

**ELECTRICITY INFORMATION
2013 EDITION**

**DOCUMENTATION FOR BEYOND 2020
FILES**

LIST OF ELECTRONIC TABLES

2013 edition

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Electricity Information 2013 – Electronic Tables

- OECD, Electricity and Heat Supply and Consumption (GWh, TJ): EleHeatBal_OECD.IVT

This table provides a full balance of electricity and heat for OECD countries, including gross and net production, trade, energy supply, energy industry use and final consumption.

- World¹, Electricity and Heat Supply and Consumption (GWh, TJ): EleHeatBal.IVT

This table provides a full balance of electricity and heat for the world, through 2010, including gross and net production, trade, energy supply, energy industry use and final consumption.

- OECD, Electricity and Heat Generation (GWh, TJ): EleHeatGen.IVT

This table presents gross electricity and heat production from each energy source such as Nuclear, Hydro, Combustible Fuels, Geothermal, Solar, Wind and Other Sources as well as the breakdown according to the type of plant (electricity only, CHP or heat only). Inputs by type of fuel are also provided.

- OECD, Net Electricity and Heat Production by Autoproducers (GWh, TJ): EleAuto.IVT

This table contains data on net electricity and heat production by autoproducers in all plants, by sector.

- OECD, Electricity Imports by Origin (GWh): EleImp.IVT

This table contains electricity imports by origin.

- OECD, Electricity Exports by Destination (GWh): EleExp.IVT

This table contains electricity exports by destination.

- OECD, Net Electrical Capacity (MWe): EleCap.IVT

This table shows a comprehensive status of net electrical capacity by type of energy. It also contains data on single fuel-fired and multi-fuel fired plants, type of generation and peak load.

- OECD, Monthly Net Electricity Supply (GWh): EleMonthly.IVT

This table includes monthly OECD net electricity production from main sources and trade data from January 2000 to December 2012.

1. Data for Non-OECD countries and World may differ between the electronic files and the Electricity Information paper publication, because at the time of publishing the paper publication, the data for non-OECD countries had not been finalised.

1. PRODUCT DEFINITIONS

Electricity and heat output		
Flow	Short name	Definition
Electricity	ELECTR	<p>Gross electricity production is measured at the terminals of all alternator sets in a station; it therefore includes the energy taken by station auxiliaries and losses in transformers that are considered integral parts of the station.</p> <p>The difference between gross and net production is generally estimated as 7% for conventional thermal stations, 1% for hydro stations, and 6% for nuclear, geothermal and solar stations. Production in hydro stations includes production from pumped storage plants.</p>
Heat	HEAT	<p>Heat production includes all heat produced by main activity producer CHP and heat plants, as well as heat sold by autoproducer CHP and heat plants to third parties.</p> <p>Fuels used to produce quantities of heat for sale are included in the transformation sector under the rows <i>CHP plants</i> and <i>Heat plants</i>. The use of fuels for heat which is not sold is included under the sectors in which the fuel use occurs.</p>

Primary electricity and heat sources

Flow	Short name	Definition
Nuclear	NUCLEAR	Energy released by nuclear fission or nuclear fusion.
Hydro	HYDRO	Hydro power represents the potential and kinetic energy of water converted into electricity in hydroelectric plants.
Pumped Hydro Production	HYDPUMP	Electricity produced in hydroelectric power stations from water pumped above the station.
Geothermal	GEO THERM	<p>Geothermal energy is the energy available as heat emitted from within the earth's crust, usually in the form of hot water or steam. It is exploited at suitable sites:</p> <ul style="list-style-type: none"> • for electricity generation using dry stream or high enthalpy brine after flashing • directly as heat for district heating, agriculture, etc.
Solar	SOLAR	<ul style="list-style-type: none"> • Electricity from photovoltaic cells. • Solar energy is the solar radiation exploited for hot water production and electricity generation, by: <ul style="list-style-type: none"> - flat plate collectors, mainly of the thermosyphon type, for domestic hot water or for the seasonal heating of swimming pools - solar thermal-electric plants <p>Passive solar energy for the direct heating, cooling and lighting of dwellings or other buildings is not included.</p>
Tide, Wave and Ocean	TIDE	Tide, wave and ocean represents the mechanical energy derived from tidal movement, wave motion or ocean current and exploited for electricity generation.
Wind	WIND	Wind energy represents the kinetic energy of wind exploited for electricity generation in wind turbines.

Combustible fuels

Flow	Short name	Definition
Combustible Fuels	COMBFUEL	Combustible fuels are capable of igniting or burning, i.e. reacting with oxygen to produce a significant rise in temperature; i.e. fossil fuels, fuels derived from biomass and fuels from wastes.

Coal and coal derived products

Flow	Short name	Definition
Hard Coal and Patent Fuel	HARDCOAL	Hard coal includes anthracite, coking coal, other bituminous coal, patent fuel, coke oven coke and gas coke. For Australia, Belgium, Finland, France, Iceland, Japan, Korea, Mexico, New Zealand, Portugal and the United States hard coal may also include sub-bituminous coal.
Lignite/Brown Coal and BKB	BROWN	Brown coal includes lignite, coal tar and BKB.
Coal Gases	MANGAS	Prior to 1990, coal gases include coke oven gas, blast furnace gas oxygen steel furnace gas..
Anthracite	ANTCOAL	Anthracite is a high rank coal used for industrial and residential applications. It is generally less than 10% volatile matter and a high carbon content (about 90% fixed carbon). Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis.
Coking Coal	COKCOAL	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.
Other Bituminous Coal	BITCOAL	Other bituminous coal is used for steam raising and space heating purposes and includes all bituminous coal that is not included under coking coal. It is usually more than 10% volatile matter and a relatively high carbon content (less than 90% 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	SUBCOAL	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% volatile matter on a dry mineral matter free basis.

Coal and coal derived products		
Flow	Short name	Definition
Lignite/Brown Coal	LIGNITE	Lignite/Brown coal is a non-agglomerating coal with a gross calorific value of less than 17 435 kJ/kg (4 165 kcal/kg), and greater than 31% 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). Shale oil and other products derived from liquefaction are included in <i>from other sources</i> under crude oil (<i>other hydrocarbons</i>).
Peat	PEAT	Peat is a combustible soft, porous or compressed, fossil sedimentary deposit of plant origin with high water content (up to 90% in the raw state), easily cut, of light to dark brown colour. Peat used for non-energy purposes is not included.
Patent Fuel	PATFUEL	Patent fuel is a composition fuel manufactured from hard coal fines with the addition of a binding agent. The amount of patent fuel produced is, therefore, slightly higher than the actual amount of coal consumed in the transformation process. Consumption of patent fuels during the patent fuel manufacturing process is included under <i>other energy industry</i> .
Coke Oven Coke and Lignite Coke	OVENCOKE	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, acting as energy source and chemical agent. 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/brown coal), coke breeze and foundry coke. The heading <i>other energy industry</i> includes the consumption at the coking plants themselves. Consumption in the <i>iron and steel industry</i> does not include coke converted into blast furnace gas. To obtain the total consumption of coke oven coke in the iron and steel industry, the quantities converted into blast furnace gas have to be added (these are included in <i>blast furnaces/gas works</i>).
Gas Coke	GASCOKE	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. <i>Other energy industry</i> includes the consumption of gas coke at gas works.
Coal Tar	COALTAR	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.

Coal and coal derived products

Flow	Short name	Definition
BKB/Peat Briquettes	BKB	BKB are composition fuels manufactured from lignite/brown coal, produced by briquetting under high pressure. These figures include peat briquettes, dried lignite fines and dust. The heading <i>other energy industry</i> includes consumption by briquetting plants.
Gas Works Gas	GASWKSGS	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.
Coke Oven Gas	COKEOVGS	Coke oven gas is obtained as a by-product of the manufacture of coke oven coke for the production of iron and steel.
Blast Furnace Gas	BLFURGS	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.
Oxygen Steel Furnace Gas	OXYSTGS	Oxygen steel furnace gas 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.

Crude, NGL and petroleum products

Flow	Short name	Definition
Liquid Fuels and Refinery Gas	LIQFUELS	Liquid fuels include all petroleum products (crude oil, NGL, refinery gas, LPG, naphtha, jet fuel, other kerosene, gas/diesel oil, residual fuel oil, bitumen, petroleum coke, other oil products) and refinery gases.
Crude Oil	CRUDEOIL	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.
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.

Crude, NGL and petroleum products		
Flow	Short name	Definition
Refinery Gas	REFINGAS	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. Own consumption is shown separately under <i>petroleum refineries</i> in the <i>energy</i> industry.
Liquefied Petroleum Gases	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 (C ₃ H ₈) and butane (C ₄ H ₁₀) 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.
Naphtha	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. Naphtha imported for blending is shown as an import of naphtha, and then shown in the transfers row as a negative entry for naphtha and a positive entry for the corresponding finished product (e.g. gasoline).
Kerosene Type Jet Fuel	JETKERO	Kerosene type jet fuel is a 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.
Kerosene	OTHKERO	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.
Gas/Diesel Oil	GASDIES	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. Gas/diesel oil does not include the liquid biofuel blended with gas/diesel oil – see liquid biofuels. This differs from the presentation of gas/diesel oil in the <i>Oil Information</i> publication.

Crude, NGL and petroleum products

Flow	Short name	Definition
Fuel Oil	RESFUEL	Heavy 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.
Bitumen	BITUMEN	Bitumen is a solid, semi-solid or viscous hydrocarbon with a colloidal structure that 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.
Petroleum Coke	PETCOKE	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%) 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.
Non-specified Petroleum Products	ONONSPEC	Other petroleum products not classified above (e.g. tar, sulphur and grease) are included here.

Gas

Flow	Short name	Definition
Natural Gas and Gas Works Gas	GAS	Prior to 1990, this aggregate includes natural gas and gas works gas.
Natural Gas	NATGAS	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.

Biofuels and wastes		
Flow	Short name	Definition
Primary Solid Biofuels	SBIOMASS	Primary solid biofuels is 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 <i>also known as black liquor</i> , animal materials/wastes and other solid biofuels).
Municipal Waste	MUNWASTE	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. Municipal waste is split into renewable and non-renewable.
Biogases	GBIOMASS	Gases in this category are composed principally of methane and carbon dioxide produced by anaerobic digestion of biofuels, comprising landfill gas, sewage sludge gas and other biogas.
Industrial Waste	INDWASTE	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, biogases or liquid biofuels.
Municipal Waste (Renewable)	MUNWASTER	Municipal waste (renewable) 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.
Municipal Waste (Non-Renewable)	MUNWASTEN	Municipal waste (non-renewable) 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.
Wood/Woodwaste/ Other solid waste	WOODVEG	This category covers organic, non-fossil material of biological origin which may be used as fuel for heat production or electricity generation. It covers purpose-grown energy crops (poplar, willow etc.), a multitude of woody materials generated by an industrial process (wood/paper industry in particular) or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, black liquor etc.) as well as wastes such as straw, rice husks, nut shells, poultry litter, crushed grape dregs etc. The quantity of fuel used should be reported on a net calorific value basis.
Landfill Gas	LANDFILL	Landfill gas is formed by the digestion of landfilled wastes.
Sewage Sludge Gas	SLUDGECS	Sewage sludge gas, produced from the anaerobic fermentation of sewage sludge.
Other Biogas	OBIOGAS	Other biogas, such as biogas produced from the anaerobic fermentation of animal slurries and of wastes in abattoirs, breweries and other agro-food industries.

Biofuels and wastes		
Flow	Short name	Definition
Liquid Biofuels	OBIOLIQ	Liquid fuels produced from biofuels, biodegradable organic waste, used frying oils, or other organic material. Please note that the quantities of liquid biofuels reported in this category should relate to the quantities of biofuel and not to the total volume of liquids into which the biofuels are blended.
Non-specified comb. renew. and waste	RENEWNS	This item is used when the detailed breakdown for primary biofuels and waste is not available.

