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| businessgraphs |
| From pivot table to graphs |
| User guide |

Top Countries (>=1%MS) ranking for Energy Consumption 330.05 Kilo PJ

Other

116.7

China 21%

United States 19%

India 9%

Nigeria 4%

Japan 4%

Germany 3%

Indonesia 3%

Canada 2%

France 2%

United Kingdom 2%

Brazil 2%

Italy 2%

Pakistan 1%

Ethiopia 1%

Turkey 1%

Poland 1%

Other 23%

Industry

101.9

China 40%

United States 11%

India 8%

Japan 4%

Brazil 3%

Germany 2%

Saudi Arabia 2%

Canada 2%

Indonesia 2%

Mexico 1%

Thailand 1%

South Africa 1%

United Arab Emirates 1%

France 1%

Turkey 1%

Italy 1%

Australia 1%

Other 17%

Transport

84.4

United States 31%

China 13%

Brazil 4%

India 4%

Japan 4%

Canada 3%

Germany 3%

Mexico 3%

Indonesia 2%

Saudi Arabia 2%

France 2%

United Kingdom 2%

Italy 2%

Australia 2%

Spain 1%

Malaysia 1%

Thailand 1%

Turkey 1%

Other 19%

non-energy use 27

China 25%

United States 19%

India 6%

Japan 6%

Saudi Arabia 4%

Thailand 4%

Germany 3%

Canada 3%

Brazil 2%

Netherlands 2%

France 2%

Belgium 1%

Indonesia 1%

Italy 1%

United Kingdom 1%

Egypt 1%

Singapore 1%

Other 16%

# Business Graph User Guide

This application is transforming CSV based tables into Marimekko and Punchcard graphs allowing to grasp at a glance numeric information embedded inside pivot tables based on the CSV underlying data.

# Prerequisite

To use the businessgraphs application, one needs to

1. Have a PC with Google Chrome web browser installed (version >56)
2. A Google account
3. CSV data ready for pivot table analysis

# EIA CSV data table

To provide a good coverage of businessgraphs, we are using a data table which is providing energy data coming from the International Energy Agency (EIA). This agency as for mission to cover the world energy production and consumption per various facets which is a nice use case to show businessgraphs operating modes.

We need to explain what is this data about to make sense and provide context for the present documentation.

Selecting this very important topic, energy, and showing the operating modes of businessgraphs to show results and benefits seemed a good opportunity designing such a documentation.

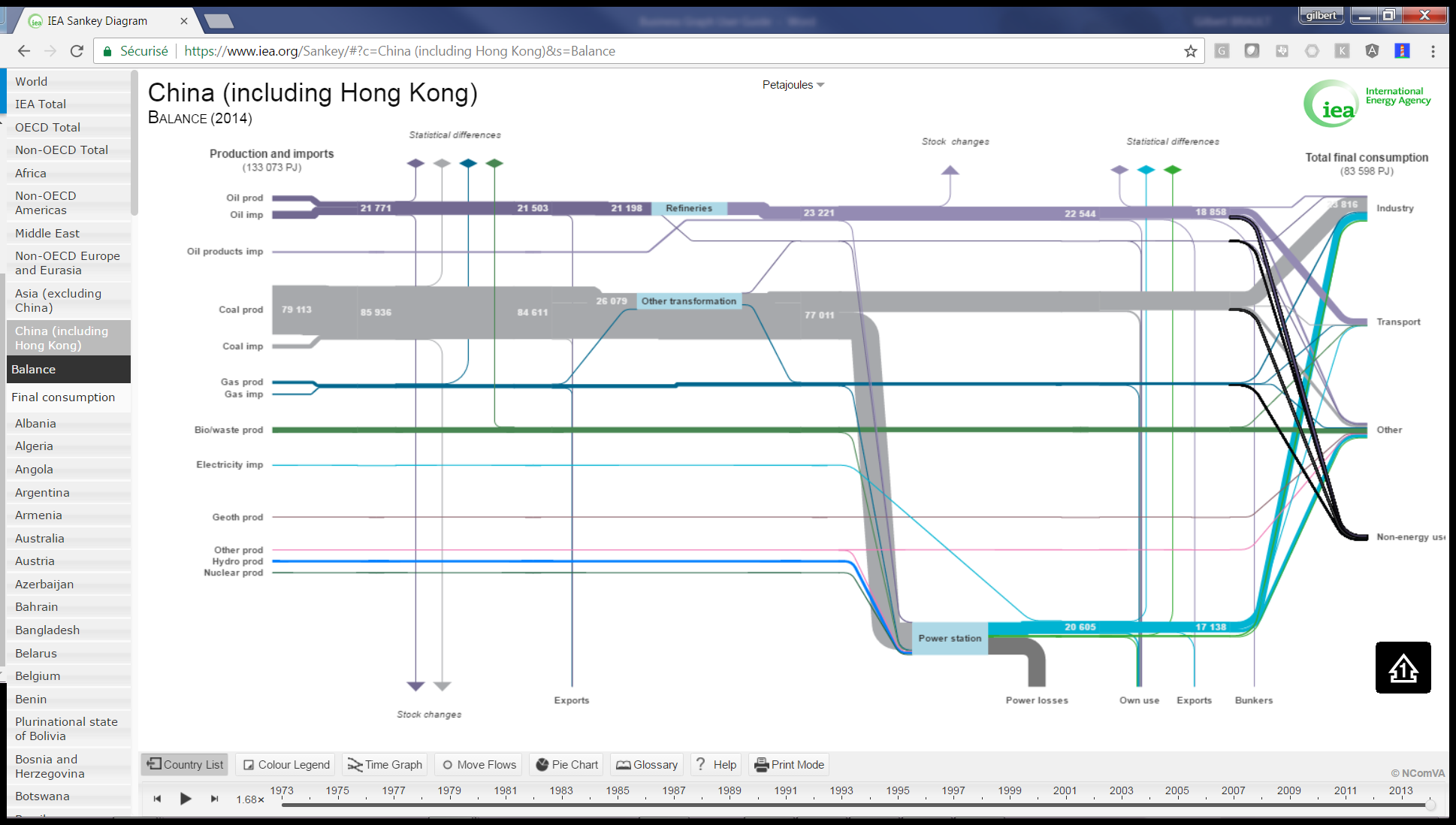
We are now going to spend some time about the definition of EIA data to be able to understand the course of action of this documentation.

