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PREFACE

Energy is a basic human need as it is used in food preparation and preservation and for space heating and cooling in extreme weather situations. Furthermore, energy is an essential key to economic development worldwide and therefore to improving the standard of living of humans everywhere. Besides, the energy sector makes a significant contribution to the pollution of environmental media globally, and is therefore responsible for the negative impacts such pollution has on human welfare. Therefore, the importance of reliable quantitative information on energy supply and demand patterns is indispensable when planning for sustainable economic development.

The energy sector in Botswana comprises of both traditional and conventional energy sources that are either locally produced or imported. The most prevalently used energy sources that are locally produced are fuelwood and coal. Coal is mainly used in the Industrial sector for power generation. On the other hand, fuelwood, which is available for collection/harvesting on a free-for-all basis in most parts of the country is the most dominant energy source at both the supply and demand levels. Other energy sources that are in use in the country include petroleum products, electricity and renewable energy sources.

Increase in population over the years has resulted in increased demand for energy. Since fuelwood is the principal energy used in the household sector, population growth has led to the unsustainable use of the wood resource, especially in relatively densely populated locations. This is of great concern because the energy requirements of Botswana's low-income rural communities can only be met through fuelwood, because being readily available; it is relatively 'inexpensive'. Thus, in view of its increasing scarcity in or near major human settlements, both rural and urban, it is imperative that the country's planners put in places policies and programs that will ensure that present and future low-income generations will always have access to their minimum energy requirements.

We trust that this publication will make a contribution to such efforts.

The production of this publication is a joint effort between the Central Statistics Office (CSO) and the Energy Affairs Division (EAD) of the Ministry of Minerals, Energy and Water Affairs. The EAD provided most of the data published here and we wish to acknowledge its significant contribution.

The Botswana Power Corporation (BPC) and the Morupule Colliery also provided data on electricity and coal, respectively. Their contributions are also acknowledged.

G. M. Charumbira
Government Statistician

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1.0 Introduction to Energy Sources Used in Botswana

1.1 Coal

Botswana has over 212 billion tonnes of coal resources available in eleven coalfields (given in Table 1.1). The measured (proven) coal reserves are located in two of the eleven coalfields. Most of the coal basins are situated in the north-eastern part of the country. Only one coalmine is in operation and it is situated in the Morupule coalfield, which is in the Central District. With the exception of a few years, the mine's production has been on the increase since its inception in 1973. In the year 2001, the mine's production was 914,584 tonnes.

Table 1.1 Estimated Botswana Coal Inventory (Million Tonnes) before Coal Mining Started in 1973[1].

Coalfield	Reserves				Resources			Total Coal
	Measured	Indicated	Inferred	Sub-total	Hypothetical	Speculative	Sub-total	Inventory
Morupule	2,846	2,706	4,272	9,824	4,851	3,397	8,248	18,072
Moijabana	-	-	2,406	2,406	-	648	648	3,054
Mmamabula	494	20,215	2,504	23,213	-	-	-	23,213
Letlhakeng	-	-	7,213	7,213	23,340	39,800	63,140	70,353
Ncojane	-	-	-	-	2,025	2,700	4,725	4,725
Dukwi	-	32	1,572	1,604	-	-	-	1,604
Mmamantswe	-	-	598	598	-	2,300	2,300	2,898
Serule	-	307	1,341	1,648	1,766	6,270	8,036	9,684
Dutlwe	-	-	2,070	2,070	60,875	8,795	69,670	71,740
Foley	-	-	-	-	6,860	-	6,860	6,860
Bobonong	-	-	-	-	-	179	179	179
	3,340	23,260	21,976	48,576	99,717	64,089	163,806	212,382

The terms **"Reserves"** and **"Resources"** have been applied to conform to definitions proposed by the United Nations Solid Fuels Framework

Measured Reserves - delineated by closely spaced observation points (such as drill holes); judged accurate to +/- 20 percent; spacing should generally not exceed 0.8 km.

Indicated Reserves - delineated by observation points which are 0.8 to 2.4 km apart.

Inferred Reserves - few observation points, spacing generally ranging from 2.4 to 9.6 km; but estimates may vary depending on complexity of geological formations.

Hypothetical Resources - essentially undiscovered but occurring in same geological environment as the areas explored in detail.

Speculative Resources - undiscovered, but may, by geological inference, be projected over unexplored ground with a reasonable degree of confidence.

- Zero or less than 1 unit

Source: Department of Geological Survey

More than half of the locally produced coal is used to fire BPC's thermal plant for electricity generation that is distributed on the national grid. Electricity production is, therefore, the main use of locally produced coal at present. Other major users are the BCL Copper-Nickel mine and Soda Ash Botswana (SAB), a cement producing industry. The three industries consumed 89 percent of the coal produced in the year 2001.

Higher-grade coal is imported for use in certain applications in the industrial sector.

[1] Data that was released in the Environment Statistics Publication (2000) has been revised.

The country needs to further develop the utilisation of its abundant coal reserves by stimulating the growth of coal-based industries and implementing its use in government institutions. Coal will provide an affordable source of energy to the industrial sector and institutions. Since a significant number of institutions use fuelwood to cook for their members, increase in coal utilization will contribute to the reduction of the high rate of wood depletion. It will also contribute to the expansion of the industrial sector.

1.2 Renewable Energy (RE) Sources

Renewable Energy (RE) sources can be broadly defined as those energy resources that are not depleted by use, or whose resource base can be maintained if used rationally or renewed through natural processes like birth for fauna or re-growth for flora. This implies that the "renewable attribute" is not always based on the supply base of the resource alone, but that it could also be a function of the interaction between the supply and demand forces of the resource.

Botswana has abundant renewable energy resources, primarily in the form of solar energy. The country receives over 3200 hours of sunshine a year with infrequent completely cloudy days. The average daily radiation on a horizontal surface is 21 J/m^2. This makes Botswana especially suitable for solar energy applications.

Solar energy is well distributed throughout the country. This is especially advantageous in rural areas where conventional energy sources are sometimes not readily available. It is currently used for water heating (mainly in urban areas), and electricity production to power telecommunication equipment, home lighting, schools and clinics (rural areas).

In Botswana, solar energy is most widely used for lighting and water heating, especially in areas that are not connected to the central power grid. Despite the abundance of solar energy, its contribution to the national energy balance remains insignificant. One of the barriers to widespread use of this technology is the relatively high initial cost required to purchase the equipment.

1.3 Fuelwood

Wood is still an important fuel for the majority of the population. It can be used as firewood (fuelwood) or charcoal. It is estimated that fuelwood is the energy source used for cooking in 46 percent of Botswana's households. On the other hand, the use of charcoal is not as widespread because it is imported and therefore commercial and expensive. Wood dominates the energy sector and contributes at least 33 percent to Primary Energy Supply, and 43 percent to each of Net and Final Energy Supply. Fuelwood has therefore remained the dominant energy source in Botswana. It is mainly used for cooking. Other uses include space heating, water heating, baking, lighting (direct and indirect), roasting, ironing and brewing. Fuelwood is also used in the government, industrial and commercial sectors, particularly in rural areas. Other biomass fuels (charcoal, dung and crop wastes) make a negligible contribution to total national energy consumption.

The total national growing stock of woody biomass has been estimated at 1400 million tonnes with an annual increment of 50 million tonnes. Regeneration capacity ranges from 0.3 t/ha/year to 2.1 t/ha/year and has a national average value of 0.93 t/ha/year. Given an estimated standing stock density ranging from 3.6 tonnes/ha to 48.0 tonnes/ha, the regeneration rate is rather low.

Unsustainable harvesting of wood has led to serious shortages in some areas. However, it has been noted that wood harvesting for energy purposes has not been the only cause of deforestation in Botswana. Other causes that are of concern include land clearing for agricultural expansion and woodcutting for construction purposes.

1.4 Petroleum Products

All the fuels marketed in Botswana are imported (in refined form) because Botswana has no known oil reserves. Presently most petroleum products are imported from the Republic of South Africa and smaller amounts from Namibia (to supply some parts of the Kalagadi and Ghantsi districts). There are five multi-national oil companies operating in Botswana. The major petroleum products imported into the country are listed below in descending order of contribution to energy supply and demand.

1.4.1 Petrol

Petrol is the most used petroleum product in Botswana. It is primarily used in the transport sector. It is also used to fuel equipments in other sectors e.g. agriculture, construction, and residential and government sectors. Government periodically regulates the price of petrol by fixing base prices. Petrol prices, however, do differ between certain locations due to transportation costs.

1.4.2 Diesel

Diesel is also mainly used in the transport sector, although substantial amounts of it are used for electricity generation and for operating equipment in the sectors indicated under petrol. The pricing system for diesel is similar to that of petrol.

1.4.3 Paraffin

Paraffin is mainly used in households for lighting. Its use as a cooking fuel is on the rise, and the trend is expected to continue as fuelwood scarcity increases. The pricing system for paraffin is similar to that of petrol and diesel.

1.4.4 Liquefied Petroleum Gas (LPG)

LPG is mostly used for cooking and to a lesser extent for lighting and refrigeration. Its use is widely spread in the residential sector partly due to its convenience and to the high cost of electricity. The Government does not control LPG prices. As a result, its price varies, even in one location.

In addition to the oil companies, Botswana Oxygen and individual vendors also participate in the procurement and sale of LPG.

1.4.5 Fuel Oil, Aviation Gas (AvGas) and Jet A1

Fuel oil is mainly used in the industrial sector, while Aviation Gas and Jet A1 are used in the transport sector by aircrafts. The contribution of the three fuels to total energy consumption is rising.

1.5 Electricity

Until 1996, electricity generation by the Botswana Power Corporation (BPC) contributed more than 50 percent to the net electricity supplied/consumed in the country. BPC is a parastatal whose mandate is to generate and supply electricity to the public. Two other sources of electricity supply are imports and local generation from diesel and coal. Electricity generation from diesel is mainly by the Department of Electrical and Mechanical Services (DEMS) while that from coal is mainly by the Botswana Ash (BOTASH) for own use.

At present the total installed generation capacity of the BPC power plant is 132 MW. The plant is coal-fired and located adjacent to the coalmine. The plant is the main user of coal from the mine in the country. In the year 2001, the plant used over 60 percent of the locally produced coal. The national power grid is mainly concentrated along the railway line in the eastern part of the country where the majority of the people live. However, all the major villages and several other locations are now connected to the grid. Nevertheless, some locations by virtue of their distance from the grid, their low population density and matters pertaining to the affordability of this energy source are still not connected to the grid.