Other generation sources		
Flow	Short name	Definition
Heat Pumps	HEATPUMP	Heat pumps should include the inputs and outputs to heat pumps corresponding to the amount of heat that is sold to third parties.
Electric Boilers	BOILER	Electric boilers should include the inputs and outputs to electric boilers corresponding to the amount of heat that is sold to third parties.
Heat from Chemical Sources	CHEMHEAT	Heat from chemical sources corresponds to heat originating from processes without input energy, such as a chemical reaction (e.g. the treatment of zinc oxide ore with hydrochloric acid). Note that waste heat originating from energy driven processes is not considered as a primary energy source and is included with the heat produced from the corresponding fuel.
Other Sources	OTHER	Other sources includes production now included elsewhere such as fuel cells.
Heat Output from non-specified comb fuels	HEATNS	This item is only used if the detailed breakdown is not available.
Total Sources	TOTAL	This item represents all the sources of electricity and heat generation.

2. BALANCE FLOW DEFINITIONS

Supply		
Flow	Short name	Definition
Gross Production	GROSPROD	This is the total gross electricity or heat production.
Own Use	OWNUSE	This is the difference between Gross and Net production.
Net Production	NETPROD	This is the total net electricity or heat production.
Imports	TOTIMPSB	Amounts are considered as imported 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.
Exports	TOTEXPSB	Amounts are considered as 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.
Used for Heat Pumps	EHEAT	This is the electricity used in heat pumps.
Used for Electric Boilers	EBOILER	This is the electricity used in electric boilers.
Used for Pumped Storage	EPUMPST	This is the electricity consumed by pumping in hydro-electric power plants.
Used for Electricity Production	EELE	Heat from chemical processes used as a primary energy form, and purchased secondary waste heat consumed as input to electricity generation.
Energy Supplied	SUPPLY	For <i>electricity</i> , this is the electrical energy supplied from the plant. In the case of a national network this is equal to the sum of the net electrical energy production supplied by all power stations within the country, reduced by the amount used simultaneously for pumping and reduced or increased by exports to or imports from abroad. For <i>heat</i> , this is equal to the sum of the net heat production for sale by all plants within a country reduced or increased by exports or imports from abroad.

Supply		
Flow	Short name	Definition
Transmission and Distribution Losses	DISTLOSS	This comprises all losses due to transport and distribution of electrical energy and heat. For electricity, losses in transformers which are not considered as integral parts of the power plants are also included.
Calculated Consumption	TFCCALC	This equals the Energy Supplied minus Transmission and Distribution Losses.
Statistical Difference	STATDIFF	This equals the Total Consumption (calculated) – Total Consumption (observed).
Observed Consumption	TFCOBS	This is the amount actually recorded in surveys of end-use sectors. It should, in principle, correspond to the total consumption (calculated).

Energy industry		
Flow	Short name	Definition
Total Energy Industry	TOTENGY	Energy industry covers the amount of fuels used by the energy producing industries (e.g. for heating, lighting and operation of all equipment used in the extraction process, for traction and for distribution). It includes energy consumed by energy industries for heating, pumping, traction and lighting purposes [ISIC Rev. 4 Divisions 05, 06, 19 and 35 and group 091 and classes 0892 and 0721].
Coal Mines	EMINES	Represents the energy which is used directly within the coal industry for hard coal and lignite mining. It excludes coal burned in pit-head power stations (included under electricity plants in the transformation sector) and free allocations to miners and their families (considered as part of household consumption and therefore included under residential).
Oil and Gas Extraction	EOILGASEX	Represents the energy which is used for oil and gas extraction. Flared gas is not included.
Blast Furnaces	EBLASTFUR	Represents the energy which is used in blast furnaces.
Gas Works	EGASWKS	Represents the energy which is used in gas works.
Gasification Plants for Biogases	E BIOGAS	Represents own consumption of biogases necessary to support temperatures needed for anaerobic fermentation.
Coke Ovens	ECOKEOVS	Represents the energy used in coke ovens.
Patent Fuel Plants	EPATFUEL	Represents the energy used in patent fuel plants.
BKB Plants	EBKB	Represents the energy used in BKB plants.
Oil Refineries	EREFINER	Represents the energy used in petroleum refineries.
Coal Liquefaction Plants	ECOALLIQ	Represents the energy used in coal liquefaction plants.
Liquefaction (LNG) / Regasification Plants	ELNG	Represents the energy used in LNG and regasification plants.
Gas-to-Liquids (GTL) Plants	EGTL	Represents the energy used in gas-to-liquids plants.
Nuclear Industry	ENUC	Represents the energy used in the nuclear industry.
Charcoal Production Plants	ECHARCOAL	Represents the energy used in charcoal production plants.
Non-specified (Energy)	ENONSPEC	Represents use in non-specified energy industry.

Final consumption		
Flow	Short name	Definition
Total Industry	TOTIND	Consumption of industry is specified in the following sub-sectors (energy used for transport by industry is not included here but is reported under transport):
Iron and Steel	IRONSTL	[ISIC Rev. 4 Group 241 and Class 2431]
Chemical and Petrochemical	CHEMICAL	[ISIC Rev. 4 Division 20 and 21] Excluding petrochemical feedstocks.
Non-Ferrous Metals	NONFERR	[ISIC Rev. 4 Group 242 and Class 2432] Basic industries.
Non-Metallic Minerals	NONMET	[ISIC Rev. 4 Division 23] Such as glass, ceramic, cement, etc.
Transport Equipment	TRANSEQ	[ISIC Rev. 4 Divisions 29 and 30]
Machinery	MACHINE	[ISIC Rev. 4 Divisions 25, 26, 27, 28] Fabricated metal products, machinery and equipment other than transport equipment.
Mining and Quarrying	MINING	[ISIC Rev. 4 Divisions 07 and 08 and group 099] Mining (excluding fuels) and quarrying.
Food and Tobacco	FOODPRO	[ISIC Rev. 4 Divisions 10, 11 and 12]
Paper, Pulp and Print	PAPERPRO	[ISIC Rev. 4 Divisions 17 and 18]
Wood and Wood Products	WOODPRO	[ISIC Rev. 4 Division 16] Wood and wood products other than pulp and paper.
Construction	CONSTRUC	[ISIC Rev. 4 Division 41, 42 and 43]
Textile and Leather	TEXTILES	[ISIC Rev. 4 Divisions 13, 14 and 15]
Non-specified (Industry)	INONSPEC	[ISIC Rev. 4 Divisions 22, 31, 32] Any manufacturing industry not included above. Note: Most countries have difficulties supplying an industrial breakdown for all fuels. In these cases, the <i>non-specified</i> industry row has been used. Regional aggregates of industrial consumption should therefore be used with caution.
Total Transport	TOTTRANS	engines) regardless of the economic sector to which it is contributing [ISIC Rev. 4 Divisions 49, 50 and 51] Consumption in transport covers all transport activity (in mobile and is divided into the following sub-sectors: rail, pipeline and non-specified transport.
Rail	RAIL	Includes quantities used in rail traffic, including industrial railways.

Final consumption		
Flow	Short name	Definition
Pipeline Transport	PIPELINE	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 from the distributor to final users is excluded and should be reported in <i>energy industry</i> , while the energy used for the final distribution of water to household, industrial, commercial and other users should be included in <i>commercial/public services</i> . Losses occurring during the transport between distributor and final users should be reported as <i>distribution losses</i> .
Non-specified (Transport)	TRNONSPE	Includes all transport not elsewhere specified. Note: <i>International marine bunkers</i> are shown in <i>Supply</i> and are not included in transport as part of final consumption.
Residential	RESIDENT	[ISIC Rev. 4 Division 97 and 98] which Includes consumption by households, excluding fuels used for transport. Includes households with employed persons is a small part of total residential consumption.
Commercial and Public Services	COMMPUB	[ISIC Rev. 4 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]
Agriculture/Forestry	AGRICULT	[ISIC Rev. 4 Divisions 01 and 02]. 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)
Fishing	FISHING	ISIC Rev. 4 Division 03]. 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 [
Non-specified (Other)	ONONSPEC	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.

3. ELECTRICITY AND HEAT GENERATION

Generation Flows		
Flow	Short name	Definition
Fuel Input Metric Ton	INPUTTON	This is the quantity of fuel used to produce electricity and heat measured in thousand metric tons.
Fuel Input TJ	INPUTTJ	This is the quantity of fuel used to produce electricity and heat measured in terajoules (TJ). Quantities are reported using net calorific values, except for gases which are reported in gross calorific values.
Gross Electricity Production	GELEPROD	Gross Electricity Production is the sum of the electrical energy production by all the generating sets concerned (including pumped storage) measured at the output terminals of the main generators.
Net Electricity Production	NELEPROD	Net Electricity Production is equal to the gross electricity production less the electrical energy absorbed by the generating auxiliaries and the losses in the main generator transformers.
Gross heat Production	GHEATPRO	Gross Heat Production is the total heat produced by the installation and includes the heat used by the installation's auxiliaries which use a hot fluid (space heating, liquid fuel heating, etc.) and losses in the installation/network heat exchanges. Note that for autoproducers, heat used by the undertaking for its own processes is not included here; only heat sold to third parties should be reported. As only heat sold to third parties is reported, gross heat production for autoproducers should be equal to net heat production.
Net Heat Production	NHEATPRO	Net Heat Production is the heat supplied to the distribution system as determined from measurements of the outgoing and return flows.

Plant type		
Flow	Short name	Definition
Main Activity Producer Electricity Plants	MAINELEC	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. Main activity producers (formerly referred to as public supply undertakings) generate electricity for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid.
Main Activity Producer CHP Plants	MAINCHP	Refers to plants which are designed to produce both heat and electricity (sometimes referred to as co-generation 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 should be adopted. Main activity producers (formerly referred to as public supply undertakings) generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid.
Main Activity Producer Heat Plants	MAINHEAT	Refers to plants (including heat pumps and electric boilers) designed to produce heat only and who sell heat to a third party (e.g. residential, commercial or industrial consumers) under the provisions of a contract. Main activity producers (formerly referred to as public supply undertakings) generate heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid.
Autoproducer Electricity Plants	AUTOELEC	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. Autoproducer undertakings generate electricity wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned.
Autoproducer CHP Plants	AUTOCHP	Refers to plants which are designed to produce both heat and electricity (sometimes referred to as co-generation 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 should be adopted. 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. Autoproducer undertakings generate electricity and/or heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned.

Plant type		
Flow	Short name	Definition
Autoproducer Heat Plants	AUTOHEAT	Refers to plants (including heat pumps and electric boilers) designed to produce heat only and who sell heat to a third party (e.g. residential, commercial or industrial consumers) under the provisions of a contract. Autoproducer undertakings generate heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned.
Total Main Activity Producer Plants	MAINTOT	This refers to inputs to and outputs from all main activity producer plants.
Total Autoproducer Plants	AUTOTOT	This refers to inputs to and outputs from all autoproducer plants.
Total Plants	TOTAL	This refers to inputs to and outputs from all plants.

4. ELECTRICAL CAPACITIES

Generation type		
Flow	Short name	Definition
Total Capacity	TOTCAP	<p>The capacity at 31st December is reported. It includes electrical capacity of both electricity (only) and CHP plants. Data for fuel cells are reported in the row "Other fuel sources".</p> <p>Net Maximum Electrical Capacity: the sum of the net maximum capacities of all stations taken individually at a given period of operation. The net maximum capacity is the maximum active power that can be supplied, continuously, with all plants running, at the point of outlet to the network (i.e. after taking the power supplies for the station auxiliaries and allowing for the losses in those transformers considered integral to the station). It represents the sum of all individual plants' maximum capacities available to run continuously throughout a prolonged period of operation in a day. Does not include overload capacity that can only be sustained for a short period of time (e.g. internal combustion engines momentarily running above their rated capacity). It is assumed that all equipment is in full working order, that the power produced can be disposed of without any restrictions and that optimum conditions prevail as regards primary sources (i.e. flow and head in the case of hydro plant; grade and quantity of fuel in hand and water supply, temperature, and purity in the case of thermal plant, and assuming that the output and method of production in CHP plant are those which lend to maximum electricity production).</p>
Solid/Liquid	SOLLIQ	Refers to units capable of generating electricity using solid and liquid fuel.
Solid/Natural Gas	SOLGAS	Refers to units capable of generating electricity using solid fuel and natural gas.
Liquid/Natural Gas	LIQGAS	Refers to units capable of generating electricity using liquid fuels and natural gas.
Solid/Liquid/Gas	SOLIGAS	Refers to units capable of generating electricity using solid, liquid fuels and natural gas.