It’s important to have a good understanding to be able to follow the rest of this documentation.

## EIA data

One can see the output of Energy data on EIA website: <https://www.iea.org>

The data is available by country in a Sankey diagram format for Energy Balance and Energy Final Consumption.



Here is the associated link for Energy Balance of China (Including Hong Kong) [https://www.iea.org/Sankey/#?c=China (including Hong Kong)&s=Balance](https://www.iea.org/Sankey/%23?c=China%20(including%20Hong%20Kong)&s=Balance)

Results are available in Million tons’ oil equivalent (Mtoe) or Peta Joules (PJ)

If we are looking the PJ results, it’s what one can read for this country and the following final consumption bins in 2014:

* Industry => 41 247 PJ
* Transport => 11 331 PJ
* Other => 24 336 PJ
* Non-Energy => 6 684 PJ

This data is available for years 1973 to 2014.

# Operating Modes

# Annexes

## EIA Definitions

# **Balance Definitions**

Sources of Energy:

* [Biofuels and Waste](https://www.iea.org/statistics/resources/balancedefinitions/#biofuelsandwaste)
* [Coal and Peat](https://www.iea.org/statistics/resources/balancedefinitions/#coalandpeat)
* [Crude Oil](https://www.iea.org/statistics/resources/balancedefinitions/#crudeoil)
* [Electricity](https://www.iea.org/statistics/resources/balancedefinitions/#electricity)
* [Geothermal, Solar, etc.](https://www.iea.org/statistics/resources/balancedefinitions/#geothermalsolaretc)
* [Heat](https://www.iea.org/statistics/resources/balancedefinitions/#heat)
* [Hydro](https://www.iea.org/statistics/resources/balancedefinitions/#hydro)
* [Natural Gas](https://www.iea.org/statistics/resources/balancedefinitions/#naturalgas)
* [Nuclear](https://www.iea.org/statistics/resources/balancedefinitions/#nuclear)
* [Oil Products](https://www.iea.org/statistics/resources/balancedefinitions/#oilproducts)

Supply which includes:

* [Indigenous Production](https://www.iea.org/statistics/resources/balancedefinitions/#iproduction)
* [Imports and Exports](https://www.iea.org/statistics/resources/balancedefinitions/#importsexports)
* [International Marine Bunkers](https://www.iea.org/statistics/resources/balancedefinitions/#intlmarinebunkers)
* [International Aviation Bunkers](https://www.iea.org/statistics/resources/balancedefinitions/#intlaviationbunkers)
* [Stock Changes](https://www.iea.org/statistics/resources/balancedefinitions/#stockchanges)
* [Total Primary Energy Supply (TPES)](https://www.iea.org/statistics/resources/balancedefinitions/#tpes)

Transfers, Transformation Processes and Energy Industry Own Use which includes:

* [CHP Plants](https://www.iea.org/statistics/resources/balancedefinitions/#chp)
* [Coal Transformation](https://www.iea.org/statistics/resources/balancedefinitions/#coaltrans)
* [Electricity Plants](https://www.iea.org/statistics/resources/balancedefinitions/#elecplants)
* [Energy Industry Own Use](https://www.iea.org/statistics/resources/balancedefinitions/#eiou)
* [Gas Works](https://www.iea.org/statistics/resources/balancedefinitions/#gasworks)
* [Heat Plants](https://www.iea.org/statistics/resources/balancedefinitions/#heatplants)
* [Liquefaction Plants](https://www.iea.org/statistics/resources/balancedefinitions/#liqplants)
* [Losses](https://www.iea.org/statistics/resources/balancedefinitions/#losses)
* [Oil Refineries](https://www.iea.org/statistics/resources/balancedefinitions/#oilrefineries)
* [Other Transformation](https://www.iea.org/statistics/resources/balancedefinitions/#othertransformation)
* [Statistical Differences](https://www.iea.org/statistics/resources/balancedefinitions/#statisticaldiff)
* [Transfers](https://www.iea.org/statistics/resources/balancedefinitions/#transfers)

Final Consumption which includes:

* [Agriculture/Forestry](https://www.iea.org/statistics/resources/balancedefinitions/#agforestry)
* [Commercial and Public Services](https://www.iea.org/statistics/resources/balancedefinitions/#commpubserv)
* [Fishing](https://www.iea.org/statistics/resources/balancedefinitions/#fishing)
* [Industry](https://www.iea.org/statistics/resources/balancedefinitions/#industry)
* [Non-Energy Use](https://www.iea.org/statistics/resources/balancedefinitions/#nonenergyuse)
* [Non-Specified](https://www.iea.org/statistics/resources/balancedefinitions/#nonspecified)
* [Other](https://www.iea.org/statistics/resources/balancedefinitions/#other)
* [Petrochemical Feedstocks](https://www.iea.org/statistics/resources/balancedefinitions/#pretrofeedstocks)
* [Transport](https://www.iea.org/statistics/resources/balancedefinitions/#transport)

