Energy and Resources-- Benin

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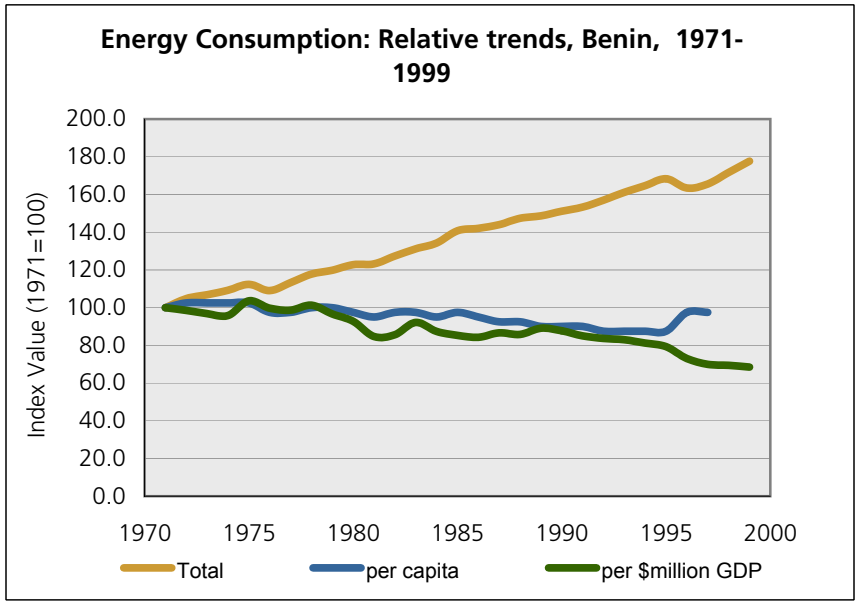
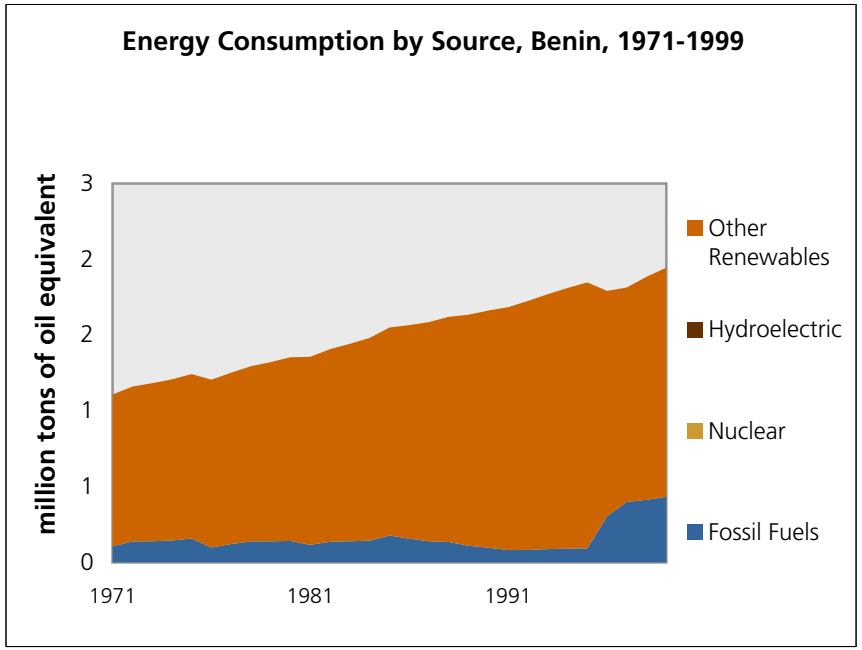
Country Profiles