In an effort to meet the electricity needs of such communities, the Government initiated the Rural Electrification Program (REP) whose aim is to extend the national electricity grid to rural areas. Over the two-year period covering 1999 to 2001 alone, 72 villages were electrified under this program. Realising that availability of electricity to households does not necessarily imply affordability, the Government established a Rural Electrification Collective Scheme (RECS). The scheme requires potential customers to voluntarily form groups of at least four members within the same village vicinity. Each member of the group is required to pay 5 percent of the total upfront costs and the government contributes 95 percent. The member is then required to pay the Governments contribution over a period of 18, 60 or 180 months depending on an individual's choice, with interest charged at a lower rate than the prime rate. Studies have shown that over 80 percent of the households who have used the scheme would not have afforded to electrify their homes without it. Therefore, the objectives of RECS are:

- to counter and alleviate the burden of the requirement that households pay total upfront costs before they are connected, as these are too high and beyond the affordability of most rural households,

- to ensure that the required guarantee by financial organisations is provided in order for genuinely interested households to participate in and benefit from the REP and that participating households *do* pay over stipulated periods *while* receiving the electricity service, and
- to enable as many households as possible to have access to electricity by using affordable means of payment.

The overall aim of the government in this effort is to trigger development in rural areas by stimulating activities in agricultural and other production efforts and commerce, thereby improving the welfare of rural households. It is also hoped that these developments in rural areas will stem the prevalent rural-urban migration.

BPC and the Department of Electrical and Mechanical Services (DEMS) of the Ministry of Works, Transport and Communications operate Centralised Power Supply Systems (CPSS) in some of the villages that are not connected to the national electricity grid. The CPSS use diesel-powered generators to provide electricity to Government institutions (DEMS) and the general public (BPC). However, where there is excess electricity generated, DEMS supplies electricity to private individuals as well.

Botswana also imports electricity from its neighbours, mainly the Republic of South Africa.

2.0 Executive Summary

2.1 Primary Energy Supply (PES)

Primary energy refers to total energy available for gross inland consumption before any transformation takes place. PES is derived from the following equation:

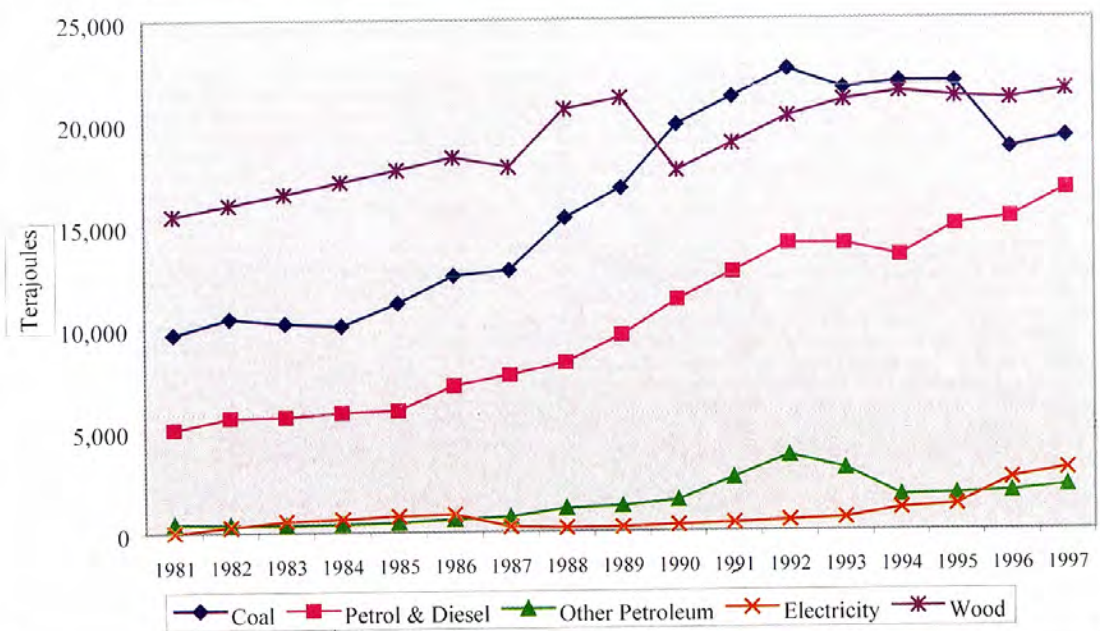
PES = DP + I – E + SC

where ;

DP	=	Domestic Production
I	=	Imports
E	=	Exports
SC	=	Stock Changes

In 1981 and 1997 the total PES in terajoules amounted to 30,799 and 62,619 respectively (see Tables 2.1 to 2.3). Differences in patterns of energy supplied were influenced by differences in financial positions of various sub-sectors. The commonly consumed energy sources were wood (residential), petroleum products (especially petrol and diesel for transport), and coal (used mainly by industries and for power generation).

Figure 2.1 Primary Energy Supply Levels of Major Energy Sources



Source: Derived from Tables 2.1 and 2.2

Fuelwood has been a leading source of energy in Botswana because of its easy accessibility as well as its availability on a free-for-all basis, or comparatively very cheaply - if

commercialised. During the period 1981-1997, its contribution to the total primary supply ranged from between 43 to 50 percent in the 1980's and dropped to 33 to 36 percent in the 1990's, as can be seen in Table 2.3. Its proportional share is on the decline due to a combination of several factors that include, inter-alia, the scarcity of wood in some parts of the country and the increased use of other energy sources (like LPG, paraffin and electricity) resulting from improvement in the standards of living in the household sector.

The second major contributor of locally available primary energy is coal, whose annual contribution ranged from 29 to 39 percent in the same period.

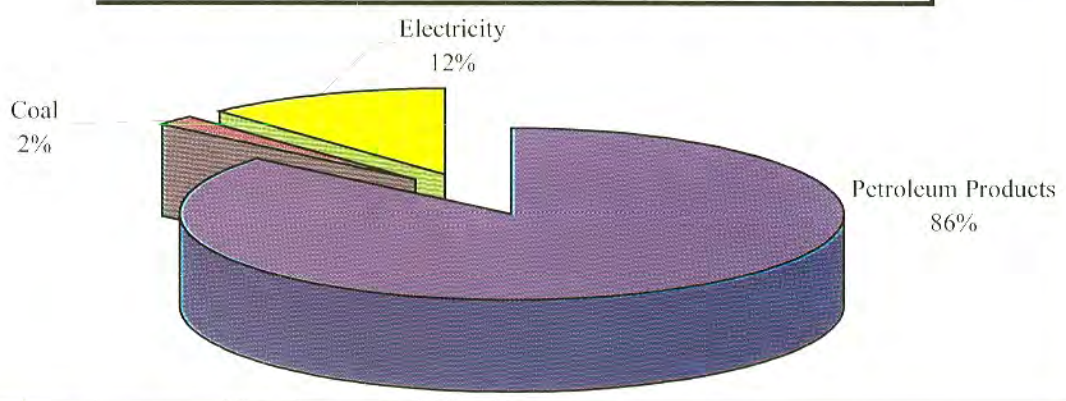
Petroleum products contributed between 16 and 30 percent of total PES. The biggest contributor in this group is petrol (5 to 14 percent), followed by diesel (8 to 11 percent).

2.2 Imported Energy Sources

Imports of energy sources during the period 1981 – 1997 included all petroleum products, and some of the coal and electricity used in the country (See Tables 3.1 to 3.3). Energy imports contributed between 22 to 29 percent of the total PES in the 1980s. However, this contribution rose to over 30 percent but less than 50 percent in the 1990s.

During the period 1981 to 1997, imports of petroleum products accounted for over 80 percent of the total energy imports (See Figure 2.2). Diesel was the leading imported energy product from 1981 to 1990, and was overtaken by petrol from 1992 to 1997. During that period, the main use of diesel was for electricity generation, in generators operated by Botswana Power Corporation (BPC) and Department of Electrical and Mechanical Services (DEMS). The decline in the consumption of diesel as compared to petrol is mainly due to the progressive decommissioning of most of BPC's diesel-powered Centralized Power Stations as a result of the extension of the national electricity grid.

Figure 2.2 Percentage Contributions to Imported Energy in 1997

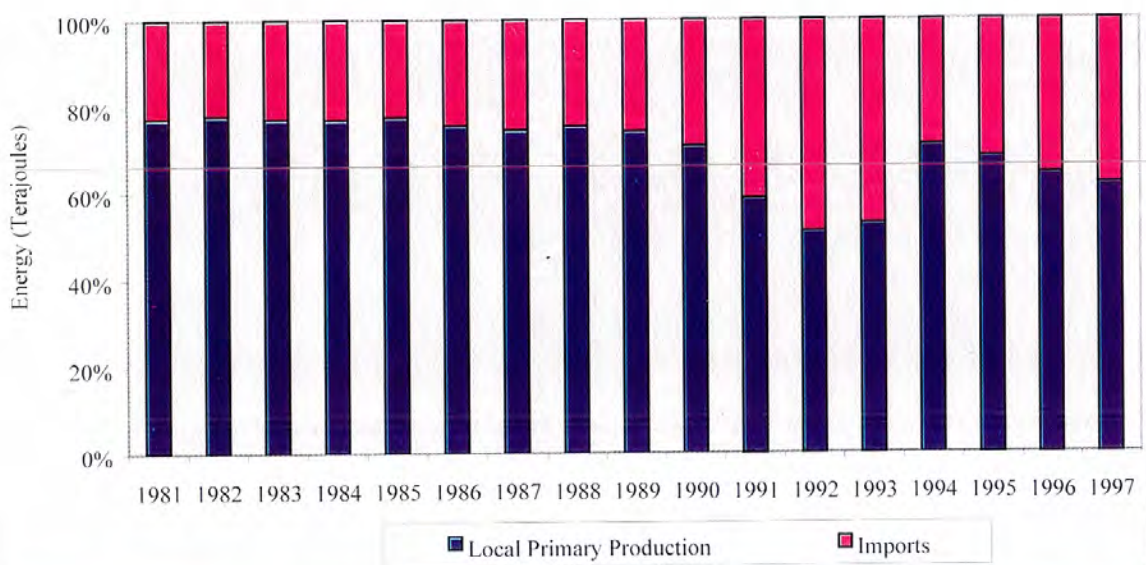


Source: Derived from Table 3.2

The imports of fuel oil followed a rather haphazard pattern in the period under review (Tables 3.1 to 3.2). This is not surprising because fuel oil is predominantly used in the industrial sector for coal ignition, a function for which it can be easily substituted for another fuel thus making it dispensable.

Most of the energy used in Botswana is locally produced as Figure 2.3 shows. Locally produced energy contributed between 51 and 78 percent of the total PES in the country during the 1981 to 1997 period (see Table 3.3).

