
Energy use in manufacturing

2012

Filling in instructions

The inquiry on energy use in manufacturing (TEK-2012) concerns the calendar year 2012. It is statutory and must be responded to by 27 March 2013.

The electronic questionnaire can be accessed on Statistics Finland's website

<http://tilastokeskus.fi/keruu/teen/lomake>.

You can find the user ID and password needed for logging in on the front page of the letter sent to you. The user ID and password are valid only during 2013. Our contact persons can provide new passwords if you have lost yours.

Main principle of the inquiry

The inquiry on energy use in manufacturing collects data on fuels and electricity used by enterprises' establishments and purchase/supply and sales/transfer data on electricity and heat (MWh). The data collection is based on EU's Regulation on energy statistics (Regulation of the European Parliament and of the Council EC No 1099/2008 concerning energy statistics issued on 22 October 2008, in the Official Journal of the European Union, issue 304, 14 November 2008).

The data of the statistics on energy use in manufacturing are needed, for instance, by enterprises and their organisations, researchers and public administration. The collected data are used in compilation of the Energy Statistics Yearbook and statistics on industry-specific electricity consumption, in the Greenhouse Gas Inventory, in calculation of carbon dioxide emissions, in load inventory, in calculation of national accounts and in international statistical reporting.

Starting from the 2007 inquiry, the data collection has been sample-based. Starting from that time, data has been requested from all establishments deemed as significant and from establishments using unusual fuels. Every four years, the inquiry also includes establishments with fewer than ten employees. The establishments included in the sample may vary from year to year. Other data sources are also used in the data collection. We receive fuel data from the Energy Market Authority's

emissions trading register and data on electricity consumption from Finnish Energy Industries' statistics on electricity consumption in the main grid.

The data supply obligation is based on the Finnish Statistics Act (280/2004, Section 14). Statistics Finland is entitled to receive the data free of charge (Section 21). The data on establishments are treated confidentially (Sections 12 to 13) and they are used for statistical purposes only.

The data are collected annually in March to April. The data are provided in electronic format with a web-based questionnaire or on a paper questionnaire that can be printed from Statistics Finland's website at

<http://www.tilastokeskus.fi/keruu/teen/lomakkeet.html> and mailed or faxed to Statistics Finland.

The electronic form has been pre-filled with the establishment's identification data. If the pre-filled data have changed or are incorrect, we ask that you correct/complete the data in the "Additional information" field. We ask that you also check the address and contact person details on the "Establishment's contact information" page of the electronic form.

Data on energy use: fuels, electricity and heat

Fuels used

Fuels are reported to the extent that they have been used to produce electricity and heat, as energy sources in industrial processes, for heating of rooms or in the establishment's machinery, forklifts, etc. (motor fuel oil, gas). Road transport fuels, petrol and diesel oil, oil or other energy products used as raw materials in production processes or welding gases are not counted as fuel use.

The codes for the fuels you reported last year for the establishment in question have been pre-filled in the electronic form. **Please note that the fuel classifications have been updated in the 2012 inquiry.** The changes made to the classification and content of the categories are presented in the appended "Changes to Statistics Finland's fuel classification" release. The new fuel categories and fuel categories that have been divided from a

three-digit division to four-digit ones have been marked with the word "new" in the fuel headings. If you have used the fuels mentioned on the form during the year of inquiry, enter their usage data in the respective columns and rows. For some fuels you can select the unit in which you wish to give the response. If you know the energy content of the fuel (GJ, MWh) enter that as well. By clicking the "Calculate energy content" button, the data collection application will calculate the imputed energy content (GJ) based on the physical use of fuel you entered, this figure can be compared to the energy content calculated based on the previous year's answer. You no longer need to report fuel purchase data.

If the display does not show the fuel you have used, click the "Add a new row" button. Select the fuel and unit from the list and enter the usage data in the new row. You can also view the codes from the "Energy source classification" link.

