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Fourth Revision
InterEnerStat definitions of Flows

Preliminary draft of InterEnerStat definitions of flows
still subject to final review by InteEnerStat

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InterEnerStat

Harmonisation of Definitions of Energy Products and Flows

FOURTH REVISION OF THE DEFINITIONS
Part 1: Flows

revisions to definitions made since the document of 21 Dec. 2009 are in redline/strikeout

IEA, Paris, 16 August 2010

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Note: **non-energy use** should be collected separately and can either be incorporated in the consumption above or be shown separately for presentational purposes

DEFINITION OF NATIONAL TERRITORY (not in flow classification)

Definition: The national territory for the purposes of energy statistics consists of the geographic territory under the effective economic control of the national government and it comprises:

(a) the land area;

(b) airspace;

(c) territorial waters, including areas over which jurisdiction is exercised over fishing rights and rights to fuels or minerals; and

(d) in a maritime territory, islands that are subject to the jurisdiction of the national government.

Explanation: The national territory includes any free trade zones, bonded warehouses or factories operated by enterprises under customs control within the areas described above.

Territorial enclaves (embassies, consulates, military bases, scientific stations, etc.) are part of the national territory where they are physically located.

SUPPLY

Definition:	The net flow of fuel or energy into the national territory from production, external trade, international bunkers and changes in stocks during the statistical reporting period.
Remark:	For the purposes of constructing commodity balances for fuels, electricity and heat, supply is calculated using the formula: Supply = production + receipts from other sources + imports - exports - international bunkers ± stock change. *where* international bunkers = international marine and aviation bunkers The sign of the stock change will depend on the convention used for stock build and stock draw. Commodity balances express the various elements of the balance in the units of measure usually used to express the trade in the product.

PRODUCTION

Definition:	The capture, extraction or manufacture of fuels or energy in forms which are ready for general use.
Explanation:	In energy statistics two types of production are distinguished, primary and secondary. Primary production is the capture or extraction of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuels within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected, flared or vented are not included. The fuels and energy produced are termed 'primary' fuels and energy. Production of secondary fuels or energy is their manufacture through the process of transformation of primary fuels or energy. The quantities of secondary fuels reported as production include quantities lost through venting and flaring during and after production. In this manner the mass, energy and carbon within the primary source(s) from which the fuels are manufactured may be balanced against the secondary fuels produced.
Remark:	Fuels and energy produced are usually sold but may be partly or entirely consumed by the producer. For convenience of expression, fuels or energy derived from secondary energy products are also referred to as 'secondary'.

RECEIPTS FROM OTHER SOURCES

Definition:	Additions to the supply of an energy product that have already been accounted for in the production of another energy form.
Remark:	Examples are: The ~~addition of petroleum coke to coking coal for use in coke ovens, the~~ blending of petroleum gases with natural gas, and the incorporation in oil products of additives and oxygenates.

IMPORTS

Definition:	For the purposes of energy statistics, imports comprise all fuel (excluding nuclear fuel) and energy entering the national territory.
Explanation:	Goods simply being transported through a country (goods in transit) and goods temporarily admitted/withdrawn are excluded but re-imports, that is domestic goods exported but subsequently readmitted, are included.

EXPORTS

Definition:	For the purposes of energy statistics, ~~imports comprise all fuel and energy entering the national territory and~~ exports comprise all fuel (excluding nuclear fuel) and energy leaving the national territory with the exception that exports exclude quantities of fuels delivered for use by merchant (including passenger) ships and civil aircraft, of all nationalities, during international transport of goods and passengers.
Explanation:	Goods simply being transported through a country (goods in transit) and goods temporarily admitted/withdrawn are excluded but re-exports, that is foreign goods exported in the same state as previously imported, are included.
Remark:	Fuels delivered to merchant ships and civil aircraft for international transport are classified as international marine or aviation bunkers, respectively.

INTERNATIONAL MARINE BUNKERS

Definition:	Quantities of fuels delivered to merchant (including passenger) ships, of any nationality, for consumption during international voyages transporting goods or passengers.
Explanation:	International voyages take place when the ports of departure and arrival are in different national territories.
Remark:	Fuels delivered for consumption by ships during domestic transportation, fishing or military use are not included here. For the purposes of energy statistics, international marine bunkers are not classified as exports.

INTERNATIONAL AVIATION BUNKERS

Definition:	Quantities of fuels delivered to civil aircraft, of any nationality, for consumption during international flights transporting goods or passengers.
Explanation:	International flights take place when the ports of departure and arrival are in different national territories.
Remark:	Fuels delivered for consumption by aircraft undertaking domestic or military flights are not included here. ~~See 'Domestic Aviation'.~~ For the purposes of energy statistics, international aviation bunkers are not classified as exports.

