waste survey we know the amounts of the various waste types produced by various economic activities. More detailed discussion of the results from supply table to show:

a) Amount of waste generated by the country by category from highest to lowest (Ex: in 2019 total waste generated was 62831.5 tonnes, with food waste accounting for 45.9% followed by plastics, with 17.1% and paper and cardboard at 15.8%. The top 3 made up almost 78.8% of the total waste of the country. Whereas, glass waste at 5.3% and remaining categories are all less than 4%. Meanwhile, the e-waste, other waste and green plants and were least generated at 1.3%, 1.2% and 1.1% respectively.

b) Amount of waste generated by economic sectors (follow analysis above): The survey revealed that the country's total solid waste generation in a year was 62831.5 tonnes. Of total waste generation, almost 50 % of it comes from households, followed by commercial units at 40%. Whereas remaining sectors generates less than 5% and the health center generated least at 1.72%.

From the waste accounts we can also more easily see the types of waste treatment used by each of the economic units. More detailed discussion of the results from table above to show:

a) Waste disposed/treated of total waste generated: around 41% goes to the landfill; about 17% went to the environment ; around 14% each went to recycle/reuse and burn; around 10% were exported and with least share of 2% each were compost and other treatment category as given in figure below.

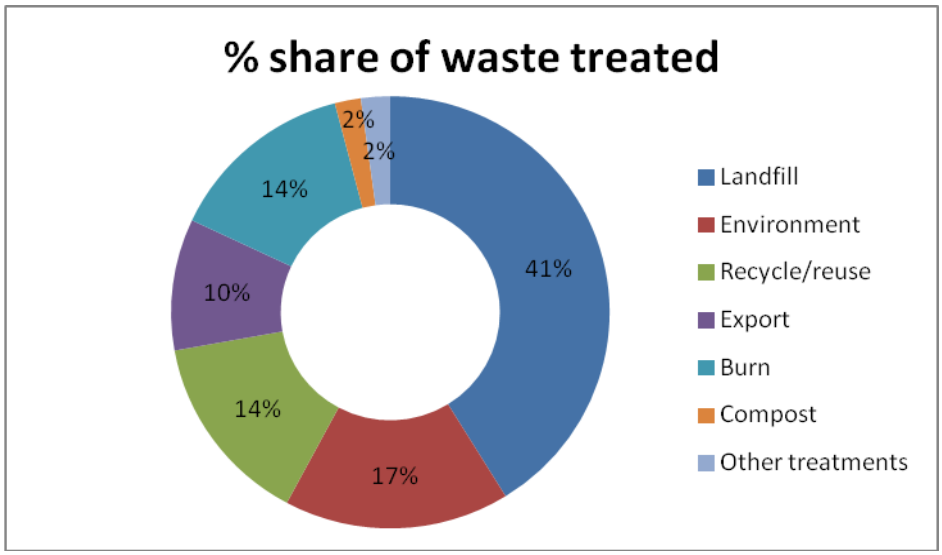


***Figure 7.1*: Share of waste treated under different treatment methods**

b) Waste disposed/treated by economic sectors: Waste generated by household were mostly disposed to landfill; etc. For the commercial sector, most of the waste goes to the landfill and recycling, etc. for industries, most of the waste were recycle/reuse; etc. whereas for remaining sectors most waste goes to landfill.

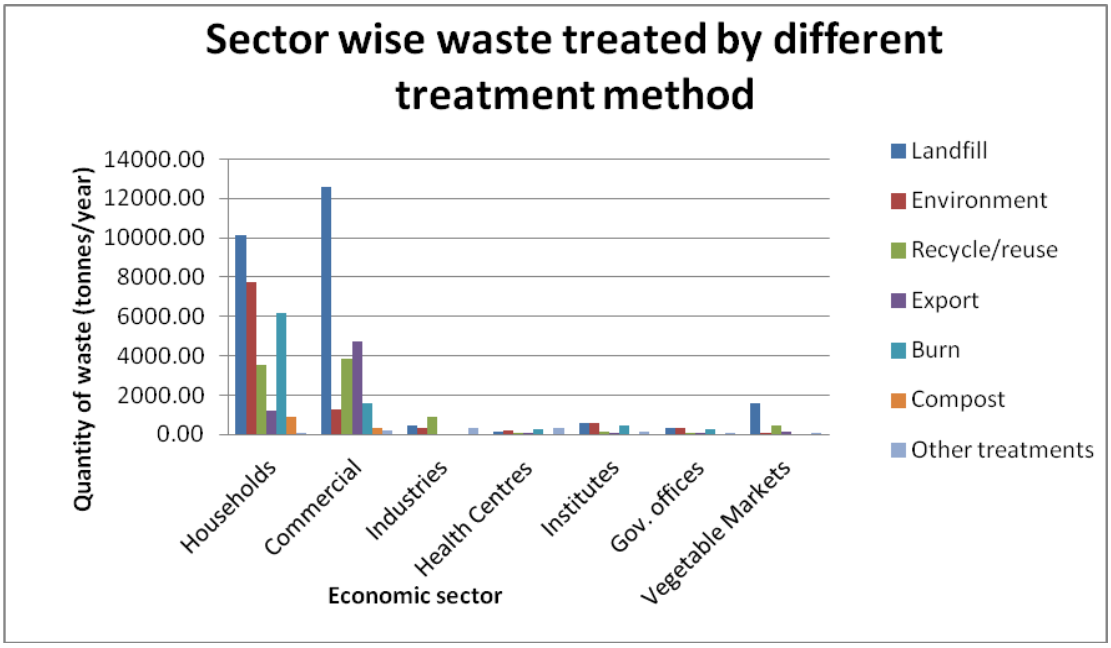


Figure7.2: Waste disposal/treatment method by different sectors 2019

And from the 'use' table we can see that households and commercial have the most waste that goes untreated to the environment or is burned. Food waste from households and commercial activities are also major sources of landfilled and dumped waste.

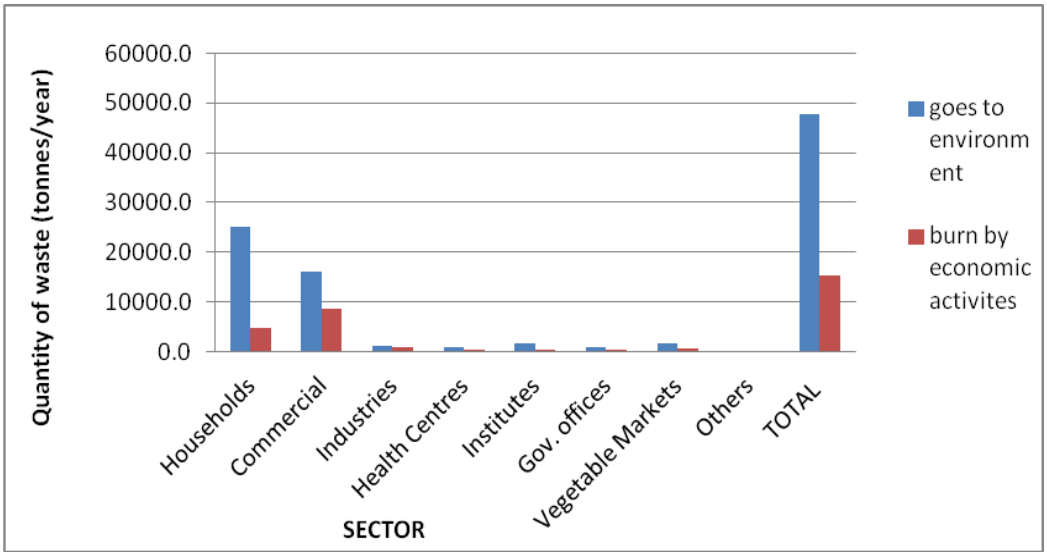


Figure 7.3: Waste dumped in open space/pit and burned by sectors 2019

As shown in figure 3 above, most of the waste that is either going back to the environment (legal or illegal dumping) or burned is from households and commercial sectors. This is not surprising since almost 90 % of the total waste produced comes from these two sectors.

7.6.2 Economic waste accounts

A supply and use table showing the supply of waste services in the supply table, and the purchase of those services as intermediate consumption for industries, and as final consumption for households and government can be a useful way to identify which sectors of the economy are using waste services. From Chapter 7 in the Annual Environmental Account-2020' report (NSB, 2020 AEAS) some of the costs related to ISIC 38 Waste collection, treatment and disposal activities have been identified. At this time, there are no data relating to the purchases of these services available for entering in the Use Table. But the following SUT example can be used when data become available. Rows can be added for more details in ISIC 38, and specifically ISIC 38.3 Materials Recovery which covers recycling could be of interest. The household budget survey can be used to obtain expenditures on waste collection services and other expenditures related to waste such as waste bins. Business surveys can ask about expenditures for waste collection and treatment.

7.7 Challenges encountered, lessons learned and next steps

7.7.1 Challenges encountered

With the restriction in movement because of pandemic, visiting the waste management companies physically to collect on information on waste treatment was not possible. There was also no complete information on the list of waste handlers since most are operating informally. It was challenging to get a complete data since the accounting was carried out mainly based on some vague assumptions.

7.7.2 Lessons learned

Multi-purpose data systems serving user needs – plan for more than one use of the data before the survey plans are made. Needed larger sample to be able to present results in ISIC groupings rather than the non-standard groupings of the waste survey.