Figure 2.3 Primary Production compared with Imported Energy



Source: Derived from Table 3.2

2.3 Net Energy Supply (NES)

Net Energy Supply (NES) is the total energy available for use by the final consumer. It therefore takes into account the changes in energy quantities that are generated by the energy transformation process. NES for each energy source can be expressed in equation form as given below:

NES = PES – (TI + CTP + TDL) + TO,

where :

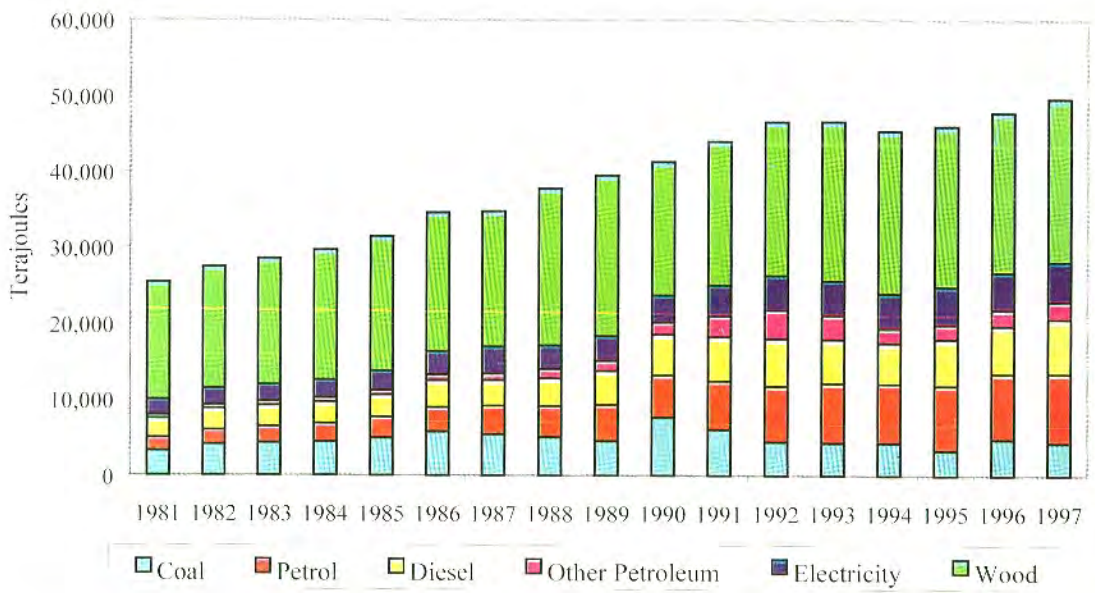
PES = Primary Energy Supply
TI = Transformation Inputs
CTP = Consumption by Transformation Plants
TDL = Transmission and Distribution Losses, and
TO = Transformation Outputs

Total NES in the country increased from 25,371 TJ in 1981 to 49,670 TJ in 1997 (see Table 4.2). Fuelwood remains the principal contributor to NES, a fact that can be readily seen from Figure 2.4. However, as Table 4.3 reveals, its contribution to NES is on the decline (60.9 percent in 1981 and 43.2 percent in 1997). Reasons for this are the same as those already advanced under PES in section 2.1.

Other energy sources that make significant contributions to NES are petrol, diesel, electricity and coal. The contribution of renewable energies is insignificant.

The contributions of the energy sources are different, for the same years, from those given under PES due to the transformation process. The process has the effect of changing the percentage shares of energy sources, by increasing the shares of those that are generated by the transformation process and those that are not used as transformation inputs; and decreasing those of energy sources that are used as transformation inputs. For example, comparison of Tables 2.3 and 4.3 show that the annual contributions of coal are lower, while those of electricity are higher, under NES than they were under PES.

Figure 2.4 Net Energy Supply in Terajoules, 1981 - 1997

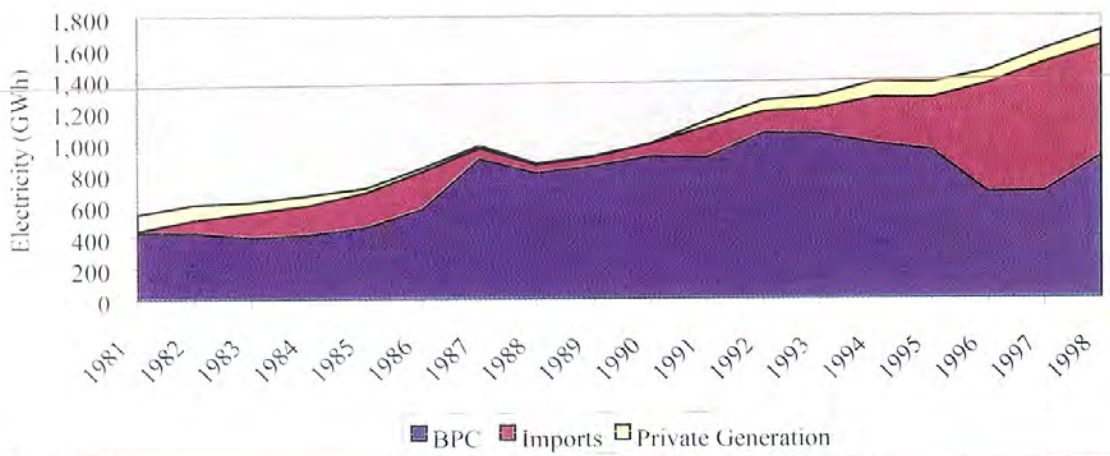


Source: Derived from Table 4.2

2.4 Net Electricity Supply (NE)

Net Electricity Supply (NE) has increased from 546 GWh in 1981 to 1,704 GWh in 1998 (Table 5.1). Although local generation by BPC increased over time, the contribution of this source of electricity supply is on the decline due to the decommissioning of many of BPC's power generation plants (both coal- and diesel- fired). As a result, the contribution of electricity imports rose over time from less than 2 percent in 1981 to above 40 percent by 1998. The proportion of NE that is sourced from public supply has been over 90 percent since 1984. The rest of the electricity available at this level is from private generation (see Tables 5.1 to 5.3).

Figure 2.5 Net Electricity Supply



Source: Derived from Table 5.1

2.5 Final Energy Demand (FED) by Energy Source

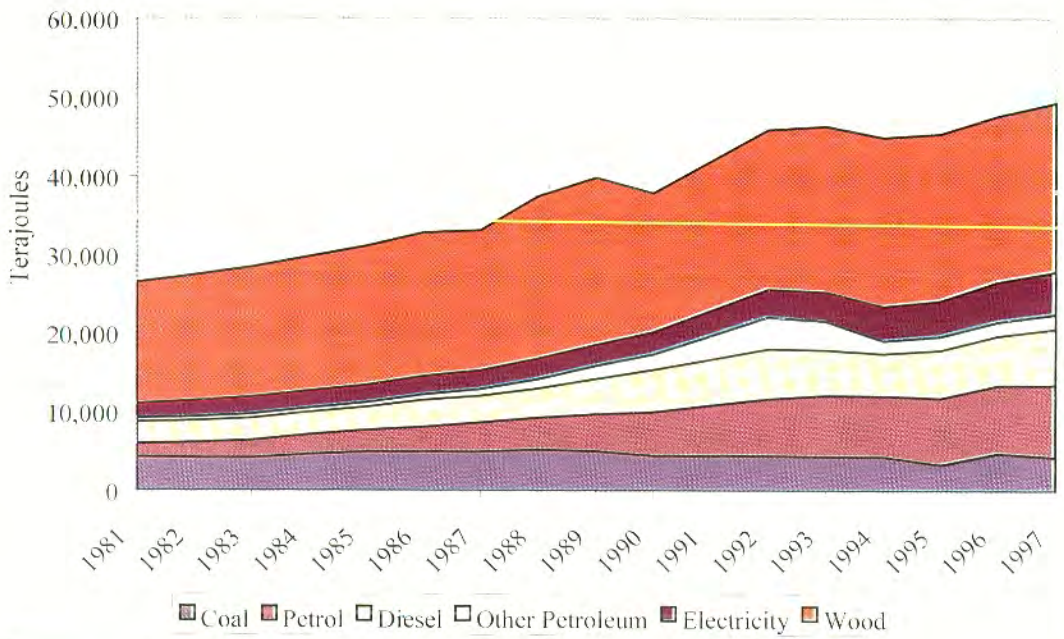
Final Energy Demand (FED) is the total energy consumed by all end users, excluding consumption by the energy sectors.

The total FED is on the increase in the country. It rose from 26,497 TJ in 1981 to 49,354 TJ in 1997 (Table 6.2). Apart from a few exceptions, annual quantities of individual energy sources that were used were on the increase (Table 6.1). Wood is the leading contributor to FED (Tables 6.2 and 6.3) and quantitative contribution rose from 15456 TJ in 1981 to 21456 TJ in 1997. However, its proportional contribution dropped from 58.3 percent in 1981 to 43.5 percent in 1997. The decline in its contribution can be attributed to the increased usage of other energy sources like LPG and electricity due to wood scarcity and other economic-related factors that are discussed in Section 2.6.

The other energy sources that make significant contributions to FED are petrol, diesel electricity and coal. It can be observed from Table 6.3 that the contribution of three of these

energy sources rose during the period under discussion from 7 to 18.6 percent for petrol, 10 to 15 percent for diesel and 7 to 11 percent for electricity while that of coal dropped from 16 to 9 percent (see Figure 2.6).

Figure 2.6 Contribution of Energy Sources to Final Energy Consumption (TJ)



Source: Derived from Table 6.2

2.6 Final Energy Demand (FED) by Sector

The household sector is the principal user of energy in the country and was consistently responsible for over 45 percent of annual FED throughout the period 1981 to 1997. The main energy source used in the household sector is fuelwood. Among other factors, the predominant use of this energy source in households is responsible for the significant contribution that the sector makes to FED. First of all, fuelwood is used in a manner that is not energy efficient in the majority of households because they cannot afford energy-efficient equipment. Hence, more energy is used to cook the same pot of food when using fuelwood than is used when using other more efficiently combusted energy sources like LPG or electricity. Secondly, the energy source is considered 'cost-free' and hence it is never used as economically as its commercial counterparts, except where family labour for its collection is limited, or due to its depletion in the vicinity of the settlement. Another factor at play here is the rural-to-urban migration. First, there has been a decline in the proportion of the country's population that live in rural areas due to the rural-to-urban migration, resulting in a decline in the use of fuelwood as more people have found jobs and therefore, with the

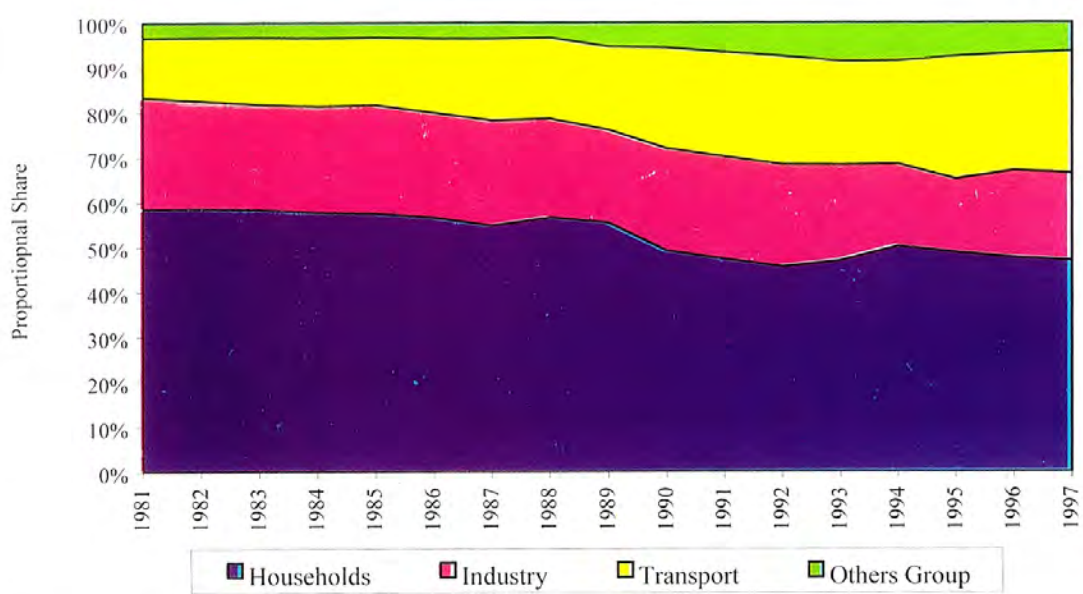
increased income, can afford more convenient commercial substitutes of wood like paraffin and LPG. Second, energy being the backbone of all production processes, there has been an increase in commercial energy consumption in the mining, manufacturing and transport sectors corresponding to growth in the activities/production of the sectors. These factors have contributed to more use of commercial energy than was the situation in the 1980s.

