

EM1: ENERGY CONSUMPTION BY TYPE AND YEAR**H****Concepts and Definitions**

Energy consumption refers to all the energy used for heat, power, and electricity generation, regardless of where the energy was produced.

Types of Fuels

Solid fuels include hard coal, lignite, peat, patent fuel, lignite briquettes, peat briquettes, coke and bituminous sands.

Liquid fuels include crude oil, natural gas liquids, plant condensate, gasoline, petroleum products, jet fuel, kerosene, liquefied petroleum gas, refinery gas, feedstock, naphtha, lubricants, gas/diesel oils and residual (heavy) fuel oils and bitumen.

Gaseous fuels include natural gas and other petroleum gases, such as gasworks gas, coke oven gas and blast furnace gas.

Primary electricity refers to electricity generated by noncombustible energy sources and includes electrical energy of geothermal, hydro, nuclear, tide, wind, wave/ocean and solar origin.

Traditional fuels include estimates of the consumption of charcoal, fuel wood and bagasse.

- *Charcoal* is solid residue consisting mainly of carbon and obtained by the destructive distillation of wood in the absence of air.
- *Fuel wood* is all wood in the rough that is used for fuel purposes.
- *Bagasse* is the cellulosic residue left after sugar is extracted from sugar cane.

Energy Statistics: Definitions, Units of Measure, and Conversion Factors (see http://unstats.un.org/unsd/publication/SeriesF/SeriesF_44E.pdf [last accessed: July 2nd 2009]).

Method of Computation

The data on energy consumption refer to the apparent energy consumption of the population. The data is derived using the formula:

$$\text{Energy consumption} = \text{energy production} + \text{energy imports} - \text{energy exports} - \text{bunkers} \\ \pm \text{stock changes}$$

Indicator Relevance

Energy use is a key aspect of consumption and production. Traditionally, energy has been regarded as the engine of

economic progress. However, its production, consumption, and by-products have resulted in major impacts on the environment. Energy consumption by year and type, therefore, gives an indication of the amount and types of fuel used in a year which allows for crucial estimations of the environmental impacts.

Moreover, energy consumption by type and year gives an indication of the amount of fossil fuels used in any given year. This is important since consumption of fossil fuels is a major contributor to global warming and air pollution. Fossil fuel resources should be conserved to support long term development and to reduce the negative environmental impacts. Consumption of fossil fuels can be reduced by regulating energy prices, which will internalise environmental and social costs, manage demand, encourage the development of alternative renewable energy sources, and hence, reduce the negative environmental impacts resulting from the consumption of fossil fuels.

Fuel consumption is highly dependent on urban land use density and the fuel efficiency of the vehicle fleet. Increasing fuel consumption may be the consequence of suburbanization of the work force, increasing income and car ownership, and reduction of passenger numbers per vehicle. This indicator, energy consumption by type and year, also provides, therefore, indirect information about urban congestion and contamination of land and water.

Data Assessment

The concept of energy consumption by type and year is harmonized across the region since all reporting Member States followed the internationally recommended definition of energy consumption.

Of the fourteen (14) Member States who usually provide data, only eight (8) provided data for this indicator and the data provided were sparse with very little detail. In addition, only one of the Associate Members of the Community provided data for this indicator.

Data Sources

Please refer **Appendix 1.5.1** for the sources of the data on the energy consumption of Member States/Associate Members by type and year.

Evaluation

The Bahamas, Dominica and Jamaica reported consumption of *liquid fuels* as shown in **Table 5.1**. In 1990, The Bahamas reported 1.8 million barrels of fuel compared to 3.7 million barrels in 2003. Consumption of *liquid fuels* grew for the years 1998 (2.5 million barrels), 1999 (2.8 million barrels) and 2000 (3.6 million barrels) but declined in 2001 to 3.4 million barrels and increased thereafter to 3.6 million barrels in 2002 and further to 3.7 million barrels in 2003.

In Dominica 27.3 thousand cubic metres of *liquid fuels* (*Kerosene, Diesel and Gasoline*) were consumed in 1990 compared to 98 thousand cubic metres in 2004. 1.8 million cubic metres of *liquid fuels* was reported in 1995, a very significant increase as compared to the period 1999 to 2003, when average consumption was recorded at 43 thousand cubic metres.

Jamaica reported 22.8 million barrels of fuel in 1998 as compared to the provisional estimate of 26.2 million barrels in 2004. The average consumption of *liquid fuels* for this Member State during the period 1998 to 2004 stood at 24.2 million barrels of fuel with the largest quantity consumed in 2005 (25.5 million barrels).

Gaseous Fluids: An analysis of *Gaseous Fluids* in **Table 5.1** for reporting countries, Dominica and Grenada, reveals that in 1995, Dominica consumed 1.3 million kilograms of gaseous fuels compared to 1.9 million kilograms in 2004. The highest consumption for Dominica was recorded in 1999 at 2.7 million kilogram with an average consumption of 2.0 million kilogram for the years 1990, 1995, 1998 to 2004. For Grenada, a reported consumption of 26.7 Imperial gallons of gaseous fuels for 2002 compared to 27.8 Imperial gallons in the following year representing an increase of 4 per cent.

Primary Electricity: Eight (8) Member States and Associate Members reported on the consumption of *primary electricity*, all of which showed increases in usage over the period for which data was submitted. The Bahamas reported 770 thousand megawatt-hour (MWh) consumption in 1990 compared to 1,462 thousand MWh in 2003, a 94.8 per cent increase in consumption over the period. Belize reported 153 thousand MWh in 1995 compared to 308 thousand MWh in 2003, an increase of 101.3 per cent, over the period. Dominica reported 31 thousand MWh in 1990 compared to 66 thousand MWh in 2004, an increase of 116.3 per cent. Grenada reported 105 thousand metric tons (tonnes) of oil equivalent (toe) consumption in 1999. Compared to 2004, the consumption of primary electricity increased in Grenada by 19.3 per cent to 126 thousand metric tons. Jamaica reported 1,998 thousand MWh consumption in 1995 which increased by 48.8 per cent to 2,974 thousand MWh in 2004, based on the provisional estimate submitted. Saint Lucia reported 197 thousand MWh consumption in 1995 compared to 309 thousand MWh in 2004, an increase of 56.9 per cent. St Vincent and the Grenadines reported 42 thousand MWh consumption in 1990 compared to 106.5 thousand MWh in 2004 to an increase of more than one and a half times or 152 per cent. Bermuda was the only Associate Member that submitted data for this indicator. In 1999 this country reported 522 thousand MWh consumption compared to 590 thousand MWh in 2003, an increase of 12.9 per cent.

For traditional fuels Belize and Jamaica were the only two countries to submit data. Belize submitted data for 2002 in the use of *fuelwood* and *bagasse*. Jamaica reported 224 thousands of barrels oil equivalent of charcoal consumption in 2000 compared to 196 thousands of barrel oil equivalent, a drop of 14.3 per cent in 2004, based on the provisional estimate provided. The data showed that the consumption fluctuated, increasing in 2001 and 2002 when compared to 2000 followed by a decrease in consumption in 2003 and 2004. The consumption of *fuelwood* reported also fluctuated

for the period of data presented showing an increase from 2000 to 2001 followed by a decrease in 2002, 2003 and 2004. In 2000, Jamaica reported 681 thousands of barrel oil equivalent consumption of *fuel wood* compared to 585 thousands of barrel oil equivalent in 2004, a provisional estimate. The consumption of *bagasse*, the other traditional fuel reported on, increased in 2001 compared to 2000 followed by a decrease in 2002 and 2003 which then rose in 2004, based on a provisional estimate. In 2000, 650 thousands of barrel of oil equivalent were consumed compared to 695 in 2004, provisional estimate.