7.7.3 Next steps

Since Bhutan's 12th Five-Year Plan (2019-2023) defines a number of national level indicators data to help monitor the development towards these goals are needed. One indicator was defined as the absolute amount of solid waste (in tonnes) that is recycled. The waste survey did not produce figures for this indicator. In this project, the recycling amounts were estimated for the different sectors by using the amounts of waste collected and then the recycling rate (1/3) of the waste collectors. As the recycling options improve in Bhutan, additional data would need to be collected if there are collection centers for recycling certain fractions that are separated at the source and kept separate from the mixed waste to allow for easier recycling and cleaner fractions.

In the future, it will be important to keep up with the changes in the waste collection, waste handling, and recycling efforts to be sure that changes in these systems will be captured by the how the waste data is collected.

7.8 Plans for future compilation:

Bhutan is looking forward to conduct more comprehensive waste surveys in the future to address the data requirements and data gaps in the waste accounts earlier compiled. Particularly, in next round of waste survey in addition to what has been compiled in first waste survey, the quantity of waste treated under different treatment groups by ISIC will be pursued in consultation with waste management companies.

8 Acknowledgements

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Chapter 8: Looking Ahead

Environmental-Economic Accounting has been recognized globally for its usefulness in terms of strategic and sustainable development planning. The NSB has made a small beginning based on the availability of information and support by DANIDA project on environmental accounts and statistics. However, the 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 waste, water, land, forest, timber resource account, carbon and selected ecosystem services.

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 of energy. 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	159.16	**7,322.95**	5,301.28	16.84	2,004.83	**7,322.95**
2015	7,747.17	124.52	**7,871.69**	5,503.07	311.48	2,057.14	**7,871.69**
2016	7,953.58	86.53	**8,040.11**	5,763.13	268.07	2,008.91	**8,040.11**
2017	7,729.77	91.93	**7,821.70**	5,700.99	(65.04)	2,185.79	**7,821.74**
2018	6,959.81	133.98	**7,093.79**	4,558.08	207.27	2,328.44	**7,093.79**
2019	8,875.87	96.37	**8,972.24**	6,146.60	545.01	2,280.63	**8,972.24**
2020	11,389.26	81.83	**11,471.09**	9,175.86	273.96	2,021.27	**11,471.09**
2021	10,822.29	98.04	**10,920.33**	8,075.50	61.49	2,783.34	**10,920.33**

Table 2 Monetary Account of Electricity

(Mill. Nu.)

	SUPPLY			USE			
Year	**Production**	**Imports**	**Total**	**Exports**	**Losses through transmission & distribution**	**Industries and households**	**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	16,292.87	440.95	**16,733.82**	12,396.77	1.38	4,335.67	**16,733.82**
2018	14,391.21	1,134.81	**15,526.02**	10,432.52	1.35	5,092.15	**15,526.02**
2019	20,293.41	596.64	**20,890.05**	15,605.17	0.85	5,284.03	**20,890.05**
2020	31,472.34	180.68	**31,653.02**	27,039.82	0.01	4,613.19	**31,653.02**
2021	28,236.05	216.47	**28,452.52**	24,435.44	1.01	4,016.07	**28,452.52**

Table 3 Gross Electricity Consumption by Household & Industry

Year	(GWh)		
	Household	Industry	Total
2000	64.01	396.30	**460.30**
2001	72.09	470.81	**542.89**
2002	91.28	561.67	**652.94**
2003	88.40	518.89	**607.30**
2004	87.59	528.57	**616.17**
2005	93.23	600.97	**694.20**
2006	90.37	655.64	**746.01**
2007	110.97	839.58	**950.55**
2008	126.41	968.16	**1,094.58**
2009	182.47	1,234.34	**1,416.81**
2010	208.80	1,504.01	**1,712.81**
2011	209.53	1,531.26	**1,740.79**
2012	179.96	1,559.03	**1,738.98**
2013	251.69	1,809.72	**2,061.41**
2014	250.44	1,754.39	**2,004.83**
2015	284.31	1,772.83	**2,057.14**
2016	547.71	1,461.20	**2,008.91**
2017	359.87	1,825.88	**2,185.75**
2018	383.36	1,945.08	**2,328.44**
2019	307.54	1,973.09	**2,280.63**
2020	346.86	1,613.68	**1,960.54**
2021	386.37	2,331.41	**2,717.78**

Table 4 Gross Electricity Consumption by Economic Sectors

(GWh)

Year	Total Industy	Agriculture, Livestock & Forestry	Mining & Quarrying	Manufacturing	Electricity & Water	Construction	Trade	Hotel & Restaurant	Transport, Storage & Communication	Finance, Insurance & Real Estate	Community, Social & Personal Service	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	**1,754.39**	1.40	4.06	1,544.64	64.19	24.33	20.24	16.91	11.98	2.63	63.28	0.73
2015	**1,772.83**	0.67	7.00	1,550.37	67.57	4.06	8.93	19.57	12.18	0.47	101.81	0.20
2016	**1,461.20**	2.25	9.47	822.76	232.12	19.07	26.34	50.41	36.64	14.71	246.76	0.66
2017	**1,825.88**	1.32	7.11	1,466.38	114.84	16.81	26.36	25.45	18.47	5.50	143.19	0.45
2018	**1,945.08**	1.41	7.57	1,562.11	122.34	17.91	28.08	27.11	19.67	5.86	152.54	0.48
2019	**1,973.09**	5.38	121.92	1,555.63	25.93	9.16	93.71	33.41	17.29	3.26	106.34	1.06
2020	**1,613.68**	6.44	148.94	1,209.50	25.59	10.40	50.68	20.69	19.49	3.94	116.95	1.07
2021	**2,331.41**	5.43	229.00	1,499.73	23.89	343.39	54.69	12.76	22.07	4.45	134.75	1.25

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 Service	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	**2,433.92**	2.88	14.62	2,058.92	102.95	28.84	28.84	22.16	24.20	4.30	143.81	2.39
2018	**4,522.96**	9.88	17.51	3,431.72	71.36	126.62	272.17	99.87	16.92	0.93	475.71	0.26
2019	**4,552.42**	22.77	244.22	3,147.73	76.57	40.39	309.49	147.30	76.13	13.93	468.96	4.92
2020	**3,797.80**	28.17	291.77	2,392.53	84.02	48.71	211.85	94.05	89.46	18.31	534.33	4.60
2021	**2,072.60**	4.70	115.50	84.02	1.12	20.68	3.85	11.05	334.40	1,298.00	198.20	1.08

Table 6 Total Supply & Use of Electricity by Sectors

(GWh)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
(I) TOTAL SUPPLY	**7,459.29**	**7,107.87**	**6,885.84**	**7,662.10**	**7,322.95**	**7,871.69**	**8,040.11**	**7,821.70**	**7,093.79**	**8,972.24**	**11,471.09**	**10,920.33**
Production	7,327.73	7,067.55	6,826.48	7,549.84	7,163.79	7,747.17	7,953.58	7,729.77	6,959.81	8,875.87	11,389.26	10,822.29
Imports	131.56	40.32	59.36	112.26	159.16	124.52	86.53	91.93	133.98	96.37	81.83	98.04
(II) TOTAL USE	**7,459.29**	**7,107.87**	**6,718.82**	**7,662.10**	**7,322.95**	**7,871.69**	**8,040.11**	**7,821.70**	**7,093.79**	**8,972.24**	**11,410.36**	**10,854.77**
1. Agriculture, Livestock & Forestry	0.54	0.56	0.51	0.62	1.40	0.67	2.25	1.32	1.41	5.38	6.44	5.43
2. Mining & Quarrying	5.29	5.79	3.52	5.75	4.06	7.00	9.47	7.11	7.57	121.92	148.94	229.00
3. Manufacturing	1,267.70	1,288.26	1,345.23	1,549.77	1,544.64	1,550.37	822.76	1,466.38	1,562.11	1,555.63	1,209.50	1,499.73
4. Electricity & Water	70.60	60.10	45.32	61.01	64.19	67.57	232.12	114.84	122.34	25.93	25.59	23.89
5. Construction	10.25	12.62	14.13	15.75	24.33	4.06	19.07	16.81	17.91	9.16	10.40	343.39
6. Wholesale & Retail Trade	30.02	33.87	34.39	42.44	20.24	8.93	26.34	26.36	28.08	93.71	50.68	54.69
7. Hotels & Restaurants	3.87	5.51	5.61	7.42	16.91	19.57	50.41	25.45	27.11	33.41	20.69	12.76
8. Transport, Storage & Communication	6.38	7.14	6.47	7.62	11.98	12.18	36.64	18.47	19.67	17.29	19.49	22.07
9. Finance, Insurance, Real Estate & Business Services	2.10	2.43	2.07	2.52	2.63	0.47	14.71	5.50	5.86	3.26	3.94	4.45
10. Community, Social & Personal Services	107.19	114.88	101.71	116.71	63.28	101.81	246.76	143.19	152.54	106.34	116.95	134.75
11. Private Social & Recreational Services	0.09	0.09	0.08	0.10	0.73	0.20	0.66	0.45	0.48	1.06	1.07	1.25
Household	208.80	209.53	179.96	251.69	250.44	284.31	547.71	359.87	383.36	307.54	346.86	386.37
Export	5,579.49	5,273.10	4,895.67	5,557.63	5,301.28	5,503.07	5,763.13	5,700.99	4,558.08	6,146.60	9,175.86	8,075.50
Cable Losses	166.99	93.98	84.17	43.06	16.84	311.48	268.07	(65.04)	207.27	545.01	273.96	61.49