**Biofuels and Waste**

Biofuels & waste is comprised of solid biofuels, liquid biofuels, biogases, industrial waste and municipal waste. Note that for biomass commodities, only the amounts specifically used for energy purposes (a small part of the total) are included in the energy statistics. Therefore, the non-energy use of biomass is not taken into consideration and quantities are null by definition. Data under this heading are often based on small sample surveys or other incomplete information. Thus the data give only a broad impression of developments, and are not strictly comparable between countries. In some cases complete categories of vegetal fuel are omitted through lack of information. For more information on a fuel type, please see the following list:

[Biogases](https://www.iea.org/statistics/resources/balancedefinitions/#biogases)  
[Liquid biofuels](https://www.iea.org/statistics/resources/balancedefinitions/#liquidbiofuels)  
[Industrial waste](https://www.iea.org/statistics/resources/balancedefinitions/#indwaste)  
[Municipal waste](https://www.iea.org/statistics/resources/balancedefinitions/#muwaste)  
[Primary solid biofuels and charcoal](https://www.iea.org/statistics/resources/balancedefinitions/#primarysolidbiofuels)

**Biogases**Biogases are gases arising from the anaerobic fermentation of biomass and the gasification of solid biomass (including biomass in wastes). The biogases from anaerobic fermentation are composed principally of methane and carbon dioxide and comprise landfill gas, sewage sludge gas and other biogases from anaerobic fermentation.   
  
Biogases can also be produced from thermal processes (by gasification or pyrolysis) of biomass and are mixtures containing hydrogen and carbon monoxide (usually known as syngas) along with other components. These gases may be further processed to modify their composition and can be further processed to produce substitute natural gas.

**Liquid biofuels**Liquid biofuels includes biogasoline, biodiesel and other liquid biofuels. It does not include the total volume of gasoline or diesel into which the biofuels are blended.

Biogasoline includes bioethanol (ethanol produced from biomass and/or the biodegradable fraction of waste), biomethanol (methanol produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol; the percentage by volume of bio-ETBE that is calculated as biofuel is 47%) and bioMTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%).   
  
Biodiesels includes biodiesel (a methyl-ester produced from vegetable or animal oil, of diesel quality), bio-dimethylether (dimethylether produced from biomass), Fischer Tropsh (Fischer Tropsh produced from biomass), cold pressed bio-oil (oil produced from oil seed through mechanical processing only) and all other liquid biofuels which are added to, blended with or used straight as transport diesel. Other liquid biofuels includes liquid biofuels not reported in either biogasoline or biodiesels.   
**Industrial waste**  
Industrial waste of non-renewable origin consists of solid and liquid products (e.g. tyres) combusted directly, usually in specialised plants, to produce heat and/or power. Renewable industrial waste is not included here, but with solid biofuels, biogas or liquid biofuels.   
  
**Municipal waste**  
Municipal waste consists of products that are combusted directly to produce heat and/or power and comprises wastes produced by households, industry, hospitals and the tertiary sector that are collected by local authorities for incineration at specific installations.   
  
**Primary solid biofuels and charcoal**  
Primary solid biofuels and charcoal are defined as any plant matter used directly as fuel or converted into other forms before combustion. This covers a multitude of woody materials generated by industrial process or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, sulphite lyes also known as black liquor, animal materials/wastes and other solid biomass).   
  
- Charcoal produced from solid biomass is also included here. Since charcoal is a secondary product, its treatment is slightly different than that of the other primary solid biofuels. Production of charcoal (an output in the transformation process) is offset by the inputs of primary solid biofuels into the charcoal production process. The losses from this process are included in the row other transformation. Other supply (e.g. trade and stock changes) as well as consumption are aggregated directly with the primary solid biofuels. In most countries, only the primary solid biofuels are reported.

**Coal and Peat**

Coal and peat includes all coal, both primary (including hard coal and lignite) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, gas works gas, coke oven gas, blast furnace gas and oxygen steel furnace gas). Peat is also included in this category.Note: starting with 2011 edition, gas works gas is included here with coal. In prior years, gas works gas was included with natural gas.

For more information on a coal type, please see the following list:

[Blast furnace gas and other recovered gases](https://www.iea.org/statistics/resources/balancedefinitions/#bfc)

[Coke oven coke, gas coke and coal tar](https://www.iea.org/statistics/resources/balancedefinitions/#coc)

[Coking coal](https://www.iea.org/statistics/resources/balancedefinitions/#cog)

[Gas works gas](https://www.iea.org/statistics/resources/balancedefinitions/#gwg)

[Lignite](https://www.iea.org/statistics/resources/balancedefinitions/#lignite)

[Patent fuel and brown coal / peat briquettes (BKB)](https://www.iea.org/statistics/resources/balancedefinitions/#patentf)

[Peat](https://www.iea.org/statistics/resources/balancedefinitions/#peat)

[Other bituminous coal and anthracite](https://www.iea.org/statistics/resources/balancedefinitions/#otbit)

[Sub-bituminous coal](https://www.iea.org/statistics/resources/balancedefinitions/#subbit)

**Blast furnace gas and other recovered gases**  
Blast furnace gas is produced during the combustion of coke in blast furnaces in the iron and steel industry. It is recovered and used as a fuel partly within the plant and partly in other steel industry processes or in power stations equipped to burn it. Also included here is oxygen steel furnace gas which is obtained as a by-product of the production of steel in an oxygen furnace and is recovered on leaving the furnace. Oxygen steel furnace gas is also known as converter gas, LD gas or BOS gas. This category may also cover other recovered gases.  
  