Table 5.1 - Energy consumption by type and year: 1990, 1995, 1998-2004

Country	Year	Solid Fuels	Liquid Fuels	Gaseous Fuels	Primary electricity	Traditional fuels		
						Charcoal	Fuelwood	Bagasse
BS			'000 barrels		MWh			
	1990	...	1,775	...	770,000	n/a	n/a	n/a
	1995	...	2,698	...	949,000	n/a	n/a	n/a
	1998	...	2,486	...	1,130,000	n/a	n/a	n/a
	1999	...	2,776	...	1,219,000	n/a	n/a	n/a
	2000	...	3,618	...	1,281,000	n/a	n/a	n/a
	2001	...	3,460	...	1,343,000	n/a	n/a	n/a
	2002	...	3,598	...	1,399,000	n/a	n/a	n/a
2003	...	3,661	...	1,462,000	n/a	n/a	n/a	
BZ					MWh	tonne	m ³	tonne
	1995	...	...	...	152,931	...	...	...
	1998	...	...	...	186,731	...	...	...
	1999	...	...	...	198,799	...	...	...
	2000	...	...	...	229,352	...	...	...
	2001	...	...	...	256,715	...	...	...
	2002	...	...	...	278,946	...	118,244	286,127
	2003	...	...	...	307,553	...	...	...
DM			m ³	'000 kgs	MWh			
	1990	...	27,322	1,295	30,697	...	...	...
	1995	...	1,830,163	1,567	45,125	...	...	...
	1998	...	...	2,133	57,294	...	...	...
	1999	...	42,060	2,699	60,594	...	...	...
	2000	...	46,181	2,318	62,005	...	...	...
	2001	...	43,775	2,040	63,914	...	...	...
	2002	...	38,751	2,300	64,194	...	...	...
	2003	...	45,305	2,147	62,735	...	...	...
2004	...	97,968	1,940	66,419	...	...	...
GD				Imperial gallons	tonne			
	1999	...	...	...	105,210	...	...	...
	2000	...	...	...	113,348	...	...	...
	2001	...	...	...	123,918	...	...	...
	2002	...	...	26,676	129,214	...	...	...
	2003	...	...	27,765	138,292	...	...	...
2004	...	...	...	125,511	...	...	...
JM			'000 barrels ^{a/}		MWh	'000 boe	'000 boe	'000 boe
	1995	...	...	...	1,998,000	...	...	...
	1998	...	22,797	...	...	...	...	...
	1999	...	23,423	...	2,576,200	...	...	...
	2000	...	23,824	...	2,738,900	224	681	650
	2001	...	23,766	...	2,793,300	227	694	726
	2002	...	24,790	...	2,896,500	230	650	663
	2003	...	25,500	...	2,998,300	207	650	600
2004p	...	25,180	...	2,974,000	196	585	695	
LC					MWh			
	1995	...	...	...	196,574	...	...	...
	1998	...	...	...	235,881	...	...	...
	1999	...	...	...	256,195	...	...	...
	2000	...	...	...	276,745	...	...	...
	2001	...	...	...	286,539	...	...	...
	2002	...	...	...	285,713	...	...	...
	2003	...	...	...	298,983	...	...	...
2004	...	...	...	308,540	...	...	...

Table 5.1 - Energy consumption by type and year: 1990, 1995, 1998-2004

Country	Year	Solid Fuels	Liquid Fuels	Gaseous Fuels	Primary electricity	Traditional fuels		
						Charcoal	Fuelwood	Bagasse
VC					MWh			
	1990	...	...	...	42,269	...	...	...
	1995	...	...	...	62,141	...	...	...
	1998	...	...	...	74,598	...	...	...
	1999	...	...	...	77,900	...	...	...
	2000	...	...	...	82,049	...	...	...
	2001	...	...	...	86,604	...	...	...
	2002	...	...	...	89,824	...	...	...
	2003	...	...	...	95,430	...	...	...
2004	...	...	...	106,523	...	...	...
ASSOCIATE MEMBERS								
BM					MWh			
	1999	...	...	...	522,470	...	...	...
	2000	...	...	...	535,335	...	...	...
	2001	...	...	...	553,920	...	...	...
	2002	...	...	...	574,726	...	...	...
2003	...	...	...	590,032	...	...	...

EM2: MDG 8: ENSURE ENVIRONMENTAL SUSTAINABILITY**Number of Households by Type of Fuel used for cooking****Proportion of population using solid fuels****H**

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Concepts and Definitions

The household is defined as follows: (a) a one-person household, defined as an arrangement in which one person makes provisions for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household; and (b) a multi-person household, defined as a group of two or more persons living together who make common provisions for food or other essentials for living. The persons in the group may pool their incomes and have a common budget. They may be related or unrelated or a combination of both related and unrelated. (*Please refer to the United Nations Principles and Recommendations for Population and Housing Censuses, Revision 1 (1997).*)

Fuel is defined as combustible matter used to maintain fire, such as coal, wood, oil, or gas, in order to create heat or power.

Fuel used for cooking refers to the fuel used predominantly for the preparation of principal meals.

The number of households by type of fuel used for cooking describes the types of fuels that households use for cooking.

Types of Cooking Fuel

Charcoal is a solid residue that consists mainly of carbon and is obtained by the destructive distillation of wood in the absence of air.

Wood refers to all wood in the rough that is used for fuel.

Liquefied Petroleum Gas (LPG)/Gas is a combination of hydrocarbons (propane, butane and ethane) which are gaseous under conditions of normal temperature and pressure, but are liquefied by compression or cooling to facilitate storage, handling and transportation.

Kerosene is medium oil that is distilled between 150°C and 300°C. It is used as an illuminant and as a fuel and is often referred to as burning oil, vaporizing oil, power kerosene or illuminating oil.

Electricity is an electric current used as a source of power.

Other refers to types of cooking fuel not mentioned above.

Method of Computation

The number of households by type of fuel used for cooking is classified from data obtained from Member States/Associate Members according to the categories: None, Charcoal, Wood, LPG/Gas, Kerosene, Electricity, Not Stated and Other.

Indicator Relevance

The proportion of households using solid fuels is one of the indicators for monitoring the Millennium Development Goals. There are important linkages between household solid fuel use, indoor air pollution, deforestation, soil erosion and greenhouse gas emissions. The type of fuel and its participation in cooking tasks are important predictors of exposure to indoor air pollution.

Data Assessment

The number of households by type of fuel used for cooking was obtained from data submitted by Member States/Associate Members. All reporting countries followed the internationally recommended concept of fuel used for cooking. This indicator is, therefore, regionally and internationally conceptually harmonized.

Data Sources

Please refer to **Appendix 1.5.2** for the sources of the data on the number of households in Member States/Associate Members by type of fuel used for cooking.

Evaluation

Tables 5.2(a) and **5.2(b)** present the number of households by type of fuel used for cooking for the 2000 Round of Census in the CARICOM Region. The total number of households for the thirteen (13) reporting Member States was 1.7 million of which *LPG/Gas* (78.3 per cent) was the preferred type of fuel used for cooking. Other significant types of fuel used in Member States were, *Wood* (6.3 per cent), *Kerosene* (5.4 per cent) and *Charcoal* (4.2 per cent) and *Electricity* (3.1 per cent). Three (3) Associate Members consisting 19,370 households, reported 77.8 per cent of households using *LPG/Gas* as the main type of fuel used for cooking followed by *Electricity* (18.9 per cent).