Electricity

All electricity used that has been purchased outside the establishment's legal enterprise, produced by the establishment or received from other establishments within the enterprise (including electricity received as shares from power plants) and that has been **used in industrial manufacturing at the establishment** (also in auxiliary unit activities), in heating of rooms, lighting, computers, etc. are reported as the establishment's electricity use. So-called own use in power plants (difference between gross and net) is not included in the figure. If the establishment sells electricity, the establishment's use is reported as the purchased/received electricity plus own production minus sold/transferred electricity (net principle).

Purchased/received electricity includes electricity that has been purchased from outside the enterprise or received from the enterprise's other establishments. Please note that if your establishment receives two different electricity bills (transmission and energy bills from different suppliers) the use volume is only reported from one bill so that you do not report the data twice.

If the power plant that is connected to the establishment is owned by some other enterprise, the electricity procured from the plant is reported as external purchases/supply.

Sold/transferred electricity refers to selling/transferring electricity that has been bought or produced by the establishment to outside the establishment's balance sheet (to another establishment or enterprise).

If you only transmit electricity to other establishments/enterprises, this data does not have to be reported in purchases and sales (net principle).

Heat

District heat refers to heat that is used to heat buildings and produce hot water. All heat used to heat any space is

reported under district heat. Any other heat not included in district heat is classified as industrial heat.

Industrial steam/heat refers to heat energy used as heat or steam in industrial manufacturing (such as drying or heating).

In terms of heat, only purchased/received and sold/transferred heat is reported.

If the power plant and boiler that is connected to the establishment is owned by some other enterprise, the heat procured from them is reported as external purchases/supply.

Establishments that have own **heat production in connection with their industrial facilities** shall report the data **only as fuel**.

If the energy consumption at your establishment is included in the rent and you are thus unable to report it separately, please report the floor area of the facility and the energy source of the heating in the Additional information field.

Units used

l	litre
kg	kilogram
t	tonne
t(ka)	tonne (dry matter)
i-m ³	loose cubic metre
1,00 m ³	1,00 cubic metres
MWh	megawatt hour = 1,000 kWh
GWh	gigawatt hour = 1,000 MWh
GJ	gigajoule

MWh = 3.6 GJ

GJ = 0.2778 M

Fuel classification 2013

Definitions for classification of fuels and energy sources 2013

Petroleum products

Petroleum gases

1111 Refinery gas

Refinery gas is gas recovered from the oil refining process used as an energy source. The category also includes fuel gases from the petrochemical industry.

1112 LPG (Liquefied petroleum gas)

LPG is a mixture of propane and butane or propane.

Light distillates

1121 Naphtha

Naphtha is a light distillate that is not much used as an energy source. It is mostly used as a solvent or feed stock in the petrochemical industry.

1122 Motor gasoline

Motor gasoline is assumed to contain an average eight per cent biofuel share of the volume in 2012 to 2013. This is taken into account in the default caloric value and carbon dioxide coefficient.

1123 Aviation gasoline

Aviation gasoline is a special product for small airplanes.

Medium heavy distillates

1131 Kerosene (Jet fuel)

Kerosene is used as a fuel for jet turbines.

1132 Other kerosenes

Other kerosenes include such as motor kerosene, paraffin and paraffin oil.

1134 Gasoil, low sulphur (heating fuel oil)

Gasoil, heating fuel oil, whose sulphur content is at most 0.1 weight percentage, is a medium distillate, which is used particularly for oil heating of detached houses and other small houses, as a fuel for industrial drying, melting and combustion furnaces, and as a fuel for various heating and drying apparatuses. Several types of heating fuel oil (light fuel oil) are sold under different product names. Light fuel oil belongs to gas oils. In 2012 to 2013, fuel oil is assumed to contain two per cent of bio oil in its energy content, on average. The bio oil content is taken into account in the default caloric values and coefficients.