**Coke oven coke, gas coke and coal tar**  
Coke oven coke is the solid product obtained from the carbonisation of coal, principally coking coal, at high temperature. It is low in moisture content and volatile matter. Coke oven coke is used mainly in the iron and steel industry. Also included are semi-coke, a solid product obtained from the carbonisation of coal at a low temperature, lignite coke (a semi-coke made from lignite), coke breeze and foundry coke.

- Gas coke is a by-product of hard coal used for the production of town gas in gas works. Gas coke is used for heating purposes. Coal tar is a result of the destructive distillation of bituminous coal.   
- Coal tar is the liquid by-product of the distillation of coal to make coke in the coke oven process. Coal tar can be further distilled into different organic products (e.g. benzene, toluene, naphthalene), which normally would be reported as a feedstock to the petrochemical industry.   
  
**Coke oven gas**   
Coke oven gas is obtained as a by-product of the manufacture of coke oven coke for the production of iron and steel.   
  
**Coking coal**  
Coking coal refers to coal with a quality that allows the production of a coke suitable to support a blast furnace charge. Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis.   
  
**Gas works gas**  
Gas works gas covers all types of gas produced in public utility or private plants, whose main purpose is the manufacture, transport and distribution of gas. It includes gas produced by carbonisation (including gas produced by coke ovens and transferred to gas works), by total gasification (with or without enrichment with oil products) and by reforming and simple mixing of gases and/or air.   
  
**Lignite**  
Lignite is a non-agglomerating coal with a gross calorific value of less than 17 435 kJ/kg (4165 kcal/kg), and greater than 31 per cent volatile matter on a dry mineral matter free basis. Oil shale and tar sands produced and combusted directly are included in this category. Oil shale and tar sands used as inputs for other transformation processes are also included here (this includes the portion consumed in the transformation process).  
  
**Patent fuel and brown coal/peat briquettes (BKB)**Patent fuel is a composition fuel manufactured from coal fines with the addition of a binding agent (pitch). The amount of patent fuel produced is, therefore, slightly higher than the actual amount of coal consumed in the transformation process. BKB are composition fuels manufactured from brown coal, produced by briquetting under high pressure. These figures include peat briquettes, dried lignite, fines and dust.   
  
**Peat**   
Peat is a combustible soft, porous or compressed, fossil sedimentary deposit of plant origin with high water content (up to 90 per cent in the raw state), easily cut, of light to dark brown colour. Peat used for non-energy purposes is not included.  
  
**Other bituminous coal and anthracite**Other bituminous coal is used for steam raising and space heating purposes and includes all bituminous coals not included under coking coal. It is usually composed of more than 10 per cent volatile matter with a relatively high carbon content (less than 90 per cent fixed carbon). Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis.   
  
Anthracite is a high rank coal used for industrial and residential applications. It is generally less than 10 per cent volatile matter and a high carbon content (about 90 per cent fixed carbon). Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis.   
  
**Sub-bituminous coal**   
Non-agglomerating coals with a gross calorific value between 17 435 kJ/kg (4 165 kcal/kg) and 23 865 kJ/kg (5 700 kcal/kg) containing more than 31 per cent volatile matter on a dry mineral matter free basis.

**Crude Oil**

Crude oil comprises crude oil, natural gas liquids, refinery feedstocks, and additives as well as other hydrocarbons (including emulsified oils, synthetic crude oil, mineral oils extracted from bituminous minerals such as oil shale, bituminous sand, etc., and oils from coal liquefaction). Crude oil is a mineral oil consisting of a mixture of hydrocarbons of natural origin and associated impurities, such as sulphur. It exists in the liquid phase under normal surface temperatures and pressure and its physical characteristics (density, viscosity, etc.) are highly variable. It includes field or lease condensates (separator liquids) which are recovered from associated and non-associated gas where it is commingled with the commercial crude oil stream. For more information on a specific product, please see the following list:

[Additives](https://www.iea.org/statistics/resources/balancedefinitions/#a)  
[Natural gas liquids (NGL)](https://www.iea.org/statistics/resources/balancedefinitions/#n)  
[Other hydrocarbons](https://www.iea.org/statistics/resources/balancedefinitions/#h)  
[Refinery feedstocks](https://www.iea.org/statistics/resources/balancedefinitions/#r)

**Additives**Additives are non-hydrocarbon substances added or blended with a product to modify its properties, for example, to improve its combustion characteristics. Alcohols and ethers (MTBE, methyl tertiary-butyl ether) and chemical alloys such as tetraethyl lead are included here. However, ethanol is not included here, but under liquid biofuels.  
  
**Natural gas liquids (NGL)**NGLs are the liquid or liquefied hydrocarbons produced in the manufacture, purification and stabilisation of natural gas. These are those portions of natural gas which are recovered as liquids in separators, field facilities, or gas processing plants. NGLs include but are not limited to ethane, propane, butane, pentane, natural gasoline and condensate.   
  