Six (6) Member States and two (2) Associate Members reported *LPG/Gas* usage above 90 per cent with Antigua and Barbuda reporting the highest among Member States at 95.7 per cent followed by Montserrat with 94.8 per cent. The British Virgin Islands reported the highest percentage of households using *LPG/Gas for cooking* at 94.1 among Associate Members followed by Anguilla (93 per cent).

**Table 5.2 (a) Number of Households by Type of Fuel used for Cooking:
2000 Round of Census**

Country	Year	Charcoal	Wood	LPG/Gas	Kerosene	Electricity	None	Not Stated	Other	Total
AG	2001	318	88	19,612	34	135			263	20,450
BS	2000	293	388	65,126	898	19,563			1,474	87,742
BB	2000	72		65,172	1,883	2,491		2,257	11,151	83,026
DM	2001	3,510		18,054	308	67			420	22,359
GD	2001	943	1,319	30,611	205	61			337	33,476
GY	2002	1,143	23,982	71,660	82,158	2,600		110	956	182,609
JM	2001	36,148	80,686	597,578	3,009	11,958			18,947	748,326
MS	2001	38	41	2,207	3	11			29	2,329
KN	2001	159	233	14,521	140	393			234	15,680
LC	2001	5,702		40,055	94	189			1,084	47,124
VC	2001	1,182	917	27,318	128	317			400	30,262
SR	2004	19,941		97,166	916	993		3,329	1,118	123,463
TT	2000	2,237		282,408	1,555	13,219	1,710	2,435	307	303,871
TOTAL MEMBER STATES		71,686	107,654	1,331,488	91,331	51,997	1,710	8,131	36,720	1,700,717
ASSOCIATE MEMBERS										
AI	2001	51		3,469	3	45		127	35	3,730
VG	2001	21	6	7,894	5	403			57	8,386
TC	2001	217	0	3,712	112	3,213		0	0	7,254
TOTAL ASSOCIATE MEMBERS		289	6	15,075	120	3,661	0	127	92	19,370
TOTAL MEMBER STATES AND ASSOCIATE MEMBERS		71,975	107,660	1,346,563	91,451	55,658	1,710	8,258	36,812	1,720,087

Table 5.2 (b) Percentage Distribution of Households by Type of Fuel used for Cooking: 2000 Round of Census

Country	Year	Charcoal	Wood	LPG/Gas	Kerosene	Electricity	None	Not Stated	Other	Total
AG	2001	1.6	0.4	95.9	0.2	0.7	0.0	0.0	1.3	100.0
BS	2000	0.3	0.4	74.2	1.0	22.3	0.0	0.0	1.7	100.0
BB	2000	0.1	0.0	78.5	2.3	3.0	0.0	2.7	13.4	100.0
DM	2001	15.7	0.0	80.7	1.4	0.3	0.0	0.0	1.9	100.0
GD	2001	2.8	3.9	91.4	0.6	0.2	0.0	0.0	1.0	100.0
GY	2002	0.6	13.1	39.2	45.0	1.4	0.0	0.1	0.5	100.0
JM	2001	4.8	10.8	79.9	0.4	1.6	0.0	0.0	2.5	100.0
MS	2001	1.6	1.8	94.8	0.1	0.5	0.0	0.0	1.2	100.0
KN	2001	1.0	1.5	92.6	0.9	2.5	0.0	0.0	1.5	100.0
LC	2001	12.1	0.0	85.0	0.2	0.4	0.0	0.0	2.3	100.0
VC	2001	3.9	3.0	90.3	0.4	1.0	0.0	0.0	1.3	100.0
SR	2004	16.2	0.0	78.7	0.7	0.8	0.0	2.7	0.9	100.0
TT	2000	0.7	0.0	92.9	0.5	4.4	0.6	0.8	0.1	100.0
TOTAL MEMBER STATES		4.2	6.3	78.3	5.4	3.1	0.1	0.5	2.2	100.0
ASSOCIATE MEMBERS										
AI	2001	1.4	0.0	93.0	0.1	1.2	0.0	3.4	0.9	100.0
VG	2001	0.3	0.1	94.1	0.1	4.8	0.0	0.0	0.7	100.0
TC	2001	3.0	0.0	51.2	1.5	44.3	0.0	0.0	0.0	100.0
TOTAL ASSOCIATE MEMBERS		1.5	0.0	77.8	0.6	18.9	0.0	0.7	0.5	100.0
TOTAL MEMBER STATES AND ASSOCIATE MEMBERS		4.2	6.3	78.3	5.3	3.2	0.1	0.5	2.1	100.0

CHART 5.2.1 (A): PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY TYPE OF FUEL USED FOR COOKING

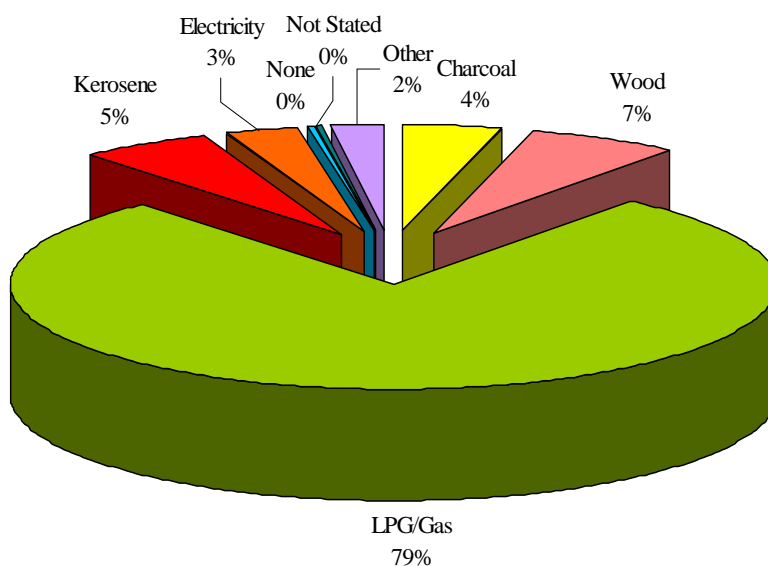
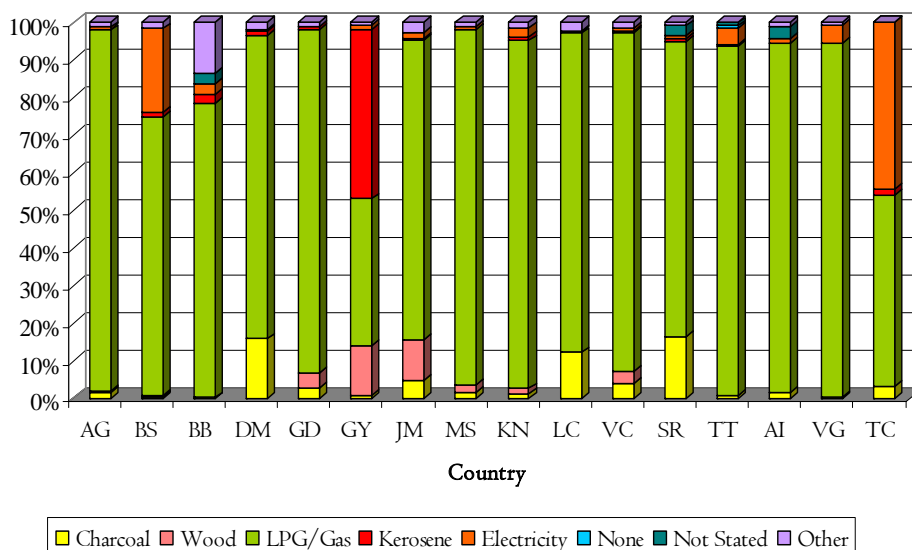
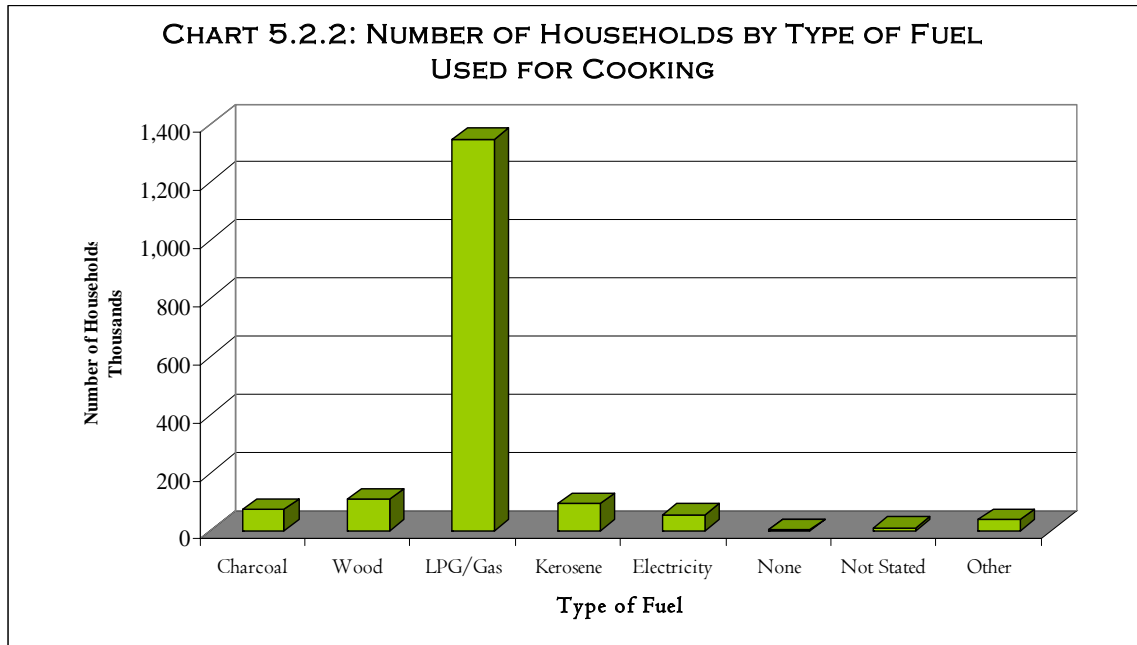