The contribution of the transport sector to FED rose from 13.3 percent in 1981 to 27.2 percent in 1997 (Tables 7.2 and 7.4). The principal energy sources used in the sector are petrol and diesel. The dominance of this sector is not surprising because transportation is essential to life and economic development. Given the rural to urban migration patterns that have been observed in Botswana over the past two decades, and the expansion of urban settlements, there is a resulting need to commute to and from work over longer distances and for increasingly more people and therefore a greater number of transport trips. These factors have led to more fuel consumption.

The contribution of the industry sector declined from 24.9 percent in 1981 to 19.4 percent in 1997 (Tables 7.2 and 7.4). The main energy sources consumed under this sector are electricity, coal, diesel and others. Total energy used in the industry increased, however, indicating an expansion of industrial activities. The decline can be attributed, therefore, to the higher rates of growth of the other energy sources that are being used in the economy.

The total energy used in the three sectors (Households, Industry and Transport) accounted for over 90 percent of the annual FED

Figure 2.7 Share of Economic Sectors in Final Energy Consumption (FEC)



Source: Derived from Table 7.2

2.7 Coal Depletion Rates

Coal is the only locally produced commercial energy source in Botswana. Furthermore, the public-supply thermal power plants used in electricity generation are coal-fired. The plants contribute at least 80 percent of the locally produced electricity, and at least 43 percent of the net electricity supply in the country, in any one year. Consequently, the importance of coal resources to energy self-sufficiency and to a steady and reliable supply of electricity in the country cannot be over-emphasised. With energy being the backbone of economic development, it is expected that along with environmentalists, economic planners/policy makers in Botswana should also be concerned about the depletion rates of coal.

Depletion rates of the measured stock of coal reserves have been calculated from the historical consumption pattern for the years 1975 to 2001 and are presented in Table 8.1. The consumption for the years 1973 and 1974 has not been used to determine consumption forecasts. An attempt has been made in the same table to establish a relationship between coal consumption and available coal stocks so as to estimate the life span of the proven coal reserves.

The Depletion Index (DI) in Table 8.1 (Column d) gives the proportion of initial reserves that would have been mined by the end of the year in question. Column d therefore shows the rate at which coal is being depleted. We observe that although coal mining started in 1973, accumulated production was at less than 1 percent of the original proven reserves by the end of 2001 (twenty nine years later; latest available data is on 2001). Using the method of least squares, production was forecast for the years 2002 onwards, assuming that there are no new discoveries and that future production will follow the trend observed up to 2001. The Depletion Index estimations (Column d) show that the percentage of the original proven reserves that would have been mined will be less than 4 percent half way into the present century, (year 2050); less than 8 percent at the end of the century, (year 2100); and about 82 percent four centuries from now (year 2400).

The Life Index (Column e, Table 8.1) of Botswana's proven coal reserves is the lifetime in years of the remaining proven coal reserves at the end of a given year. It is the ratio of the remaining coal reserves at the end of a given year to the production of the coal during that year. It is calculated without taking into account the possibility of future changes in the production trend. The life index is therefore the time in years that the remaining reserves would last if production were to continue at the level observed during the year under consideration.

Using the foregoing assumptions, Table 8.1 has been derived and it is estimated that the proven reserves will be exhausted during the course of 2446 (i.e. last through more than four centuries of exploitation). This conclusion is obvious from the negative values arrived at for both Remaining Reserves and Life Index for the year 2446, and which follow positive values in the previous year. Furthermore, the greater-than-100 percent value for the Depletion Index (value of 100.291 percent), and the greater-than-the-initial reserves value of the accumulated production for the year 2446, both indicate that additional reserves would be

needed for production to be maintained at the assumed rate that is based on the historical trend.

In future, the rate of coal consumption may change and hence modify the rate of depletion of the coal reserves that was observed up to 2001, and on which this analysis is based, as a result of the following.

- The introduction of clean coal technologies may encourage more utilization of coal, especially at the household level.
- An increase in the cost of petroleum products may also influence more consumers to switch to coal.
- With the inevitable increase in fuelwood scarcity, coal may increasingly become its substitute, especially in low-income households.
- The consumption of coal may also decrease due to international pressure to reduce greenhouse gas emissions from fossil fuel combustion.

However, it should be noted that there are other coal reserves ('indicated' and 'inferred') in the country that have not been taken into consideration in this analysis.

Table 2.1 Primary Energy Supply (Original Units), 1981 - 1997

Year	Coal kt	LPG t	AvGas kl	Jet A kl	Petrol kl	Paraffin kl	Diesel kl	Fuel Oil kl	Lubes kl	Electricity GWh	Wood kt	Solar TJ	Other RE TJ
1981	403	2,100	1,730	1,750	52,194	3,173	93,196	3,022	3,628	10	966	2	0
1982	435	1,780	1,652	2,000	59,427	3,894	102,329	1,230	4,080	82	999	5	0
1983	425	2,040	1,569	1,898	64,342	3,844	98,956	610	3,971	160	1,033	9	0
1984	420	2,270	1,792	2,275	74,153	4,315	95,956	455	3,770	186	1,068	12	0
1985	466	3,030	1,909	2,896	85,521	4,460	87,815	320	3,688	223	1,105	16	0
1986	522	3,880	2,200	3,272	96,984	6,631	110,918	466	4,210	240	1,143	16	0
1987	532	4,950	2,560	3,808	115,379	7,484	108,365	470	4,670	72	1,113	19	0
1988	638	5,980	2,500	9,200	124,830	9,125	116,070	3,500	5,000	55	1,289	20	0
1989	699	6,969	2,852	8,852	144,715	11,011	135,000	3,600	5,808	60	1,323	18	1
1990	827	8,017	2,521	14,260	169,769	12,059	160,001	3,600	6,357	84	1,101	21	1
1991	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	939	7,606	3,094	9,693	223,103	13,423	187,467	62,223	6,583	138	1,265	34	1
1993	900	5,260	1,723	5,398	239,258	10,378	172,315	56,333	7,238	166	1,313	34	1
1994	913	13,734	2,000	5,781	237,638	19,973	157,253	2,737	5,975	293	1,339	35	1
1995	912	10,612	3,063	7,773	260,855	20,962	177,864	4,108	6,633	334	1,323	21	1
1996	777	12,032	3,087	6,730	266,192	23,046	182,221	4,335	8,634	691	1,315	21	1
1997	799	16,138	3,087	7,414	281,091	23,137	207,148	6,043	7,146	818	1,341	21	1

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs

Table 2.2 Primary Energy Supply (Terajoules), 1981 - 1997

Year	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity	Wood	Solar	Other RE	Total
1981	9,674	95	57	61	1,702	111	3,355	116	132	36	15,456	2	0	30,799
1982	10,442	81	55	70	1,937	137	3,684	47	149	295	15,984	5	0	32,886
1983	10,198	93	52	66	2,098	135	3,562	23	145	576	16,528	9	0	33,485
1984	10,082	103	59	79	2,417	151	3,454	18	138	670	17,088	12	0	34,272
1985	11,186	138	63	101	2,788	157	3,161	12	135	803	17,680	16	0	36,240
1986	12,516	176	73	114	3,162	233	3,993	18	154	864	18,288	16	0	39,606
1987	12,768	225	85	133	3,761	263	3,901	18	170	259	17,808	19	0	39,410
1988	15,314	271	83	321	4,069	320	4,179	135	183	198	20,624	20	0	45,717
1989	16,767	316	94	309	4,718	386	4,860	139	212	216	21,168	18	1	49,205
1990	19,853	364	83	498	5,534	423	5,760	139	232	302	17,616	21	1	50,827
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	22,536	345	102	338	7,273	471	6,749	2,396	240	497	20,240	34	1	61,223
1993	21,600	239	57	188	7,800	364	6,203	2,169	264	598	21,008	34	1	60,525
1994	21,912	624	66	202	7,747	701	5,661	105	218	1,055	21,424	35	1	59,751
1995	21,888	482	101	271	8,504	736	6,403	158	242	1,202	21,168	21	1	61,178
1996	18,654	546	102	235	8,678	809	6,560	167	315	2,488	21,040	21	1	59,615
1997	19,176	733	102	259	9,164	812	7,457	233	261	2,945	21,456	21	1	62,619

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 2.3 Primary Energy supply (Percentages)

Year	Coal kt	LPG t	AvGas kl	Jet A kl	Petrol kl	Paraffin kl	Diesel kl	Fuel Oil kl	Lubes kl	Electricity GWh	Wood kt	Solar TJ	Other RE TJ	Total
1981	31.4	0.3	0.2	0.2	5.5	0.4	10.9	0.4	0.4	0.1	50.2	0.0	0.0	100
1982	31.8	0.2	0.2	0.2	5.9	0.4	11.2	0.1	0.5	0.9	48.6	0.0	0.0	100
1983	30.5	0.3	0.2	0.2	6.3	0.4	10.6	0.1	0.4	1.7	49.4	0.0	0.0	100
1984	29.4	0.3	0.2	0.2	7.1	0.4	10.1	0.1	0.4	2.0	49.9	0.0	0.0	100
1985	30.9	0.4	0.2	0.3	7.7	0.4	8.7	0.0	0.4	2.2	48.8	0.0	0.0	100
1986	31.6	0.4	0.2	0.3	8.0	0.6	10.1	0.0	0.4	2.2	46.2	0.0	0.0	100
1987	32.4	0.6	0.2	0.3	9.5	0.7	9.9	0.0	0.4	0.7	45.2	0.0	0.0	100
1988	33.5	0.6	0.2	0.7	8.9	0.7	9.1	0.3	0.4	0.4	45.1	0.0	0.0	100
1989	34.1	0.6	0.2	0.6	9.6	0.8	9.9	0.3	0.4	0.4	43.0	0.0	0.0	100
1990	39.1	0.7	0.2	1.0	10.9	0.8	11.3	0.3	0.5	0.6	34.7	0.0	0.0	100
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	36.8	0.6	0.2	0.6	11.9	0.8	11.0	3.9	0.4	0.8	33.1	0.1	0.0	100
1993	35.7	0.4	0.1	0.3	12.9	0.6	10.2	3.6	0.4	1.0	34.7	0.1	0.0	100
1994	36.7	1.0	0.1	0.3	13.0	1.2	9.5	0.2	0.4	1.8	35.9	0.1	0.0	100
1995	35.8	0.8	0.2	0.4	13.9	1.2	10.5	0.3	0.4	2.0	34.6	0.0	0.0	100
1996	31.3	0.9	0.2	0.4	14.6	1.4	11.0	0.3	0.5	4.2	35.3	0.0	0.0	100
1997	30.6	1.2	0.2	0.4	14.6	1.3	11.9	0.4	0.4	4.7	34.3	0.0	0.0	100

