

Energy Indicators (UNSD)

Workshop on Environment
Statistics

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Indicators in the MDG list

- None

Indicators in the CSD list

- Theme: Poverty
- Sub-theme: Access to energy
- Core indicator: Share of households without electricity or other modern energy services
- Other indicator: Percentage of population using solid fuels for cooking

- Theme: Consumption and production patterns
- Sub-theme: Energy use
- Core indicators:
 - Annual energy consumption, total and by main user category
 - Share of renewable energy sources in total energy use
- Other indicator:
 - Intensity of energy use, total and by economic activity

Energy indicators in the ECA list

Energy production	Primary energy production total, per capita and by source
Energy consumption	Share of renewable sources in total energy use [CSD]
	Share of imports in total energy supply
	Intensity of energy use, total and by economic activity [CSD]
	Annual energy consumption total and by main user category [CSD]
	Total energy consumption per capita
	Share of households with access to electricity
	% of traditional fuel energy use

Primary energy production total, per capita and by source

- **Brief Definition:**

Total primary energy production measures the amount of primary energy produced by a particular country or region. Primary energy includes hard coal, lignite, peat, crude oil, natural gas liquids (NGLs), natural gas, nuclear, hydro, geothermal, solar, and the heat from heat pumps that is extracted from the ambient environment. Primary energy includes losses from transportation, friction, heat loss and other inefficiencies. Production is calculated after impurities are removed. Data are reported in thousand tonnes (metric tons) of oil equivalent (ktoe).

SHARE OF RENEWABLE ENERGY SOURCES IN TOTAL ENERGY USE

- **Brief Definition:**

The percentage of a country's total energy use from renewables and waste.

- **Unit of Measurement:** %

- **Underlying Definitions and Concepts:** The elements comprising this indicator are renewable resources, non-renewable resources, and consumption. Renewable resources refer to energy collected from current ambient energy flows or from substances derived from them. The indicator aggregates renewable energy sources and waste on the one hand, and all other non-renewable sources on the other hand.
- **Renewable energy** includes both combustible and non-combustible renewables. Non-combustible renewables include geothermal, solar, wind, hydro, tide and wave energy. Combustible renewables and waste include and biofuels (biogas, ethanol, biodiesel); biomass products (fuelwood, vegetal waste, pulp and paper waste, animal waste, bagasse), municipal waste (waste produced by the residential, commercial and public service sectors that are collected by the local authorities for disposal) and industrial waste; all for the production of heat and/or power. Non-renewable resources refer to fossil fuels: solids, liquids and gases. **Consumption** refers to "apparent consumption".

- **Measurement Methods:**

This indicator is computed by calculating the ratio of consumption of energy from renewable resources and waste and from non-renewable resources over gross inland energy consumption (total energy requirement). Gross inland energy consumption (apparent consumption) is calculated by the following formula: Primary production + Imports – Exports – Bunkers +/- stock changes. For geothermal energy, the energy quantity is the enthalpy of the geothermal heat entering the process. For solar, wind, hydro, tide and wave energy, the quantities entering the electricity generation are equal to the electrical energy generated. Electricity is accounted for as the same heat value as electricity in final consumption. Direct use of geothermal and solar heat and heat from heat pumps also included.

- **Data Needed to Compile the Indicator:** Consumption of energy from renewable resources and waste; consumption of energy from non-renewable energy sources; gross inland consumption of energy.
- **National and International Data Availability and Sources:** National data and estimates on renewable resources are available from national statistical offices and country publications for many countries. The United Nations Statistics Division, and the International Energy Agency of the Organisation for Economic Co-operation and Development compile data and estimates based on information from national and international sources.

SHARE OF IMPORTS IN TOTAL ENERGY SUPPLY

- Total energy supply: production of primary energy + imports – exports – international marine bunkers +/- net changes in stocks.
- Calculation method: $\text{imports} / \text{total energy supply}$

INTENSITY OF ENERGY USE, TOTAL AND BY ECONOMIC ACTIVITY

Brief Definition:

Ratio of total energy use to GDP: ratio of energy use by economic activity to value added.

Unit of Measurement:

Tonnes of oil equivalent per unit of local currency or per US \$

- **Purpose:** Trends in overall energy use relative to GDP indicate the general relationship of energy consumption to economic development and provide a rough basis for projecting energy consumption and its environmental impacts with economic growth.