CHART 5.2.1 (B): PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY TYPE OF FUEL USED FOR COOKING AND MEMBER STATE/ASSOCIATE MEMBER





EM3: NUMBER OF HOUSEHOLDS BY TYPE OF FUEL USED FOR LIGHTING**H****Concepts and Definitions**

The household is defined as follows: (a) a one-person household, defined as an arrangement in which one person makes provisions for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household; and (b) a multi-person household, defined as a group of two or more persons living together who make common provisions for food or other essentials for living. The persons in the group may pool their incomes and have a common budget. They may be related or unrelated or a combination of both related and unrelated. (*Please refer to the United Nations Principles and Recommendations for Population and Housing Censuses, Revision 1 (1997).*)

Type of lighting refers to the source of lighting predominantly used by occupants of a housing unit.

The number of households by type of lighting describes the types of fuels that members of households use for lighting.

Types of Fuel Used for Lighting

Gas is a combination of hydrocarbons (propane, butane and ethane) which are gaseous under conditions of normal temperature and pressure, but are liquefied by compression or cooling to facilitate storage, handling and transportation.

Kerosene is medium oil that is distilled between 150°C and 300°C. It is used as an illuminant and as a fuel and is often referred to as burning oil, vaporizing oil, power kerosene or illuminating oil.

Electricity is an electric current used as a source of power.

Other is other types of lighting fuel not so far mentioned.

Method of Computation

Data for this indicator were obtained from Member States/Associate Members according to the categories: Gas, Kerosene, Electricity, Not Stated and Other as defined under concepts and definitions.

Indicator Relevance

Household lighting energy use is increasing due to the construction of larger homes and the installation of more light

fittings per home. Most homes could probably reduce the amount of energy they use for lighting by 50 percent or more. The average household's energy use is responsible for about eight tonnes of carbon dioxide (CO₂), the main greenhouse gas, per year

Data Assessment

The number of households by type of fuel used for lighting was obtained from data submitted by Member States/Associate Members. All reporting countries followed the internationally recommended concept of fuel used for lighting. This indicator is, therefore, regionally and internationally conceptually harmonized.

Data Sources

Please refer to **Appendix 1.5.3** for the sources of the data on the number of households in Member States/Associate Members by type of fuel used for lighting.

Evaluation

In the Region, *Electricity* provided lighting to 86.7 percent of the 1.6 million households who reported to be users of electricity (**Table 5.3 (a)**). *Kerosene* followed with 165,301 or 10.3 percent of households reporting use of this type of fuel for lighting. The percentage use of *electricity* was higher for Associate Member States which reported 96.8 percent of households as compared to 86.6 percent of households for Member States. Among Associate States, The Virgin Islands 99.2 percent of households reportedly used *electricity* as the main type of fuel used for lighting whilst among member states 96.5 percent of Barbados households used this type of fuel for lighting. Guyana reported the lowest proportion of households using *electricity* as the main source of lighting although this Member State reported the highest proportion of households using *kerosene* as their main source of lighting. A mere 0.8 percent of households in the Region used *Gas* for lighting although Guyana reported 5.4 percent of households using this type of fuel as the main source of lighting.

**Table 5.3 (a) Number of Households by Type of Fuel used for lighting:
2000 Round of Census**

Country	Year	Gas	Kerosene	Electricity	Other	Not Stated	Total All Households
AG	2001	61	564	19,236	421	168	20,450
BS	2000	837	0	84,115	2,790	0	87,742
BB	2000	69	1,807	80,126	465	559	83,026
BZ	2000	1,068	6,859	42,417	1,488	113	51,945
DM	2001	58	1,764	19,237	1,300	0	22,359
GD	2001	58	3,720	28,885	813	0	33,476
GY	2002	9,821	44,301	124,874	3,411	202	182,609
JM	2001	0	79,066	651,405	17,855	0	748,326
MS	2001	0	24	2,233	46	26	2,329
KN	2001	54	655	14,665	177	129	15,680
VC	2001	71	3,877	24,940	1,113	261	30,262
TT	2000	711	22,392	277,413	1,546	1,809	303,871
TOTAL MEMBER STATES		12,808	165,029	1,369,546	31,425	3,267	1,582,075
ASSOCIATE MEMBERS							
AI	2001	1	95	3,491	33	110	3,730
VG	2001	30	11	8,320	18	7	8,386
TC	2001	21	167	6,938	128	0	7,254
TOTAL ASSOCIATE MEMBERS		42	272	18,760	179	117	19,370
TOTAL MEMBER STATES AND ASSOCIATE MEMBERS		12,850	165,301	1,388,306	31,604	3,384	1,601,445

Table 5.3 (b) Percentage distribution of Households by Type of Fuel used for lighting: 2000 Round of Census