Table 7 Total Supply & Use of Electricity by Sectors

(Mill. Nu.)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
(I) TOTAL SUPPLY	**12,045.33**	**11,015.51**	**11,251.10**	**13,266.59**	**14,277.05**	**14,599.60**	**13,105.44**	**16,733.82**	**15,526.02**	**20,890.05**	**31,653.02**	**28,452.52**
Production	11,811.46	10,948.33	11,140.80	13,051.66	13,905.77	14,258.09	12,882.94	16,292.87	14,391.21	20,293.41	31,472.34	28,236.05
Imports	233.87	67.18	110.30	214.93	371.28	341.51	222.50	440.95	1,134.81	596.64	180.68	216.47
(II) TOTAL USE	**12,045.33**	**11,015.51**	**11,251.10**	**13,266.59**	**14,277.05**	**14,599.60**	**13,105.44**	**16,733.82**	**15,526.02**	**20,890.05**	**31,653.02**	**26,769.56**
1. Agriculture, Livestock & Forestry	0.51	0.35	0.45	0.69	3.02	1.42	1.89	2.88	9.88	22.77	28.17	4.70
2. Mining & Quarrying	5.92	4.33	4.98	7.54	11.26	16.69	7.93	14.62	17.51	244.22	291.77	115.50
3. Manufacturing	1,117.37	757.65	1,055.89	1,599.14	2,687.10	2,670.50	689.18	2,058.92	3,431.72	3,147.73	2,392.53	297.20
4. Electricity & Water	65.29	37.09	43.61	66.05	122.27	125.18	194.43	102.95	71.36	76.57	84.02	1.12
5. Construction	10.62	8.73	12.62	19.11	58.23	9.23	15.98	28.84	126.62	40.39	48.71	20.68
6. Wholesale & Retail Trade	27.75	20.89	30.32	45.93	41.79	20.90	22.07	28.84	272.17	309.49	211.85	3.85
7. Hotels & Restaurants	3.35	3.18	4.96	7.52	44.52	44.34	42.23	22.16	99.87	147.30	94.05	11.05
8. Transport, Storage & Communication	6.32	4.72	5.83	8.84	29.49	29.60	30.69	24.20	16.92	76.13	89.46	334.40
9. Finance, Insurance, Real Estate & Business Services	1.86	1.43	1.73	2.62	6.31	1.00	12.32	4.30	0.93	13.93	18.31	1,298.00
10. Community, Social & Personal Services	108.87	77.86	91.64	138.78	158.50	255.01	206.70	143.81	475.71	468.96	534.33	198.20
11. Private Social & Recreational Services	0.08	0.05	0.07	0.11	1.72	0.43	0.55	2.39	0.26	4.92	4.60	1.08
Household	146.20	97.89	136.23	206.31	414.54	433.97	458.78	1,901.75	569.19	731.61	815.40	47.33
Export	10,411.46	9,839.21	9,714.53	11,013.99	10,698.31	10,991.32	11,421.89	12,396.77	10,432.52	15,605.17	27,039.82	24,435.44
Cable Losses	139.73	162.12	148.23	149.96	-	-	0.80	1.38	1.35	0.85	0.01	1.01

Table 8 Total Supply & Use of Fossil Fuel

(in KL)

Supply												
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic Production	-	-	-	-	-	-	-	-	-			
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	156,817.50	149,905.00	100,835.56	110,349.50
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	46,932.00	50,882.00	34,290.55	32,819.50
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**	**203,749.50**	**200,787.00**	**135,126.11**	**143,169.00**
Use												
Major sectors	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
1. Agriculture, Livestock & Forestry	**7,555.83**	**10,016.58**	**11,269.47**	**11,676.31**	**12,810.17**	**16,838.55**	**19,471.82**	**23,289.57**	**24,879.55**	**26,080.15**	**19,635.01**	**18,710.80**
Diesel	7,554.64	10,015.39	11,268.28	11,675.12	12,808.97	16,827.71	19,457.05	23,273.36	20,302.48	21,503.43	16,541.73	18,698.78
Petrol	1.19	1.19	1.19	1.20	1.19	10.85	14.77	16.21	4,577.07	4,576.72	3,093.28	12.02
2. Industry	**18,479.83**	**23,188.34**	**24,450.98**	**24,934.18**	**25,751.13**	**26,626.96**	**31,787.68**	**38,583.40**	**38,786.32**	**41,384.55**	**30,571.61**	**30,912.87**
Diesel	18,365.15	23,040.77	24,305.61	24,771.61	25,588.21	26,409.68	31,551.73	38,352.93	38,557.23	41,127.37	30,384.12	30,651.00
Petrol	114.68	147.57	145.37	162.57	162.92	217.28	235.95	230.47	229.09	257.18	187.50	261.88
3. Services	**47,855.76**	**56,805.04**	**58,346.78**	**60,852.59**	**61,058.08**	**62,132.52**	**64,184.98**	**68,512.88**	**68,016.75**	**71,701.07**	**49,512.82**	**43,141.26**
Diesel	47,070.86	56,048.19	57,652.61	60,079.95	60,285.98	61,149.61	63,077.83	67,397.86	66,881.48	70,455.47	48,811.58	41,981.39
Petrol	784.89	756.85	694.16	772.64	772.10	982.92	1,107.14	1,115.03	1,135.27	1,245.60	701.24	1,159.86
3. HH consumption	**21,957.49**	**24,472.51**	**26,218.26**	**26,304.71**	**27,345.30**	**30,527.70**	**34,380.85**	**37,237.01**	**36,923.05**	**38,995.91**	**28,143.60**	**32,320.10**
Diesel	3,003.06	3,525.11	4,000.95	4,033.25	4,166.79	4,719.66	6,650.35	7,405.85	7,343.41	8,222.60	6,025.63	5,691.45
Petrol	18,954.43	20,947.41	22,217.31	22,271.46	23,178.51	25,808.04	27,730.50	29,831.16	29,579.64	30,773.32	22,117.97	26,628.65
4. Re-Export	**13,193.60**	**15,889.53**	**30,640.51**	**28,852.20**	**21,598.32**	**19,846.27**	**13,673.67**	**11,978.14**	**35,143.83**	**22,625.31**	**7,263.06**	**18,083.97**
1. Diesel	9,626.30	10,981.45	24,604.55	21,864.87	14,423.84	12,984.75	6,802.03	4,210.50	23,732.90	8,596.13	2,838.64	13,326.89
2. Petrol	3,567.30	4,908.08	6,035.96	6,987.33	7,174.48	6,861.52	6,871.64	7,767.64	11,410.93	14,029.19	4,424.42	4,757.09
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**	**156,817.50**	**149,905.00**	**104,601.69**	**110,349.50**
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**	**46,932.00**	**50,882.00**	**30,524.42**	**32,819.50**
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**	**203,749.50**	**200,787.00**	**135,126.11**	**143,169.00**

Table 9: Supply & Use of Fossil Fuel

(Percentage)

Supply												
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic Production	-	-	-	-	-	-	-	-	-			
Import												
1. Diesel	78.52	79.47	80.72	80.22	78.94	78.28	78.01	78.31	76.97	74.66	74.62	77.08
2. Petrol	21.48	20.53	19.28	19.78	21.06	21.72	21.99	21.69	23.03	25.34	25.38	22.92
Total Supply	**100.00**	**100.00**	**100.00**	**100.00**	**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**	**2018**	**2019**	**2020**	**2021**
1. Agriculture, Livestock & Forestry	**6.93**	**7.68**	**7.47**	**7.65**	**8.62**	**10.80**	**11.91**	**12.97**	**12.21**	**12.99**	**14.53**	**13.07**
Diesel	8.82	9.67	9.25	9.54	10.92	13.78	15.26	16.55	12.95	14.34	15.81	16.95
Petrol	0.01	0.00	0.00	0.00	0.00	0.03	0.04	0.04	9.75	8.99	10.13	0.04
2. Industry	**16.95**	**17.79**	**16.20**	**16.34**	**17.33**	**17.07**	**19.44**	**21.48**	**19.04**	**20.61**	**22.62**	**21.59**
Diesel	21.45	22.24	19.95	20.23	21.82	21.63	24.74	27.27	24.59	27.44	29.05	27.78
Petrol	0.49	0.55	0.50	0.54	0.52	0.64	0.66	0.59	0.49	0.51	0.61	0.80
3. Services	**43.89**	**43.57**	**38.66**	**39.87**	**41.10**	**39.84**	**39.26**	**38.15**	**33.38**	**35.71**	**36.64**	**30.13**
Diesel	54.98	54.09	47.32	49.07	51.41	50.09	49.46	47.92	42.65	47.00	46.66	38.04
Petrol	3.35	2.83	2.39	2.56	2.47	2.90	3.08	2.86	2.42	2.45	2.30	3.53
3. HH consumption	**20.14**	**18.77**	**17.37**	**17.24**	**18.41**	**19.57**	**21.03**	**20.73**	**18.12**	**19.42**	**20.83**	**22.57**
Diesel	3.51	3.40	3.28	3.29	3.55	3.87	5.21	5.27	4.68	5.49	5.76	5.16
Petrol	80.92	78.28	76.36	73.76	74.08	76.17	77.11	76.57	63.03	60.48	72.46	81.14
Re-Export	**12.10**	**12.19**	**20.30**	**18.90**	**14.54**	**12.72**	**8.36**	**6.67**	**17.25**	**11.27**	**5.38**	**12.63**
1. Diesel	11.24	10.60	20.20	17.86	12.30	10.64	5.33	2.99	15.13	5.73	2.71	12.08
2. Petrol	15.23	18.34	20.75	23.14	22.93	20.25	19.11	19.94	24.31	27.57	14.49	14.49
Total use of Diesel	**100.00**	**100.00**	**100.00**	**100.00**	**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**	**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**	**100.00**	**100.00**	**100.00**	**100.00**