Generation type		
Flow	Short name	Definition
Steam	STEAM	This refers to two main types of steam turbines -- non-condensing (or open cycle), also called back-pressure turbines, and condensing turbines (or closed cycle). In non-condensing turbines, the exhaust steam leaving the turbine is used either as co-generated process steam or, more rarely, released into the atmosphere. In a condensing turbine, the exhaust steam is condensed and the water thus formed supplies the feedwater for the generator. The boilers supplying steam turbines can be fuelled by all forms of fossil fuels.
Internal Combustion/ Diesel	INTCOMB	The internal combustion engines referred to in this heading are the engines based on the gasoline or diesel cycle, which work on the spark ignition or the compression-ignition principle. Diesel-type engines can use a variety of fuels ranging from natural gas to liquid fuels.
Gas Turbine	GASTURB	This refers to the gas turbine that use high temperature, high pressure gas as fuel, in which part of the heat supplied by the gas is converted into rotational energy. Fuel can be natural gas, coal gases or liquid fuels.
Combined Cycle	COMBINED	The combined cycle system refers to electricity produced by coupling two heat engines in a sequence to drive generators. The heat discharged from one heat engine serves as the energy source for the next engine. The gas turbine is generally used as the first heat engine and a conventional condensing steam turbine at the second stage.
Other Type of Generation	OTHGEN	This refers to electric generating capacity not included elsewhere.
Peak Load	PEAKLOAD	This is the highest value of the power absorbed or supplied by a network or combination of networks within the country.
Capacity at Peak	PEAKCAP	This is the available capacity of an installation at peak period is the maximum power at which it can be operated under the prevailing conditions at the time, assuming no external constraints. It depends on the technical state of the equipment and its ability to operate, and may be less than Net Maximum Capacity due to lack of water for hydro capacity, unanticipated shutdown, etc.

5. GEOGRAPHICAL COVERAGE

Countries and regions		
Country/Region	Short name	Definition
Australia	AUSTRALI	Excludes the overseas territories.
Austria	AUSTRIA	
Belgium	BELGIUM	
Canada	CANADA	
Chile	CHILE	
Czech Republic	CZECH	
Denmark	DENMARK	Excludes the Danish Faroes and Greenland
Estonia	ESTONIA	Data for Estonia are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Finland	FINLAND	
France	FRANCE	Includes Monaco, and excludes the following overseas departments and territories: Guadeloupe, Guyana, Martinique, New Caledonia, French Polynesia, Reunion, and St.-Pierre and Miquelon.
Germany	GERMANY	
Greece	GREECE	
Hungary	HUNGARY	
Iceland	ICELAND	
Ireland	IRELAND	
Israel	ISRAEL	The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Italy	ITALY	Includes San Marino and the Vatican.

Countries and regions		
Country/Region	Short name	Definition
Japan	JAPAN	Includes Okinawa.
Korea	KOREA	
Luxembourg	LUXEMBOU	
Mexico	MEXICO	
Netherlands	NETHLAND	Excludes Suriname and the Netherlands Antilles.
New Zealand	NZ	
Norway	NORWAY	
Poland	POLAND	
Portugal	PORTUGAL	Includes the Azores and Madeira.
Slovak Republic	SLOVAKIA	
Slovenia	SLOVENIA	Data for Slovenia are available starting in 1990. Prior to that, they are included in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
Spain	SPAIN	Includes the Canary Islands.
Sweden	SWEDEN	
Switzerland	SWITLAND	Does not include Liechtenstein.
Turkey	TURKEY	
United Kingdom	UK	
United States	USA	Includes the 50 states and the District of Columbia.
OECD Total	OECDTOT	Includes Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. Estonia and Slovenia are included starting in 1990. Prior to 1990, data for Estonia are included in Former Soviet Union and data for Slovenia in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
OECD Americas	OECDAM	Includes Canada, Chile, Mexico and the United States.
OECD Asia Oceania	OECDAO	Includes Australia, Israel, Japan, Korea and New Zealand.

Countries and regions		
Country/Region	Short name	Definition
OECD Europe	OECD EUR	Includes Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom. Estonia and Slovenia are included starting in 1990. Prior to 1990, data for Estonia are included in Former Soviet Union and data for Slovenia in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
IEA Total	IEA TOT	Includes Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.
IEA Americas	IEA AM	Includes Canada and the United States.
IEA Asia Oceania	IEA AO	Includes Australia, Japan, Korea and New Zealand.
IEA Europe	IEA EUR	Includes Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom.
Non-OECD Total	NON-OECD TOT	Includes all Non-OECD countries.
Africa	AFRICA	Includes Algeria, Angola, Benin, Botswana (from 1981), Cameroon, Congo, Democratic Republic of Congo, Côte d'Ivoire, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Libyan Arab Jamahiriya, Morocco, Mozambique, Namibia (from 1991), Nigeria, Senegal, South Africa, Sudan, United Republic of Tanzania, Togo, Tunisia, Zambia, Zimbabwe and Other Africa.
Latin America	LATIN AMERI	Includes Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela and Other Latin America.
Asia excluding China	ASIA	Includes Bangladesh, Brunei Darussalam, Cambodia, Chinese Taipei, India, Indonesia, DPR of Korea, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam and Other Asia.
China (including Hong Kong)	CHINA REG	Includes the People's Republic of China and Hong Kong (China).

Countries and regions		
Country/Region	Short name	Definition
Non-OECD Europe and Eurasia	EURASIA	Includes Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Georgia, Gibraltar, Former Yugoslav Republic of Macedonia (FYROM), Kazakhstan, Kosovo, Kyrgyzstan, Latvia, Lithuania, Malta, Montenegro, Republic of Moldova, Romania, Russian Federation, Serbia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.
Middle East	MIDDLEEAST	Includes Bahrain, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.
World marine and aviation bunkers	WORLDBUNK	Due to the structure of the database and the specific nature of international marine and aviation bunkers, including CO ₂ emissions, World marine and aviation bunkers are reported both as a flow and as an entity similar to a country or a region. World marine and aviation bunkers represent the sum of international marine and aviation bunkers from all countries. Therefore, World marine and aviation bunkers are not applicable for individual countries and regions, and they are included in the transport for the world total.
World	WORLD	Includes OECD Total, non-OECD Total, World marine bunkers and World aviation bunkers.
Algeria	ALGERIA	
Angola	ANGOLA	
Benin	BENIN	
Botswana	BOTSWANA	
Cameroon	CAMEROON	
Congo	CONGO	
Democratic Rep. of Congo	CONGOREP	
Cote d'Ivoire	COTEIVOIRE	
Egypt	EGYPT	
Eritrea	ERITREA	
Ethiopia	ETHIOPIA	
Gabon	GABON	
Ghana	GHANA	
Kenya	KENYA	
Libya	LIBYA	

Countries and regions		
Country/Region	Short name	Definition
Morocco	MOROCCO	
Mozambique	MOZAMBIQUE	
Namibia	NAMIBIA	
Nigeria	NIGERIA	
Senegal	SENEGAL	
South Africa	SOUTHAFRIC	
Sudan	SUDAN	
United Republic of Tanzania	TANZANIA	
Togo	TOGO	
Tunisia	TUNISIA	
Zambia	ZAMBIA	
Zimbabwe	ZIMBABWE	
Other Africa	OTHERAFRIC	Includes Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Djibouti, Equatorial Guinea, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Niger, Reunion, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, Somalia, Swaziland and Uganda.
Argentina	ARGENTINA	
Bolivia	BOLIVIA	
Brazil	BRAZIL	
Colombia	COLOMBIA	
Costa Rica	COSTARICA	
Cuba	CUBA	
Dominican Republic	DOMINICANR	
Ecuador	ECUADOR	
El Salvador	ELSALVADOR	
Guatemala	GUATEMALA	
Haiti	HAITI	
Honduras	HONDURAS	
Jamaica	JAMAICA	

Countries and regions		
Country/Region	Short name	Definition
Netherlands Antilles	NANTILLES	The Netherlands Antilles was dissolved on 10 October 2010, resulting in two new “constituent countries” of the Netherlands (Curaçao and Saint Maarten), with the other islands joining the Netherlands as “special municipalities”. However, due to a lack of detailed data, the Secretariat’s data and estimates under the “Netherlands Antilles” still refer to the whole territory of the Netherlands Antilles as it was known prior to 10 October 2010.
Nicaragua	NICARAGUA	
Panama	PANAMA	
Paraguay	PARAGUAY	
Peru	PERU	
Trinidad and Tobago	TRINIDAD	
Uruguay	URUGUAY	
Venezuela	VENEZUELA	
Other Latin America	OTHERLATIN	Includes Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Falkland Islands, French Guyana, Grenada, Guadeloupe, Guyana, Martinique, Montserrat, St. Kitts and Nevis, Saint Lucia, Saint Pierre et Miquelon, St. Vincent and the Grenadines, Suriname, and Turks and Caicos Islands.
Bangladesh	BANGLADESH	
Brunei	BRUNEI	
Cambodia	CAMBODIA	
Hong Kong (China)	HONGKONG	
India	INDIA	
Indonesia	INDONESIA	
DPR of Korea	KOREADPR	
Malaysia	MALAYSIA	
Mongolia	MONGOLIA	
Myanmar	MYANMAR	
Nepal	NEPAL	
Pakistan	PAKISTAN	
Philippines	PHILIPPINE	
Singapore	SINGAPORE	
Sri Lanka	SRILANKA	

Countries and regions		
Country/Region	Short name	Definition
Chinese Taipei	TAIPEI	
Thailand	THAILAND	
Vietnam	VIETNAM	
Other Asia	OTHERASIA	Includes Afghanistan, Bhutan, Cambodia (until 1994), Cook Islands, East Timor, Fiji, French Polynesia, Kiribati, Laos, Macau, Maldives, Mongolia (until 1984), New Caledonia, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu.
People's Republic of China	CHINA	
Albania	ALBANIA	
Bulgaria	BULGARIA	
Cyprus	CYPRUS	<p>Note by Turkey:</p> <p><i>The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".</i></p> <p>Note by all the European Union Member States of the OECD and the European Union:</p> <p><i>The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this report relates to the area under the effective control of the Government of the Republic of Cyprus.</i></p>
Gibraltar	GIBRALTAR	
Malta	MALTA	
Romania	ROMANIA	
Bosnia and Herzegovina	BOSNIAHERZ	Data for Bosnia and Herzegovina are available starting in 1990. Prior to that, they are included in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
Croatia	CROATIA	Data for Croatia are available starting in 1990. Prior to that, they are included in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
FY Republic of Macedonia	FYROM	Data for FYROM are available starting in 1990. Prior to that, they are included in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
Kosovo	KOSOVO	Data for Kosovo are available starting in 2000. Prior to that, they are included in Serbia.

Countries and regions		
Country/Region	Short name	Definition
Montenegro	MONTENEGRO	Data for Kosovo are available starting in 2005. Prior to that, they are included in Serbia.
Serbia	SERBIA	Data for Serbia are available starting in 1990. Prior to that, they are included in Former Yugoslavia in the publication <i>Energy Balances of Non- OECD Countries</i> .
Armenia	ARMENIA	Data for Armenia are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Azerbaijan	AZERBAIJAN	Data for Azerbaijan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Belarus	BELARUS	Data for Belarus are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Georgia	GEORGIA	Data for Georgia are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Kazakhstan	KAZAKHSTAN	Data for Kazakhstan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Kyrgyzstan	KYRGYZSTAN	Data for Kyrgyzstan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Latvia	LATVIA	Data for Latvia are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Lithuania	LITHUANIA	Data for Lithuania are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Republic of Moldova	MOLDOVA	Data for Moldova are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Russia	RUSSIA	Data for Russian Federation are available starting in 1990. Prior to that, they are included in Former Soviet Union. in the publication <i>Energy Balances of Non- OECD Countries</i> .
Tajikistan	TAJIKISTAN	Data for Tajikistan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Turkmenistan	TURKMENIST	Data for Turkmenistan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .

Countries and regions		
Country/Region	Short name	Definition
Ukraine	UKRAINE	Data for Ukraine are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Uzbekistan	UZBEKISTAN	Data for Uzbekistan are available starting in 1990. Prior to that, they are included in Former Soviet Union in the publication <i>Energy Balances of Non- OECD Countries</i> .
Bahrain	BAHRAIN	
Islamic Republic of Iran	IRAN	
Iraq	IRAQ	
Jordan	JORDAN	
Kuwait	KUWAIT	
Lebanon	LEBANON	
Oman	OMAN	
Qatar	QATAR	
Saudi Arabia	SAUDIARABI	
Syria	SYRIA	
United Arab Emirates	UAE	
Yemen	YEMEN	

6. ABBREVIATIONS

GJ	:	Gigajoule (10^9 joules)
GW	:	Gigawatt
GWh	:	Gigawatt hour = 3.6 Terajoules
kW	:	kilowatt
kWh	:	kilowatt hour
MW	:	Megawatt (electric)
MWh	:	Megawatt hour
MW _{th}	:	Megawatt thermal
m ²	:	metre squared
t	:	metric ton = tonne
TJ	:	Terajoule (10^{12} joules)
1 toe	:	tonne of oil equivalent = 41.868 GJ = 10^7 kcal
TWh	:	Terawatt hour
GDP	:	Gross domestic product
RES	:	Renewable energy sources
TPES	:	Total primary energy supply
c	:	confidential data
e	:	estimated data
..	:	not available
x	:	not applicable

7. SOURCES AND NOTES

General notes

Energy data for OECD countries are submitted to the IEA Secretariat in a common reporting format and methodology to allow for international comparisons to be made.

Energy data reported for 2012 (shown as 2012e) are preliminary estimates based on submissions received in early 2013 and on monthly submissions to the IEA from member countries.

Statistics of non-OECD countries presented in this publication are based on available data at the time of publishing and may differ from the final non-OECD data to be published in *Energy Statistics of Non-OECD Countries*.

Additional information on methodologies and reporting conventions are included in the notes in *Energy Balances of OECD Countries 2013 Edition* and *Energy Statistics of OECD Countries 2013 Edition*.

Qualifiers

Data marked as 'e' are the estimates of the IEA secretariat. Data marked as 'c' means that data are confidential due to country specific regulations. Data marked as '.' means that data are not available (either not collected or not submitted by national government). Data marked as 'x' means that the data point is not applicable, there is no meaningful explanation of a value there (for example, unit price is not shown if there was no trade).

Data sources

Historical data (1960-2011)

The annual historical data in Part II of this report are taken from the IEA/OECD databases of Energy Statistics which are based on annual submissions from all OECD member countries.

i) IEA/OECD Electricity Statistics

This database of annual statistics for OECD countries covers generating capacity and electricity production from main activity producer and autoproducer plants. It includes information on electricity and heat production by fuel type and supply/demand balances for electricity and heat from different types of power and heat plants.

The main data from this system are published annually in this IEA/OECD publication, *Electricity Information*.

ii) IEA/OECD Coal Statistics

This database of annual statistics for OECD countries covers all primary solid fuels, derived fuels and related manufactured gases. It contains detailed supply/demand balances for each fuel, as well as information on coal trade by origin and destination.

The main data from this system are published annually in the IEA/OECD publication *Coal Information*.

iii) IEA/OECD Oil and Gas Statistics

This database of annual statistics for OECD countries covers crude oil, NGL, refinery feedstocks and natural gas, as well as derived petroleum products. It includes detailed supply/demand balances, trade by origin and destination and stock levels and changes.

The main data from this system are published annually in the IEA/OECD publications *Oil Information* and *Natural Gas Information*.

iv) IEA/OECD Renewables Statistics

This database of annual statistics for OECD countries covers hydroelectricity, solid biofuels, geothermal, renewable municipal waste, wind, gas from biofuels, liquid biofuels, solar photovoltaics, solar thermal, tide/wave/ocean, non-renewable municipal waste and industrial waste. It includes electricity and heat

production from renewable sources, and a supply/demand balances of renewable and waste products.

The main data from this system are published annually in the IEA/OECD publication *Renewables Information*.

v) IEA/OECD Energy Statistics

This annual database integrates data from the four IEA/OECD statistical database systems listed above to provide a summary of energy supply and demand for each OECD country. It includes detailed statistics on production, trade and consumption for each source of energy, expressed in original units (e.g. tonne, TJ, GWh).

The main data from this data system are published annually in the IEA/OECD *Energy Statistics of OECD Countries*. Detailed country notes referring to historical data can be found in this publication.

vi) IEA/OECD Energy Balances

Overall energy balances are constructed annually for all OECD countries from the basic energy statistics described above. The overall energy balance data are expressed in a common energy unit of tonne of oil equivalent (toe) and presented in a standard matrix

format. The balances are published annually in the IEA/OECD publication *Energy Balances of OECD Countries* in which detailed country notes referring to historical data can be found.

vii) IEA/OECD Energy Prices and Taxes

The prices and taxes are published quarterly in IEA/OECD *Energy Prices and Taxes*.

viii) OECD Main Economic Indicators

OECD Main Economic Indicators is a monthly compilation of a range of indicators on recent economic developments for the 34 OECD member countries. Please refer to this publication for detailed notes regarding the selected indicators.

Latest year data: 2012

Data reported for 2012 in this publication are submitted to the Secretariat by member countries as preliminary data and are shown in this book as 2012e. Final 2012 data on electricity and heat will be submitted by OECD member countries to the Secretariat in Annual Questionnaires in late 2013. As a result, final data for 2012 and preliminary 2013 data will be published in the *Electricity Information 2014 Edition*.

8. COUNTRY NOTES

General notes applicable to all countries

These notes refer to data from 1960 to 2011. As a general rule, most series show a more detailed breakdown from 1970, due to limited availability of data prior to that year. Data on inputs to and output from combined heat and power plants and from heat plants may have been estimated by the Secretariat.

Prior to 1974, there is no split available between main activity producer and autoproducer electricity plants for any country.

Australia

For 2012 estimates, the Australian Administration provided natural gas production numbers which appeared too high. Information received after the preparation of this report suggest that 2012 production should have been about 47.03 Mtoe, an increase of 5%, not the 17% previously reported and included in this report.

In the 2012 edition, data for Australia were revised back to 2005 due to the adoption of the National Greenhouse and Energy Reporting (NGER) data as the main energy consumption data source for the Australian Energy Statistics. As a result, there are breaks in the time series for many data between 2004 and 2005. The Australian administration plans on revising the data in prior years as resources become available.

Data refer to fiscal year (*e.g.* July 2010 to June 2011 for 2011). For the 2002 data, the Australian Administration started to use a new survey methodology which caused shifts in the structure of industry consumption. The Australian Administration is planning to revise the historical series. Fuels used for generation by autoproducers are for single-fuel-fired units

only. The use of fuel in multi-fired units operated by autoproducers is included in industry consumption. Inputs to and outputs from autoproducer CHP plants are not available prior to 1986. In 2002, the Australian Administration reclassified the types of plants between main activity producers and autoproducers.

The production of electricity from wind is available from 1994. Electricity production from solar PV starts in 1992 and from solar thermal in 2003. Prior to 1995, electricity production from biogases is included with natural gas.

Heat data are not available from 1992 onwards.

Prior to 1971 electricity consumption in the commercial and public services sector is included in industry. Prior to 1974, the breakdown of electricity consumption in industry and energy sub-sectors is not available and energy industry consumption is included in industry. Electricity consumption in coke ovens has been estimated by the Australian Administration from 1974 to 1999. Prior to 2006, electricity consumption in the mining and quarrying sector includes consumption in liquefaction/regasification plants. From 1990 to 2007, electricity consumption in the wood and wood products sector is included together with paper, pulp and printing.

The direct use of solar energy (mostly domestic solar panels) is available from 1974.

Capacity refers to net maximum capacity on 30 June.

Austria

Breaks in the series from 1995 to 1996 and from 1998 to 1999 are due to different methods of survey.

Electricity plants data may include some CHP plants operating in electricity only mode. Prior to 1981, all electricity production by CHP plants is included in

electricity plants, and only production from combustible fuel sources is taken into account.

Prior to 1981, autoproducer CHP heat production is included in main activity producer CHP plants. For heat, own use is included in distribution losses.

Inputs to main activity producer electricity plants include inputs to CHP plants prior to 1981. Inputs of other oil products to autoproducer CHP plants were reclassified as refinery gas and natural gas in 2009.

Electricity consumption in non-specified transport represents tramways, electric busses, ski-lifts and cable cars. Electricity consumption in oil refineries includes consumption in gas works prior to 1991. Also prior to 1991, electricity consumption in the iron and steel industry includes consumption in coke ovens and blast furnaces.

Prior to 1991, consumption in commercial and public services includes small industries, offices in the tertiary sector and electricity use in electricity supply, district heating and water supply companies. From 1991, consumption in electricity supply, district heating and water supply companies is included in other energy sector. From 1990 – 2012, small amounts of electricity used in heat pumps have been included in the residential sector.

Only gross maximum electrical capacity is available. The breakdown of capacity by type of generation and fuel for autoproducer plants is not available from 1988 to 1992. In the 2012 edition, pumped hydro capacity was revised to include only the capacity relating to pure-part of the mixed-storage pumping plant.

Exports of electricity to non-specified/others are to Liechtenstein.

Belgium

The federal authorities changed their method of collecting data: instead of receiving data from the “Fédération des Producteurs d’Électricité” (FEP), the operators in the relevant sectors are surveyed by the Ministry of Economic Affairs using a survey based on that of the IEA. Moreover, the “Institut de Conseil et d’Études en Développement Durable” (ICEDD), through its co-ordinating role with respect to the regional authorities, provides complementary information (such as small off-grid power stations, and data on heat from renewable sources) which may not be collected by the FEP.

Breaks in the series may exist between 2007 and 2008 due to revisions of the NACE classifications.

There is no heat consumption from 2007 in the iron and steel industry because the installation concerned became an autoproducer in July 2006 and the heat is no longer sold.

Prior to 1982, electricity production in main activity producer CHP plants is included in production from electricity plants. Also, inputs of fuels for electricity generation in main activity producer electricity plants include inputs for heat production in CHP plants.

For 1998 and 1999, electricity production at main activity producer CHP plants with annual heat output below 0.5 TJ is reported with main activity producer electricity only plants.

In 2000, most autoproducer electricity plants were reclassified as autoproducer CHP plants; the heat production from these plants was used for internal industrial processes and not sold to third parties until 2005. Heat from chemical processes used for electricity production is available from 2005.

Heat output from CHP plants is not available prior to 1973.

The production of electricity from wind is available from 1987. Prior to 1982, data on electrical capacity by type of generation are not available.

Canada

The breakdown of electricity and heat generation between natural gas and oil products in main activity producer CHP plants has been estimated by the Canadian Administration starting in 1990. This may cause breaks in the time series between 1989 and 1990. For autoproducers generating electricity with process steam produced from biofuels and waste, the energy required to produce the initial steam is not taken into account by the Canadian Administration and as a result the efficiencies are overstated. Net electricity production by autoproducers prior to 1990 includes production from combustible fuel sources only. Starting in 2009, a new source has been used for electricity production from solar, wind, and tide. This new source covers production from solar and wind only from plants with capacity higher than 500 kW.

Heat production includes heat produced by nuclear power stations for distribution to other consumers.

Secretariat estimates have been made for certain inputs to CHP production based on output. However, incompatibility of data for inputs to and output from thermal production of autoproducers may result in

variable efficiency rates. Inputs of fuels to heat plants are not available for 1979 to 1987.