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 3.1 Primary Energy Production, 1981-1997 (Original Units)

Year	Primary Production				Imports									
	Coal	Wood	Solar	Other RE	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity
	kt	kt	TJ	TJ	kt	t	kl	kl	kl	kl	kl	kl	kl	GWh
1981	381	966	2	0	22	2,100	1,730	1,750	52,194	3,173	93,196	3,022	3,628	10
1982	415	999	5	0	20	1,780	1,652	2,000	59,427	3,894	102,329	1,230	4,080	82
1983	395	1,033	9	0	30	2,040	1,569	1,898	64,342	3,844	98,956	610	3,971	160
1984	393	1,068	12	0	27	2,270	1,792	2,275	74,153	4,315	95,956	455	3,770	186
1985	437	1,105	16	0	29	3,030	1,909	2,896	85,521	4,460	87,815	320	3,688	223
1986	490	1,143	16	0	32	3,880	2,200	3,272	96,984	6,631	110,918	466	4,210	240
1987	487	1,113	19	0	45	4,950	2,560	3,808	115,379	7,484	108,365	470	4,670	72
1988	609	1,289	20	0	21	5,980	2,500	9,200	124,830	9,125	116,070	3,500	5,000	55
1989	663	1,323	18	1	16	6,969	2,852	8,852	144,715	11,011	135,000	3,600	5,808	60
1990	794	1,101	21	1	21	8,017	2,521	14,260	169,769	12,059	160,001	3,600	6,357	84
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	196
1992	903	1,265	34	1	9	7,606	3,094	9,693	223,103	13,423	187,467	62,223	6,583	138
1993	890	1,313	34	1	10	5,260	1,723	5,398	239,258	10,378	172,315	56,333	7,238	166
1994	900	1,339	35	1	11	13,734	2,000	5,781	237,638	19,973	157,253	2,737	5,975	293
1995	898	1,323	21	1	14	10,612	3,063	7,773	260,855	20,962	177,864	4,108	6,633	334
1996	763	1,315	21	1	15	12,032	3,087	6,730	266,192	23,046	182,221	4,335	8,634	691
1997	779	1,341	21	1	20	16,138	3,087	7,414	281,091	23,137	207,148	6,043	7,146	818

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 3.2 Primary Energy Production Compared to Imports 1981-1997 (Terajoules)

Year	Primary Production					Imports											Grand Total
	Coal	Wood	Solar	Other RE	Sub-total	Coal	LPG	AvGas	Jet A	Petrol	Para-ffin	Diesel	Fuel Oil	Lubes	Elect-ricity	Sub total	
1981	9,137	15,456	2	0	24,595	528	95	57	61	1,702	111	3,355	1,163	132	36	7,242	31,836
1982	9,955	15,984	5	0	25,945	480	81	55	70	1,937	137	3,684	474	149	295	7,361	33,305
1983	9,482	16,528	9	0	26,019	720	93	52	66	2,098	135	3,562	235	145	576	7,681	33,701
1984	9,430	17,088	12	0	26,530	648	103	59	79	2,417	151	3,454	175	138	670	7,895	34,425
1985	10,490	17,680	16	0	28,186	696	138	63	101	2,788	157	3,161	123	135	803	8,164	36,350
1986	11,748	18,288	16	0	30,052	768	176	73	114	3,162	233	3,993	179	154	864	9,716	39,768
1987	11,688	17,808	19	0	29,515	1080	225	85	133	3,761	263	3,901	181	170	259	10,058	39,573
1988	14,618	20,624	20	0	35,262	511	271	83	321	4,069	320	4,179	1,348	183	198	11,483	46,745
1989	15,913	21,168	18	1	37,100	382	316	94	309	4,718	386	4,860	1,386	212	216	12,880	49,980
1990	19,056	17,616	21	1	36,694	511	364	83	498	5,534	423	5,760	1,386	232	302	15,095	51,789
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	21,672	20,240	34	1	41,947	218	345	102	338	7,273	471	6,749	23,956	240	497	40,190	82,137
1993	21,360	21,008	34	1	42,403	247	239	57	188	7,800	364	6,203	21,688	264	598	37,649	80,052
1994	21,600	21,424	35	1	43,060	262	624	66	202	7,747	701	5,661	1,054	218	1,055	17,589	60,649
1995	21,552	21,168	21	1	42,742	336	482	101	271	8,504	736	6,403	1,582	242	1,202	19,859	62,601
1996	18,318	21,040	21	1	39,380	348	546	102	235	8,678	809	6,560	1,669	315	2,488	21,750	61,130
1997	18,696	21,456	21	1	40,174	490	733	102	259	9,164	812	7,457	2,327	261	2,945	24,548	64,722

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs

Table 3.3 Primary Energy Production Compared to Imports 1981-1997 (Percentages)

Year	Local Production						Imports											Grand Total
	Coal	Wood	Electr-icity	Solar	Other RE	Sub-total	Coal	LPG	Av-Gas	Jet A	Petrol	Para-ffin	Diesel	Fuel Oil	Lubes	Electr. icity	Sub total	
1981	28.7	48.5	0.0	0.0	0.0	77.3	1.7	0.3	0.2	0.2	5.3	0.3	10.5	3.7	0.4	0.1	22.7	100.0
1982	29.9	48.0	0.0	0.0	0.0	77.9	1.5	0.2	0.2	0.2	5.8	0.4	11.1	1.4	0.4	0.9	22.1	100.0
1983	28.1	49.0	0.0	0.0	0.0	77.2	2.3	0.3	0.2	0.2	6.2	0.4	10.6	0.7	0.4	1.7	22.8	100.0
1984	27.4	49.6	0.0	0.0	0.0	77.1	2.0	0.3	0.2	0.2	7.0	0.4	10.0	0.5	0.4	1.9	22.9	100.0
1985	28.9	48.6	0.0	0.0	0.0	77.5	2.2	0.4	0.2	0.3	7.7	0.4	8.7	0.3	0.4	2.2	22.5	100.0
1986	29.5	46.0	0.0	0.0	0.0	75.6	2.4	0.4	0.2	0.3	8.0	0.6	10.0	0.5	0.4	2.2	24.4	100.0
1987	29.5	45.0	0.0	0.0	0.0	74.6	3.4	0.6	0.2	0.3	9.5	0.7	9.9	0.5	0.4	0.7	25.4	100.0
1988	31.3	44.1	0.0	0.0	0.0	75.4	1.6	0.6	0.2	0.7	8.7	0.7	8.9	2.9	0.4	0.4	24.6	100.0
1989	31.8	42.4	0.0	0.0	0.0	74.2	1.2	0.6	0.2	0.6	9.4	0.8	9.7	2.8	0.4	0.4	25.8	100.0
1990	36.8	34.0	0.0	0.0	0.0	70.9	1.6	0.7	0.2	1.0	10.7	0.8	11.1	2.7	0.4	0.6	29.1	100.0
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	26.4	24.6	0.0	0.0	0.0	51.1	0.7	0.4	0.1	0.4	8.9	0.6	8.2	29.2	0.3	0.6	48.9	100.0
1993	26.7	26.2	0.0	0.0	0.0	53.0	0.8	0.3	0.1	0.2	9.7	0.5	7.7	27.1	0.3	0.7	47.0	100.0
1994	35.6	35.3	0.0	0.1	0.0	71.0	0.8	1.0	0.1	0.3	12.8	1.2	9.3	1.7	0.4	1.7	29.0	100.0
1995	34.4	33.8	0.0	0.0	0.0	68.3	1.1	0.8	0.2	0.4	13.6	1.2	10.2	2.5	0.4	1.9	31.7	100.0
1996	30.0	34.4	0.0	0.0	0.0	64.4	1.1	0.9	0.2	0.4	14.2	1.3	10.7	2.7	0.5	4.1	35.6	100.0
1997	28.9	33.2	0.0	0.0	0.0	62.1	1.5	1.1	0.2	0.4	14.2	1.3	11.5	3.6	0.4	4.5	37.9	100.0

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 4.1 Net Energy Supply (Original Units), 1981 - 1997

Year	Coal kt	LPG t	AvGas kl	Jet A kl	Petrol kl	Paraffin kl	Diesel kl	Fuel Oil kl	Lubes kl	Electricity GWh	Wood kt	Solar TJ	Other RE TJ
1981	135	2,100	1,730	1,750	52,194	3,173	70,690	461	3,579	546	966	2	0
1982	168	1,780	1,652	2,000	59,383	3,894	77,021	582	4,011	604	999	5	0
1983	179	2,040	1,569	1,898	64,293	3,844	77,770	565	3,922	622	1,033	9	0
1984	185	2,266	1,792	2,275	74,101	4,315	77,314	311	3,716	661	1,068	12	0
1985	205	2,993	1,909	2,896	85,469	4,460	79,891	213	3,636	709	1,105	16	0
1986	241	3,880	2,200	3,272	96,932	6,631	97,564	359	4,158	837	1,143	16	0
1987	224	4,950	2,560	3,808	115,327	7,484	92,971	363	4,618	978	1,113	19	0
1988	210	5,980	2,500	9,200	124,778	9,125	101,668	1,000	4,650	863	1,289	20	0
1989	189	6,969	2,852	8,852	144,715	11,011	124,238	750	5,485	908	1,323	18	1
1990	318	8,017	2,521	14,260	169,769	12,059	149,238	750	6,034	990	1,101	21	1
1991	..	..	..	..	...	..	..	..	..	..	..	..	..
1992	185	7,606	3,094	9,693	223,103	13,423	175,205	59,736	6,215	1,262	1,265	34	1
1993	181	5,260	1,723	5,398	239,258	10,378	160,449	53,931	6,882	1,290	1,313	34	1
1994	181	13,734	2,000	5,781	237,638	19,973	149,098	1,355	5,730	1,381	1,339	35	1
1995	138	10,612	3,063	7,773	260,855	20,962	169,623	2,806	6,392	1,375	1,323	21	1
1996	199	12,032	3,087	6,730	266,192	23,046	174,060	2,965	8,383	1,449	1,315	21	1
1997	180	16,138	3,087	7,414	281,091	23,137	198,987	4,433	6,895	1,585	1,341	21	1

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 4.2 Net Energy Supply (Terajoules), 1981 - 1997