Country	Year	Gas	Kerosene	Electricity	Other	Not Stated	Total All Households
AG	2001	0.3	2.8	94.1	2.1	0.8	100.0
BS	2000	1.0	0.0	95.9	3.2	0.0	100.0
BB	2000	0.1	2.2	96.5	0.6	0.7	100.0
BZ	2000	2.1	13.2	81.7	2.9	0.2	100.0
DM	2001	0.3	7.9	86.0	5.8	0.0	100.0
GD	2001	0.2	11.1	86.3	2.4	0.0	100.0
GY	2002	5.4	24.3	68.4	1.9	0.1	100.0
JM	2001	0.0	10.6	87.0	2.4	0.0	100.0
MS	2001	0.0	1.0	95.9	2.0	1.1	100.0
KN	2001	0.3	4.2	93.5	1.1	0.8	100.0
VC	2001	0.2	12.8	82.4	3.7	0.9	100.0
TT	2000	0.2	7.4	91.3	0.5	0.6	100.0
TOTAL MEMBER STATES		0.8	10.4	86.6	2.0	0.2	100.0
ASSOCIATE MEMBERS							
AI	2001	0.0	2.5	93.6	0.9	2.9	100.0
VG	2001	0.4	0.1	99.2	0.2	0.1	100.0
TC	2001	0.3	2.3	95.6	1.8	0.0	100.0
TOTAL ASSOCIATE MEMBERS		0.3	1.4	96.8	0.9	0.6	100.0
TOTAL MEMBER STATES AND ASSOCIATE MEMBERS		0.8	10.3	86.7	2.0	0.2	100.0

CHART 5.3.1(A): PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY TYPE OF FUEL USED FOR LIGHTING

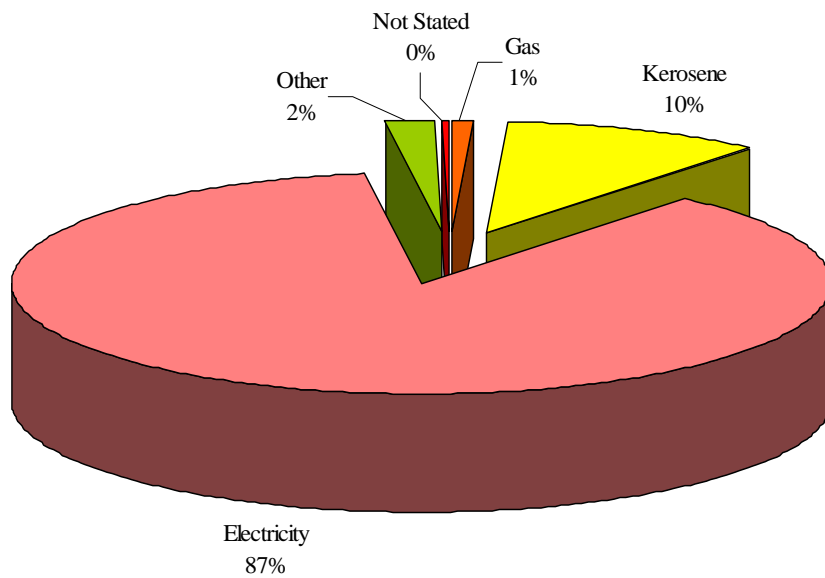
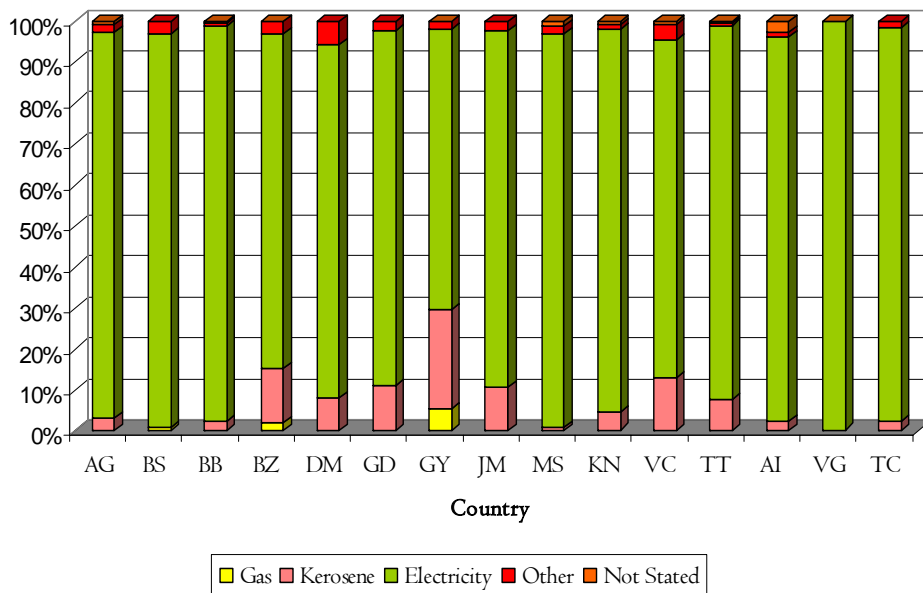
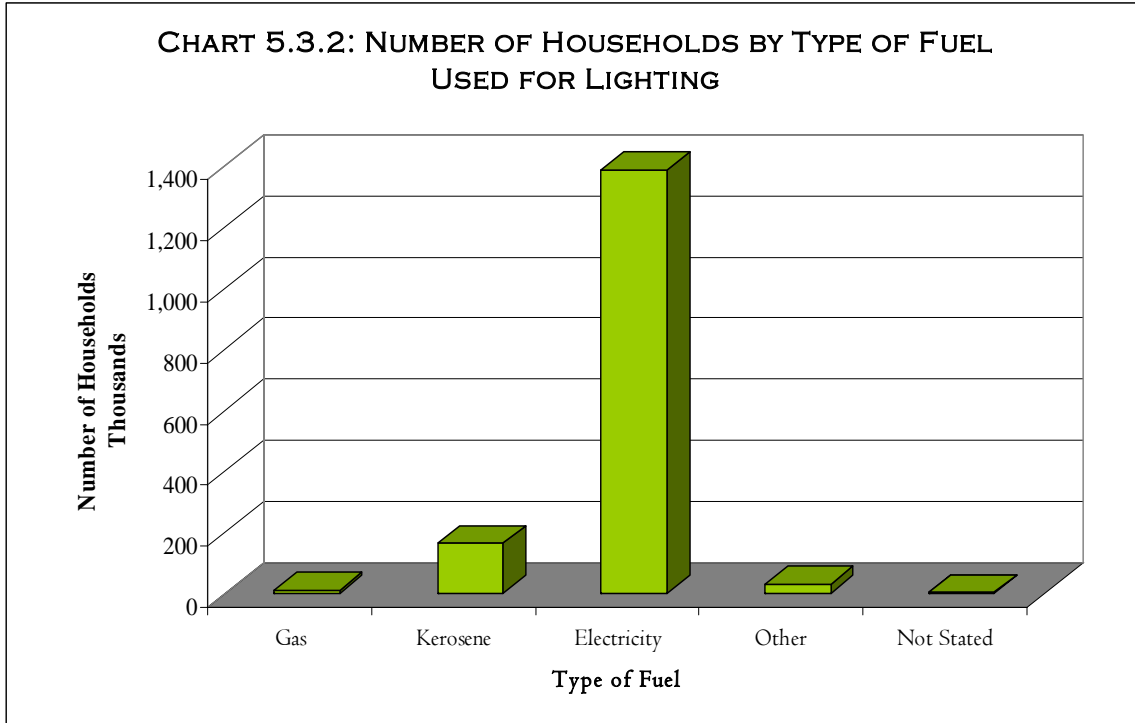


CHART 5.3.1(B): PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY TYPE OF FUEL USED FOR LIGHTING AND MEMBER STATE/ASSOCIATE MEMBER





EM4: MINERAL PRODUCTION BY TYPE**H****Concepts and Definitions**

A *mineral* is defined as any of a class of substances occurring in nature, usually comprising inorganic substances, as quartz or feldspar, of definite chemical composition and usually of definite crystalline structure. They, however, sometimes also include rocks formed by these substances, as well as certain natural products of organic origin, such as asphalt or coal.