**Other hydrocarbons**Other hydrocarbons includes emulsified oils (e.g. orimulsion), synthetic crude oil, mineral oils extracted from bituminous minerals such as oil shale, bituminous sand, etc. and liquids from coal liquefaction.   
  
**Refinery feedstocks**A refinery feedstock is processed oil destined for further processing (e.g. straight run fuel oil or vacuum gas oil) other than blending in the refining industry. It is transformed into one or more components and/or finished products. This definition covers those finished products imported for refinery intake and those returned from the petrochemical industry to the refining industry.

**Electricity**  
Electricity shows final consumption and trade in electricity (which is accounted at the same heat value as electricity in final consumption; i.e. 1 GWh = 0.000086 Mtoe).

**Geothermal, Solar, etc.**  
Geothermal, solar, etc. shows production of geothermal, solar, wind and tide/wave/ocean energy and the use of these energy forms for electricity and heat generation. Unless the actual efficiency of the geothermal process is known, the quantity of geothermal energy entering electricity generation is inferred from the electricity production at geothermal plants assuming an average thermal efficiency of 10%. For solar, wind and tide/wave/ocean energy, the quantities entering electricity generation are equal to the electrical energy generated. Other uses shown in this column relate to geothermal and solar heat.

**Heat**  
Heat shows the disposition of heat produced for sale. The large majority of the heat included in this column results from the combustion of fuels although some small amounts are produced from electrically powered heat pumps and boilers. Any heat extracted from ambient air by heat pumps is shown as production.

**Hydro**  
Hydro shows the energy content of the electricity produced in hydro power plants. Hydro output excludes output from pumped storage plants.

**Natural Gas**

Natural gas comprises gases, occurring in underground deposits, whether liquefied or gaseous, consisting mainly of methane. It includes both "non-associated" gas originating from fields producing only hydrocarbons in gaseous form, and "associated" gas produced in association with crude oil as well as methane recovered from coal mines (colliery gas) or from coal seams (coal seam gas). Production represents dry marketable production within national boundaries, including offshore production and is measured after purification and extraction of NGL and sulphur. It includes gas consumed by gas processing plants and gas transported by pipeline. Quantities of gas that are re-injected, vented or flared are excluded. 

**Nuclear**  
Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant with an average thermal efficiency of 33 per cent.

**Oil Products**

Oil products comprise refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other oil products. Oil products are any oil-based products which can be obtained by distillation and are normally used outside the refining industry. The exceptions to this are those finished products which are classified as refinery feedstocks.

[**Aviation gasoline**](https://www.iea.org/statistics/resources/balancedefinitions/#avgas)[**Bitumen**](https://www.iea.org/statistics/resources/balancedefinitions/#bit)[**Ethane**](https://www.iea.org/statistics/resources/balancedefinitions/#ethane)[**Fuel oil**](https://www.iea.org/statistics/resources/balancedefinitions/#fueloil)[**Gas/diesel oil (distilled fuel oil)**](https://www.iea.org/statistics/resources/balancedefinitions/#gdo)[**Kerosene**](https://www.iea.org/statistics/resources/balancedefinitions/#kerosene)[**Jet fuels**](https://www.iea.org/statistics/resources/balancedefinitions/#jf)[**Liquefied petroleum gases (LPG)**](https://www.iea.org/statistics/resources/balancedefinitions/#lpg)[**Lubricants**](https://www.iea.org/statistics/resources/balancedefinitions/#lub)[**Motor gasoline**](https://www.iea.org/statistics/resources/balancedefinitions/#motgas)[**Naphtha**](https://www.iea.org/statistics/resources/balancedefinitions/#naptha)[**Other oil products**](https://www.iea.org/statistics/resources/balancedefinitions/#otpet)[**Paraffin waxes**](https://www.iea.org/statistics/resources/balancedefinitions/#parwax)[**Petroleum coke**](https://www.iea.org/statistics/resources/balancedefinitions/#petcoke)[**Refinery gas (not liquefied)**](https://www.iea.org/statistics/resources/balancedefinitions/#refgas)[**White spirit**](https://www.iea.org/statistics/resources/balancedefinitions/#wspirit)

**Aviation gasoline**  
Aviation gasoline is motor spirit prepared especially for aviation piston engines, with an octane number suited to the engine, a freezing point of -60°C, and a distillation range usually within the limits of 30°C and 180°C.   
  
**Bitumen**  
Bitumen is a solid, semi-solid or viscous hydrocarbon with a colloidal structure which is brown to black in colour. It is obtained by vacuum distillation of oil residues from atmospheric distillation of crude oil. Bitumen is often referred to as asphalt and is primarily used for surfacing of roads and for roofing material. This category includes fluidised and cut back bitumen.   
  
**Ethane**  
Ethane is a naturally gaseous straight-chain hydro-carbon (C2H6). It is a colourless paraffinic gas which is extracted from natural gas and refinery gas streams.   
  
**Fuel oil**   
Fuel oil defines oils that make up the distillation residue. It comprises all residual fuel oils, including those obtained by blending. Its kinematic viscosity is above 10 cSt at 80°C. The flash point is always above 50°C and the density is always higher than 0.90 kg/l.   
  
**Gas diesel oil/(distillate fuel oil)**  
Gas/diesel oil includes heavy gas oils. Gas oils are obtained from the lowest fraction from atmospheric distillation of crude oil, while heavy gas oils are obtained by vacuum redistillation of the residual from atmospheric distillation. Gas/diesel oil distils between 180°C and 380°C. Several grades are available depending on uses: diesel oil for diesel compression ignition (cars, trucks, marine, etc.), light heating oil for industrial and commercial uses, and other gas oil including heavy gas oils which distil between 380°C and 540°C and which are used as petrochemical feedstocks.   
  