Breaks in the series occur between 1973 and 1974 in agriculture, and between 1987 and 1988 in the industry sector. Consumption of electricity in coal mines is not available between 1982 and 1986. Consumption of electricity in oil and gas extraction is not available prior to 1987. In the 2013 edition, the Canadian Administration has allocated a large portion of 2010 and 2011 final heat consumption into statistical difference. The Secretariat has decided to allocate the final heat consumption to industry non-specified. The net calorific value provided in the coal questionnaire and the gas diesel oil and residual fuel oil net calorific values based on IEA oil product standards has been used as the basis for estimating the total amount of terajoules used for main electricity and autoproducer electricity plants. Electricity output in main activity electricity plants from other sources is electricity produced as a by-product of the transformation process from oil sands to synthetic crude oil.

Only gross maximum electrical capacity is available. From 2000 to 2002, data on capacity were estimated by the Secretariat based on Statistics Canada's "Electric Power Generating Stations" publication. Prior to 1981, data on electrical capacity by type of generation are not available.

Chile

Electricity production from other bituminous coal includes sub-bituminous coal.

The split of electricity generation by main activity and autoproducer and by fuel was estimated by the Chilean Administration for 1990 to 2003. From 2004-2007, the split includes estimations by the secretariat.

The majority of electricity generation from other sources is from a conveyor belt transporting crushed rock from high altitude to lower altitude in a mine. A small amount from waste heat is also included. Increases in electricity from natural gas in 2010 are due to the openings of new LNG terminals.

Detailed data on autoproducer electricity production by sector is available from 2009.

Prior to 2009, statistical differences are included in distribution losses. From 1990, consumption in paper and pulp includes forestry and consumption in agriculture is included in non-specified industry. In general,

a new methodology has been applied for data since 1990, leading to other breaks in the time series between 1989 and 1990.

Data for peak load is available from 1999. Installed capacity by type of technology is not available.

Imports of electricity to non-specified/others are from Argentina.

Czech Republic

Data are available from 1971.

Electricity statistics from 1971 to 1989 have been estimated by the Secretariat, except for final consumption and trade which were submitted by the Czech Administration. Data from 1990 onwards have been officially submitted by the Czech Administration. This may lead to breaks in the series between 1989 and 1990. Prior to 1990, electricity production in main activity producer and autoproducer CHP plants is included in main activity producer electricity plants. The breakdown of net electricity production by source is not available prior to 1990. In 1999 and 2000 various big enterprises were divided, sold and merged. This causes breaks in the time series of all types of plants. The new reporting methodology used by the Czech Administration for biofuels and wastes causes some breaks in the time series between 2002 and 2003.

Other sources for heat production refer to recovered waste heat from the glass industry. Electricity generated from waste heat in CHP plants is included with the total production from combustible fuels.

Heat produced from heat pumps is reported from 2007, but the electricity inputs are not available. Heat produced from boilers is reported from 2010, but the electricity inputs are smaller than 1 GWh.

Data on heat production, and the corresponding fuel inputs, have been estimated from 1980 to 1989 based on consumption in the residential and commercial/public services sectors. Prior to that, inputs are included in industry. Heat production prior to 1990 excludes heat sold by industry. In addition, heat production prior to 1990 is reported under main activity heat plants because the breakdown by producer and plant type is not available before then.

Industrial waste use in main activity producer electricity plants is included with solid biofuels from 1996.

Data on biogases and waste used in main activity producer CHP and autoproducer heat plants start in 1993.

From 1999 onwards, small amounts of heat have been exported to Slovak Republic.

The direct use of solar energy is available from 2004.

The breakdown of generating capacity is not available prior to 1990. Starting in 2000, the peak load data reported in main activity producers include the autoproducers value.

Denmark

The production of electricity from wind is available from 1978.

Heat data are not available prior to 1976. Geothermal and solar heat production for sale is available from 1989. Heat produced for sale in heat pumps starts in 1994.

From 1984 onwards, small amounts of heat have been imported from Germany.

The amount of heat reported under other sources is heat recovered from industrial processes and sold for district heating. The breakdown of industry heat consumption is estimated by the Danish Administration for 2010 and 2011.

Electricity consumption in non-specified energy industry includes consumption in district heating plants and use for the distribution of electricity.

The direct use of solar thermal energy is available from 1978.

Prior to 1981 for main activity producers, to 1994 for autoproducers, data on electrical capacity by type of generation are not available.

Estonia

Data for Estonia are available starting in 1990. Prior to that, they are included in Former Soviet Union in *Energy Statistics of Non-OECD Countries*.

Data reported under lignite are for oil shale. From 1990-1999 some electricity and heat production are reported under other oil products while the inputs are reported under the individual fuels. Revisions to classify the electricity and heat production by oil product are pending. Inputs of residual fuel oil and gas works gas to the transformation sector include shale oil.

Finland

A new survey system and a reclassification of the data led to breaks in the time series between 1999 and 2000.

Electricity production from biofuels and waste is not available between 1974 and 1976. Inputs of liquid fuels and natural gas to CHP plants are included with the inputs of these fuels to main activity producer electricity only and heat only plants prior to 1978. Electricity and heat production from biogases are available from 1996. The breakdown of net electricity production by autoproducers is not available before 1999. The decrease in electricity production in 2005 is mainly due to lower generation from coal and peat which was offset by increased electricity imports from Sweden.

Heat production from autoproducer CHP plants is available starting in 1996 and from autoproducer heat plants starting in 2000; corresponding inputs may be under-reported. Heat from chemical processes and associated electricity generation are available from 2004. The increasing heat production from heat pumps in 2007 and 2008 is from the new Katri Vala district heating and cooling plant. Other sources include hydrogen and purchased steam.

Consumption of electricity in the industry sub-sector machinery includes consumption in transport equipment prior to 1995. Consumption of electricity in non-specified transport corresponds to use for urban transport systems.

Consumption of heat in residential includes consumption in commercial and public services and agriculture.

Net maximum electrical capacity data are not available prior to 1974. Prior to 2000, capacity reported in autoproducers steam generation includes all types of generation.

France

A new survey and a reclassification between main activity producer electricity plants and autoproducer electricity plants may cause breaks in the series for other bituminous coal between 1998 and 1999. The French Administration is working to reconcile their data collection methods for the inputs and the outputs for electricity generation. Plants using municipal waste were reclassified as autoproducer CHP plants from 1995, which leads to a break in the time series.

From 2000-2008, there are further classification issues for inputs of and outputs of electricity from oil.

Net electricity production by autoproducers prior to 1983 includes production from combustible fuel sources only. Net electricity production by autoproducer CHP plants is available from 1989. Electricity production from wind is available from 1993.

Due to a new survey, for the 2007 edition the French Administration revised the heat data back to 2000 and included heat produced from fossil fuels in CHP plants. Data for heat produced from fossil fuels in heat only plants are not available. However, it is not possible to separate out the amount of heat not sold in autoproducer plants, so these amounts are included. But, no double counting occurs since the corresponding inputs have not been included in final consumption. In 2005, autoproducer CHP efficiencies for other biogases drop due to the opening of a larger, less efficient plant.

There are major breaks in the time series in 1965 when more detailed breakdown of data on electricity consumption became available. The industry classifications used by the French Administration were changed in 1986.

A large part of energy industry electricity consumption in non-specified is consumption in uranium treatment plants; this electricity consumption is not available prior to 1980. Consumption of electricity in the nuclear industry is not available prior to 1980. Consumption of electricity in oil refineries is included in oil and gas extraction from 1988 to 2000. Total energy industry includes the statistical differences from 1992. Consumption of electricity in non-specified includes exports to Monaco prior to 1992.

From 1995, due to a change in the economic activity classification, data have been reported in non-specified other sectors.

Prior to 1981 and after 1998, data on electrical capacity by type of generation and fuel are not available.

Germany

Data for Germany include the new federal German states from 1970, but only the former Federal Republic of Germany from 1960 to 1969. A new survey for the renewable products can cause breaks in the time series between 1998 and 1999.

GDP figures prior to 1991 are based on conversions made by the German Institute for Economic Research

(*Deutsches Institut für Wirtschaftsforschung*) and the former Statistical Office of the GDR (*Statistisches Amt der DDR*). These conversions are calculations which are highly dependent on specific hypotheses and do not necessarily reflect economic realities.

Electricity production in electricity plants includes production from CHP plants prior to 2003. In 2007, many main activity CHP plants that burn biofuels and waste were reclassified as electricity only which results in breaks in the time series between 2006 and 2007. Data on electricity production from wind and solar are available from 1986 and 1990, respectively. In some instances, electricity generation from nuclear, hydroelectric, solar and wind in autoproducer electricity plants are confidential or non-available and, therefore, included in main activity producer electricity plants. The same applies to biogases from 1999. The German Administration started reporting near the surface geothermal energy in 1995, which leads to a break in the time series with 1994, where only deep geothermal energy is reported. From 1999-2008, small amounts of electricity generation that are not accounted for in the data submission have been attributed to various combustible fuels. Electricity production from other sources is available starting in 2009. This refers to the production of electricity from turbines which are located at pressure drops in fluid transport and from purchased waste heat.

Due to the implementation of the Energy Statistics Act, data collection concerning heat produced in heat plants and district heating plants became more efficient and more complete. This leads to breaks in the time series between 2002 and 2003 and between 2003 and 2004. Detailed data by fuel are not available for total heat production. The non-allocated part is reported as "heat production from non-specified combustible fuels". Starting in the 2010 edition, the German Administration changed their methodology for reporting heat. From 2007 onwards all heat production in autoproducers is considered as non-sold (*i.e.* for self-use) and, therefore, not reported. Inputs for this heat production are no longer reported in the transformation sector. Also, more information on district heat has become available. This causes breaks in the time series between 2006 and 2007. Prior to 1993, all heat production from BKB/peat briquettes is included in main activity CHP plants. Heat production from Natural Gas was estimated based on the revisions of natural gas inputs by the German Administration for 1995-2000 and 2003-2006 for Autoproducer CHP, Main Activity CHP, and Main Activity Heat. The electricity and heat is expected to be revised in the *Electricity Information* 2014 Edition.

Heat production and consumption prior to 1970, have been estimated by the Secretariat based on *Energiebilanz der Bundesrepublik für das Jahr 1990* provided by the German Institute for Economic Research.

Prior to 1991, electricity trade data includes only trade of the Former Federal Republic of Germany.

Starting in 1984, small amounts of heat have been exported to Denmark.

Between 1971 and 1980 electricity consumption in coal mines includes consumption in coke ovens and BKB plants. The German Federal Statistics Office reclassified some industrial branches which may cause a break in the time series in the industry sub-sectors of industry between 1994 and 1995.

The breakdown of heat consumption is not available for 2003 to 2006. The data for that period were estimated as follows: the transformation and distribution losses were estimated based on previous years, the heat produced by autoproducers was included in non-specified industry, and the remaining consumption included in non-specified other.

Prior to 1974, data on electrical capacity by type of generation are not available. Electricity generating capacity before 1991 is for the Former Federal Republic.

Greece

No production of solar heat is reported. Production or consumption of distributed heat (heat sold) that is produced from lignite is available from 1997.

In 2008 a new plant using refinery gas started operating in an experimental phase. For this reason the efficiency is low.

Electricity consumption in iron and steel and in the non-ferrous metals industry prior to 1971 has been estimated by the Secretariat. There is a break in the series between 1991 and 1992 for electricity consumption in transport. Prior to 1981, data on electrical capacity by type of generation are not available.

Hungary

Data are available from 1965.

The Hungarian Administration reclassified some of their plants in 1996 and 2000 which may lead to breaks in the time series.

The electricity and heat statistics were revised by the Hungarian Administration in early 2000. The revision of heat production data to conform to IEA reporting methodologies may result in a mismatch of fuel inputs with electricity and heat outputs by plant type, causing high efficiencies.