1135 Light fuel oil, sulphur-free (previously gasoil)

Sulphur-free gasoil is a fuel applicable for use in diesel motors of moving off-road machinery. It replaces previous gasoil and it can be utilised for all uses of light fuel oil. In 2012 to 2013, fuel oil is assumed to contain two per cent of bio oil in its energy content, on average. The bio oil content is taken into account in the default caloric values and coefficients.

1139 Other medium distillates

Other medium distillates include special products corresponding to light fuel oil. 2(8)

Heavy distillates

Heavy distillates are produced from an undistilled cut of crude oil, which is used as a fuel for large oil heating plants and stations, industrial melting and combustion furnaces, and ships and diesel plants.

1141 Heavy fuel oil, low sulphur (< 1%)

1142 Heavy fuel oil, high sulphur (> 1%)

1143 Other heavy distillates

Other heavy distillates include special products such as extra heavy bottom oil and other bottom oils.

1150 Petroleum coke

Includes coke produced from oil by distillation and catalytic FCC and TCC coke by cracking.

1160 Recycled and waste oils

The oils that are recovered from use after possible refining and are utilised as energy sources.

1190 Other petroleum products

This category includes oil products not belonging to other categories, such as process gas produced from heavy fuel oil. Please specify which oil products are reported in this group.

Coal

Hard coal and anthracite

Coal is a solid fossil fuel with an effective thermal value of more than 24MJ/kg in ashless substance. Coal is mainly graded according to the amount of volatile matter it contains and its thermal value.

1211 Anthracite

Measured by geological age, anthracite is the oldest and most advanced type of hard coal with a low content of volatile matter. The net calorific value of anthracite is highest, about 33 MJ per kg.

1212 Hard coal

Bituminous coal, so called steam coal. Includes types of coal whose calorific value is at least 24 MJ per kg, excluding anthracite.

Other coal

1221 Semi-bituminous coal, brown coal, lignite

Brown coal is the youngest coal by geological age. It is less carbonised than hard coal but it contains more volatile components such as hydrogen and oxygen. The calorific value of brown coal is under 24 MJ per kg.

1222 Coal briquettes

Pieces of certain size produced from hard coal by adding binding agents.

1228 Coal tar

Tar formed of hard coal in connection with the production of coke.

1229 Other non-specified coal

Coal other than belonging to the categories above. Please specify which coal product has been used as a fuel.

1230 Coke

Coke is a fuel produced from hard coal by pyrolysis. The category also includes semi-coke. 3(8)

1240 Coke oven gas

Gas obtained as a by-product from the production of coke, containing hydrogen and light hydrocarbon gases. Gas is used as an energy source at coking plants and elsewhere in the iron and steel industry.

1250 Blast furnace gas

Blast furnace gas produced in a blast furnace, which is used after refining as a fuel for heating and energy production. This group also includes CO gas comparable to blast furnace gas.

Natural gas

Natural gas contains primarily methane and some other light hydrocarbons. Natural gas is used as an energy source in the manufacturing industry and energy production. Natural gas can also be used as a transport fuel and as a feed stock in the production of hydrogen.

1311 Natural gas **NEW**

Natural gas in gaseous form distributed to use through the pipe network. Liquefied natural gas distributed to use through the natural gas network is also reported in this category.

1312 Liquefied natural gas (LNG) **NEW**

Natural gas distributed in liquefied form to use outside the pipe network.

Peat

Peat is an organic type of soil generated as a result of slow decay of marsh plants, decomposed incompletely and stored in the habitat under extremely wet conditions. Peat is used as a fuel after drying. Snag trees among peat are considered as part of peat. If wood or other fuel has been added to peat, each fuel is reported separately.

2110 Milled peat

Milled peat is a fine powder milled from the peatland surface. Typical properties as fired: moisture content 40-50 %, net calorific value 9-11 GJ/t.