Table 10 Supply & Use of Fossil Fuel (Diesel and Petrol)

(Nu. in million)

Supply												
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Production	-	-	-	-	-	-	-	-	-	-	-	-
Imports	**4,201.76**	**4,927.00**	**6,228.71**	**7,218.10**	**7,731.32**	**6,730.68**	**7,307.19**	**8,479.01**	**10,348.01**	**9,946.51**	**6,338.69**	**8,515.98**
1. Diesel at basic price	3,250.61	3,562.81	4,601.90	5,471.94	5,911.38	5,024.82	5,549.46	6,505.27	7,965.84	7,602.88	4,678.80	6,485.41
2. Petrol at basic price	951.15	1,364.19	1,626.82	1,746.16	1,819.94	1,705.86	1,757.73	1,973.74	2,382.17	2,343.63	1,659.89	2,030.57
Total Margin	**636.70**	**690.87**	**749.12**	**841.32**	**1,035.00**	**1,233.21**	**1,669.84**	**1,668.68**	**1,702.96**	**1,982.51**	**744.98**	**1,593.18**
Trade and Transport margin (Diesel)	480.09	526.19	571.09	637.05	760.59	966.20	1,113.18	1,272.15	1,297.37	1,316.47	538.43	1,306.37
Trade and Transport margin (Petrol)	156.62	164.67	178.03	204.26	274.40	267.01	556.66	396.52	405.59	666.04	206.54	286.81
Supply at market price (Diesel)	3,730.70	4,089.00	5,172.99	6,108.99	6,671.97	5,991.02	6,662.64	7,777.42	9,263.21	8,919.35	5,217.23	7,791.78
Supply at market price (Petrol)	1,107.77	1,528.86	1,804.85	1,950.42	2,094.34	1,972.87	2,314.39	2,370.26	2,787.76	3,009.67	1,866.43	2,317.38
Total Supply at market Price	**4,838.46**	**5,617.87**	**6,977.83**	**8,059.42**	**8,766.32**	**7,963.89**	**8,977.02**	**10,147.69**	**12,050.97**	**11,929.02**	**7,083.67**	**10,109.16**
Use												
Major sectors	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
1. Agriculture, Livestock & Forestry	**278.46**	**395.33**	**478.53**	**582.67**	**728.81**	**826.37**	**1,017.39**	**1,288.00**	**1,557.07**	**1,552.69**	**951.74**	**2,632.46**
Diesel	278.41	395.26	478.45	582.59	728.73	825.74	1,016.44	1,287.02	1,556.11	1,551.76	951.15	2,631.23
Petrol	0.06	0.07	0.07	0.08	0.08	0.63	0.95	0.99	0.95	0.93	0.58	1.22
2. Industry	**682.23**	**917.73**	**1,041.03**	**1,246.60**	**1,466.68**	**1,308.58**	**1,663.45**	**2,134.94**	**2,291.18**	**2,462.29**	**1,485.58**	**4,339.79**
Diesel	676.80	909.30	1,032.02	1,236.10	1,455.77	1,295.92	1,648.26	2,120.92	2,277.58	2,447.08	1,475.37	4,313.11
Petrol	5.42	8.43	9.02	10.50	10.91	12.65	15.19	14.02	13.61	15.21	10.21	26.68
3. Services	**1,776.06**	**2,260.06**	**2,495.54**	**3,064.24**	**3,532.77**	**3,099.31**	**3,424.95**	**3,859.73**	**4,087.26**	**4,338.38**	**2,480.81**	**6,025.65**
Diesel	1,738.93	2,216.83	2,452.47	3,014.33	3,481.09	3,042.08	3,353.69	3,791.90	4,019.83	4,264.70	2,428.42	5,924.69
Petrol	37.12	43.24	43.06	49.91	51.68	57.24	71.26	67.84	67.43	73.68	52.39	100.95
3. HH consumption	**1,007.12**	**1,335.84**	**1,548.13**	**1,639.86**	**1,788.51**	**1,734.40**	**2,132.15**	**2,224.40**	**2,190.81**	**2,309.49**	**1,498.64**	**3,514.72**
Diesel	110.67	139.12	169.88	201.26	237.06	231.59	347.41	409.54	433.78	489.24	293.61	800.88
Petrol	896.45	1,196.73	1,378.25	1,438.60	1,551.45	1,502.80	1,784.73	1,814.86	1,757.03	1,820.24	1,205.03	2,713.84
Re-Export	1,094.60	708.90	1,414.61	1,526.05	1,249.54	995.24	739.09	640.61	1,924.65	1,266.17	666.89	(458.42)
1. Diesel	925.88	428.50	1,040.17	1,074.71	769.32	595.70	296.83	168.05	975.92	166.56	68.67	68.67
2. Petrol	168.72	280.40	374.44	451.34	480.22	399.55	442.26	472.56	948.73	1,099.61	598.22	(527.09)
Total use of Diesel	3,730.70	4,089.00	5,172.99	6,108.99	6,671.97	5,991.02	6,662.64	7,777.42	9,263.21	8,919.35	5,217.23	13,738.59
Total use of Petrol	1,107.77	1,528.86	1,804.85	1,950.42	2,094.34	1,972.87	2,314.39	2,370.26	2,787.76	3,009.67	1,866.43	2,315.60
Total use	**4,838.46**	**5,617.87**	**6,977.83**	**8,059.42**	**8,766.32**	**7,963.89**	**8,977.02**	**10,147.69**	**12,050.97**	**11,929.02**	**7,083.65**	**16,054.19**

Table 11: Supply & Use of Kerosene

(in KL)

Supply												
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
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	3,597.00	2,886.00	1,794.00	1,654.00
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**	**3,597.00**	**2,886.00**	**1,794.00**	**1,654.00**
Use												
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
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	3,597.00	2,886.00	1,782.00	1,654.00
Industries	240.0	120.0	20.0	12.0	21.0	12.0	36.0	12.0	0.0	0.0	12.0	0.0
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**	**3,597.00**	**2,886.00**	**1,794.00**	**1,654.00**

Table 12: Growth in Supply & Use of Kerosene

(In Percent)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic Production	-	-	-	-	-	-	-	-	-	-	-	-
Import	-	(0.92)	(2.79)	(10.36)	14.11	(19.02)	3.90	(11.54)	(15.13)	(19.77)	(37.84)	(7.80)
Total Supply	**-**	**(0.92)**	**(2.79)**	**(10.36)**	**14.11**	**(19.02)**	**3.90**	**(11.54)**	**(15.13)**	**(19.77)**	**(37.84)**	**(7.80)**
Use												
Household	-	1.21	(1.07)	(10.26)	13.96	(18.93)	3.39	(11.13)	(14.88)	(19.77)	(38.25)	(7.18)
Industries	-	(50.00)	(83.33)	(40.00)	75.00	(42.86)	200.00	(66.67)	(100.00)			(100.00)
Total Use	**-**	**(0.92)**	**(2.79)**	**(10.36)**	**14.11**	**(19.02)**	**3.90**	**(11.54)**	**(15.13)**	**(19.77)**	**(37.84)**	**(7.80)**

Table 13: Supply & Use of Kerosene

(Million Nu.)

Supply	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Domestic Production	-	-	-	-	-	-	-	-	-	-	0	0
Import	60.61	72.68	72.71	65.56	75.83	60.69	66.06	98.41	79.34	79.93	43.76	58.60
Total Supply	**60.61**	**72.68**	**72.71**	**65.56**	**75.83**	**60.69**	**66.06**	**98.41**		**79.93**	**43.76**	**58.6**
Losses	-	-	-	-	-	-	-	-	-	-	0	0
Trade and Transport margin (TTM)	37.65	36.13	33.06	30.98	11.18	11.77	11.61	4.65	34.00	29.42	12.18	(7.03)
Total Supply (at market price)	**98.26**	**108.81**	**105.77**	**96.54**	**87.01**	**72.46**	**77.67**	**103.06**	**34.00**	**109.35**	**55.94**	**51.57**
Use												
Household	94.18	106.53	105.39	96.30	86.69	72.27	77.09	102.77	113.34	109.35	55.56	51.57
Industries	4.08	2.28	0.38	0.23	0.32	0.19	0.58	0.29	-	-	0.37	-
Total use (3+4)	**98.26**	**108.81**	**105.77**	**96.54**	**87.01**	**72.46**	**77.67**	**103.06**	**113.34**	**109.35**	**55.94**	**51.57**

Table14: Supply & Use of LPG

(in MT)

Supply												
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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	10,002.22	10,341.24	9,685.51	9,175.79
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**	**10,002.22**	**10,341.24**	**9,685.51**	**9175.79**
Use												
Household	6,834.16	7,410.87	7,470.22	6,777.98	7,029.93	7,302.60	7,593.23	8,046.82	8,728.14	8,932.34	9,009.20	8,697.87
Industries*	-	-	-	557.84	516.61	810.54	1,118.34	1,251.72	1,274.08	1,408.96	676.31	477.92
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**	**10,002.22**	**10,341.30**	**9,685.51**	**9,175.79**

Note: Information on imports are sourced from Department of Trade, MoEA

**Industrial LPG usage couldn't be estimated between 2010/12 as there are no proper records of information*

Table 15: Supply & Use of LPG

(in percent)

Supply												
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic Production	-	-	-	-	-	-	-	-	-	-	-	-
Import	-	8.44	0.80	(1.80)	2.87	7.51	7.38	6.74	7.57	3.39	(6.34)	(5.26)
Total Supply	**-**	**8.44**	**0.80**	**(1.80)**	**2.87**	**7.51**	**7.38**	**6.74**	**7.57**	**3.39**	**(6.34)**	**(5.26)**
Use												
Household	-	8.44	0.80	(9.27)	3.72	3.88	3.98	5.97	8.47	2.34	0.86	(3.46)
Industries					(7.39)	56.90	37.97	11.93	1.79	10.59	(52.00)	(29.33)
Total Use	**-**	**8.44**	**0.80**	**(1.80)**	**2.87**	**7.51**	**7.38**	**6.74**	**7.57**	**3.39**	**(6.34)**	**(5.26)**

Table 16: Supply & Use of LPG

(In Million Nu.)