**Kerosene**  
Kerosene (other than kerosene used for aircraft transport which is included with aviation fuels) comprises refined petroleum distillate intermediate in volatility between gasoline and gas/diesel oil. It is a medium oil distilling between 150°C and 300°C.

**Jet fuel**  
This category comprises both gasoline and kerosene type jet fuels meeting specifications for use in aviation turbine power units.   
  
Gasoline type jet fuel includes all light hydrocarbon oils for use in aviation turbine power units which distil between 100°C and 250°C. This fuel is obtained by blending kerosenes and gasoline or naphthas in such a way that the aromatic content does not exceed 25 per cent in volume, and the vapour pressure is between 13.7 kPa and 20.6 kPa. Additives can be included to improve fuel stability and combustibility.  
Kerosene type jet fuel is medium distillate used for aviation turbine power units. It has the same distillation characteristics and flash point as kerosene (between 150°C and 300°C but not generally above 250°C). In addition, it has particular specifications (such as freezing point) which are established by the International Air Transport Association (IATA). It includes kerosene blending components.

**LPG**  
Liquefied petroleum gases are the light hydrocarbon fraction of the paraffin series, derived from refinery processes, crude oil stabilisation plants and natural gas processing plants comprising propane (C3H8) and butane (C4H10) or a combination of the two. They could also include propylene, butylene, isobutene and isobutylene. LPG are normally liquefied under pressure for transportation and storage.

**Lubricants**  
Lubricants are hydrocarbons produced from distillate or residue; they are mainly used to reduce friction between bearing surfaces. This category includes all finished grades of lubricating oil, from spindle oil to cylinder oil, and those used in greases, including motor oils and all grades of lubricating oil base stocks.

**Motor gasoline**   
Motor gasoline is light hydrocarbon oil for use in internal combustion engines such as motor vehicles, excluding aircraft. Motor gasoline is distilled between 35°C and 215°C and is used as a fuel for land based spark ignition engines. Motor gasoline may include additives, oxygenates and octane enhancers, including lead compounds such as TEL (Tetraethyl lead) and TML (tetramethyl lead).

**Naphtha**  
Naphtha is a feedstock destined either for the petrochemical industry (e.g. ethylene manufacture or aromatics production) or for gasoline production by reforming or isomerisation within the refinery. Naphtha comprises material that distils between 30°C and 210°C.   
  
**Other oil products**  
Other oil products not classified elsewhere (e.g. tar, sulphur and grease) are included here. This category also includes aromatics (e.g. BTX or benzene, toluene and xylene) and olefins (e.g. propylene) produced within refineries.  
  
**Paraffin waxes**Paraffin Waxes are saturated aliphatic hydrocarbons. These waxes are residues extracted when dewaxing lubricant oils and they have a crystalline structure which is more or less fine according to the grade. Their main characteristics are that they are colourless, odourless and translucent, with a melting point above 45°C.   
  
**Petroleum coke**Petroleum coke is defined as a black solid residue, obtained mainly by cracking and carbonising of petroleum derived feedstocks, vacuum bottoms, tar and pitches in processes such as delayed coking or fluid coking. It consists mainly of carbon (90 to 95 per cent) and has a low ash content. It is used as a feedstock in coke ovens for the steel industry, for heating purposes, for electrode manufacture and for production of chemicals. The two most important qualities are "green coke" and "calcinated coke". This category also includes "catalyst coke" deposited on the catalyst during refining processes: this coke is not recoverable and is usually burned as refinery fuel.   
  
**Refinery gas**  
Refinery gas is defined as non-condensable gas obtained during distillation of crude oil or treatment of oil products (e.g. cracking) in refineries. It consists mainly of hydrogen, methane, ethane and olefins. It also includes gases which are returned from the petrochemical industry. Refinery gas production refers to gross production.   
  
**White spirit**  
White spirit and SBP are refined distillate intermediates with a distillation in the naphtha/kerosene range. White spirit has a flash point above 30°C and a distillation range of 135°C to 200°C. Industrial spirit (SBP) comprises light oils distilling between 30°C and 200°C, with a temperature difference between 5 per cent volume and 90 per cent volume distillation points, including losses, of not more than 60°C. In other words, SBP is a light oil of narrower cut than motor spirit. There are seven or eight grades of industrial spirit, depending on the position of the cut in the distillation range defined above.

**Production**

Production is the production of primary energy, i.e. hard coal, lignite, peat, crude oil, NGL, natural gas, combustible renewables and waste, 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).

Calculation of production of hydro, geothermal, etc. and nuclear electricity is explained in the Energy Statistics Manual available for free download on the IEA website.

**Imports and Exports**

Imports and exports comprise amounts having crossed the national territorial boundaries of the country, whether or not customs clearance has taken place.

**Coal**  
Imports and exports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit should not be included.

**Oil and gas**   
Quantities of crude oil and oil products imported or exported under processing agreements (i.e. refining on account) are included. Quantities of oil in transit are excluded. Crude oil, NGL and natural gas are reported as coming from the country of origin; refinery feedstocks and oil products are reported as coming from the country of last consignment.

Re-exports of oil imported for processing within bonded areas are shown as exports of product from the processing country to the final destination.