- **Underlying Definitions and Concepts:** The ratio of energy use to GDP is called “energy intensity”. The indicator could be called “aggregate energy intensity” or “economy-wide energy intensity”. The term “energy intensity” is also used for ratios of energy use by the different economic activities to output.
- The ratio of energy use to GDP indicates the total energy being used to support economic and social activity. It represents an aggregate of energy consumption resulting from a wide range of production and consumption activities. In specific economic activities, the ratio of energy use to output is the “energy intensity” (if the output is measured in monetary units) or the “specific energy requirement” (if the output is measured in physical units such as tonnes or passenger-kilometers).
- The energy intensity of a process (energy consumed per unit of output) is the inverse of the “energy efficiency” of the process (output per unit energy consumed).

- **Measurement Methods:**

Energy Use: Total energy consumption is obtained from national energy balances. For the economic activities, services/commercial consumption should be carefully separated from households, and manufacturing should be separated from other industrial uses and agriculture.

- **Unit:** tonnes of oil equivalent

Output: GDP for total energy intensity, value added for intensities by economic activity.

- **Unit:** GDP and value added are measured in local currency for national purposes. For the purposes of international comparison, they are measured in US dollars, converted from real local currency at purchasing power parity for the base year to which local currency was deflated.

ANNUAL ENERGY CONSUMPTION, TOTAL AND BY MAIN USER CATEGORY

- **Brief Definition:** The amount of energy - liquids, solids, gases and electricity – used in a given year in a country, total, and by main user category.
- **Unit of Measurement:** Tonnes of oil equivalent

- **Underlying Definitions and Concepts:**

Gross inland consumption of energy is a key aggregate in the energy balances. Total consumption of energy refers to “apparent” consumption and is derived from the formula that takes into account production, exports, imports and stock changes. Production refers to the first stage of production. International trade of energy commodities is based on the “general trade” system, that is, all goods entering and leaving the national boundary of a country are recorded as exports and imports. Bunkers refer to fuels supplied to ships and airplanes engaged in international transport, irrespective of the carriers’ flag. In general, data on stocks refer to changes in stocks of producers, importers and/or industrial consumers at the beginning and the end of the year.

Consumption of energy by main user categories refers to final consumption. This is a different concept from the one used for total consumption. Apparent consumption refers to primary energy, and includes energy lost to the environment in transformation processes. Final consumption, on the other hand, mixes primary and secondary sources of energy and is linked to the concept of total energy requirement, not taking transformation losses into account.

- The main user categories should be established ideally at the two-digit level of the International Standard Industrial Classification of Economic Activities (ISIC rev. 4), but at least on the one letter Alpha level. Domestic/household use is a separate category.
- **Measurement Methods:** Total energy requirement (gross inland consumption) is calculated from the following formula: $\text{Primary production} + \text{Imports} - \text{Exports} - \text{Bunkers} \pm \text{Stock changes} = \text{Total energy requirement}$. Consumption by main user categories is available from the national energy balances.

- **Data Needed to Compile the Indicator:** Energy commodity data for consumption at the national level and by main user categories. National energy balances.
- **National and International Data Availability and Sources:** Energy commodity data for production and consumption are regularly available for most countries at the national level; and for some countries, at the sub-national level. The data are compiled by and available from national statistical offices and country publications.

TOTAL ENERGY CONSUMPTION PER CAPITA

SHARE OF HOUSEHOLDS WITH ACCESS TO ELECTRICITY

- **Brief Definition:** *Access to electricity* is defined as the percentage of the total population that has electrical power in their home. It includes commercially sold electricity, both on and off the grid. For those countries where access to electricity has been assessed through government surveys, it also includes self-generated electricity.

PERCENTAGE OF TRADITIONAL FUEL ENERGY USE

- The indicator measures the proportion of traditional fuels in energy sources. Traditional fuels are those of solid biomass. Solid biomass measures the amount of primary energy consumed from plant matter used directly as fuel or converted into other forms before combustion. Data are reported in thousand tonnes of oil equivalent (ktoe).
Solid biomass includes fuel wood (firewood, wood chips, bark, sawdust, shavings), animal materials/wastes, sulphite lyes (also known as "black liquor"), and other solid biomass. Inputs to charcoal production are included here. However, since charcoal is a secondary product, final charcoal production numbers are excluded to avoid double counting.
Consumption equals indigenous production + imports - exports - energy delivered to international marine bunkers +/- stock changes.