Year	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity	Wood	Solar	Other RE	Total
1981	3,228	95	57	61	1,702	111	2,545	18	131	1,966	15,456	2	0	25,371
1982	4,030	81	55	70	1,936	137	2,773	22	146	2,174	15,984	5	0	27,413
1983	4,303	93	52	66	2,096	135	2,800	22	143	2,239	16,528	9	0	28,486
1984	4,428	103	59	79	2,416	151	2,783	12	136	2,380	17,088	12	0	29,648
1985	4,913	136	63	101	2,786	157	2,876	8	133	2,552	17,680	16	0	31,421
1986	5,782	176	73	114	3,160	233	3,512	14	152	3,013	18,288	16	0	34,532
1987	5,386	225	85	133	3,760	263	3,347	14	169	3,521	17,808	19	0	34,728
1988	5,042	271	83	321	4,068	320	3,660	39	170	3,107	20,624	20	0	37,725
1989	4,547	316	94	309	4,718	386	4,473	29	200	3,269	21,168	18	1	39,529
1990	7,633	364	83	498	5,534	423	5,373	29	220	3,564	17,616	21	1	41,360
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	4,440	345	102	338	7,273	471	6,307	2,300	227	4,543	20,240	34	1	46,623
1993	4,344	239	57	188	7,800	364	5,776	2,076	251	4,543	21,008	34	1	46,682
1994	4,344	624	66	202	7,747	701	5,368	52	209	4,644	21,424	35	1	45,416
1995	3,322	482	101	271	8,504	736	6,106	108	233	4,972	21,168	21	1	46,025
1996	4,782	546	102	235	8,678	809	6,266	114	306	4,950	21,040	21	1	47,850
1997	4,320	733	102	259	9,164	812	7,164	171	252	5,216	21,456	21	1	49,670

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 4.3 Net Energy Supply (Percentages), 1981 - 1997

Year	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity	Wood	Solar	Other RE	Total
1981	12.7	0.4	0.2	0.2	6.7	0.4	10.0	0.1	0.5	7.7	60.9	0.0	0.0	100.0
1982	14.7	0.3	0.2	0.3	7.1	0.5	10.1	0.1	0.5	7.9	58.3	0.0	0.0	100.0
1983	15.1	0.3	0.2	0.2	7.4	0.5	9.8	0.1	0.5	7.9	58.0	0.0	0.0	100.0
1984	14.9	0.3	0.2	0.3	8.1	0.5	9.4	0.0	0.5	8.0	57.6	0.0	0.0	100.0
1985	15.6	0.4	0.2	0.3	8.9	0.5	9.2	0.0	0.4	8.1	56.3	0.1	0.0	100.0
1986	16.7	0.5	0.2	0.3	9.2	0.7	10.2	0.0	0.4	8.7	53.0	0.0	0.0	100.0
1987	15.5	0.6	0.2	0.4	10.8	0.8	9.6	0.0	0.5	10.1	51.3	0.1	0.0	100.0
1988	13.4	0.7	0.2	0.9	10.8	0.8	9.7	0.1	0.4	8.2	54.7	0.1	0.0	100.0
1989	11.5	0.8	0.2	0.8	11.9	1.0	11.3	0.1	0.5	8.3	53.6	0.0	0.0	100.0
1990	18.5	0.9	0.2	1.2	13.4	1.0	13.0	0.1	0.5	8.6	42.6	0.1	0.0	100.0
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	9.5	0.7	0.2	0.7	15.6	1.0	13.5	4.9	0.5	9.7	43.4	0.1	0.0	100.0
1993	9.3	0.5	0.1	0.4	16.7	0.8	12.4	4.4	0.5	9.7	45.0	0.1	0.0	100.0
1994	9.6	1.4	0.1	0.4	17.1	1.5	11.8	0.1	0.5	10.2	47.2	0.1	0.0	100.0
1995	7.2	1.0	0.2	0.6	18.5	1.6	13.3	0.2	0.5	10.8	46.0	0.0	0.0	100.0
1996	10.0	1.1	0.2	0.5	18.1	1.7	13.1	0.2	0.6	10.3	44.0	0.0	0.0	100.0
1997	8.7	1.5	0.2	0.5	18.4	1.6	14.4	0.3	0.5	10.5	43.2	0.0	0.0	100.0

.. *Data unavailable*

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 5.1: Net Electricity Supply (GWh), 1979 - 1998

Year	Net Electricity Supply (GWh)*						
	Public Supply			Private Generation			Total Public and Private
	BPC1	Imports	Sub-Total	BMC2	Botash3	Sub-Total	
1979	396	..	396	75	..	75	471
1980	387	..	387	86	..	86	473
1981	429	10	439	107	..	107	546
1982	426	82	508	96	..	96	604
1983	395	160	554	68	..	68	622
1984	412	186	598	63	..	63	661
1985	457	223	680	22	8	29	709
1986	575	240	815	10	12	22	837
1987	891	72	963	8	7	15	978
1988	802	55	857	6	..	6	863
1989	845	60	905	3	..	3	908
1990	906	84	990	-	..	-	990
1991	900	196	1,096	-	35	35	1,131
1992	1,052	138	1,190	-	72	72	1,262
1993	1,046	166	1,212	-	78	78	1,290
1994	988	293	1,281	-	100	100	1,381
1995	944	334	1,278	-	97	97	1,375
1996	675	691	1,366	-	82	82	1,449
1997	681	818	1,499	-	86	86	1,585
1998	905	703	1,608	-	95	95	1,704

** This excludes unavailable data on generation from diesel engines for the following purposes:*

(i) Generation for own use in businesses or households that does not fall under BMC/BOTASH

(ii) Public generation in educational, health and other Government institutions/offices which are in locations around the country that are not connected to the National Grid.

1: Generation by Botswana Power Corporation for public use

2: Generation by the Botswana Meat Commission for own use

3: Generation by Botswana Ash (Pty) for own use

Table 5.2: Net Electricity Supply (Terajoules), 1979 - 1998

Year	Net Electricity Supply (TJ)*						
	Public Supply			Private Generation			Total Public
	BPC[1]	Imports	Sub-Total	BMC[2]	Botash[3]	Sub-Total	and Private
1979	1,426	..	1,426	269	..	269	1,696
1980	1,393	..	1,393	311	..	311	1,704
1981	1,544	36	1,580	384	..	384	1,964
1982	1,533	295	1,828	345	..	345	2,173
1983	1,421	575	1,995	244	..	244	2,240
1984	1,484	668	2,153	225	..	225	2,378
1985	1,645	801	2,446	78	28	106	2,552
1986	2,071	863	2,934	36	42	78	3,012
1987	3,207	259	3,466	28	27	55	3,521
1988	2,886	198	3,084	22	..	22	3,106
1989	3,044	215	3,259	11	..	11	3,270
1990	3,260	303	3,564	-	..	-	3,564
1991	3,239	705	3,944	-	126	126	4,070
1992	3,787	498	4,285	-	258	258	4,544
1993	3,765	599	4,364	-	281	281	4,645
1994	3,557	1,054	4,611	-	360	360	4,971
1995	3,398	1,204	4,601	-	349	349	4,950
1996	2,431	2,488	4,919	-	296	296	5,215
1997	2,451	2,946	5,397	-	309	309	5,706
1998	3,258	2,532	5,790	-	343	343	6,133

** This excludes unavailable data on generation from diesel engines for the following purposes:*
(i) Private Generation for businesses or domestic that is not reported and
(ii) Public Generation in educational, health and other Government institutions/offices that are in locations around the country that are not connected to the National Grid.
1: Generation by Botswana Power Corporation for public use
2: Generation by the Botswana Meat Commission for own use
3: Generation by Botswana Ash (Pty) for own use

Table 5.3: Net Electricity Supply (Percentages), 1979 – 1998

Year	Net Electricity Supply (Percentages)*						
	Public Supply			Private Generation			Total Public
	BPC[1]	Imports	Sub-Total	BMC[2]	Botash[3]	Sub-Total	and Private
1979	84.1	..	84.1	15.9	..	15.9	100
1980	81.7	..	81.7	18.3	..	18.3	100
1981	78.6	1.8	80.4	19.6	..	19.6	100
1982	70.6	13.6	84.1	15.9	..	15.9	100
1983	63.4	25.7	89.1	10.9	..	10.9	100
1984	62.4	28.1	90.5	9.5	..	9.5	100
1985	64.5	31.4	95.8	3.1	1.1	4.2	100
1986	68.8	28.7	97.4	1.2	1.4	2.6	100
1987	91.1	7.4	98.4	0.8	0.8	1.6	100
1988	92.9	6.4	99.3	0.7	..	0.7	100
1989	93.1	6.6	99.7	0.3	..	0.3	100
1990	91.5	8.5	100.0	-	..	-	100
1991	79.6	17.3	96.9	-	3.1	3.1	100
1992	83.4	11.0	94.3	-	5.7	5.7	100
1993	81.1	12.9	93.9	-	6.1	6.1	100
1994	71.6	21.2	92.8	-	7.2	7.2	100
1995	68.6	24.3	93.0	-	7.0	7.0	100
1996	46.6	47.7	94.3	-	5.7	5.7	100
1997	43.0	51.6	94.6	-	5.4	5.4	100
1998	53.1	41.3	94.4	-	5.6	5.6	100

** This excludes unavailable data on generation from diesel engines for the following purposes:*

(i) Private Generation for businesses or domestic that is not reported and

(ii) Public Generation in educational, health and other Government institutions/offices that are in locations around the country that

are not connected to the National Grid.