2120 Sod peat

Sod peat is peat compressed into pieces and separated from the peatland surface. Typical properties as fired: moisture content 35-40%, net calorific value 11-13 GJ/t.

2130 Peat pellets and briquettes

Peat pellets and briquettes are a fuel produced from dried powdered peat by compression. Typical properties as fired: moisture content 5-10%, net calorific value 17-21 GJ/t.

Biomass

Forest fuelwood

Includes wood harvested for energy use collected from forests and wooded areas.

3111 Firewood (stems and split firewood)

The raw material of chopped firewood is firewood (usually 1 m in length) or culled diameter stem. Chopped firewood is chopped and cut furnace-ready firewood used in households' wood-heated equipment, such as stoves, fireplaces and central heating systems. Typical properties as fired: moisture content 20-25%, net calorific value 13-15 GJ/t.

3112 Whole tree chips (from roundwood)

Chips made from culled stem wood or from the entire superterrestrial biomass of the tree (stem wood, branches, needles). Typical properties as fired: moisture content 40-55%, net calorific value 7-11 GJ/t. 4(8)

3113 Forest residue chips

After harvesting of commercial timber, chips or chippings made from branches and tree tops. Also includes chips or chippings produced from twig logs. Typical properties as fired: moisture content 30-50%, net calorific value 8-13 GJ/t.

3114 Stump wood chips **NEW**

Chips or chippings produced from tree stumps and roots. Typical properties as fired: moisture content 30-40%, net calorific value 11-13 GJ/t.

Industrial wood residues

Wood residue or by-product produced in the wood processing or other industry used as an energy source.

3121 Bark

Bark residue derived from commercial timber by different debarking techniques. Typical properties as fired: moisture content 45-65%, net calorific value 5-11 GJ/t.

3122 Saw dust

Residue from sawing of timber. Typical properties as fired: moisture content 45-60%, net calorific value 6-10 GJ/t.

3123 Wood residue chips or chippings

Chips or chippings from industrial wood residue (wood strips, offcuts, veneers in the board industry, plywood edges, etc.) and unbarked or barked chips or chippings produced as by-products by the wood industry, which do not contain halogenated organic compounds, heavy metals or plastics.

Wood residue chippings: moisture content 10-60%, calorific value 6-17 GJ/t.

Plywood residue: moisture content 5-15%, calorific value 10-19 GJ/t.

3124 Cutter shavings, grinding powder, etc. **NEW**

Residue from grinding or planing of timber Also includes dry sawdust and wood dust. Typical properties as fired: moisture content 5-15%, net calorific value 16-18 GJ/t.

3128 Unspecified industrial wood residue

Includes industrial wood residue composed of at least two of the above categories (e.g. bark and sawdust), which cannot be separated even by an approximate estimate.

3129 Other industrial wood residue

Includes other wood residue classified as biofuels (e.g. from the construction material industry), which do not contain halogenated organic compounds, heavy metals and other such impurities.

3130 Black liquor and other concentrated liquors

Includes black liquor and sulphite-based chemical liquor.

By-products from wood processing industry

3141 Pine oil and and pitch NEW

Soft soap, pine oil, pine oil pitch and the like, excluding methanol and turpentine produced from pulp mill processes. Typical properties as fired: - pine oil: net caloric value 30-40 GJ/t.

3142 Methanol and turpentine NEW

Methanol produced from pulp mill processes. Also includes turpentine. Typical properties as fired:

- methanol: net caloric value 19.5 GJ/t.
- turpentine: net caloric value 40 GJ/t.

3149 Other by-products and waste products from the wood processing industry NEW

Wood-based by-products and waste products belonging to other than the above-mentioned categories, such as fibrous sludges (0 fibre), weak and strong odour gases and refuse paper produced not fit for material recycling in produced paper production or other paper, cardboard, paperboard and viscose waste to be burned. 5(8)

3150 Recovered wood

Clean wood residue classified as a biofuel or disposed wood or wood product, which do not contain coatings or halogenated organic compounds and heavy metals. For example, wood residue, wood or loading pallets.