Types of Minerals

Gold is a soft, yellow, corrosion-resistant element. It is the most malleable and ductile metal, occurring in veins and alluvial deposits and recovered by mining or by panning or sluicing. A good thermal and electrical conductor, gold is generally alloyed to increase its strength, and it is used as an international monetary standard, in jewellery, for decoration, and as a plated coating on a wide variety of electrical and mechanical components.

Silver is a lustrous, white, ductile, malleable, metallic element, occurring both uncombined and in ores, such as argentite. It has the highest thermal and electrical conductivity of the metals.

Aluminium is a silvery-white, ductile, metallic element and is the most abundant in the earth's crust. It is found in combination, chiefly in bauxite. Having good conductive and thermal properties, it is used to form many hard, light, corrosion-resistant alloys.

Bauxite is the principal ore of aluminium, composed mainly of hydrous aluminium oxides and aluminium hydroxides.

Sand/Gravel is small loose grains of worn or disintegrated rock or an unconsolidated mixture of rock fragments and pebbles.

Limestone is a common sedimentary rock consisting mostly of calcium carbonate, CaCO_3 . It is used as a building stone and in the manufacture of lime, carbon dioxide, and cement.

Salt is a crystalline compound, sodium chloride, NaCl , which occurs as a mineral.

Clay is a fine-grained, firm, earthy material that is plastic when wet and hardens when heated. It consists primarily of hydrated silicates of aluminium and is widely used in making bricks, tiles, and pottery.

Crushed Stone is a concremented earthy or mineral matter (rock) that is quarried and worked into a specific size and shape for a particular purpose.

A *diamond* is an extremely hard, highly refractive crystalline form of carbon that is usually colourless and is used as a gemstone and in abrasives, cutting tools, and other applications.

Gypsum, hydrated calcium sulphate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), is a very common mineral occurring in crystals and in masses. It is soft enough to be scratched by the fingernail and is used to make plaster of Paris, as an ornamental material and as a fertilizer.

Anhydrite is a colourless, white, grey, blue, or lilac mineral of anhydrous calcium sulphate (CaSO_4), occurring as layers in gypsum deposits.

Marble is a metamorphic rock formed by alteration of limestone or dolomite, often irregularly coloured by impurities, and used especially in architecture and sculpture.

Silica Sand is the dioxide form of silicon, SiO_2 , occurring especially as quartz sand, flint, and agate. It is usually used in the form of its prepared white powder chiefly in the manufacture of glass, water glass, ceramics, and abrasives.

Stone is the hard, mineral substance of which rock consists.

Clay/Fill is a fine-grained, firm earthy material that is plastic when wet and hardens when heated. It consists primarily of hydrated silicates of aluminium and is widely used for making bricks, tiles, and pottery.

Lime sand & Silt are sedimentary materials consisting of very fine particles intermediate in size between sand and clay.

Dolomite, essentially $\text{CaMg}(\text{CO}_3)_2$, is a white or light-coloured mineral that is used in fertilizers, as a furnace refractory, and as a construction and ceramic material.

Limestone (Marble Grade) is a common sedimentary rock that consists mostly of calcium carbonate, CaCO_3 . It is used as a building stone and in the manufacture of lime, carbon dioxide, and cement.

Other refers to some other type of mineral not so far mentioned.

Method of Computation

Mineral production by type is classified from data obtained from Member States/Associate Members according to the categories: Gold, Silver, Aluminium, Bauxite, Sand/Gravel, Limestone, Salt, Clay, Crushed Stone, Diamond, Gypsum & Anhydrite, Marble, Silica Sand, Stone, Clay/Fill, Lime sand & Silt, Pridge sand, Dolomite, Limestone (Marble Grade) and Other as defined in the forgoing section.

Indicator Relevance

Unsustainable exploitation of minerals will cause depletion in the long term, which can ultimately have a great impact on the economy of a country. The activities associated with mineral production, such as explosions, drilling and smelting, are a major source of air, water and soil pollution caused by the discharges of mineral wastes or mine tailings. For example, aluminium and iron production accounts for over 5% of anthropogenic GHG emissions worldwide. Alumina production is also associated with emission of dust and corrosive materials and creation of large amounts of alkaline mud ("red mud"). Dust and caustic soda contamination are also significant environmental concerns associated with the refining process. The biggest problem of smelting operations (processing alumina into aluminium) is fluoride emissions. In addition, these activities can also cause loss of habitats of wildlife. (*Trends in Consumption and Production: Selected Minerals* "Discussion Paper of the United Nations Department of Economic and Social Affairs.")

Data Assessment

This indicator, mineral production by type, is regionally and internationally conceptually harmonized since the internationally recommended definition for a mineral was followed.

The data provided for this indicator was sparse: seven Member States provided data. Those seven Member States were the Bahamas, Belize, Dominica, Grenada, Guyana, Jamaica and Suriname. None of the Associate Members of the Community provided data.

Data Sources

Please refer to **Appendix 1.5.4** for the sources of the data on mineral production by type in Member States/Associate Members.

Evaluation

It can be seen from the data provided in **Table 5.4** below that mineral production is concentrated in Guyana, Jamaica, Belize and Suriname. Guyana reported the largest quantities of *Gold* produced in the region which ranged from 1.2 million tonnes in 1990 to 14.5 million tonnes in 1997 and was the only country to report the production of silver. Guyana also reported production of *clay*, *crushed stone* and *diamonds*. Suriname produced an average of 4,064 x 1,000Mt *bauxite* for the period 1990 to 2004, while Jamaica reportedly produced an average of 12.3 Mt of *bauxite* for the period 1990 to 2004. Suriname also reported average production of 1,977 x 1,000Mt of Aluminium for the years 2000 to 2004. Other production of minerals for Jamaica includes *Gypsum and anhydrite*, *Marble*, *Silica sand* and *Limestone*. Four Member States reported production of *Sand* and *Gravel* with the highest being reported by Jamaica averaging over 1.9 million tonnes from 1990 to 2004. The Bahamas was the only member state which reported the production of *salt* that can be described as fluctuating since 1990 along with the production of *Aragonite*. Mineral production in Belize included increasing production of *clays*, *sand* and *gravel*, stone and *Pridgesand* and fluctuations in the production of *limestone*, *dolomite* and *limestone marble*.

Table 5.4- Mineral Production by Type: 1990 - 2004

Country	Year	Salt	Alagomite
BS		tonnes	tonnes
	1990	754,499	...
	1995	1,579,323	...
	1998	1,226,981	13,611
	1999	879,163	6,587
	2000	1,021,921	17,596
	2001	1,267,496	5,311
	2002	1,074,355	73
	2003	1,245,447	8,933

Country	Year	Sand and Gravel	Limestone	Stone	Clay/ Fill	Limesand & Silt	Pridgesand	Dolomite	Limestone Marble Grade
BZ		yds³	yds³	yds³	yds³	yds³	yds³	tonnes	ft²
	1995	66,857	182,462	291	...	...	...	...	...
	1998	254,266	189,258	894	122,312	113,656	...	3,198	...
	1999	100,821	213,154	2,613	74,645	282,512	25,489	5,740	...
	2000	190,160	350,114	6,877	339,015	104,273	15,612	5,272	...
	2001	215,477	549,716	...	303,451	334,888	30,185	4,525	38,000
	2002	142,451	170,716	24,027	265,181	124,092	50,000	5,500	45,000
	2003	369,362	423,464	18,116	224,948	106,962	40,064	6,319	25,000
	2004	211,922	274,790	21,077	311,449	327,031	36,312	3,288	...