1: Generation by Botswana Power Corporation for public use

2: Generation by the Botswana Meat Commission for own use

3: Generation by Botswana Ash (Pty) for own use

Table 6.1 Final Energy Demand (Original Units) by Energy Source, 1981 - 1997

Year	Coal kt	LPG t	AvGas kl	Jet A kl	Petrol kl	Paraffin kl	Diesel kl	Fuel Oil kl	Lubes kl	Electricity GWh	Wood kt	Solar TJ	Other RE TJ
1981	177	1,885	1,691	1,578	53,496	4,045	76,241	833	3,077	507	966	2	0
1982	172	2,099	1,682	1,628	60,680	4,110	76,851	615	3,339	566	999	5	0
1983	173	2,513	1,553	1,712	68,551	4,162	78,780	610	3,068	607	1,033	9	0
1984	192	2,857	1,783	2,126	77,034	4,210	79,095	262	2,999	612	1,068	12	0
1985	206	3,221	1,893	2,523	84,846	4,263	81,200	245	3,253	620	1,105	16	0
1986	206	3,612	2,200	3,278	96,976	6,377	94,224	245	3,328	647	1,143	16	0
1987	206	4514	2,560	3,810	114,820	6,913	93,700	245	3,889	670	1,113	16	0
1988	218	6,228	2,514	9,216	124,874	9,087	102,164	823	3,670	740	1,289	16	0
1989	209	10,222	2,852	8,852	144,715	11,817	124,238	4,128	5,485	753	1,323	18	1
1990	186	11,132	2,521	14,260	169,769	12,701	149,238	5,262	6,034	795	1,101	21	1
1991	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	186	11,687	3,094	9,693	223,102	13,290	175,206	62,200	6,215	986	1,265	34	1
1993	181	12,232	1,722	5,398	239,257	13,960	160,448	53,931	6,883	1,044	1,313	34	1
1994	181	13,162	2,000	5,781	237,638	14,593	149,098	1,355	5,731	1,215	1,339	35	1
1995	138	11,525	3,063	7,773	260,855	13,945	169,623	2,806	6,392	1,263	1,323	21	1
1996	199	12,118	3,087	6,730	266,192	13,974	174,060	2,965	8,383	1,415	1,315	21	1
1997	180	12,484	3,087	7,414	281,091	14,392	198,987	4,433	6,895	1,491	1,341	21	1

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 6.2 Final Energy Demand (Terajoules) by Energy Source, 1981 - 1997

Year	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity	Wood	Solar	Other RE	Total
1981	4,241	86	56	55	1,744	142	2,745	32	112	1,826	15,456	2	-	26,497
1982	4,135	95	56	57	1,978	144	2,767	24	122	2,038	15,984	5	-	27,405
1983	4,162	114	51	60	2,235	146	2,836	23	112	2,187	16,528	9	-	28,463
1984	4,613	130	59	74	2,511	148	2,847	10	109	2,205	17,088	12	-	29,807
1985	4,949	146	63	88	2,766	150	2,923	9	119	2,233	17,680	16	-	31,142
1986	4,949	164	73	114	3,161	224	3,392	9	121	2,330	18,288	16	-	32,842
1987	4,949	205	85	133	3,743	243	3,373	9	142	2,411	17,808	16	-	33,116
1988	5,224	283	83	322	4,071	319	3,678	32	134	2,664	20,624	16	-	37,449
1989	5,023	464	94	309	4,718	415	4,473	159	200	2,711	21,168	18	1	39,752
1990	4,460	505	83	498	5,534	446	5,373	203	220	2,862	17,616	21	1	37,823
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	4,452	531	102	338	7,273	466	6,307	2,395	227	3,549	20,240	34	1	45,915
1993	4,344	555	57	188	7,800	490	5,776	2,076	251	3,758	21,008	34	1	46,340
1994	4,344	598	66	202	7,747	512	5,368	52	209	4,374	21,424	35	1	44,932
1995	3,322	523	101	271	8,504	489	6,106	108	233	4,546	21,168	21	1	45,395
1996	4,786	550	102	235	8,678	490	6,266	114	306	5,094	21,040	21	1	47,684
1997	4,325	567	102	259	9,164	505	7,164	171	252	5,369	21,456	21	1	49,354

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 6.3 Final Energy Demand (Percentages) by Energy Source, 1981 - 1997

Year	Coal	LPG	AvGas	Jet A	Petrol	Paraffin	Diesel	Fuel Oil	Lubes	Electricity	Wood	Solar	Other RE	Total
1981	16.0	0.3	0.2	0.2	6.6	0.5	10.4	0.1	0.4	6.9	58.3	0.0	0.0	100
1982	15.1	0.3	0.2	0.2	7.2	0.5	10.1	0.1	0.4	7.4	58.3	0.0	0.0	100
1983	14.6	0.4	0.2	0.2	7.9	0.5	10.0	0.1	0.4	7.7	58.1	0.0	0.0	100
1984	15.5	0.4	0.2	0.2	8.4	0.5	9.6	0.0	0.4	7.4	57.3	0.0	0.0	100
1985	15.9	0.5	0.2	0.3	8.9	0.5	9.4	0.0	0.4	7.2	56.8	0.1	0.0	100
1986	15.1	0.5	0.2	0.3	9.6	0.7	10.3	0.0	0.4	7.1	55.7	0.0	0.0	100
1987	14.9	0.6	0.3	0.4	11.3	0.7	10.2	0.0	0.4	7.3	53.8	0.0	0.0	100
1988	14.0	0.8	0.2	0.9	10.9	0.9	9.8	0.1	0.4	7.1	55.1	0.0	0.0	100
1989	12.6	1.2	0.2	0.8	11.9	1.0	11.3	0.4	0.5	6.8	53.3	0.0	0.0	100
1990	11.8	1.3	0.2	1.3	14.6	1.2	14.2	0.5	0.6	7.6	46.6	0.1	0.0	100
1991	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1992	9.7	1.2	0.2	0.7	15.8	1.0	13.7	5.2	0.5	7.7	44.1	0.1	0.0	100
1993	9.4	1.2	0.1	0.4	16.8	1.1	12.5	4.5	0.5	8.1	45.3	0.1	0.0	100
1994	9.7	1.3	0.1	0.4	17.2	1.1	11.9	0.1	0.5	9.7	47.7	0.1	0.0	100
1995	7.3	1.2	0.2	0.6	18.7	1.1	13.5	0.2	0.5	10.0	46.6	0.0	0.0	100
1996	10.0	1.2	0.2	0.5	18.2	1.0	13.1	0.2	0.6	10.7	44.1	0.0	0.0	100
1997	8.8	1.1	0.2	0.5	18.6	1.0	14.5	0.3	0.5	10.9	43.5	0.0	0.0	100

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.1: Final Energy Consumption by Sector (TJ)

Year	Households				Agriculture			Industry				
	LPG & PFN	Wood	Other	Sub-total	Diesel	Other	Sub-total	Coal	Diesel	Electricity	Others	Sub-total
1981	156	15,223	109	15,488	286	2	288	4,217	674	1,522	176	6,590
1982	167	15,756	122	16,045	289	2	291	4,114	604	1,708	181	6,607
1983	183	16,307	136	16,626	264	2	266	4,138	523	1,828	165	6,654
1984	199	16,878	155	17,232	340	3	343	4,589	481	1,812	154	7,036
1985	225	17,469	219	17,912	336	3	338	4,874	654	1,809	181	7,518
1986	307	18,080	219	18,606	424	3	426	4,874	722	1,906	183	7,685
1987	352	17,600	219	18,171	349	3	352	4,874	811	1,863	209	7,757
1988	500	20,416	275	21,191	365	3	367	5,150	893	2,037	197	8,276
1989	762	20,960	313	22,035	450	38	488	4,889	1,014	2,033	308	8,244
1990	831	17,402	346	18,578	450	38	488	4,323	1,147	2,159	1,005	8,633
1991	..	..	..	..	..	..	..	..	..	..	..	..
1992	877	19,677	466	21,020	475	53	528	4,289	1,323	2,277	2,627	10,517
1993	928	20,288	517	21,733	475	53	528	4,128	1,253	2,218	2,342	9,941
1994	982	20,944	608	22,534	475	53	528	4,080	1,305	2,592	253	8,229
1995	951	20,527	648	22,126	475	46	521	3,111	1,380	2,657	304	7,451
1996	985	21,039	694	22,719	475	46	521	4,466	1,582	2,819	379	9,246
1997	1,019	21,454	755	23,229	475	46	521	4,153	2,001	3,003	431	9,587

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.1: Final Energy Consumption by Sector (TJ, Continued)

Year	Trade & Hotels				Transport					Social & Private Services.		
	Electricity	Wood	Other	Sub-total	AG &JA	Petrol	Diesel	Other	Sub-total	Electricity.	Others	Sub-total
1981	47	229	60	336	111	1,676	1,681	49	3,517	34	-	34
1982	50	229	57	336	112	1,905	1,770	53	3,840	37	-	37
1983	54	218	55	327	111	2,169	1,916	58	4,255	41	-	41
1984	59	213	54	325	133	2,440	1,901	61	4,535	45	-	45
1985	63	213	52	328	151	2,666	1,818	65	4,700	50	-	50
1986	63	213	55	332	187	3,064	2,118	68	5,437	50	2	53
1987	63	213	57	333	207	3,646	2,080	88	6,021	50	-	50
1988	63	213	42	318	388	3,986	2,267	96	6,737	50	8	58
1989	63	213	88	364	381	4,151	2,681	154	7,367	50	8	58
1990	63	213	88	364	565	4,330	3,448	156	8,499	50	8	58
1991	..	..	..	..	..	..	..	..	..	..	..	..
1992	608	240	119	967	430	6,512	4,063	155	11,160	50	170	221
1993	792	240	95	1,127	236	6,867	3,401	179	10,683	47	170	217
1994	929	-	53	982	258	6,871	3,054	146	10,329	47	170	217
1995	950	488	6	1,444	363	7,908	3,924	182	12,376	47	161	208
1996	1,264	0	100	1,364	325	8,082	3,881	184	12,472	-	-	-
1997	1,278	0	4	1,282	345	8,571	4,360	133	13,409	-	-	-

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.1: Final Energy Consumption by Sector (TJ, Continued)

Year	Government						Grand Total
	Coal	Petrol	Diesel	Electricity	Others	Sub-total	
1981	19	-	103	116	1	240	26,492
1982	19	-	103	125	1	249	27,406
1983	22	-	132	135	1	290	28,459
1984	22	-	125	145	2	293	29,809
1985	22	-	115	157	2	295	31,143
1986	22	-	129	157	2	309	32,847
1987	22	-	132	281	2	437	33,121
1988	22	-	154	304	27	506	37,454
1989	48	456	328	304	63	1,199	39,757
1990	48	456	328	304	63	1,199	37,821
1991	..	..	..	..	..	..	..
1992	48	605	446	263	358	1,719	46,133
1993	120	756	647	256	332	2,110	46,340
1994	216	739	534	270	354	2,113	44,932
1995	163	456	328	311	17	1,275	45,402
1996	175	456	328	384	17	1,361	47,682
1997	120	456	328	403	17	1,324	49,352

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.2: Final Energy Consumption by Sector (Percentage)

Year	Households				Agriculture			Industry				
	LPG & PFN	Wood	Other	Sub-total	Diesel	Other	Sub-total	Coal	Diesel	Electricity	Others	Sub-total
1981	0.6	57.5	0.4	58.5	1.1	0.0	1.1	15.9	2.5	5.7	0.7	24.9
1982	0.6	57.5	0.4	58.5	1.1	0.0	1.1	15.0	2.2	6.2	0.7	24.1
1983	0.6	57.3	0.5	58.4	0.9	0.0	0.9	14.5	1.8	6.4	0.6	23.4
1984	0.7	56.6	0.5	57.8	1.1	0.0	1.1	15.4	1.6	6.1	0.5	23.6
1985	0.7	56.1	0.7	57.5	1.1	0.0	1.1	15.7	2.1	5.8	0.6	24.1
1986	0.9	55.0	0.7	56.6	1.3	0.0	1.3	14.8	2.2	5.8	0.6	23.4
1987	1.1	53.1	0.7	54.9	1.1	0.0	1.1	14.7	2.4	5.6	0.6	23.4
1988	1.3	54.5	0.7	56.6	1.0	0.0	1.0	13.7	2.4	5.4	0.5	22.1
1989	1.9	52.7	0.8	55.4	1.1	0.1	1.2	12.3	2.6	5.1	0.8	20.7
1990	2.2	46.0	0.9	49.1	1.2	0.1	1.3	11.4	3.0	5.7	2.7	22.8
1991	..	..	..	..	..	..	..	..	..	..	..	..
1992	1.9	42.7	1.0	45.6	1.0	0.1	1.1	9.3	2.9	4.9	5.7	22.8
1993	2.0	43.8	1.1	46.9	1.0	0.1	1.1	8.9	2.7	4.8	5.1	21.5
1994	2.2	46.6	1.4	50.2	1.1	0.1	1.2	9.1	2.9	5.8	0.6	18.3
1995	2.1	45.2	1.4	48.7	1.0	0.1	1.1	6.9	3.0	5.9	0.7	16.4
1996	2.1	44.1	1.5	47.6	1.0	0.1	1.1	9.4	3.3	5.9	0.8	19.4
1997	2.1	43.5	1.5	47.1	1.0	0.1	1.1	8.4	4.1	6.1	0.9	19.4