3160 Peat pellets and briquettes

Compressed wood made by compression from sawdust, shavings and grinding dust.

Vegetable-based fuels and other field biomass

Vegetable-based fuels include field biomass and residues and waste from other than arboreal plants, as well as vegetable-based by-products of the food industry. These are cereal, reed canary grass, straw, reed grass, turnip rape and linen. (NB! Transport and heating fuels produced industrially from vegetable oils and fats for distribution belong to categories 3221-3229).

3171 Reed canary grass

Reed canary grass is an energy plant used as fuel. It is usually burned as mixed fuel together with peat and wood. The components of the mixture are reported separately in their own respective fuel category.

3172 Cereal crops and straw parts

Cereals or parts of cereal crops such as straw used as fuel.

3173 Energy willow NEW

Short rotation coppice willow is grown for energy use and is chipped prior to use. This category also includes other short rotation forestry wood species that are grown for energy use.

3174 Vegetable oils and fats NEW

Vegetable oils and fats used as fuels, including roasting fats, etc. removed from use.

3179 Other vegetable-based fuels

This category includes others than the above-mentioned vegetable-based by-products, etc. from food production or the food industry. Please specify which products that have been used as a fuel.

Animal-based fuels

Animal-based fuels include such as meat and bone flour and animal fats. The category also includes dung and litter. Please specify which products that have been used as a fuel. (NB! Transport and heating fuels produced from animal fats for industrial distribution belong to categories 3221-3229).

3181 Animal fats NEW

Animal-based fats and oils used as a fuel.

3189 Other animal-based fuels NEW

Other animal-based products used as a fuel, such as meat and bone flour. The category also includes dung and litter. Please specify which products that have been used as a fuel.

Other biofuels and mixed fuels

Biogas

Biogas is the result of a microbiological process, where organic matter is decomposed due to bacterial activity in an anaerobic state. Biogas and digested biomass are produced from the raw

material as a result of the decomposition. This category also includes organic gases produced in other ways, e.g. by means of a thermal process.

3211 Landfill gas

Biogas recovered from landfills. Methane content around 35–60%.

3212 Biogas from wastewater treatment plants

Biogas produced in wastewater treatment plants. Methane content around 60-70%.

3213 Industrial biogas

Biogas produced in industrial wastewater treatment plants, and from industrial biodegradable waste and by-products (e.g. in the food and forest industries). Methane content around 65-70%. 6(8)

3214 Biomethane NEW

Purified biogas whose methane content is over 95%. Report here the biomethane that is used as such (not mixed with fossil natural gas). This does not include the biofuel share of natural gas distributed with fossil natural gas in the natural gas network.

3215 Synthetic (thermal) biogas) NEW

A so-called synthetic (thermal) biogas produced from an organic material by gasification.

3219 Other biogases

Other biogases include biogas produced on farms and in co-digestion plants. Co-digestion plants differ from other plants in that they use diversified raw materials, such as waste sludges, and municipal and industrial wastes or by-products. Methane content around 55-65%.

Bioliquids

Liquid fuels produced from biomass or vegetable oil used as such (not mixed into fossil fuels). This does not include biofuel shares mixed into traffic fuels and fuel oils. The category also includes bio-based propane, which is produced as a by-product of oil refining. Pine oil, pine oil pitch, methanol and the like derived from the wood processing industry and processing of pine oil belong to categories 3141 to 3149.

3221 Biofuel oil NEW

Fuel oil industrially produced from biomass or vegetable oil used as such for heating or fuel for off-road machinery (not mixed with fossil fuels).

3222 Biopyrolysis oil NEW

Fuel oil produced from wood or other biomass by the pyrolysis method.