Supply	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic Production	-	-	-	-	-	-	-	-	-	-	-	-
Import	138.15	190.05	193.33	223.35	223.74	236.10	254.94	292.22	322.68	349.73	353.06	507.17
Total Supply	**138.15**	**190.05**	**193.33**	**223.35**	**223.74**	**236.10**	**254.94**	**292.22**	**322.68**	**349.73**	**353.06**	**507.17**
Losses	-	-	-	-	-	-	-	-	-	-	-	-
Trade and Transport margin (TTM)	102.49	70.90	69.71	81.55	45.65	49.19	46.48	47.67	46.78	59.07	78.33	96.36
Total Supply (at market price)	**240.64**	**260.95**	**263.04**	**304.90**	**269.39**	**285.29**	**301.42**	**339.89**	**369.46**	**408.80**	**431.39**	**603.53**
Use	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Household	138.15	190.05	193.33	177.10	182.95	190.00	198.26	222.50	245.13	272.45	272.45	272.45
Industries	-	-	-	46.25	40.79	46.10	56.68	69.72	77.55	77.28	78.28	78.28
Total use (3+4)	**138.15**	**190.05**	**193.33**	**223.35**	**223.74**	**236.10**	**254.94**	**292.22**	**322.68**	**349.73**	**350.73**	**350.73**

Table 17: Supply and Consumption of Fuelwood

(m3)

SUPPLY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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	32,949.91	37,537.54	32,124.38	44,477.19
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	47,367.00	58,055.00	56,884.48	41,199.61
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**	**80,316.91**	**95,592.54**	**89,008.86**	**85,676.80**
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	32,949.91	37,537.54	32,124.38	44,477.19
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	4,283.49	4,879.88	4,176.17	5,782.03
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	28,666.42	32,657.66	27,948.21	38,695.16
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	47,367.00	58,055.00	56,884.48	41,199.61
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	35,473.00	40,444.00	43,198.92	18,801.66
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	11,894.00	17,611.00	13,685.56	22,397.95
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**	**39,756.49**	**45,323.88**	**47,375.09**	**24,583.69**
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**	**40,560.42**	**50,268.66**	**41,633.77**	**61,093.11**
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**	**80,316.91**	**95,592.54**	**89,008.86**	**85,676.80**

Table 18: Supply and Consumption of Fuelwood

(Percentage)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1. Supply by NRDCL	38.95	24.96	45.08	30.25	34.80	32.27	27.22	26.06	41.02	39.27	36.09	51.91
2. Supply by DoFPS, MoAF	61.05	75.04	54.92	69.75	65.20	67.73	72.78	73.94	58.98	60.73	63.91	48.09
Total Supply (1+2)	**100.00**	**100.00**	**100.00**	**100.00**	**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	41.02	39.27	36.09	51.91
3.1 Household	5.34	3.42	6.18	4.14	4.73	4.42	3.73	3.57	5.33	5.10	4.69	6.75
3.2 Industries	33.62	21.54	38.90	26.10	29.78	27.84	23.49	22.49	35.69	34.16	31.40	45.16
4. DoFPS, MoAF Disposal (4.1+4.2)	61.05	75.04	54.92	69.75	65.49	67.73	72.78	73.94	58.98	60.73	63.91	48.09
4.1 Household	51.09	48.49	26.31	38.35	35.47	38.54	43.24	43.42	44.17	42.31	48.53	21.94
4.2 Industries	9.96	26.55	28.61	31.41	30.02	29.19	29.54	30.52	14.81	18.42	15.38	26.14
Total Household	**56.43**	**51.91**	**32.49**	**42.49**	**40.20**	**42.96**	**46.97**	**46.99**	**49.50**	**47.41**	**53.23**	**28.69**
Total Industries	**43.57**	**48.09**	**67.51**	**57.51**	**59.80**	**57.04**	**53.03**	**53.01**	**50.50**	**52.59**	**46.77**	**71.31**
Total Use (3+4)	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 19: Physical account for Briquette production

(KG)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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	327,420.00	373,440.00	356,850.00	175,230.00
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	81,000.00	112,380.00	177,150.00	22,290.00
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	246,420.00	261,060.00	179,700.00	152,940.00
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	215,040.00	196,290.00	334,560.00	167,820.00
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	215,040.00	196,290.00	334,560.00	167,820.00
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	112,380.00	177,150.00	22,290.00	7,410.00

Table 20: Physical account for Timber production

(Cft.)

SUPPLY	2015	2016	2017	2018	2019	2020	2021
1. Supply by NRDCL	1,954,917.00	1,770,200.20	1,567,282.39	1,849,307.60	2,154,096.96	2,664,408.52	1,554,399.48
2. Supply by DoFPS, MoAF	14,233,257.87	6,529,630.09	5,172,512.81	3,099,780.99	7,146,269.25	5,459,053.47	2,699,310.52
Total Supply (1+2)	**16,188,174.87**	**8,299,830.29**	**6,739,795.20**	**4,949,088.59**	**9,300,366.21**	**8,123,461.99**	**4,253,710.00**
USE	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
3. NRDCL	**1,954,917.00**	**1,770,200.20**	**1,567,282.39**	**1,849,307.60**	**2,154,096.96**	**2,664,408.52**	**1,554,399.48**
3.1. Commercial	1,954,917.00	1,770,200.20	1,567,282.39	1,849,307.60	2,154,096.96	2,664,408.52	1,554,399.48
4. DoFPS, MoAF	**14,233,257.87**	**6,529,630.09**	**5,172,512.81**	**3,099,781.03**	**7,146,269.25**	**5,459,053.47**	**2,699,310.52**
4.1. Commercial	1,506,804.07	2,472,601.66	1,408,914.38	537,066.00	2014128.226	1,579,186.43	1,323,792.37
4.2. Concessional	12,706,721.83	4,015,903.40	3,588,205.42	2,553,111.55	5132141.022	3,879,867.04	1,375,518.16
4.3. Free	19,731.97	41,125.03	175,393.01	9,603.48	-	-	-
Total Use (3+4)	**16,188,174.87**	**8,299,830.29**	**6,739,795.20**	**4,949,088.63**	**9,300,366.21**	**8,123,461.99**	**4,253,710.00**

Table 21: Physical account for Sand production

(Million Cft.)

	2014	2015	2016	2017	2018	2019	2020	2021
Total Stock (1+2)	15.24	15.54	17.94	21.21	19.31	21.21	25.05	24.31
1. Opening Stock	3.02	4.29	3.46	2.62	1.59	2.94	3.91	4.74
2. Additions to stock (via production)	12.22	11.25	14.48	18.59	17.71	18.27	21.13	19.56
Total Reductions in stock (3)	10.71	11.66	15.32	17.69	15.96	16.93	20.30	22.59
3. Disposal	10.71	11.66	15.32	17.69	15.96	16.93	20.30	22.59
Closing stock (1+2-3)	4.29	3.46	2.62	1.59	2.94	3.91	4.74	1.71

Table 22: Physical Asset Account for Coal

(Million MT)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	0.95	0.84	0.74	0.66	0.54	0.45	0.33	0.17	(0.02)	(0.21)	(0.28)
Additions to Stock (+)											
Discoveries	-	-	-	-	-	-	-	-	-	-	
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	
Reclassifications	-	-	-	-	-	-	-	-	-	-	
Total additions to stock	-	-	-	-	-	-	-	-	-	-	
Reductions in Stock (-)											
Extractions	0.11	0.10	0.08	0.12	0.09	0.12	0.16	0.19	0.19	0.07	0.11
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	
Reclassifications	-	-	-	-	-	-	-	-	-	-	
Total reductions in stock	0.11	0.10	0.08	0.12	0.09	0.12	0.16	0.19	0.19	0.07	0.11
Revaluations	-	-	-	-	-	-	-	-	-	-	
Closing Stock	**0.84**	**0.74**	**0.66**	**0.54**	**0.45**	**0.33**	**0.17**	**(0.02)**	**(0.21)**	**(0.28)**	**(0.40)**