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.2: Final Energy Consumption by Sector (Percentage, Continued)

Year	Trade & Hotels				Transport					Social & Private Services.		
	Electricity	Wood	Other	Sub-total	AG &JA	Petrol	Diesel	Other	Sub-total	Electricity	Others	Sub-total
1981	0.2	0.9	0.2	1.3	0.4	6.3	6.3	0.2	13.3	0.1	0.0	0.1
1982	0.2	0.8	0.2	1.2	0.4	7.0	6.5	0.2	14.0	0.1	0.0	0.1
1983	0.2	0.8	0.2	1.1	0.4	7.6	6.7	0.2	15.0	0.1	0.0	0.1
1984	0.2	0.7	0.2	1.1	0.4	8.2	6.4	0.2	15.2	0.2	0.0	0.2
1985	0.2	0.7	0.2	1.1	0.5	8.6	5.8	0.2	15.1	0.2	0.0	0.2
1986	0.2	0.6	0.2	1.0	0.6	9.3	6.4	0.2	16.6	0.2	0.0	0.2
1987	0.2	0.6	0.2	1.0	0.6	11.0	6.3	0.3	18.2	0.2	0.0	0.2
1988	0.2	0.6	0.1	0.8	1.0	10.6	6.1	0.3	18.0	0.1	0.0	0.2
1989	0.2	0.5	0.2	0.9	1.0	10.4	6.7	0.4	18.5	0.1	0.0	0.1
1990	0.2	0.6	0.2	1.0	1.5	11.4	9.1	0.4	22.5	0.1	0.0	0.2
1991	..	..	..	..	..	..	..	..	..	..	..	..
1992	1.3	0.5	0.3	2.1	0.9	14.1	8.8	0.3	24.2	0.1	0.4	0.5
1993	1.7	0.5	0.2	2.4	0.5	14.8	7.3	0.4	23.1	0.1	0.4	0.5
1994	2.1	0.0	0.1	2.2	0.6	15.3	6.8	0.3	23.0	0.1	0.4	0.5
1995	2.1	1.1	0.0	3.2	0.8	17.4	8.6	0.4	27.3	0.1	0.4	0.5
1996	2.7	0.0	0.2	2.9	0.7	17.0	8.1	0.4	26.2	0.0	0.0	0.0
1997	2.6	0.0	0.0	2.6	0.7	17.4	8.8	0.3	27.2	0.0	0.0	0.0

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 6.2: Final Energy Consumption by Sector (Percentage, Continued)

Year	Government						Grand Total
	Coal	Petrol	Diesel	Electricity	Others	Sub-total	
1981	0.1	0.0	0.4	0.4	0.0	0.9	100
1982	0.1	0.0	0.4	0.5	0.0	0.9	100
1983	0.1	0.0	0.5	0.5	0.0	1.0	100
1984	0.1	0.0	0.4	0.5	0.0	1.0	100
1985	0.1	0.0	0.4	0.5	0.0	0.9	100
1986	0.1	0.0	0.4	0.5	0.0	0.9	100
1987	0.1	0.0	0.4	0.8	0.0	1.3	100
1988	0.1	0.0	0.4	0.8	0.1	1.4	100
1989	0.1	1.1	0.8	0.8	0.2	3.0	100
1990	0.1	1.2	0.9	0.8	0.2	3.2	100
1991	..	..	..	..	..	..	..
1992	0.1	1.3	1.0	0.6	0.8	3.7	100
1993	0.3	1.6	1.4	0.6	0.7	4.6	100
1994	0.5	1.6	1.2	0.6	0.8	4.7	100
1995	0.4	1.0	0.7	0.7	0.0	2.8	100
1996	0.4	1.0	0.7	0.8	0.0	2.9	100
1997	0.2	0.9	0.7	0.8	0.0	2.7	100

.. Data unavailable

Source: Energy Affairs Division, Ministry of Minerals, Energy and Water Affairs.

Table 7.3: Final Energy Consumption by Sector (TJ, Summarised)

Year	Households	Industry	Transport	Others	Total
1981	15,488	6,590	3,517	898	26,492
1982	16,045	6,607	3,840	913	27,406
1983	16,626	6,654	4,255	924	28,459
1984	17,232	7,036	4,535	1,007	29,809
1985	17,912	7,518	4,700	1,012	31,143
1986	18,606	7,685	5,437	1,120	32,847
1987	18,171	7,757	6,021	1,172	33,121
1988	21,191	8,276	6,737	1,251	37,454
1989	22,035	8,244	7,367	2,111	39,757
1990	18,578	8,633	8,499	2,111	37,821
1991	19,799	9,575	9,830	2,773	41,977
1992	21,020	10,517	11,160	3,436	46,133
1993	21,733	9,941	10,683	3,983	46,340
1994	22,534	8,229	10,329	3,840	44,932
1995	22,126	7,451	12,376	3,448	45,402
1996	22,719	9,246	12,472	3,246	47,682
1997	23,229	9,587	13,409	3,128	49,352

Source: Derived from Table 7.1

Table 7.4: Final Energy Consumption by Sector (Percentage, Summarised)

Year	Households	Industry	Transport	Others	Total
1981	58.5	24.9	13.3	3.4	100.0
1982	58.5	24.1	14.0	3.3	100.0
1983	58.4	23.4	15.0	3.2	100.0
1984	57.8	23.6	15.2	3.4	100.0
1985	57.5	24.1	15.1	3.3	100.0
1986	56.6	23.4	16.6	3.4	100.0
1987	54.9	23.4	18.2	3.5	100.0
1988	56.6	22.1	18.0	3.3	100.0
1989	55.4	20.7	18.5	5.3	100.0
1990	49.1	22.8	22.5	5.6	100.0
1991	47.2	22.8	23.4	6.6	100.0
1992	45.6	22.8	24.2	7.4	100.0
1993	46.9	21.5	23.1	8.6	100.0
1994	50.2	18.3	23.0	8.5	100.0
1995	48.7	16.4	27.3	7.6	100.0
1996	47.6	19.4	26.2	6.8	100.0
1997	47.1	19.4	27.2	6.3	100.0

Source: Derived from Table 7.2

Table 8.1 Stocks (Million Tonnes) and Changes in Stocks of Coal[2]

(Initial proven reserves = 3,340 million tonnes)

Year*	Production (a)	Accumulated Production (b)	Remaining Reserves (c)	Depletion Index (d)	Life Index (e)
1973	0.032732	0.032732	3,339.97	0.001	102,039.82
1974	0.020229	0.052961	3,339.95	0.002	165,106.88
1975	0.060117	0.113078	3,339.89	0.003	55,556.45
1976	0.225000	0.338078	3,339.66	0.010	14,842.94
1977	0.357269	0.695347	3,339.30	0.021	9,346.75
1978	0.310587	1.005934	3,338.99	0.030	10,750.59
1979	0.349641	1.355575	3,338.64	0.041	9,548.78
1980	0.307603	1.663178	3,338.34	0.050	10,852.74
1981	0.377026	2.040204	3,337.96	0.061	8,853.39
1982	0.430684	2.470888	3,337.53	0.074	7,749.37
1983	0.378707	2.849595	3,337.15	0.085	8,811.96
1984	0.388687	3.238282	3,336.76	0.097	8,584.70
1985	0.492609	3.730891	3,336.27	0.112	6,772.65
1986	0.522583	4.253474	3,335.75	0.127	6,383.19
1987	0.582777	4.836251	3,335.16	0.145	5,722.88
1988	0.521753	5.358004	3,334.64	0.160	6,391.23
1989	0.794141	6.152145	3,333.85	0.184	4,198.06
1990	0.804778	6.956923	3,333.04	0.208	4,141.57
1991	0.921579	7.878502	3,332.12	0.236	3,615.67
1992	0.870746	8.749248	3,331.25	0.262	3,825.74
1993	0.900778	9.650026	3,330.35	0.289	3,697.19
1994	0.907569	10.557595	3,329.44	0.316	3,668.53
1995	0.728430	11.286025	3,328.71	0.338	4,569.71
1996	0.801167	12.087192	3,327.91	0.362	4,153.83
1997	0.818884	12.906076	3,327.09	0.386	4,062.96
1998	0.938992	13.845068	3,326.15	0.415	3,542.26
1999	0.714952	14.560020	3,325.44	0.436	4,651.28
2000	0.939386	15.499406	3,324.50	0.464	3,539.01
2001	0.914584	16.413990	3,323.59	0.491	3,633.99
2050	2.419370	100.688702	3,239.31	3.015	1,338.91
2100	3.876615	258.816945	3,081.18	7.749	794.81
2150	5.333860	489.807449	2,850.19	14.665	534.36
2200	6.791105	793.660215	2,546.34	23.762	374.95
2250	8.248351	1,170.375242	2,169.62	35.041	263.04
2300	9.705596	1,619.952531	1,720.05	48.502	177.22
2350	11.162841	2,142.392081	1,197.61	64.143	107.29
2400	12.620086	2,737.693893	602.31	81.967	47.73
2440	13.785883	3,266.396171	73.60	97.796	5.34
2444	13.902462	3,321.831151	18.17	99.456	1.31
2445	13.931607	3,335.762758	4.24	99.873	0.30
2446	13.960752	*3,349.723510	*(9.72)	*100.291	*(0.70)

1: This table has been worked out for all years of the period 1973 - 2446, but a sample of years (after 2001) within this period has been selected to highlight the rate of depletion of the proven coal reserves over time

2: Entries of annual production (**a**) after 2001 are forecasts. It is assumed that there are no new discoveries and therefore no adjustments to initial reserves.

* These values indicate that the reserves will be exhausted during the year 2446.

b Equals the sum over all the years of production up to current year

c Equals initial reserves less accumulated reserves (**b**)

d Equals accumulated production divided by initial reserves (**b**/3,340)

e Equals **c** / **a**

Source: Coal Production data (1973 – 2001) is from Morupule Colliery

Initial Reserves figure is from the Department of Geological Survey

[2] Data on reserves, and a few of the production figures, that was released in the Environment Statistics Publication (2000) has been revised.

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