**Electricity**   
Amounts are considered as imported or exported when they have crossed the national territorial boundaries of the country. If electricity is "wheeled" or transited through a country, the amount is shown as both an import and an export.

**International marine bunkers**

International marine bunkers covers those quantities delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship. Consumption by fishing vessels and by military forces is also excluded.

**International aviation bunkers**

International aviation bunkers includes deliveries of aviation fuels to aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. For many countries this incorrectly excludes fuel used by domestically owned carriers for their international departures.

Note: In October 2008 the IEA hosted the 3rd meeting of InterEnerStat. This group is made up of 24 international organizations that collect or use energy statistics. One of the objectives of the group is to improve the quality of energy data by harmonizing definitions for energy sources and flows. As a result of this meeting, the IEA has decided to align its energy statistics and balances with most other international organizations and to treat international aviation bunkers in the same way as international marine bunkers. Starting with the 2009 edition, international aviation bunkers is subtracted out of supply in the same way as international marine bunkers.

**Stock Changes**

Stock changes reflect the difference between opening stock levels at the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number.

**Total Primary Energy Supply**

 is made up of:

[Indigenous production](https://www.iea.org/statistics/resources/balancedefinitions/#iproduction)(row 1)**+**[imports](https://www.iea.org/statistics/resources/balancedefinitions/#importsexports)(row 2)**-**  [exports](https://www.iea.org/statistics/resources/balancedefinitions/#importsexports) (row 3)**-**[international marine bunkers](https://www.iea.org/statistics/resources/balancedefinitions/#intlmarinebunkers) (row 4)**-**[international aviation bunkers](https://www.iea.org/statistics/resources/balancedefinitions/#intlaviationbunkers) (row 5)**+/-** [stock changes](https://www.iea.org/statistics/resources/balancedefinitions/#stockchanges) (row 6).

Note: rows refer to the number of the row in the Energy Balance Table.

**Combined Heat and Power Plants**

Combined heat and power plants, refers to plants which are designed to produce both heat and electricity, sometimes referred to as cogeneration power stations. If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plant basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above is adopted.

Both public and autoproducer plants are included here. Note that for autoproducer CHP plants, all fuel inputs to electricity production are taken into account, while only the part of fuel inputs to heat **sold** is shown. Fuel inputs for the production of heat consumed within the autoproducer's establishment are **not** included here but are included with figures for the final consumption of fuels in the appropriate consuming sector.

Columns 1 to 8 of the Energy Balance Table, show the use of primary and secondary fuels for the production of electricity and heat as negative entries. Total gross electricity produced appears as a positive quantity in the electricity column and heat produced appears as a positive number in the heat column. Transformation losses appear in the total column as a negative number.

**Coal Transformation**

Coal transformation contains losses in transformation of coal from primary to secondary and from secondary to tertiary fuels (hard coal to coke, coke to blast furnace gas, lignite to BKB, etc.).

**Electricity Plants**

Electricity plants refers to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs can not be distinguished on a unit basis) then the whole plant is designated as a CHP plant. Both main activity producer and autoproducer plants are included here.

Columns 1 to 8 of the Energy Balance Table, show the use of primary and secondary fuels for the production of electricity as negative entries. Gross electricity produced (including power stations' own consumption) appears as a positive quantity in the electricity column. Transformation losses appear in the total column as a negative number.

**Energy Industry Own Use**

Energy industry own use contains the primary and secondary energy consumed by transformation industries for heating, pumping, traction, and lighting purposes. These quantities are shown as negative figures. Included here are, for example, own use of energy in coal mines, own consumption in power plants (which includes net electricity consumed for pumped storage) and energy used for oil and gas extraction.

**Gas Works**

Gas works is treated similarly to electricity generation, with the quantity produced appearing as a positive figure in the gas column, inputs as negative entries in the coal, oil products and gas columns, and conversion losses appearing in the total column. Note, this item also includes other gases blended with natural gas.

**Heat Plants**

Heat plants, refers to plants (including heat pumps and electric boilers) designed to produce heat only and who sell heat to a third party under the provisions of a contract. Both main activity producer and autoproducer plants are included here. Heat pumps that are operated within the residential sector where the heat is not sold are not considered a transformation process and are not included here – the electricity consumption appears as residential use. Columns 1 to 8 of the Energy Balances Table, show the use of primary and secondary fuels in a heating system that transmits and distributes heat from one or more energy source to, among others, residential, industrial, and commercial consumers for space heating, cooking, hot water, and industrial processes.

**Liquefaction Plants**

Liquefaction plants includes diverse liquefaction processes, such as coal liquefaction plants and gas-to-liquid plants.

**Losses**

Losses includes losses in gas distribution, electricity transmission, and coal transport.

**Oil Refineries**

Oil refineries shows the use of primary energy for the manufacture of finished oil products and the corresponding output. Thus, the total reflects transformation losses. In certain cases the data in the total column are positive numbers. This can be due either to problems in the primary refinery balance, or to the fact that the IEA uses regional net calorific values for oil products.

**Other Transformation**

Other transformation covers non-specified transformation not shown elsewhere, such as the transformation of primary solid biomass into charcoal.

**Statistical Differences**

Statistical differences includes the sum of the unexplained statistical differences for individual fuels, as they appear in the basic energy statistics. It also includes the statistical differences that arise because of the variety of conversion factors in the coal and oil columns.

**Transfers**

Transfers include interproduct transfers, products transferred and recycled products (e.g. used lubricants which are reprocessed).