Table 23: Physical Asset Account for Dolomite

(Million MT)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	14,541.26	14,540.18	14,538.68	14,536.94	14,534.90	14,532.24	14,529.87	14,527.33	14,524.51	14,521.49	14,520.25
Additions to Stock											
Discoveries	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock											
Extractions	1.08	1.50	1.74	2.04	2.66	2.37	2.54	2.82	3.03	1.23	2.04
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	1.08	1.50	1.74	2.04	2.66	2.37	2.54	2.82	3.03	1.23	2.04
Revaluations	-	-	-	-	-	-	-	-	-	-	-
Closing Stock	**14,540.18**	**14,538.68**	**14,536.94**	**14,534.90**	**14,532.24**	**14,529.87**	**14,527.33**	**14,524.51**	**14,521.49**	**14,520.25**	**14,518.21**

Table 24: Physical Asset Account for Limestone

(Million MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	164.65	163.95	163.30	162.62	161.61	160.49	159.64	158.38	157.14	155.80	154.26	153.44
Additions to Stock												
Discoveries	-	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock												
Extractions	0.70	0.65	0.68	1.01	1.12	0.85	1.26	1.24	1.34	1.55	0.82	1.30
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	0.70	0.65	0.68	1.01	1.12	0.85	1.26	1.24	1.34	1.55	0.82	1.30
Revaluations	-	-	-	-	-	-	-	-	-	-	-	-
Closing Stock	**163.950**	**163.300**	**162.620**	**161.610**	**160.490**	**159.640**	**158.380**	**157.145**	**155.805**	**154.259**	**153.441**	**152.146**

Table 25: Physical Asset Account for Gypsum

(Million MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	134.22	133.88	133.53	133.22	132.87	132.46	132.07	131.75	131.42	130.96	130.47	130.14
Additions to Stock												
Discoveries	-	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock												
Extractions	0.34	0.35	0.31	0.35	0.41	0.39	0.32	0.33	0.46	0.49	0.33	0.40
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	0.34	0.35	0.31	0.35	0.41	0.39	0.32	0.33	0.46	0.49	0.33	0.40
Revaluations	-	-	-	-	-	-	-	-	-	-	-	-
Closing Stock	**133.88**	**133.53**	**133.22**	**132.87**	**132.46**	**132.07**	**131.75**	**131.42**	**130.96**	**130.47**	**130.14**	**129.74**

Table 26: Physical Asset Account for Quartzite

(Million MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	5.18	5.07	4.97	4.88	4.79	4.71	4.63	4.54	4.36	4.21	4.07	3.92
Additions to Stock												
Discoveries	-	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock												
Extractions	0.11	0.10	0.09	0.09	0.08	0.08	0.09	0.18	0.15	0.14	0.15	0.12
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	0.11	0.10	0.09	0.09	0.08	0.08	0.09	0.18	0.15	0.14	0.15	0.12
Revaluations	-	-	-	-	-	-	-	-	-	-		
Closing Stock	**5.07**	**4.97**	**4.88**	**4.79**	**4.71**	**4.63**	**4.54**	**4.36**	**4.21**	**4.07**	**3.92**	**3.80**

Table 27: Physical Asset Account for Talc

(Million MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	0.13	0.09	0.08	0.06	0.05	0.04	0.03	0.03	0.02	(0.05)	(0.05)	(0.05)
Additions to Stock												
Discoveries	-	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock												
Extractions	0.0400	0.0100	0.0200	0.0100	0.0100	0.0100	0.0000	0.0100	0.0700	0.0014	0.0010	0.0007
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	0.04	0.01	0.02	0.01	0.01	0.01	-	0.01	0.07	0.001	0.001	0.001
Revaluations	-	-	-	-	-	-	-	-	-	-	-	-
Closing Stock	**0.090**	**0.080**	**0.060**	**0.050**	**0.040**	**0.030**	**0.030**	**0.020**	**(0.050)**	**(0.051)**	**(0.052)**	**(0.053)**

Table 28: Physical Asset Account for Iron-ore

(Million MT)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Opening Stock	2.69	2.69	2.69	2.69	2.67	2.65	2.61	2.58	2.55	2.51	2.47	2.46
Additions to Stock												
Discoveries	-	-	-	-	-	-	-	-	-	-	-	-
Upward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total additions to stock	-	-	-	-	-	-	-	-	-	-	-	-
Reductions in Stock												
Extractions	-	-	-	0.02	0.02	0.04	0.03	0.03	0.04	0.04	0.01	0.03
Catastrophic losses	-	-	-	-	-	-	-	-	-	-	-	-
Downward re-appraisals	-	-	-	-	-	-	-	-	-	-	-	-
Reclassifications	-	-	-	-	-	-	-	-	-	-	-	-
Total reductions in stock	-	-	-	0.02	0.02	0.04	0.03	0.03	0.04	0.04	0.01	0.03
Revaluations	-	-	-	-	-	-	-	-	-	-	-	-
Closing Stock	**2.69**	**2.69**	**2.69**	**2.67**	**2.65**	**2.61**	**2.58**	**2.55**	**2.51**	**2.47**	**2.46**	**2.43**

Table 29: Monetary Asset Account for Coal

(Million Nu.)

Time	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2020	0.12	2,247.83	277.81	0.12	1.00	277.81
1	2021	0.12	2,247.83	277.81	0.12	0.89	248.05
2	2022	0.12	2,247.83	277.81	0.12	0.80	221.47
3	2023	0.12	2,247.83	277.81	0.12	0.71	197.74
4	2024	0.12	2,247.83	277.81	0.12	0.64	176.56
5	2025	0.12	2,247.83	277.81	0.12	0.57	157.64
6	2026	0.12	2,247.83	277.81	0.12	0.51	140.75

Table 30: Monetary Asset Account for Dolomite

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	967.88	293.99	284,543.81	0.12	1.00	284,543.81
1	2022	967.88	293.99	284,543.81	0.12	0.89	254,056.97
2	2022	967.88	293.99	284,543.81	0.12	0.80	226,836.58
3	2023	967.88	293.99	284,543.81	0.12	0.71	202,532.66
4	2023	967.88	293.99	284,543.81	0.12	0.64	180,832.73
5	2024	967.88	293.99	284,543.81	0.12	0.57	161,457.80
6	2024	967.88	293.99	284,543.81	0.12	0.51	144,158.75
7	2025	967.88	293.99	284,543.81	0.12	0.45	128,713.17
8	2025	967.88	293.99	284,543.81	0.12	0.40	114,922.47
9	2026	967.88	293.99	284,543.81	0.12	0.36	102,609.35

Table 31: Monetary Asset Account for Limestone

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	10.14	5,019.86	50,916.63	0.12	1.00	50,916.63
1	2022	10.14	5,019.86	50,916.63	0.12	0.89	45,461.27
2	2023	10.14	5,019.86	50,916.63	0.12	0.80	40,590.42
3	2024	10.14	5,019.86	50,916.63	0.12	0.71	36,241.45
4	2025	10.14	5,019.86	50,916.63	0.12	0.64	32,358.44
5	2026	10.14	5,019.86	50,916.63	0.12	0.57	28,891.46
6	2027	10.14	5,019.86	50,916.63	0.12	0.51	25,795.95
7	2028	10.14	5,019.86	50,916.63	0.12	0.45	23,032.10
8	2029	10.14	5,019.86	50,916.63	0.12	0.40	20,564.37
9	2030	10.14	5,019.86	50,916.63	0.12	0.36	18,361.05

Table 32 Monetary Asset Account for Gypsum

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	8.65	813.46	7,035.69	0.12	1.00	7,035.69
1	2022	8.65	813.46	7,035.69	0.12	0.89	6,281.86
2	2023	8.65	813.46	7,035.69	0.12	0.80	5,608.81
3	2024	8.65	813.46	7,035.69	0.12	0.71	5,007.86
4	2025	8.65	813.46	7,035.69	0.12	0.64	4,471.31
5	2026	8.65	813.46	7,035.69	0.12	0.57	3,992.24
6	2027	8.65	813.46	7,035.69	0.12	0.51	3,564.50
7	2028	8.65	813.46	7,035.69	0.12	0.45	3,182.59
8	2029	8.65	813.46	7,035.69	0.12	0.40	2,841.60
9	2030	8.65	813.46	7,035.69	0.12	0.36	2,537.14

Table 33: Monetary Asset Account for Quartzite

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	0.25	3,220.00	815.73	0.12	1.00	815.73
1	2022	0.25	3,220.00	815.73	0.12	0.89	728.33
2	2023	0.25	3,220.00	815.73	0.12	0.80	650.29
3	2024	0.25	3,220.00	815.73	0.12	0.71	580.62
4	2025	0.25	3,220.00	815.73	0.12	0.64	518.41
5	2026	0.25	3,220.00	815.73	0.12	0.57	462.87
6	2027	0.25	3,220.00	815.73	0.12	0.51	413.27
7	2028	0.25	3,220.00	815.73	0.12	0.45	368.99
8	2029	0.25	3,220.00	815.73	0.12	0.40	329.46
9	2030	0.25	3,220.00	815.73	0.12	0.36	294.16

Table 34: Monetary Asset Account for Talc

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	0.02	468.50	7.87	0.12	1.00	7.87
1	2022	0.02	468.50	7.87	0.12	0.89	7.03
2	2023	0.02	468.50	7.87	0.12	0.80	6.28
3	2024	0.02	468.50	7.87	0.12	0.71	5.60
4	2025	0.02	468.50	7.87	0.12	0.64	5.00
5	2026	0.02	468.50	7.87	0.12	0.57	4.47

Table 35: Monetary Asset Account for Iron-ore

(Million Nu.)