Autoproducer electricity, CHP, and heat plants using coke oven gas and blast furnace gas were reclassified as main activity power plants in 1998. Prior to 2000, electricity output from sub-bituminous coal is included with lignite. Nuclear electricity production in main activity producer electricity plants is available from 1983. Electricity and heat production from solid biofuels in autoproducer CHP plants is available from 1995. Geothermal heat production in main activity producer heat plants is also available from 1995.

Direct use of geothermal heat is available from 1990. Direct use of solar thermal heat is available from 2001.

Iceland

Electricity production from geothermal sources in main activity producer CHP plants is available from 1992. In 1998, 60 MW of generating capacity was installed in the geothermal CHP plant at Nesjavellir. Since the plant was inoperable for four months, production of geothermal heat decreased compared to 1997. However, the extra electricity capacity caused electricity production from geothermal to almost double over the same period.

Heat production from municipal waste is available from 1993. In 2002, the increase of heat produced by geothermal was due to the installation of a third unit at the Nesjavellir CHP power plant. The increase in hydro and geothermal electricity production from 2007 is due to expansion of the aluminium industry.

Energy industry consumption of electricity refers mainly to the use of electricity by the geothermal industry to pump hot water from underground sources. From 1991, it includes electricity used for the transport by pipeline of hot water from Nesjavellir to Reykjavik. Prior to 1970, total final consumption includes inputs to and outputs from heat production and non-energy use. After 1970, data on inputs and outputs in CHP plants and in main activity producer heat plants (district heat plants) and for non-energy use are separately specified. The consumption of electricity reported in non-specified other sectors corresponds to

a NATO base at Keflavik airport which closed in 2005. Residential sector includes agriculture prior to 1983. The industrial classifications used by the Icelandic Administration changed in 1987. The increase of electricity consumption in the construction sector from 2003 to 2007 is due to the drilling of tunnels for the Kárahnjúkar power plant. Prior to 2008, all heat for space heating was reported in residential. From 2008 a portion is estimated by the Iceland Administration to be consumed in commercial and public services.

Ireland

Electricity production from wind begins in 1992 and from landfill gas in 1996.

Fuels used by autoproducers have been estimated by the Irish Administration for 1991 and 1992. Inputs of peat in kilo tonnes (kt) for electricity production have been estimated by the Secretariat prior to 1992 based on data submitted in terajoules (TJ) by the Irish Administration. Inputs of hard coal in autoproducer CHP plants have been estimated by the Secretariat from 1984 to 1989.

Prior to 1990, electricity consumption in agriculture is included with residential. Electricity consumption in the iron and steel industry includes consumption in the non-ferrous metals industry prior to 1990. The decrease of electricity consumption in the iron and steel industry from 2001 onwards is due to the fact that the main steel plant in Ireland ceased production. Electricity used for urban transport is included in non-specified transport. The increase in 2004 is due to the new light rail transit system in Dublin.

Direct use of geothermal heat and solar thermal heat is available from 1989 and 1990, respectively.

Prior to 1981, data on electrical capacity by type of generation are not available for main activity producers.

Capacity reported under other sources corresponds to cross-border transmission capacity with Northern Ireland.

Israel

Electricity production from wind begins in 2001. Data on the breakdown of hydroelectric plants are available from 2008. For 2009, solar photovoltaic electricity generation is estimated. Data for oil shale are included with lignite.

Italy

From 2000 onwards, the Italian Administration defines electricity and heat production from autoproducers as including generation from producers that consume more than 70% of their own electricity production. However, for the 2000 to 2002 period, all electricity production from autoproducers is reported with main activity producers.

Prior to 2004, electricity production from orimulsion is confidential and is included with residual fuel oil. The production of electricity reported in the category other fuel sources refers to produced from turbines which are located at pressure drops in fluid transport. Prior to 1984, net electricity production by autoproducers includes production from combustible fuel sources only. From 1989, not all outputs are reported for industrial waste used in autoproducer CHP plants.

Heat production is reported starting in 2004 and includes self-generation in industry. With the introduction of a new survey in 2008, amounts of naphtha and other kerosene that were previously included in other oil products have been reported separately in autoproducer CHP plants.

The breakdown of renewables and waste inputs into electricity, heat and CHP plants is available from 1989 only. Prior to that year, the total of the different fuels involved is reported as non-specified renewables. Prior to 2009, sub-bituminous coal used in main activity electricity plants was included under other bituminous coal.

Consumption of electricity in transport includes electricity used for pumping in oil pipelines from 1981. Other energy industry includes electricity consumption for blast furnaces. From 2000 it also includes consumption for the distribution of gas, and prior to 1989 consumption of electricity used for uranium extraction. The breakdown of heat consumption by sector has been estimated by the Italian Administration.

Prior to 1981, data on electrical capacity by type of generation are not available.

Japan

Data for the entire time series refer to fiscal year.

Fuels used and corresponding electricity and heat produced in CHP plants are not included in the data series. Inputs of biofuels and waste for electricity production and related outputs are available from 1982.

Net electricity production by autoproducers prior to 1982 includes production from combustible fuel sources only. Net electricity production by autoproducers in the transport sector is included in non-specified prior to 1982. Net electricity production by autoproducers in the energy industry is not available prior to 1982. The production of electricity from wind began in 1993.

The IEA Secretariat estimated the photovoltaic (PV) electricity generation from autoproducers starting in 1992 based on an average capacity factor of 12% and capacity data for autoproducers. Autoproducer PV capacity is derived from data from the Japanese Administration as well as the IEA Photovoltaic Power Systems Programme (IEA-PVPS) report, "Trends in Photovoltaic Applications" published in 2012. The capacity factor was based on the report "National survey report of PV Power Applications in Japan 2009", published in 2012 by IEA-PVPS. The corresponding electricity consumption has been included with non-specified other consumption.

Prior to 1998, the electricity produced using TRT technology (Top pressure Recovery Turbines) was included with electricity generated from solid biofuels. Starting in 1998, it is included with electricity generated from coal gases.

Fuels used and heat produced for sale by autoproducers from heat plants are not available. Heat production from geothermal and solar thermal sources in Japan is not reported by the Japanese Administration. Heat produced for sale in main activity heat plants is not available prior to 1972. Heat produced for sale in main activity producer heat plants from waste heat and from electric boilers is available from 1977 and 1983, respectively.

Between 1972 and 1976, the use of combustible fuels in main activity producer heat plants is included in non-specified. Fuels used to produce heat for sale in heat plants are not available prior to 1977.

Consumption of electricity in non-specified industry includes wood and wood products and construction prior to 1982. Electricity consumption in urban transport systems is included with rail.

Prior to 1981, data on electrical capacity by type of generation are not available for main activity producer plants. Prior to 1974, data on electrical capacity by type of fuel are not available for autoproducer plants. Electricity generation capacity for nuclear power increased in 1997 due to the commissioning of two nuclear plants. Due to the events related to the March 2012 tsunami, the Japanese authorities decided to scale back the level of their nuclear program.

Korea

Data are available from 1971.

Electricity statistics from 1971 to 1993 are estimated by the Secretariat based on the Korean National Statistics. Data from 1994 onwards have been submitted by the Korean Administration. This leads to breaks in the series between 1993 and 1994.

Before 1994, electricity production from main activity producer CHP plants is included with main activity producer electricity only plants. In 2002, the Korean Administration started to report electricity and heat production by autoproducers using natural gas and petroleum products which were not reported before. Electricity generation reported under other sources is from fuel cells. Electricity production using heat from chemical processes in copper and zinc plants is available from 2005; the corresponding heat inputs are estimated. Heat from chemical processes that is sold is available from 2008. Prior to 2009, autoproducer heat production includes amounts of unsold heat.

Heat data are available from 1993. For 1993 to 1999, the breakdown of heat output by type of fuel has been estimated by the Secretariat. The breakdown by sector of heat production in autoproducers is estimated by the Korean Administration based on consumption data of purchasing companies. Heat consumption by sector is available from 2000.

Prior to 2007, production and consumption of electricity and heat in oil refineries and LNG liquefaction/regasification plants are included in the industry sector. Prior to 2008, sales of electricity by Korea's main electricity distributor, KEPCO, to the non-ferrous metals sector are included in iron and steel consumption. Data for electricity consumption in the transport equipment sector are available from 1994 and are included in the machinery sector until 2000. Heat consumption by subsector was reclassified in 2010 due to new information available on heat sales from autoproducers to end-users by sector.

The breakdown of generating capacity by fuel is not available prior to 1994.

Luxembourg

Data on the inputs of natural gas and gas/diesel oil for electricity and heat production are confidential starting in 2010.

Most of the hydro production shown for Luxembourg is from the Vianden pumped storage plant and is exported directly to Germany. For 1989, the electricity production by autoproducers by fuel was estimated by the Secretariat based on fuel inputs submitted by the Luxembourg Administration. Net electricity production by autoproducers prior to 1990 includes production from combustible fuel sources only. Electricity from natural gas for autoproducer CHP plants are available starting in 1995 and for main activity CHP plants starting in 1996. Electricity production from biogases are available from 1999. The increase in electricity production in 2002 was due to a new natural gas combined cycle power plant. Heat production from biogases is available from 2010. In the 2012 edition, heat production from biogases in autoproducer CHP plants was removed from 2000-2009 because it was discovered the heat was not sold.

The iron and steel industry stopped production of electricity at the end of 1997.

Starting in 2005, data for electricity transmission and distribution losses were obtained from the network operator. Prior to 2005, they were estimated by the national administration.

The breakdown of electricity consumption in industry is not available from 1990-1999.

Prior to 1995, data on electrical capacity by type of generation are not available for autoproducers. Due to the lack of blast furnace gas, the iron and steel industry stopped generating electricity at the end of 1997. Therefore, electrical capacity by combustible fuels declined.

Mexico

Electricity statistics are available from 1971. In the 2012 edition, autoproducer data was revised to be consistent with the data presented by the national Energy Regulatory Commission (Comisión Reguladora de Energía).

The breakdown of net electricity production by autoproducers is available from 1993. Electricity production from wind and solar photovoltaic is available from 1990. Electricity output from biofuels and waste is available from 1998. New autoproducer electricity plants fuelled with coal gases were put on line in 1999. Prior to 1996, gas/diesel oil inputs to autoproducer electricity plants were only of diesel.

Some electricity consumption in the energy industry is included in the industry sub-sector where it was

generated (e.g. the chemical industry, as well as in non-specified industry).

Net maximum electrical capacity for autoproducers is not available prior to 1974. The breakdown of generating capacity for main activity producer electricity plants by combustible fuels is not available prior to 1982. Production and generating capacity of main activity producer electricity plants from wind is available from 1994.

Netherlands

Electricity from other sources includes generation from chemical waste gases and heat bought from other industries. For 1970 to 1973, electricity output from autoproducer CHP plants has been included with main activity producer CHP plants. Electricity production from and inputs to main activity producer CHP plants are included with main activity producer electricity plants prior to 1982. Net electricity production by autoproducers prior to 1988 includes production from combustible fuel sources only. Electricity production from solar photovoltaic is available from 1992. Net electricity production by autoproducers in the energy industry is not available prior to 1993. The decrease in electricity produced from nuclear in 1997 is due to the closure for five months of one nuclear power plant. For the 2007 edition, the Dutch Administration implemented a reporting methodology which causes some breaks in the time series between 2004 and 2005.

Heat production from main activity producer CHP plants and heat plants is available from 1982. Heat production by fuel in heat plants prior to 1987 are estimated by the Secretariat based on fuel inputs submitted by the Dutch Administration. Heat produced from combustible renewables is available from 1990.

Heat production in commercial and public services includes production in agriculture.

Inputs of hard coal for electricity production from 1981 to 1989 in terajoules (TJ) are estimated by the Secretariat based on data submitted in kilotonnes (kt) by the Dutch Administration. Prior to 2008, a few small autoproducer electricity plants using solid biofuels were included with main activity plants for reasons of confidentiality.

The strong increase in electricity trade in 1999 is caused by the liberalization of the Dutch electricity

market. Until 2003, trade data are based on contracted quantities instead of physical flows.