Country	Year	Sand and Gravel
DM		tonnes
	1995	*101,479
	1998	201,571
	1999	444,634
	2000	608,750
	2001	672,993
	2002	597,529
	2003	598,643
2004	*399,143	

Country	Year	Sand and Gravel
GD		yds³
	1998	17,862
	1999	186
	2000	13,237
	2001	14,101
	2002	39,393
2003	116	

Table 5.4 Cont'd. Mineral Production by Type: 1990 - 2004

Country	Year	Gold	Silver	Aluminium	Clay	Crushed Stone	Diamonds
		kg	tonnes	tonnes	tons	tons	x10 ³ metric carats
GY	1990	1,204	0.1	1,423,058	2,000	49,000	15.3
	1991	1,844	0.1	1,345,727	2,000	55,000	29.3
	1992	2,475	0.1	895,196	6,000	73,000	46.0
	1993	9,635	0.5	2,093,899	406	110,000	50.9
	1994	11,678	0.6	1,991,132	...	150,000	36.8
	1995	9,005	0.5	2,028,080	...	...	52.4
	1996	12,007	0.6	2,475,459	...	...	46.7
	1997	14,571	0.7	2,470,895	360	90,000	36.5
	1998	14,146	0.7	2,267,368	...	214,000	35.3
	1999	12,905	0.7	2,359,272	...	...	52.6
	2000	13,527	0.7	2,689,451	...	...	83.9

Country	Year	Gold	Bauxite	Sand and Gravel	Limestone	Gypsum and Anhydrite	Marble	Silica Sand
		kg	tonnes	tonnes	tonnes	'000 tonnes	'000 tonnes	'000 tonnes
JM	1990	...	11.0	0.9	5.5	82.2	4.0	16.6
	1995	...	11.0	1.8	7.3	208.0	2.8	16.3
	1998	...	13.0	1.8	7.1	154.5	0.8	6.1
	1999	...	12.0	2.1	7.8	236.0	0.4	9.4
	2000	...	11.1	2.1	8.1	330.0	0.1	6.7
	2001	227	12.4	2.2	8.9	320.3	0.1	8.2
	2002	...	13.1	2.2	9.2	164.9	0.2	9.4
	2003	...	13.4	2.3	9.9	249.0	0.2	12.8
	2004	...	13.3	2.4	8.4	283.0	0.1	11.2

Country	Year	Aluminium	Bauxite
SR			tonne*
	2000	...	3,659.0
	2001	...	4,334.0
	2002	1,902	3,999.0
	2003	2,004	4,111.0
	2004	2,025	4,217.0

EM5: MINERAL RESERVES BY TYPE**H****Concepts and Definitions**

A *mineral* is defined as any of a class of substances occurring in nature, usually comprising inorganic substances, as quartz or feldspar, of definite chemical composition and usually of definite crystal structure. They, however, sometimes also include rocks formed by these substances, as well as certain natural products of organic origin, such as asphalt or coal.

A *mineral reserve* is the economically mineable material derived from a measured mineral resource. It is inclusive of diluting materials and allows for losses that may occur when the material is mined.

Minerals

Gold is a soft, yellow, corrosion-resistant element. It is the most malleable and ductile metal, occurring in veins and alluvial deposits and recovered by mining or by panning or sluicing. A good thermal and electrical conductor, gold is generally alloyed to increase its strength, and it is used as an international monetary standard, in jewellery, for decoration, and as a plated coating on a wide variety of electrical and mechanical components.

Silver is a lustrous, white, ductile, malleable, metallic element, occurring both uncombined and in ores, such as argentite. It has the highest thermal and electrical conductivity of the metals.

Iron is a silvery-white, lustrous, malleable, ductile, magnetic, metallic element occurring abundantly in combined forms, notably in hematite, limonite, magnetite, and taconite

Bauxite is the principal ore of aluminium, composed mainly of hydrous aluminium oxides and aluminium hydroxides.

Nickel is a silvery, hard, ductile and ferromagnetic metallic element used in alloys, in corrosion-resistant surfaces, batteries and for electroplating.

Sand/Gravel is small loose grains of worn or disintegrated rock or an unconsolidated mixture of rock fragments and pebbles.

Limestone is a common sedimentary rock that consists mostly of calcium carbonate, CaCO₃. It is used as a building stone and in the manufacture of lime, carbon dioxide, and cement.

Salt is a crystalline compound, sodium chloride, NaCl, which occurs as a mineral.

Crude Oil is unrefined petroleum, which is a thick, flammable, yellow-to-black mixture of gaseous, liquid, and solid hydrocarbons that occurs naturally beneath the earth's surface.

Gypsum, hydrated calcium sulphate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), is a very common mineral occurring in crystals and in masses. It is soft enough to be scratched by the fingernail and is used to make plaster of Paris, as an ornamental material and as a fertilizer.

Anhydrite is a colourless, white, grey, blue, or lilac mineral of anhydrous calcium sulphate (CaSO_4), occurring as layers in gypsum deposits.

Marble is a metamorphic rock formed by alteration of limestone or dolomite, often irregularly coloured by impurities, and used especially in architecture and sculpture.

Silica Sand is the dioxide form of silicon, SiO_2 , occurring especially as quartz sand, flint, and agate. It is usually used in the form of its prepared white powder chiefly in the manufacture of glass, water glass, ceramics, and abrasives.

Not Stated refers to minerals that have not been so far mentioned and that were not specified in the questionnaires.

Method of Computation

Data for this indicator was obtained from Member States/Associate Members according to the categories: Gold, Silver, Iron, Bauxite, Nickel, Sand & Gravel, Limestone, Salt, Crude Oil, Gypsum & Anhydrite, Marble, Silica Sand and Not Stated.

Indicator Relevance

The purpose of the indicator is to measure the availability of mineral resources. Mineral reserves estimates, particularly in terms of years remaining at current rates of extraction, are crucial for the assessment of sustainable development. The factors for estimating the availability of non-renewable resources are exhaustibility, uncertainty and economic supply as a function of price and technology. The conservation of energy and the increased use of recycling materials can result in reducing mineral exploitation.

Data Assessment

The internationally recommended definition of a mineral reserve was followed and so, this indicator is regionally and internationally conceptually harmonized.

Only three of the Member States provided data for this indicator. Those three countries are Grenada, Guyana and Jamaica. None of the Associate Members provided data. The data for this indicator is, therefore, sparse and with little detail.

Data Sources

Please refer to **Appendix 1.5.5** for the sources of the data on mineral reserves by type in Member States/Associate Members.

Evaluation

Data on mineral reserves for three Member States are supplied in **Table 5.5** below. In Guyana mineral reserves of *bauxite* was 1,200 x 10⁶ million tonnes in 1996 whereas Grenada reported its reserves of *sand and gravel* experiencing major fluctuations from 17,862 cubic yards in 1998 to 186 cubic yards in 1999 then increasing to 13,237 cubic yards in 2000 with further increases in 2001 (14,101 cubic yards) and 2002 (39,393 cubic yards) with a high decline in 2003 to 116 cubic yards. The Table below also shows data for Jamaica whose reserves of *Gold* were 986 in 2002. The data for Jamaica also shows reserves of *Bauxite* at 2,500 tonnes in 1990 and 2002, *limestone*, sand and gravel, gypsum and Anhydrite, marble and silica sand.