	Extraction year	Quantity	ressource rent per unit	Total ressource rent from extraction	Discount rate, 12 per cent	Discount factor	Net present value (NPV) of extraction
0	2021	0.16	468.50	75.88	0.12	1.00	75.88
1	2022	0.16	468.50	75.88	0.12	0.89	67.75
2	2023	0.16	468.50	75.88	0.12	0.80	60.49
3	2024	0.16	468.50	75.88	0.12	0.71	54.01
4	2025	0.16	468.50	75.88	0.12	0.64	48.22
5	2026	0.16	468.50	75.88	0.12	0.57	43.06
6	2027	0.16	468.50	75.88	0.12	0.51	38.44
7	2028	0.16	468.50	75.88	0.12	0.45	34.33
8	2029	0.16	468.50	75.88	0.12	0.40	30.65
9	2030	0.16	468.50	75.88	0.12	0.36	27.36

Table 36: Energy supply, consumption and trade

Energy Supply, Consumption & Trade	2013	2014	2015	2016	2017	2018	2019	2020	2021
Production	**701.72**	**698.24**	**723.52**	**591.87**	**772.86**	**707.30**	**871.51**	**1,075.53**	**1,033.69**
Hydro-electricity	649.17	615.97	666.03	512.35	663.83	598.19	762.35	979.30	930.55
Wind	-	-	-	0.06	0.10	0.17	0.22	0.10	0.10
Solar	-	-	-	-	-	-	-	-	-
Coal	52.36	82.09	57.36	79.33	108.79	108.79	108.79	96.04	102.96
Firewood	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.03	0.03
Briquettee	0.15	0.14	0.09	0.09	0.10	0.10	0.10	0.07	0.06
Consumption	**372.41**	**398.79**	**393.91**	**422.95**	**471.54**	**521.70**	**531.69**	**448.10**	**535.02**
Hydro-electricity	177.25	190.92	190.91	187.21	200.33	200.33	200.33	218.40	244.71
Wind	-	-	-	0.06	0.10	0.17	0.22	0.10	0.10
Solar	-	-	-	-	-	-	-	-	-
Diesel	109.42	104.82	109.12	113.96	125.66	140.12	133.94	90.10	98.60
Petrol	24.60	25.49	27.60	29.30	31.74	38.24	41.45	27.94	26.74
Kerosene	4.46	5.09	4.12	4.28	3.64	3.09	2.48	1.54	1.42
ATF	2.69	3.02	2.83	2.81	3.39	4.15	4.04	3.39	0.99
LPG	4.94	5.08	5.46	5.87	10.50	9.66	10.09	10.50	10.37
Coal	48.86	64.20	53.72	79.33	96.04	125.83	124.45	96.04	152.02
Firewood	0.04	0.04	0.05	0.05	0.05	0.03	14.60	0.03	0.03
Briquettee	0.15	0.14	0.09	0.09	0.10	0.09	0.07	0.07	0.06
Export	**507.90**	**466.52**	**496.64**	**511.28**	**453.33**	**376.06**	**608.04**	**797.19**	**710.70**
Electricity	477.87	433.73	476.51	496.93	435.81	348.55	528.47	788.98	694.37
Diesel	19.54	12.89	11.60	6.08	3.76	5.64	7.68	0.52	11.91
Petrol	5.69	5.85	5.59	5.60	6.33	7.63	11.43	7.44	3.88
Coal	4.80	14.05	2.94	2.67	7.43	14.23	60.45	0.25	0.55
Import	**220.44**	**219.63**	**236.81**	**236.44**	**261.12**	**350.49**	**337.13**	**213.34**	**224.44**
Electricity	9.65	16.49	14.03	9.73	17.89	25.85	22.85	7.03	8.43
Diesel	109.42	104.82	109.12	113.96	125.66	140.12	133.94	90.10	98.60
Petrol	24.60	25.49	27.60	29.30	31.74	140.12	133.94	27.94	26.74
Kerosene	4.28	4.88	3.96	4.11	3.64	-	-	1.53	1.42
ATF	2.69	3.02	2.83	2.81	3.39	38.24	41.45	1.44	0.99
LPG	8.29	8.53	9.17	9.84	10.50	3.09	2.48	10.94	9.83
Coal	61.51	56.40	70.11	66.70	68.29	3.09	2.48	74.37	78.45
Total Supply	**922.17**	**917.87**	**960.34**	**828.31**	**1,033.97**	**1,057.79**	**1,208.65**	**1,288.88**	**1,258.14**

*NOTE: *Standard International Energy Classification*

***The production only pertains to those handled by NRDCL*

****Energy losses relates to only hydro-electricity*

Table 37: Physical supply table for energy

Unit: As specified.	PRODUCTION		Accumulation	Flows from RoW	Flows from the	Total Supply
	Industries	Households		Imports	Environment	
I. Energy from natural inputs						
Inputs of energy from renewable sources					**10,823.40**	**10,823.40**
(1) Hydro (GWh)					10,822.29	10,822.29
(2) Diesel(GWh)					0.0042	0.0042
(3) Wind (GWh)					1.11	1.11
Natural resource inputs					**73,075.36**	**73,075.36**
(1) Coal (MT)					72,838.11	72,838.11
1.1) Bituminous / Sub-Bituminous					-	-
1.2) Anthracite					-	-
1.3) Coke/Semi-coke of coal					72838.11	72,838.11
1.4) Other coal					-	-
(2) Fuelwood (MT)					84.31	84.31
(3) Briquettee (MT)					152.94	152.94
Total energy from natural inputs						
II. Energy products						
Production of energy products by SIEC* class						
(1) Coal (MT)	72,838.11			152,874.60		225,712.71
1.1) Bituminous / Sub-Bituminous	-			40,137		40,136.58
1.2) Anthracite	-			199.545		199.55
1.3) Coke/Semi-coke of coal	72,838.11			72,483		145,320.93
1.4) Other coal	-			40,056		40,055.65
(2) Diesel (KL)	-			110,349.50		110,349.50
2.1) Diesel	-			110,349.50		110,349.50
2.2) Light Diesel Oil (LDO)	-			-		-
(3) Petrol (KL)				32,819.50		32,819.50
(4) Aviation Turbine Fuel (ATF) (KL)	-			1,162.14		1,162.14
(5) Kerosene (KL)	-			1,654.00		1,654.00
5.1) Kerosene (SK Oil)	-			1,654.00		1,654.00
5.2) Kerosene (SK Oil-Industrial)	-			-		-
(6) Furnace Oil (FO) (KL)	-			724.00		724.00
(7) LPG (MT)	-			8,697.87		8,697.87
(8) Electricity (GWh)	10,823.40			98.04		10,921.44
(9) Biogas for cooking (MT)	-			-		-
(10) Fuelwood (MT)	84.31			-		84.31
(11) Briquette (MT)**	152.94			-		152.94
Total use of energy products						
III. Energy residuals* **						
Losses during extraction (GWh)	-	-				-
Losses during distribution (GWh)		-				-
Losses during transformation (GWh)	-	-				-
Other energy residuals (GWh)	-	-				-
Total energy from residuals						

Table 38: Physical use table for energy

Unit: As specified.	USE		Accumulation	Flows to RoW	Flows to the Environment	Total Use
	Industries	Households		Exports		
I. Energy from natural inputs						
Inputs of energy from renewable sources	**10,823.40**					**10,823.40**
(1) Hydro (GWh)	10,822.29					10,822.29
(2) Solar (GWh)	0.00					0.00
(3) Wind (GWh)	1.11					1.11
Natural resource inputs	**73,075.36**					**73,075.36**
(1) Coal (MT)	**72,838.11**					72,838.11
1.1) Bituminous / Sub-Bituminous	-					-
1.2) Anthracite	-					-
1.3) Coke/Semi-coke of coal	72,838.11					72,838.11
1.4) Other coal	-					-
(2) Fuelwood (MT)	**84.31**					84.31
(3) Briquettee (MT)	**152.94**					152.94
Total energy from natural inputs						
II. Energy products						
Production of energy products by ISIC* class						
(1) Coal (MT)	71,618.75	-		1,219.36		225,712.71
1.1) Bituminous / Sub-Bituminous	-		38,922.22	1,214		40,136.58
1.2) Anthracite	-	-	199.55	-		199.55
1.3) Coke/Semi-coke of coal	71,618.75	-	73,702.18	-		145,320.93
1.4) Other coal	-	-	40,050.65	5		40,055.65
(2) Diesel (KL)**	91,331.17	5,691.45	-	13,326.89		110,349.50
2.1) Diesel	91,331.17	5,691.45	-	13,326.89		110,349.50
2.2) Light Diesel Oil (LDO)	-	-	-	-		-
(3) Petrol (KL)***	1,433.76	26,628.65	-	4,757.09		32,819.50
(4) Aviation Turbine Fuel (ATF)	1,162.14	-	-	-		1,162.14
(5) Kerosene (KL)	-	1,654.00	-	-		1,654.00
5.1) Kerosene (SK Oil)	-	1,654.00	-	-		1,654.00
5.2) Kerosene (SK Oil-Industrial)	-	-	-	-		-
(6) Furnace Oil (FO) (KL)	724.00	-	-	-		724.00
(7) LPG (MT)	477.92	8,697.87	-	-		9,175.79
(8) Electricity (GWh)	514.53	2,331.41		8,075.50		10,921.44
(9) Biogas for cooking (MT)			-			-
(10) Fuelwood (MT)	60.12	24.19				84.31
(10) Briquette (MT)	152.94	-	-	-		152.94
Total use of energy products						
III. Energy residuals						
Losses during extraction (GWh)					-	-
Losses during distribution (GWh)					-	-
Losses during transformation (GWh)					-	-
Other energy residuals (GWh)					-	-
Total energy from residuals						