Electricity consumption in commercial and public services includes small users in other sectors. Electricity consumption in non-specified transport corresponds to consumption for road traffic. Increasing electricity consumption in agriculture is due to the expansion of the greenhouse farming sector. Prior to 1979, electricity consumption in agriculture is included in commercial and public services.

Data on direct use of solar thermal are available from 1988.

Prior to 1981 for main activity producer plants and 1982 for autoproducers, data on electrical capacity by type of generation are not available.

New Zealand

There are several breaks in the series between 1987 and 1988 due to a reorganisation of government departments during 1987. The industry classifications used by the Administration of New Zealand were changed in 1991. In the 2012 edition, electricity and heat data were revised back to 1990.

Prior to 1994, data refer to fiscal year (April 1993 to March 1994 for 1993). From 1994 data refer to calendar year. As a result, there are breaks in the series between 1989 and 1990.

Electricity production by autoproducers from natural gas and from oil has been estimated by the Secretariat from 1970 to 1973. Electricity production by autoproducers from geothermal is available from 1990. In 1999, a reclassification of autoproducer plants causes some breaks in the time series. For 2002 and 2003, natural gas autoproducer electricity includes generation of electricity from on-site heat/steam recovery during the combustion of carbon monoxide (CO) gas from the iron making reduction and melting process.

Heat from chemical processes used for electricity production is available from 2004 and corresponds to acid plants in the fertiliser industry where sulphur is the main input.

From 1974 to 1993 distribution losses include the statistical differences. Electricity consumption in pulp, paper and printing is included in wood and wood products prior to 1991. There are breaks in the time series between 1996 and 1997 for electricity consumption

due to a new NZ Standard Industrial Classification (NZSIC).

Prior to 1981, data on electrical capacity by type of generation are not available. Generating capacity for autoproducers is available from 1994.

Norway

No data on electricity production from solar energy are submitted to the IEA by the Norwegian Administration. Prior to 1991, net electricity production by autoproducers by industry sub-sector was estimated by the Secretariat based on data submitted by the Norwegian Administration. Electricity production from wind is available from 1992. Breaks in the time series between 1996 and 1997 and between 2001 and 2002 are due to a reclassification of main activity producers and autoproducers. The electricity generated from other sources represents electricity from waste heat.

Own use of electricity in 2008 is based on preliminary monthly statistics as opposed to final annual data for previous years.

The increase in gas-fired generating capacity and the associated production of electricity in 2007 is due to the opening of a new plant at Kårstø in late 2007.

Heat production is not available prior to 1983. Heat production from heat pumps and electric boilers (and the electricity used for this production) are available from 1989. Heat production from biogases is available from 1995. Heat produced in autoproducer heat plants from chemical processes and from other sources and used for electricity production was estimated by the Secretariat for the period 1990 to 2006.

Data on inputs and outputs in heat plants are not available prior to 1983 for main activity heat plants and prior to 1988 for autoproducer heat plants.

Distribution losses may include statistical differences. The breakdown of heat consumption by industry sub-sector was expanded in 1992, reclassified in 1994 and collected by a new reporting system in 1997.

Consumption of electricity for pipeline transport is included in oil and gas extraction.

Electricity trade with the Netherlands begins in 2008 with the operation of a cross-sea cable interconnection between the two countries.

Net maximum electrical capacity of pumped storage plants is not available from 1970 to 1972.

Poland

Electricity production in autoproducer electricity plants is available from 1986.

Gross heat production from autoproducer CHP plants includes the unsold heat for own use between 1988 – 1995. In order to alleviate this, the Polish Administration adopted new methods to estimate the production of heat sold in autoproducer heat plants (1993) and in autoproducer CHP plants (1995). This causes breaks in the time series between 1992 and 1993, and between 1994 and 1995 for heat production and fuel inputs in these plants and for heat consumption in industry sub-sectors. Direct use of geothermal heat is available from 2000 and direct use of solar thermal heat in commercial/public services from 2002 and in residential from 2009. In 2008, a number of CHP plants were reclassified from autoproducer to main activity producer due to an industry re-organisation. Heat production from heat pumps is available from 2009.

Prior to 1995, heat consumption in the energy industry includes process heat not sold.

Portugal

Production of electricity in main activity producer CHP plants and the associated fuel inputs are not available prior to 1980. Production of electricity from solar photovoltaic and wind are available from 1989. Net electricity production by autoproducers prior to 1992 includes production from combustible fuel sources only. New plants fuelled by municipal waste started in 1999. Electricity production from other oil products refers to methanol.

To conform to the IEA methodology, heat produced from biofuels and waste (mainly black liquor) in autoproducer CHP plants is not accounted for since it is not sold, while the electricity produced in these plants is included. In 2007, some power plants that were previously reported as main activity CHP were reclassified as autoproducer CHP. The power station that burns industrial waste started to work as a CHP plant in 2007, whereas previously it was only producing electricity.

Data on direct use of solar thermal heat and geothermal heat are available from 1989 and 1994, respectively.

Peak load for main activity producer plants includes the autoproducers data and is not available prior to 1986.

Slovak Republic

Data are available from 1971.

Electricity and heat production from combustible fuels from 1990 to 2000 have been estimated by the Secretariat based on the data on fuel used for electricity and heat plants reported in the annual fuel questionnaires. Prior to 2001, electricity generation from primary solid biofuels, municipal waste and biogases are included with industrial waste. The IEA Secretariat estimated the photovoltaic (PV) electricity generation in 2010 by the reported PV capacity by a capacity factor of 9.7%. The capacity factor was based on an annual yield published in a national report in 2009 by the IEA Photovoltaic Power Systems Programme. The corresponding electricity consumption was allocated to the residential and commercial and public services sectors.

The breakdown of net electricity and heat production by source has been estimated by the Secretariat for the period 1990-2000.

The breakdown of trade by origin and destination is available from 1993.

Direct use of geothermal heat is available from 2001 and of solar thermal heat from 2005.

The low electricity consumption in petroleum refineries in 2003 and 2004 is due to a change in ownership and work carried out on a refinery.

Data for generating capacity are not available prior to 1995. The breakdown of installed capacity by type of generation/fuel is available from 2001.

Slovenia

Data for Slovenia are available starting in 1990. Prior to that, they are included in Former Yugoslavia. A new energy data collection system was implemented in January 2001, causing some breaks in the time series between 1999 and 2000.

Surveys for data on heat consumption are available from 2003 onward for the residential, industry and energy sectors. Prior to 2003 the data was estimated by the Slovenian national administration.

Spain

Prior to 1983, net electricity production by autoproducers includes production from combustible fuel sources only and net electricity production by autoproducer CHP plants is included in electricity plants. From 1983, net electricity production by autoproducers has been estimated by the Spanish Administration. Prior to 1987 electricity production in main activity producer CHP plants is included with production from main activity producer electricity plants. Prior to 1989 inputs and outputs from the use of biofuels and waste to generate electricity and/or heat (*i.e.* comprising solid and liquid biofuels, industrial waste, municipal waste and biogases) are reported under non-specified biofuels and waste. Electricity production from wind and solar are reported from 1989 when data became available. Production by autoproducer CHP is included with autoproducer electricity for petroleum products prior to 1990. The large increase in electricity output from main activity producer electricity plants fuelled by natural gas in 1997 is due to the opening of a new plant. Electricity from solar thermal plants is available from 2007. A reclassification of plants from main activity to autoproducer in 2008 has led to breaks in the time series for electricity production between 2008 and 2009. For 2004 and 2005, electricity production from gas diesel is included under heavy fuel oil. Electricity reported under other sources is from waste heat.

Transmission and distribution losses are estimated by the Spanish administration. Starting in 2006, a new method was used to estimate the losses from final consumption data resulting in a break in time series between 2005 and 2006.

Direct use of solar thermal heat and geothermal heat are available from 1994.

Prior to 1980, data on electrical capacity by type of generation are not available and from 2003 no breakdown of capacity by type of fuel and generation type is available. From 2004, capacity of autoproducers is included with main activity producers.

Sweden

Prior to 1987 net electricity production by autoproducer plants includes data for CHP plants only. From 1987, the breakdown of net electricity production by

industry for autoproducer electricity plants is available. Prior to 1992, electricity production from biogases is included with wood/wood waste.

Heat produced in main activity producer CHP plants is not available prior to 1974; heat produced in main activity producer heat plants is not available prior to 1980. Heat produced for sale by autoproducer heat plants is available from 1992. Heat produced for sale from heat pumps and electric boilers is reported from 1992. Heat production from petroleum products in main activity producer CHP plants includes heat recovered from flue-gas condensing for 1997 and 1998.

Consumption of heat in industry and other sectors is available from 1984. Consumption of electricity for distribution of district heat is included in other energy industry.

Data on direct use of solar thermal are available from 1989.

The breakdown of generating capacity of main activity producer and autoproducer electricity plants by fuel is not available from 1990 to 2003 and from 2006 onwards. Peak load data for main activity producer plants includes data for autoproducer plants from 1992. Generating capacity of main activity producer electricity plants includes autoproducer plants prior to 1984. Prior to 1981, data on electrical capacity by type of generation are not available for main activity producer plants.

Switzerland

The allocation of electricity production in main activity producer electricity only and CHP plants between 1967 and 1973, and in main activity producer CHP and autoproducer CHP plants in 1974 are Secretariat estimates. Solar electricity production by autoproducers is available from 1990. Data for pumped hydro electricity production by autoproducers data are available from 1996.

Heat production includes heat sold by nuclear power stations and distributed to other consumers. Prior to 1978, heat output from CHP plants is not available. A decrease in the use of natural gas in main activity CHP plants in 2007 is caused by the reduced operation of one plant after the start-up of a new waste-incineration plant and the shutting down of another plant. Use increases again in 2008 due to the re-starting of a district heating plant.

Electricity consumption in the transport equipment industry is included in the machinery sub-sector. The breakdown of final consumption of electricity in the industry sector from 2000 to 2001 were estimated by the Secretariat.

Direct use of solar thermal heat and geothermal heat is available from 1990. Geothermal direct use is overstated as it refers to heat production by geothermal heat pumps, which include inputs from electricity and/or gas in the transformation process.

Electricity generating capacity for liquid fuels in main activity producer plants includes all combustible fuels prior to 1990. For 1990 to 2007 the split of hydro and pumped hydro capacity between main activity producers and autoproducers is estimated based on the split of capacity at peak load.

Electricity trade to and from the country for non-specified/others non-specified represents trade with Liechtenstein.

Turkey

Data on electricity generated from biofuels are available from 1991. In 1995, the Turkish Administration reclassified autoproducer plants by type and source to be consistent with IEA definitions. This causes breaks in the time series between 1994 and 1995 for electricity production in these plants. Electricity production from wind is available starting in 1998.

A new gas fired main activity producer CHP plant was put into operation in 1999 and a new autoproducer electricity plant fuelled with coking coal started in 2000. In the 2006 edition, the Turkish Statistical Office started providing electricity and heat output on the basis of a new survey that allowed for the revision of the time series back to 2000. This causes breaks in the time series between 1999 and 2000.

Comprehensive data on electricity consumption are available from 1973. This causes a break in the series between 1972 and 1973. Consumption in the machinery sector includes transport equipment. Prior to 1998, electricity consumption in wood and wood products sub-sector includes that of pulp, paper, and printing industry.

Net electricity generating capacity by type of generation for both main activity producers and autoproducers is not available prior to 1999. Generating capacity reported in other type of generation corresponds to gas engines.

Imports of electricity from Turkmenistan are not physical quantities, but contracted quantities that are imported via Iran. Exports of electricity to non-specified/others are to Iraq and Syria.

United Kingdom

The reorganisation and subsequent privatisation of the electricity supply industry in 1990 results in some breaks in the time series. In 1996, the break in the electricity production from nuclear time series is due to the reclassification of plants from autoproducer to main activity producer plants. Data on electricity production from solar is available from 1999 and electricity production from wind is available from 1989.