Table 5.5 - Mineral Reserves by Type: 1998 - 2003

Country	Year	Gold	Bauxite	Sand & Gravel	Limestone	Gypsum & Anhydrite	Marble	Silica Sand
GD				yds ³				
	1998	...	...	17,862	...	...	...	...
	1999	...	...	186	...	...	...	...
	2000	...	...	13,237	...	...	...	...
	2001	...	...	14,101	...	...	...	...
	2002	...	...	39,393	...	...	...	...
	2003	...	...	116	...	...	...	...
GY	1996	...	tonnes 1,200,000,000	...	...	...	...	...
JM		kg	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes
	1990	...	2,500	...	...	...	...	...
	2002	986	2,500	2.4	3,100,450	85	355	2.1

Appendix 1.5

1.5.1 (a): Sources of Data for Table 5.1 - Energy Consumption by Type and Year: 1990, 1995, 1998 - 2004

Country	Data Source
THE BAHAMAS	Bahamas Electricity Company
BELIZE	Land Information Centre/ Ministry of Natural Resources
DOMINICA	Central Statistical Office and Dominica Electricity Services
GRENADA	National Statistical Office
JAMAICA	Jamaica Public Service Company, Ministry of Commerce, Science & Technology
SAINT LUCIA	Saint Lucia Electricity Services Limited
ST. VINCENT AND THE GRENADINES	St. Vincent Electricity Services
BERMUDA	Department of Statistics: Facts and Figures

1.5.1 (b): Notes for Table 5.1 - Energy Consumption by Type and Year: 1990, 1995, 1998 - 2004

Country	Notes
THE BAHAMAS	The increase in kWh sold and the corresponding fuel consumption is a direct reflection of Bahamas Electricity Company's use of higher efficiency machinery, which uses lower grade and less fuel. n/a refer to not applicable or not in use at any measurable scale.
DOMINICA	Liquids are Kerosene, Diesel and Gasoline. Gases are Butane and Propane.
JAMAICA	a/: Import of liquid fuels p: provisional data boe: barrel oil equivalent

1.5.2 (a): Sources of Data for Table 5.2 - Number of Households by Type of Fuel Used for Cooking: 2000 Round of Census

Country	Data Source
ANTIGUA AND BARBUDA	Basic Table Volume
THE BAHAMAS	Population and Housing Census, 2000 Round
BARBADOS	Basic Table Volume
BELIZE	Population and Housing Census, 2000 Round
DOMINICA	Population and Housing Census, Central Statistics Office
GRENADA	Population and Housing Census 2001
GUYANA	Basic Table Volume
JAMAICA	Population Census 2001
MONTserrat	Basic Table Volume
ST. KITTS AND NEVIS	Basic Table Volume
SAINT LUCIA	Population and Housing Census, 2000 Round
ST VINCENT AND THE GRENADINES	Basic Table Volume
SURINAME	Population and Housing Census, 2000 Round
TRINIDAD AND TOBAGO	Central Statistical Office/2000 Population and Housing Census
ANGUILLA	Basic Table Volume
BRITISH VIRGIN ISLANDS	Basic Table Volume
THE TURKS AND CAICOS ISLANDS	TCI 2001 Population & Housing Census, Statistical Office

1.5.2 (b): Notes for Table 5.3 - Number of Households by Type of Fuel Used for Cooking: 2000 Round of Census

Country	Notes
THE BAHAMAS	Other includes not stated
BARBADOS	Charcoal = wood/charcoal. Other includes natural gas, solar and other.
DOMINICA	Other includes not stated. Charcoal = coal/wood
GRENADA	Other includes not stated
GUYANA	Charcoal = coal
JAMAICA	Other includes not stated
SAINT LUCIA	Other includes not stated. Charcoal = coal/wood
ST VINCENT AND THE GRENADINES	Other includes not stated
TRINIDAD AND TOBAGO	Charcoal = coal/wood
ANGUILLA	Charcoal = charcoal/wood
THE TURKS AND CAICOS ISLANDS	Charcoal = coal/wood

1.5.3 (a): Sources of Data for Table 5.3 - Number of Households by Type of Fuel Used For Lighting: 2000 Round of Census

Country	Data Source
ANTIGUA AND BARBUDA	Basic Table Volume
THE BAHAMAS	Population and Housing Census, 2000 Round
BARBADOS	Basic Table Volume
BELIZE	Basic Table Volume
DOMINICA	Population and Housing Census, Central Statistical Offices
GRENADA	Population and Housing Census 2001
GUYANA	Basic Table Volume
JAMAICA	Population and Housing Census 2001
MONTSERRAT	Basic Table Volume
ST. KITTS AND NEVIS	Basic Table Volume
ST VINCENT AND THE GRENADINES	Basic Table Volume
TRINIDAD AND TOBAGO	Central Statistical Office/2000 Population and Housing Census
ANGUILLA	Basic Table Volume
BRITISH VIRGIN ISLANDS	Basic Table Volume
THE TURKS AND CAICOS ISLANDS	TCI 2001 Population and Housing Census, Statistical Office

1.5.3 (b): Notes for Table 5.3 - Number of Households by Type of Fuel Used for Lighting: 2000 Round of Census

Country	Notes
ANTIGUA AND BARBUDA	Not stated includes none.
THE BAHAMAS	Other includes not stated
BARBADOS	Other includes batteries and other.
DOMINICA	1981 data for kerosene lighting was mainly due to Hurricane David's devastating effects on electrical power.
GUYANA	Other includes generator/inverter and other.
GRENADA	Other includes not stated
JAMAICA	Other includes not stated
MONTSERRAT	Not stated = none.
ST VINCENT AND THE GRENADINES	Other includes not stated. Not stated = none.
ANGUILLA	Other = other + none
BRITISH VIRGIN ISLANDS	Not stated = none.

1.5.4 (a): Sources of Data for Table 5.4 - Mineral Production by Type: 1990 - 2004

Country	Data Source
THE BAHAMAS	Department of Statistics
BELIZE	Land Information Centre/ Ministry of Natural Resources
DOMINICA	Central Statistical Office
GRENADA	Central Statistical Office
GUYANA	Guyana Geology and Mines Commission
JAMAICA	Mines & Geology Division, Jamaica Bauxite Institute
SURINAME	General Bureau of Statistics

1.5.4 (b): Notes for Table 5.4 - Mineral Production by Type: 1990 – 2004

Country	Notes
THE BAHAMAS	Other refers to Aragonite.
DOMINICA	*: only export data available. There are no reserves or production of gold, silver, iron, aluminium, nickel, limestone, salt and crude oil.

1.5.5 (a): Sources of Data for Table 5.5 - Mineral Reserves by Type: 1998 - 2003

Country	Data Source
GRENADA	National Statistical Office.
GUYANA	Guyana Geology and Mines Commission
JAMAICA	Mines & Geology Division, Jamaica Bauxite Institute

1.5.5 (b): Notes for Table 5.5 - Mineral Reserves by Type: 1998 - 2003

Country	Notes
JAMAICA	It is difficult to arrive at a value for reserves of sand and gravel as there is replenishment in river beds and plains after heavy rainfall. There are no reserves or production of gold, silver, iron, aluminium, nickel, limestone, salt and crude oil.

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1. The United Nations Statistics Division, Energy Statistics: Definitions, Units of Measure and Conversion Factors
2. A joint publication by the World Resources Institute, the United Nation's Environment Programme, the United Nations Development Programme, and The World Bank, World Resources 1998-99: Environmental change and human health