3229 Other liquid biofuels NEW

Such as biopropane generated in connection with oil refining and other liquid fuels made from organic matters not belonging to the above-mentioned categories.

Mixed fuels

Mixed fuels refer to fuels that contain both fossil and renewable (biodegradable) coal.

3231 Recovered fuels

Fuel produced from sorted municipal solid, enterprise or industrial waste, such as SRF, REF, RDF or PDF. Pellets produced from waste belong to category 3235.

3232 Demolition wood

Wood waste from the demolition of buildings and structures containing coatings or other impurities, and does not thus belong to category 315 Recovered wood.

3233 Impregnated wood (chemically treated)

Impregnated wood products, e.g. railway sleepers.

3234 Deinking sludge NEW

Fibrous sludge from the deinking process of recycled paper, which is used after desiccation as a fuel in energy production. Contains carbonates and is therefore classified as a mixed fuel.

3235 Waste pellets NEW

Pellets produced from waste.

3238 Municipal waste/mixed waste

Source separated municipal waste (energy waste or dry waste) used as a fuel for energy production at waste incineration plants. This category also includes the fuel section remaining from separation of other fractions at waste treatment and separation plants. 7(8)

3239 Other mixed fuels

Other mixed fuels and gases not belonging to the categories above, such as unspecified industrial waste and deinking waste. If the fossil part of these fuels is not specified separately, they are counted as totally fossil in the emissions trading system.

3240 Gasified waste (Product gas)

Fuel gas produced from solid raw materials in a thermal gasification process. The energy of product gas is reported as the energy content of its raw materials, in other words inclusive of losses from the gasification process. In energy statistics, product gas is recorded as its raw materials.

3250 Biosludge

Includes sludge from municipal waste water treatment, which is used as fuel after desiccation. Fibrous sludges from the wood industry are reported in category 314 Other by-products from wood processing industry.

3260 Biocoal NEW

Fuel produced from wood or other biomass by heating. Includes wood coal produced by torrefication.
Typical properties as fired:

- torrefied wood: net caloric value 18-22 GJ/t
- wood coal: net caloric value 28-33 GJ/t

Nuclear energy**4110 Nuclear energy****Other energy sources****Other by-products and wastes used as fuel**

Solid and liquid waste and by-products not belonging to other categories used as an energy source.

4911 Plastics waste

Includes various plastics waste, e.g. mobile phone covers.

4912 Rubber waste

Includes various rubber waste, such as car tyres and other waste rubber.

4913 Hazardous waste**4919 Other waste**

Waste not belonging to any of the above categories.

4920 Exothermic heat from industry

Industrial reaction heat refers to heat generated as a by-product of an exothermic heat-transferring chemical reaction in an industrial process (such as calcination, catalytic process). The energy content of the formed heat has not previously been included in the usage figures of any other energy sources. Reaction heat is utilised in electricity and/or heat generation and it replaces other primary energy. This category also includes heat recovered from combustion gases not included in the net calorific value of fuels, which lowers the need for other primary energy.

4940 Electricity

Electricity used in heat pumps and electric boilers. 8(8)

4970 Sulphur

Sulphur generated in industrial processes, which is used as fuel in energy production.

4980 Hydrogen**4990 Other non-specified energy sources**

Fuels or energy sources not belonging to the categories above. Please specify which products that have been used as a fuel.

Electricity and heat**5100 Electricity****5210 District heat**

Heat generated by a power plant/heat plant that is transferred from the heat exchanger to consumers with the help of hot water that circulates in a closed district heating network. District heat is used to heat buildings and produce hot water.

5220 Heat/steam used in industrial processes

Industrial heat/steam produced in a power plant or steam centre or recovered from exothermic reactions, which is used in industrial processes, for instance, in drying of paper, raising temperatures to the level required for a reaction, etc. (NB: heat produced/purchased to heat buildings is recorded under "District

heat"). Do not include the use of secondary heat or steam fed into a turbine for electricity production.