Energy Production and Consumption (in thousand metric tons of oil equivalent) {a}	Benin	Sub-Saharan Africa	World
Total energy production, 2000	1,821	552,808	10,077,984
% change since 1980	50%	71%	37%
Energy imports, 1997	340	28,564	9,521,506
Energy exports, 1997	70	219,173	3,419,104
Total energy consumption {b}, 1999	1,973	X	9,702,786
Electricity consumption, 1999	28	X	1,040,770
Energy consumption per capita, 1997	0.39	0.54	1.64
% change since 1990	8%	-2%	0%
Energy consumption per GDP {c}, 1999:	355	425	244
% change since 1990	-22%	4%	-13%
Energy Consumption by Source, 1999 (in thousand metric tons oil equivalent)			
Total Fossil Fuels	433	X	7,689,047
Coal and coal products	0	X	2,278,524
Crude oil and natural gas liquids	0	X	3,563,084
Natural gas	0	X	2,012,559
Nuclear	0	X	661,901
Hydroelectric	0	X	222,223
Renewables, excluding hydroelectric:	1,511	X	1,097,889
Primary solid biomass (includes fuelwood)	1,511	X	1,035,139
Biogas and liquid biomass	0	X	14,931
Geothermal	0.0	X	43,802
Solar	0.0	X	2,217
Wind	0.0	X	1,748
Tide, wave, and ocean	0.0	X	53
Energy Consumption by Sector, 1999 (in thousand metric tons of oil equivalent)			
Industry	54	X	2,140,474
Transportation	300	X	1,755,505
Agriculture	0	X	166,287
Commercial & public services	135	X	511,555
Residential	1,004	X	1,845,475
Non-energy uses and "other" consumption	0	X	333,981
Total final energy consumption {d}	1,493	X	6,753,276





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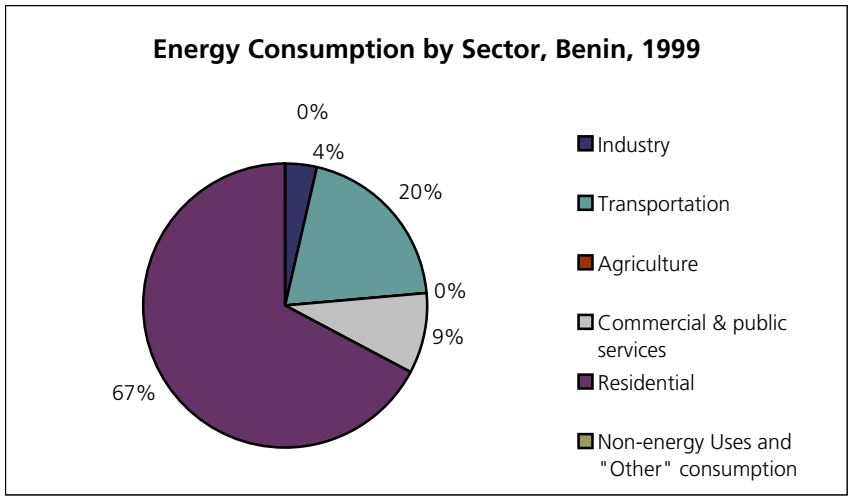
	Benin	Sub-Saharan Africa	World
Resource Consumption			
Passenger cars per 1000 people, 1998	X	X	109
Annual motor gasoline consumption, 2000 (liters per person)	45	X	179
Annual meat consumption, 1998 (kg per person)	15	13	38
Annual paper consumption, 2000 (kg per person)	X	X	53
Annual coffee consumption, 2001 (kg per person)	0	X	X



Footnotes:

a. One metric ton of oil equivalent (toe) is defined as 10 Exp. 7 kilocalories or 41.868 gigajoules, equal to the amount of energy contained in 1 metric ton of crude oil.

b. In metric tons of oil equivalent per million constant 1995 international dollars.

TPES = Energy Production + Imports - Exports - Stock Changes - Consumption by International Marine Bunkers

c. In metric tons of oil equivalent per million constant 1995 international dollars.

d. "Total final consumption" is calculated as the sum of energy consumption by sectors.

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Energy and Resources—Sources and Definitions

All energy consumption values presented here are calculated and reported by the International Energy Agency (IEA) based on an energy balance methodology using ***metric tons of oil equivalent*** (toe), a common unit based on the calorific content of energy commodities. One toe is defined as 10 Exp. 7 kilocalories, 41.868 gigajoules, or 11,628 GWh. This amount of energy is roughly equal to the amount of energy contained in a ton of crude oil.