Prior to 1988, electricity output from CHP plants was included in autoproducer electricity plants. For the United Kingdom, it was necessary to combine figures for main activity producers and autoproducers in order to prevent the disclosure of information relating to less than three electricity generating companies, since this information is considered confidential. For this reason data for main activity producer CHP plants have been included with autoproducer CHP plants from 1988. Also, inputs of and output from natural gas in main activity producer electricity plants are included in autoproducer electricity plants for 1990. Prior to 2003, all outputs of electricity and heat from oil products are reported in the other oil products category. From 2007 onwards, outputs of petroleum coke from main electricity plants are included in residual fuel oil. Heat production from autoproducers is available starting in 1999.

From 1984 onwards, the electricity consumption in the industry non-specified sub-sector includes that of the wood and wood products sub-sector and unallocated consumption. Electricity consumption in coal mines includes consumption in patent fuel plants. Consumption in gas works includes electricity use in the transmission/distribution of public supply gas. Consumption in the machinery sub-sector includes that of the transport equipment industry before 1996. Consumption in the non-metallic mineral products sub-sector includes mining and quarrying. Starting in 1990, small amounts of electricity used in heat pumps have been included in the residential sector. In the 2012 edition, the data for electricity consumption in transport sector was reclassified by sub-sector resulting in a break in time series between 2003 and 2004. Prior to 2004, non-specified transport includes consumption for traction by urban rails and road vehicles,

and consumption for non-traction by railways and bus stations and airports. From 2004 onwards, non-specified transport includes consumption by road vehicles only. Prior to 2004, electricity consumption in rail refers to industrial rail only. From 2004 onwards it includes both industrial and urban rail. The break in the electricity consumption in the residential sector between 2004 and 2005 is due to a revision in methodology for allocating by sector.

Prior to 1981 for main activity producer plants and prior to 1983 for autoproducers, data on electrical capacity by type of generation are not available.

United States

There are breaks in the series concerning the total production of electricity and heat in the United States. Prior to 1989, there are no data available for autoproducers. Electricity production in main activity producer CHP plants is available from 1991. Comprehensive data on electricity and heat production and consumption in main activity producer electricity, CHP and heat plants and autoproducer electricity and CHP plants are not available for all years. The selling of main activity producer plants to autoproducers may cause breaks in the series between 1998 and 2000. Data on electricity used for pumping and electricity production from pumped storage plants are available from 1987.

For the 2003 edition the US Administration changed the definition of what it reports under autoproducers. Prior to 2000, autoproducers include small and independent power producers which under IEA definitions are considered as main activity producers. Production from these small and independent power producers account for about 25% of reported production of electricity by autoproducers in the United States. This reclassification causes breaks between 1999 and 2000. For the 2009 edition the US Administration changed their methodology for calculating heat production in CHP plants, and revised data back to 2006. This leads to breaks in the time series between 2005 and 2006. Electricity generation reported under other sources is from purchased steam. From 2007, the industrial waste category includes recovered heat from industrial processes. Accurate accounting of coke oven gas and refinery gas inputs is not always possible and can lead to efficiencies of over 100% in main activity producer CHP plants.

Data for heat produced in main activity producer heat plants are available from 1992. Since 1995, heat data

are no longer collected and have been estimated by the US Administration, which causes breaks in the time series between 1994 and 1995.

Sub-bituminous coal inputs for electricity and heat production are included in hard coal before 1983. Prior to 1991 some of the fuel inputs to electricity and heat production reported for autoproducer plants are reported as final consumption in the particular economic sector in which the autoproducer is operating. Data for peat are confidential between 1994 and 1998 and from 2000 are not reported. Prior to 2001, data on plants consuming other bituminous coal, sub-bituminous coal and lignite have been estimated by the Secretariat using information provided in the EIA's *Annual Electricity Generator Report – Utility*. From 2004 onwards, the EIA has reported electricity and heat production from anthracite under sub-bituminous coal. The IEA Secretariat estimated the split of output by fuel type based on the assumption that the plant efficiencies of the aggregate are equal to that of each part. The decline in patent fuel used for electricity production in 2008 and subsequent cessation of the time series in 2009 is a result of the termination of the patent fuel tax credit in 2008 which had previously made the fuel economical for electricity production.

The breakdown of fuel used and production of heat in main activity producer heat plants have been estimated by the Secretariat for 1992 and 1993.

A new survey for electricity consumption may cause breaks in the time series for 2003 and 2004, especially in the industry, transport, commercial and residential sectors. There are breaks in the series concerning the total consumption of heat sold to third parties. The consumption of heat sold in industry is available from 1991 and in the energy industry from 1992. Prior to 1991, total consumption of heat sold only referred to consumption in commercial and public services. No heat is reported as being sold to the residential or agriculture sectors.

From 1999 onwards, the fuel used in heat production by autoproducers is included in final consumption because the US administration cannot distinguish between the heat used directly on-site and the heat sold. Therefore, this may underestimate the heat sold to third parties.

Direct use of heat in heat pumps (mainly in residential and industry) is not available. Direct use of solar thermal heat in residential is available from 1999. Prior to 1999, solar thermal electricity production includes generation from natural gas because some

natural gas units are attached to solar thermal plants and their production cannot be separated. The IEA Secretariat estimated US photovoltaic (PV) electricity generation from autoproducers starting in 1999 by multiplying the dispersed and distributed PV capacity estimated by the EIA by an average capacity factor of 12%. The capacity factor was based on a report published in 2007 by the IEA Photovoltaic Power Systems Programme, *Cost and Performance Trends in*

Grid-Connected Photovoltaic Systems and Case Studies. The corresponding electricity consumption has been included under non-specified other consumption.

Capacity is net summer capacity. The breakdown of capacity by fuel type for 1989 is a Secretariat estimate. Capacity by type of generation is not reported prior to 1981. Data on electrical capacity for autoproducers are available from 1989.

9. CONVERSION FACTORS AND CALORIFIC VALUES

Units and conversions

Conversion (to toe)

All units in this publication are metric units. Most IEA/OECD publications showing inter-fuel relations and projections present such information in a common energy unit, the tonne of oil equivalent (toe). A tonne of oil equivalent is defined as 10^7 kcal (41.868 GJ), a convenient measure because it is approximately the net heat content of one tonne of average crude oil. This unit is used by the IEA/OECD in its energy balances. Note also that totals may not be the sum of their components due to independent rounding.

The change from using the original unit to tonne of oil equivalent implies choosing coefficients of equivalence between different forms and sources of energy. This problem can be approached in many different ways. For example one could adopt a single equivalence for each major primary energy source in all countries, *e.g.* 29 307 kJ/kg (7 000 kcal/kg) for hard coal, 41 868 kJ/kg (10 000 kcal/kg) for oil, etc.

The main objection to this method is that it results in distortions since there is a wide spread in calorific values between types of coal and individual coal products, and between calorific values of these fuels in different countries.

The Secretariat has therefore adopted specific calorific factors supplied by the national administrations for the main categories of each quality of coal and for each flow or use (*i.e.* production, imports, exports, electricity generation, coke ovens, blast furnaces and industry). For crude oil, specific factors have been used based on consultations with experts from the national administrations, while for petroleum products regional conversion factors have been used.

The balances are expressed in terms of “net” calorific value. The difference between the “net” and the “gross” calorific value for each fuel is the latent heat of vaporisation of the water produced during combustion of the fuel. For coal and oil, net calorific value is usually around 5% less than gross, for most forms of natural and manufactured gas the difference is 9-10%, while for electricity there is no difference as the concept has no meaning in this case. The use of the net calorific value is consistent with the practice of the Statistical Offices of the European Communities and the United Nations.

Electricity data are converted from original units of gigawatt hours to million tonnes of oil equivalent using the relationship:

$$1 \text{ TWh} = 0.086 \text{ Mtoe.}$$

Complete listings of net calorific values to convert energy sources from basic units to tonne of oil equivalent are reported in section IV and can be found at the end of this Chapter.

Electricity

All electricity data are reported to the IEA in GWh (for generation) or MW (for capacity).

Figures for electricity production, trade, and final consumption are calculated using the energy content of the electricity (*i.e.* at a rate of 1 TWh = 86 ktoe).

Hydro-electricity production (excluding pumped storage) and electricity produced by other non-thermal means (wind, tide/wave/ocean, solar PV, etc.) are accounted for similarly using 1 TWh = 86 ktoe.

The primary energy equivalent of nuclear electricity is calculated from the gross generation by assuming a 33% conversion efficiency, *i.e.* 1 TWh = $(86 \div 0.33)$ ktoe.

For geothermal and solar thermal, if no country-specific information is reported, the primary energy equivalent is calculated as follows:

- 10% for geothermal electricity
1 TWh = (86 ÷ 0.1) ktoe
- 33% for solar thermal electricity
1 TWh = (86 ÷ 0.33) ktoe

Heat

Information on heat is supplied in terajoules and 1 terajoule = 0.02388 ktoe.

For geothermal and solar, if no country-specific information is reported, the primary energy equivalent is calculated as follows:

- 50% for geothermal heat
1 TJ = (0.02388 ÷ 0.5) ktoe.
- 100% for solar

For direct use of geothermal and solar heat, all the heat consumed is accounted for production and consumption.

Natural gas

In this publication, natural gas excludes natural gas liquids. For the net heat content of a natural gas, its gross heat content is multiplied by 0.9.

Oil

The IEA applies regional conversion factors (in conjunction with Eurostat for the European countries) for the petroleum products:

Regional net calorific values for petroleum products

Petroleum products	Europe	Americas	Asia Oceania
	kJ/kg	kJ/kg	kJ/kg
Refinery gas	49 500	48 100	48 100
Ethane	49 500	49 400	49 400
Liquefied petroleum gases	46 000	47 300	47 700
Motor gasoline	44 000	44 800	44 600
Aviation gasoline	44 000	44 800	44 600
Gasoline type jet fuel	43 000	44 800	44 600
Kerosene type jet fuel	43 000	44 600	44 500
Kerosene	43 000	43 800	42 900
Gas/diesel oil	42 600	42 600	42 600
Residual fuel oil	40 000	40 200	42 600
Naphtha	44 000	45 000	43 200
White spirit	43 600	43 000	43 000
Lubricants	42 000	42 000	42 900
Bitumen	39 000	40 000	38 800
Paraffin waxes	40 000		
Petroleum coke	32 000	32 000	33 800
Non-specified petroleum products	40 000		

General conversion factors for energy

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	multiply by:				
TJ	1	238.8	2.388×10^{-5}	947.8	0.2778
Gcal	4.1868×10^{-3}	1	10^{-7}	3.968	1.163×10^{-3}
Mtoe	4.1868×10^4	10^7	1	3.968×10^7	11630
MBtu	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
GWh	3.6	860	8.6×10^{-5}	3412	1

Conversion factors for mass

To:	kg	t	lt	st	lb
From:	multiply by:				
kilogramme (kg)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
tonne (t)	1000	1	0.984	1.1023	2204.6
long ton (lt)	1016	1.016	1	1.120	2240.0
short ton (st)	907.2	0.9072	0.893	1	2000.0
pound (lb)	0.454	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}	1

Conversion factors for volume

To:	gal U.S.	gal U.K.	bbbl	ft ³	l	m ³
From:	multiply by:					
U.S. gallon (gal)	1	0.8327	0.02381	0.1337	3.785	0.0038
U.K. gallon (gal)	1.201	1	0.02859	0.1605	4.546	0.0045
Barrel (bbbl)	42.0	34.97	1	5.615	159.0	0.159
Cubic foot (ft ³)	7.48	6.229	0.1781	1	28.3	0.0283
Litre (l)	0.2642	0.220	0.0063	0.0353	1	0.001
Cubic metre (m ³)	264.2	220.0	6.289	35.3147	1000.0	1

Decimal prefixes

10^1	deca (da)	10^{-1}	deci (d)
10^2	hecto (h)	10^{-2}	centi (c)
10^3	kilo (k)	10^{-3}	milli (m)
10^6	mega (M)	10^{-6}	micro (μ)
10^9	giga (G)	10^{-9}	nano (n)
10^{12}	tera (T)	10^{-12}	pico (p)
10^{15}	peta (P)	10^{-15}	femto (f)
10^{18}	exa (E)	10^{-18}	atto (a)