*NOTE:**Standard International Energy Classification*

*** & *** Export figures refers to re-export of fuels: refueling by Indian vehilces in southern borders of Bhutan*

Table 39: Physical Supply table for energy

Unit: KToE	PRODUCTION		Accumulation	Flows from RoW	Flows from the environment	Total Supply
	Industries	Households		Imports		
I. Energy from natural inputs						
Inputs of energy from renewable sources					930.64	930.64
(1) Hydro					930.55	930.55
(2) Solar					0.00	0.00
(3) Wind					0.10	0.10
Natural resource inputs					49.14	49.14
(1) Coal					49.06	49.06
1.1) Bituminous / Sub-Bituminous					-	-
1.2) Anthracite					-	-
1.3) Coke/Semi-coke of coal					49.06	49.06
1.4) Other coal					-	-
(2) Fuelwood					0.03	0.03
(3) Briquettee					0.06	0.06
Total energy from natural inputs					**979.79**	**979.79**
II. Energy products						
Production of energy products by SIEC* class						
(1) Coal	49.06			78.45		127.50
1.1) Bituminous / Sub-Bituminous	-			18.12		18.12
1.2) Anthracite	-			0.13		0.13
1.3) Coke/Semi-coke of coal	49.06			48.82		97.87
1.4) Other coal	-			11.38		11.38
(2) Diesel	-			98.60		98.60
2.1) Diesel	-			98.60		98.60
2.2) Light Diesel Oil (LDO)	-			-		-
(3) Petrol	-			26.74		26.74
(4) Aviation Turbine Fuel (ATF)	-			0.99		0.99
(5) Kerosene	-			1.42		1.42
5.1) Kerosene (SK Oil)	-			1.42		1.42
5.2) Kerosene (SK Oil-Industrial)	-			-		-
(6) Furnace Oil (FO)	-			0.62		0.62
(7) LPG	-			9.83		9.83
(8) Electricity	930.64			8.43		939.07
(9) Biogas for cooking	-			-		-
(10) Fuelwood	0.03			-		0.03
(11) Briquette**	0.06			-		0.06
Total energy products	**979.79**			**225.06**		**1,204.85**
III. Energy residuals* **						
Losses during extraction	-	-				-
Losses during distribution	-	-				-
Losses during transformation	-	-				-
Other energy residuals	-	-				-
Total energy residuals* **	-	-				-
TOTAL SUPPLY	**979.79**	-	-	**225.06**	-	**1,204.85**

*NOTE: *Standard International Energy Classification*

***The production only pertains to those handled by NRDCL*

****Energy losses relates to only hydro-electricity*

Table 40: Physical Use table for energy

Unit: KToE			Accumulation	Flows to RoW	Flows to the environment	Total Use
	Industries	Households		Exports		
I. Energy from natural inputs						
Inputs of energy from renewable sources	930.64					930.64
(1) Hydro	930.55					930.55
(2) Solar	0.00					0.00
(3) Wind	0.10					0.10
Natural resource inputs	49.14					49.14
(1) Coal	49.06					49.06
1.1) Bituminous / Sub-Bituminous	-					-
1.2) Anthracite	-					-
1.3) Coke/Semi-coke of coal	49.06					49.06
1.4) Other coal	-					-
(2) Fuelwood	0.03					0.03
(3) Briquettee	0.06					0.06
Total energy from natural inputs	**979.79**					**979.79**
II. Energy products						
Production of energy products by SIEC* class						
(1) Coal	48.24	-	78.72	0.55		127.50
1.1) Bituminous / Sub-Bituminous	-	-	17.57	0.55		18.12
1.2) Anthracite	-	-	0.13	-		0.13
1.3) Coke/Semi-coke of coal	48.24	-	49.64	-		97.87
1.4) Other coal	-	-	11.38	0.00		11.38
(2) Diesel	81.60	5.09	-	11.91		98.60
2.1) Diesel	81.60	5.09	-	11.91		98.60
2.2) Light Diesel Oil (LDO)	-	-	-	-		-
(3) Petrol	1.17	21.69	-	3.88		26.74
(4) Aviation Turbine Fuel (ATF)	0.99	-	-	-		0.99
(5) Kerosene	-	1.42	-	-		1.42
5.1) Kerosene (SK Oil)	-	1.42	-	-		1.42
5.2) Kerosene (SK Oil-Industrial)	-	-	-	-		-
(6) Furnace Oil (FO)	0.62	-	-	-		0.62
(7) LPG	0.54	9.83	-	-		10.37
(8) Electricity	44.24	200.47	-	694.37		939.07
(9) Biogas for cooking	-	-	-	-		-
(10) Fuelwood	0.02	0.01	-	-		0.03
(11) Briquette	0.06	-	-	-		0.06
Total use of energy products	**177.45**	**238.49**	**78.72**	**710.70**		**1,205.39**
III. Energy residuals						
Losses during extraction					-	-
Losses during distribution					-	-
Losses during transformation					-	-
Other energy residuals					-	-
Total energy residuals					-	-
TOTAL USE	**177.45**	**238.49**	**78.72**	**710.70**	**-**	**1,205.39**

**Standard International Energy Classification*

Table 41: Waste Supply/Generation

(kg/day)

Categories	Households	Commercial	Industries	Health Centres	Institutes	Gov. offices	Vegetable Markets	Total
Food Waste	40,399.8	23,891.4	1,315.4	654.8	2,055.7	1,170.4	4,359.9	73,847.4
Plastics	16,251.2	11,912.0	770.4	535.8	1,149.2	654.3	462.6	31,735.6
Paper and Cardboard	8,410.9	8,614.4	2,243.7	493.1	1,307.8	744.7	771.1	22,585.6
Glass	3,480.1	7,739.5	265.9	54.4	113.3	64.5	9.9	11,727.5
Sanitary Waste	4,743.3	2,086.3	3.4	82.0	114.4	66.8	159.1	7,255.3
Metals	1,825.6	5,249.4	243.1	16.7	115.5	67.4	-	7,517.7
Textiles	2,151.6	1,884.4	53.5	53.8	177.0	103.3	1.7	4,425.3
Wood	358.6	2,422.8	159.6	5.2	102.5	59.3	45.6	3,153.6
Rubber	1,972.3	807.6	467.3	43.4	64.7	36.6	-	3,391.9
E-Waste	692.8	2,019.0	-	5.3	71.8	40.9	-	2,829.6
Other	586.8	471.1	62.9	29.8	42.1	24.0	172.7	1,389.3
Green plant materials	627.6	201.9	141.3	5.2	79.9	45.5	185.1	1,286.3
Medical Waste	-	-	-	996.0	-	-	-	996.0
Total	**81,500.5**	**67,299.7**	**5,726.5**	**2,975.3**	**5,393.9**	**3,077.7**	**6,167.7**	**172,141.2**

Table 42: 'Use' or Final Treatment and/or Disposal

(kg/day)

Treatments	Households	Commercial	Industries	Health Centres	Institutes	Gov. offices	Vegetable Markets	TOTALS
Landfill	27738.20	34521.43	1321.42	399.28	1661.21	947.86	4308.78	70898.19
Environment	21229.73	3440.19	969.25	534.63	1563.45	892.07	11.72	28641.04
Recycle/reuse	9614.22	10501.46	2554.88	235.01	366.39	209.06	1206.08	24687.09
Export	3254.74	13033.39	0.00	41.75	122.13	69.69	401.82	16923.51
Burn	16939.31	4299.03	0.00	768.59	1250.76	713.66	0.00	23971.34
Compost	2451.85	858.84	0.00	0.00	0.00	0.00	0.00	3310.69
Other treatments	272.47	645.34	880.95	996.00	429.95	245.32	239.31	3709.33
TOTAL	**81500.52**	**67299.67**	**5726.49**	**2975.26**	**5393.89**	**3077.66**	**6167.71**	**172141.19**

Data Sources

1. Department of Industries, Ministry of Economic Affairs
2. Department of Geology & Mines, Ministry of Economic Affairs
3. Royal Civil Service Commission. Civil Service Statistics. Civil Service Statistics.
4. Ministry of Education. Annual Education Statistics.
5. Ministry of Health. Annual Health Survey. Annual Health Bulletin.
6. National Environment Commission. Second National Communication to the UNFCC.
7. Ministry of Works & Human Settlements. Annual Info Bulletin.
8. Ministry of Agriculture & Forests. Livestock Statistics, RNR Statistics, Forestry Facts & Figure.
9. National Statistics Bureau. Bhutan at Glance.
   —. Bhutan Population Projection.
   —. Dzongkhag Population Projection
   —. National Accounts Statistics.
   —. Bhutan Living Standard Survey. 2017.
   —. Poverty Analysis Report. 2017.
   —. Statistical Yearbook of Bhutan.
   —. Labor Force Survey.
10. Tourism Council of Bhutan. Annual Report.
11. Ministry of Finance. Trade Statistics.
    —. Annual Financial Statement of Bhutan.
    —. Public Expenditure Review.
12. Druk Green Power Corporation. Annual Report.
13. Bhutan Power Corporation. Annual Report.
14. Natural Resource Development Corporation Ltd. Annual Report. 2018.
15. Ministry of Information & Communications. Annual Report.