Energy Use

Total Energy Production is the total amount of primary energy produced in the year specified by all sources, i.e. hard coal, lignite/brown coal, peat, crude oil, natural gas liquids (NGLs), natural gas, combustible renewables and wastes, nuclear, hydro, geothermal, solar and the heat from heat pumps that is extracted from the ambient environment. Production is calculated after removal of impurities (e.g. sulphur from natural gas).
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Energy Imports and **Energy Exports** present the energy equivalent amounts of electricity, coal, natural gas, oil and oil products that have crossed the national territorial boundaries of a country, whether or not customs clearance has taken place. Crude oil, natural gas, and natural gas liquids are reported as coming from the country of origin; refinery feedstocks and oil products are reported as coming from the country of last consignment. Coal or oil in transit is not included. If electricity is "wheeled" or transited through a country, the amount is shown as both an import and an export.
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Total Energy Consumption is the total amount of primary energy consumed from all sources in the year specified. Primary energy includes losses from transportation, friction, heat loss and other inefficiencies. Specifically, consumption equals indigenous production plus imports and stock changes, minus exports and international marine bunkers. The International Energy Agency (IEA) calls this value Total Primary Energy Supply (TPES).
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Electricity Consumption is the amount of electricity consumed by each country or region in the year specified. This variable includes electricity from all energy sources. This variable accounts for the amount of electricity consumed by the end user, meaning that losses due to transportation, friction, heat loss and other inefficiencies are not included in this figure.
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Energy Consumption per capita is the total amount of energy consumed per person, in each country in the year specified. This variable includes energy from all energy sources. The **% Change since 1980** shows the percentage change in per capita energy consumption between 1980 and the specified year: in this case, 1997.
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Energy Consumption per GDP PPP indicates the amount of energy consumed per unit of income generated by the country's economy. GDP PPP is a country or region's gross domestic product (GDP) converted to international dollars using Purchasing Power Parity (PPP) rates, and rescaled to 1995 to give a common reference year. An international dollar has the same purchasing power in a given country as a United States Dollar in the United States. In other words, an international dollar buys an equivalent amount of goods or services in all countries. The **% Change since 1980** shows the percentage change in energy consumption per GDP PPP between 1980 and the specified year: in this case, 1999.
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Energy Consumption by Source is the total amount of primary energy consumed from the usage of a specified fuel. Primary energy includes losses from transportation, friction, heat loss and other inefficiencies. Specifically, consumption equals indigenous production plus imports and stock changes, minus exports and international marine bunkers. The IEA calls this value Total Primary Energy Supply (TPES).

Fossil Fuels, total is the amount of energy consumed from the use of crude oil and natural gas liquids, coal and coal products, and natural gas.
Coal and coal products refer coal and all coal products, such as peat and coke.
Crude oil and natural gas liquids refer to liquid fuels such as crude oil or natural gas liquids, including motor and aviation gasoline, kerosene, diesel oil, and petrochemical feedstocks. Feedstocks include all oil products used as raw material in the petrochemical industry for steamcracking, and aromatics plants, such as naphtha, liquefied petroleum gases, light and heavy gasoil, reformate, etc.
Natural gas refers to natural gases that occur in underground deposits, whether liquefied or gaseous, consisting mainly of methane. Natural gas includes both non-associated gas originating from fields producing hydrocarbons only in gaseous form, associated gas produced in association with crude oil, and methane recovered from coal mines (colliery gas).
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Nuclear Fuels shows the primary heat equivalent of the electricity consumed from nuclear power plants. Heat-to-electricity conversion efficiency is assumed to be 33 percent.
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Hydroelectric refers to the energy content of the electricity consumed from hydroelectric power plants, which convert the potential and kinetic energy of water into electricity. This variable excludes output from pumped storage.
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Renewables, excluding Hydroelectric shows the amount of energy consumed from renewable sources such as wind; tide, wave and ocean; thermal and photovoltaic solar; primary solid biomass; liquid biomass and biogas; and geothermal systems.
Solid Biomass is defined as any plant matter used directly as fuel or converted into other forms before combustion. This category includes wood; vegetal waste such as wood waste and crop waste; animal materials and wastes; sulphite lyes (also known as black liquor, a sludge that contains the lignin digested from wood for paper making); and other solid biomass.
Biogas and liquid biomass. ***Biogases*** are derived principally from the anaerobic fermentation of biomass and solid wastes, which are combusted to produce heat and electrical power. Landfill gases and gases from sewage and animal waste facilities are included in this category. Energy from ***liquid biomass*** uses liquid derivatives from biomass as a fuel. Ethanol is the main form of liquid biomass produced.
Geothermal energy is available as heat emitted from within the earth's crust, usually in the form of hot water or steam. It is exploited for electricity generation using dry steam or high enthalpy brine after flashing, or directly as heat for district heating, agriculture, etc.
Solar energy is harnessed using two primary methods. ***Solar-thermal power*** exploits solar radiation for hot water production and electricity generation by flat plate collectors (mainly of the thermosiphon type, for domestic hot water or for the seasonal heating of swimming pools) or solar thermal-electric plants. ***Solar power from photovoltaics*** involves the conversion of solar energy to electricity in photovoltaic cells. Passive solar energy for the direct heating, cooling and lighting of dwellings or other buildings is not included in this category.
Wind power exploits the kinetic energy of wind in wind turbines to generate electrical power.
Tide, wave, ocean power captures the mechanical energy from tidal motion or wave activity and transforms it into electrical power.
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Energy Consumption by Sector