**Agriculture/Forestry**

Agriculture/forestry includes deliveries to users classified as agriculture, hunting and forestry by the ISIC, and therefore includes energy consumed by such users whether for traction (excluding agricultural highway use), power or heating (agricultural and domestic) [ISIC Divisions 01 and 02].

**Commercial and Public Services**

Commercial and public services [ISIC Divisions 33, 36-39, 45-47, 52, 53, 55, 56, 58-66, 68-75, 77-82, 84 (excluding Class 8422), 85-88, 90-96 and 99].

**Fishing**

Fishing includes fuels used for inland, coastal and deep-sea fishing. Fishing covers fuels delivered to ships of all flags that have refuelled in the country (including international fishing) as well as energy used in the fishing industry [ISIC Division 03].

Prior to the 2007 edition, fishing was included with agriculture/forestry and this may continue to be the case for some countries.

**Industry**

Industry consumption is specified as follows (energy used for transport by industry is not included here but is reported under transport):

* **Iron and steel industry** [ISIC Group 241 and Class 2431];
* **Chemical and petrochemical industry** [ISIC Divisions 20 and 21] excluding petrochemical feedstocks;
* **Non-ferrous metals** basic industries [ISIC Group 242 and Class 2432];
* **Non-metallic minerals** such as glass, ceramic, cement, etc. [ISIC Division 23];
* **Transport equipment**[ISIC Divisions 29 and 30];
* **Machinery**. Fabricated metal products, machinery and equipment other than transport equipment [ISIC Divisions 25 to 28];
* **Mining** (excluding fuels) and quarrying [ISIC Divisions 07 and 08 and Group 099];
* **Food and tobacco** [ISIC Divisions 10 to 12];
* **Paper, pulp and print** [ISIC Divisions 17 and 18];
* **Wood and wood products** (other than pulp and paper) [ISIC Division 16];
* **Construction** [ISIC Divisions 41 to 43];
* **Textile and leather** [ISIC Divisions 13 to 15];
* **Non-specified** (any manufacturing industry not included above) [ISIC Divisions 22, 31 and 32].

Note: Most countries have difficulties supplying an industrial breakdown for all fuels. In these cases, the non-specified industry row has been used. Regional aggregates of industrial consumption should therefore be used with caution.  ISIC codes refer to the International Standard Industrial Classification of All Economic Activities, Series M, No. 4/Rev. 4, United Nations, New York, 2008.

**Non-Energy Use**

Non-energy use covers those fuels that are used as raw materials in the different sectors and are not consumed as a fuel or transformed into another fuel. Non-energy use is shown separately in final consumption under the heading non-energy use.

Note that for biomass commodities, only the amounts specifically used for energy purposes (a small part of the total) are included in the energy statistics. Therefore, the non-energy use of biomass is not taken into consideration and the quantities are null by definition.

**Non-Specified**

**Non-specified** includes all fuel use not elsewhere specified as well as consumption in the above-designated categories for which separate figures have not been provided. Military fuel use for all mobile and stationary consumption is included here (e.g. ships, aircraft, road and energy used in living quarters) regardless of whether the fuel delivered is for the military of that country or for the military of another country.

**Other**

Other covers residential, commercial and public services, agriculture/forestry, fishing and non-specified***.***

**Petrochemical Feedstocks**

The petrochemical industry includes cracking and reforming processes for the purpose of producing ethylene, propylene, butylene, synthesis gas, aromatics, butadene and other hydrocarbon-based raw materials in processes such as steam cracking, aromatics plants and steam reforming [part of ISIC Group 201].

**Transport**

Consumption in transport covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing [ISIC Divisions 49 to 51], and is specified as follows:

* **Domestic aviation**includes deliveries of aviation fuels to aircraft for domestic aviation - commercial, private, agricultural, etc. It includes use for purposes other than flying, e.g. bench testing of engines, but not airline use of fuel for road transport. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Note that this may include journeys of considerable length between two airports in a country (e.g. San Francisco to Honolulu). For many countries this incorrectly includes fuel used by domestically owned carriers for outbound international traffic (see international aviation bunkers).
* **Road** includes fuels used in road vehicles as well as agricultural and industrial highway use. Excludes military consumption as well as motor gasoline used in stationary engines and diesel oil for use in tractors that are not for highway use.
* **Rail** includes quantities used in rail traffic, including industrial railways.
* **Pipeline transport** includes energy used in the support and operation of pipelines transporting gases, liquids, slurries and other commodities, including the energy used for pump stations and maintenance of the pipeline. Energy for the pipeline distribution of natural or manufactured gas, hot water or steam (ISIC Division 35) from the distributor to final users is excluded and should be reported in energy industry own use, while the energy used for the final distribution of water (ISIC Division 36) to household, industrial, commercial and other users should be included in commercial/public services. Losses occurring during the transport between distributor and final users should be reported as losses.
* **Domestic navigation** includes fuels delivered to vessels of all flags not engaged in international navigation (see international marine bunkers). The domestic/international split should be determined on the basis of port of departure and port of arrival and not by the flag or nationality of the ship. Note that this may include journeys of considerable length between two ports in a country (e.g. San Francisco to Honolulu). Fuel used for ocean, coastal and inland fishing and military consumption are excluded.
* **Non-specified** includes all transport not elsewhere specified.

Note: International marine bunkers and international aviation bunkers are shown in Supply and are not included in transport as part of final consumption. ISIC codes refer to the International Standard Industrial Classification of All Economic Activities, Series M, No. 4/Rev. 4, United Nations, New York, 2008