Industry represents energy consumed by activities in all industrial sub-sectors, such as mining and quarrying, iron and steel, construction, etc. Energy used for transport by industry is not included here but is reported under transportation. The industry sector is further defined as including International Standard Industrial Classification (ISIC) divisions 15-37.
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Transportation represents energy used for all transport except international marine bunkers. It covers road, railway, air, internal navigation (including small craft and coastal shipping not included under marine bunkers), transport in the industry sector, and energy used for transport of materials by pipeline and non-specified transport. Energy used for ocean, coastal and inland fishing is not included here but is reported under agriculture. The transportation sector is further defined as including International Standard Industrial Classification (ISIC) divisions 60, 61 and 62.
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Agriculture encompasses all energy consumed by all traction (excluding agricultural highway use), power, or heating (agricultural and domestic) for activities defined under the International Standard Industrial Classification (ISIC) divisions of Agriculture or Hunting & Forestry. These activities include, for example, operation of irrigation systems and agricultural machinery, animal husbandry, maintenance of parks and gardens, hunting and trapping, logging, and ocean, coastal, and inland fishing.
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Commercial & Public Sectors refers to the energy consumed by wholesale and retail trade; the operation of hotels and restaurants; post and telecommunications; real estate, renting and business activities; the collection, purification and distribution of water; maintenance and repair of motor vehicles and motorcycles; financial intermediation, except insurance and pension funding; computer and related activities; sewage and refuse disposal; public administration and defense; education; and other community, health, social and personal service activities. The activities and services defined above are listed under International Standard Industrial Classification (ISIC) divisions 41, 50, 51, 55, 63, 64, 65, 66, 70, 71, 72, 73, 74, 75, 80, 85, 90, 91, 93 and 99.
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Residential includes all energy used for activities by households except for transportation.
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Non-Energy Uses covers the amount of energy consumed by the use of petroleum products such as white spirit, paraffin waxes, lubricants, bitumen and other products, as well as the non-energy use of coal (excluding peat). It is assumed that the use of these products is exclusively non-energy use. An exception to this treatment is petroleum coke, which is counted under non-energy use only when there is evidence of such use; otherwise it is shown under energy use in industry or in other sectors. Non-energy use of coal includes carbon blacks, graphite electrodes, etc. and is also shown separately by sector. Feedstocks for the petrochemical industry, like naptha, are accounted for in industry under chemical industry.

Total Final Energy Consumption (TFC) is the sum of consumption of energy by the different end-use sectors described above. In final consumption, petrochemical feedstocks and non-energy use of such oil products as white spirit, lubricants, bitumen, paraffin waxes and other products are included. Backflows from the petrochemical industry are not included in final consumption (see other transformation).

Resource Consumption

Passenger Cars per 1000 People refer to the number of individual four-wheel vehicles per 1,000 people. These numbers exclude buses, freight vehicles, and two-wheelers such as mopeds and motorcycles.
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Annual Motor Gasoline Consumption refers to the per capita consumption of motor gasoline, a light hydrocarbon oil used in internal combustion engines such as motor vehicles. The data in this variable only considers the fuels used in road vehicles (including military) as well as agricultural and industrial highway use. It excludes motor gasoline used in stationary engines.
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Annual Meat Consumption refers to per capita meat consumption. This variable includes meat from animals slaughtered in countries, irrespective of their origin, and comprises horsemeat, poultry, and meat from all other domestic or wild animals such as camels, rabbits, reindeer, and game animals. Meat consumption was calculated using a trade balance approach (total production plus imports, minus exports).
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Annual Paper Consumption refers to the per capita consumption of newsprint, printing and writing paper, packaging paper, household and sanitary paper, and other paper and paperboard. Paper consumption was calculated using a trade balance approach (total production plus imports, minus exports). For some countries for which the FAO has no production data, production was assumed to be negligible and was assigned a value of 0 instead of reporting X for these countries. These countries, marked with a footnote, have <500,000 hectares of forest land
and have imported <10,000 metric tons of recovered paper.
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Annual Coffee Consumption refers to the per capita consumption of all coffee and is given in kilograms of raw coffee beans per capita.
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