STOCKS (not in flow classification)

Definition:	For the purposes of energy statistics, stocks are quantities of fuels that can be held and used to • maintain service under conditions where supply and demand are variable in their timing or amount due to normal market fluctuations, or • supplement supply in the case of a supply disruption.
Remark:	Stocks used to manage a supply disruption may be called 'strategic' or 'emergency' stocks and are often held separately from stocks designed to meet normal market fluctuations.

STOCK CHANGES

Definition:	The increase (*stock build*) or decrease (*stock draw*) in the quantity of stock over the reporting period.

TRANSFERS

Definition:	Transfers are essentially statistical devices to overcome practical classification and presentation issues resulting from changes in use or identity of a product. Transfers comprise products transferred and interproduct transfers.

PRODUCTS TRANSFERRED

Definition:	The reclassification (renaming) of ~~petroleum~~oil products which is necessary when finished oil~~petroleum~~ products are used as feedstock in refineries.

INTERPRODUCT TRANSFERS

Definition:	The movements of fuels between product categories because of reclassification of a product which no longer meets its original specification.
Remark:	The transferred product is often blended with its host.

PRODUCT RECYCLING

Definition:	The return of a delivered product to supply without reclassification as another product.
Remark:	An example is~~,~~ the recovery of used lubricants.

STATISTICAL DIFFERENCE

Definition:	The numerical difference between the total supply of a fuel/energy and the total use of it.
Explanation:	It arises from various practical limitations and problems related to the collection of the data which make up supply and demand. The data may be subject to sampling or other collection errors and/or be taken from different data sources which use different time periods, different spatial coverage, different fuel specifications or different conversions from volume to mass or from mass to energy content in the supply and demand sides of the balance.

TRANSFORMATION PROCESSES

Definition: From the point of view of energy statistics, a transformation process is the movement of part or all of the energy content of a product entering the process to one or more different products leaving the process.

Explanation: There are two groups of processes.

(a) The physical or chemical conversion of a product into another product or products whose intrinsic properties differ from those of the original product.

Examples are:

- Chemical or physical changes to the input product(s) resulting in the creation of products containing new chemical compounds. (For example, refining).
- Physical changes to the input which involve separation into several different products with intrinsic physical properties which are different from those of the input material. (For example, coke oven carbonisation of coal).
- Conversion of heat into electricity.
- Production of heat from combustion, fission or electricity.

and

(b) The ~~separation~~aggregation or blending of products sometimes involving a change of physical shape.

Examples are:

- Blending gases to meet safety and quality requirements before distribution to consumers.
- Briquetting of peat and brown coal.

Remark: The transformation processes are currently identified by the plants in which they occur.

Electricity plants
Combined heat and power plants
Heat plants
Coke ovens
Patent fuel plants
Brown coal briquette plants
Coal liquefaction plants
Gas works (and other conversion to gases)
Blast furnaces
Peat briquette plants
Natural gas blending plants
Gas to liquid (GTL) plants
Oil refineries
Petrochemical plants
Charcoal plants
Other transformation processes

PRODUCER TYPES (not in flow classification)

Main Activity Producers

Definition: Enterprises which produce electricity or heat as their ~~main~~principal activity.

Remark: Formerly known as *public utilities*, the enterprises may be privately or publicly owned companies.

Autoproducers

Autoproducers (Electricity)

Definition: Enterprises which produce electricity but for whom the production is not their ~~main~~principal activity.

Autoproducers (Heat)

Definition: Enterprises which produce heat for sale but for whom the production is not their ~~main~~principal activity.

Remark: Deliveries of fuels for heat generated by an establishment for its own use are classified within the ~~branch~~part of final consumption where they are consumed.

ELECTRICITY PLANTS

Definition: Plants in which only electricity is produced.

Explanation: The electricity may be obtained directly from natural sources such as hydro, geothermal, wind, tidal, marine, solar energy or from fuel cells or from the heat obtained from the combustion of fuels or nuclear reactions.

COMBINED HEAT AND POWER PLANTS

Definition: Combined heat and power (CHP) plants produce both heat and electricity from at least one generating unit in the plant.

Remark: They are sometimes referred to as ‘co-generation’ plants.

HEAT PLANTS

Definition: Heat plants refers to plants (including heat pumps and electric boilers) designed to produce heat only for deliveries to third parties.

Remark: Deliveries of fuels for heat generated by an establishment for its own use are classified within the branch of final consumption where they are consumed.

COKE OVENS

Definition:	Large ovens within which coke oven coke, coke oven gas and coal tars are produced by high temperature carbonisation of coking coal.

PATENT FUEL PLANTS

Definition:	Plants manufacturing patent fuels.

BROWN COAL BRIQUETTE PLANTS

Definition:	Plants manufacturing brown coal briquettes.

COAL LIQUEFACTION PLANTS

Definition:	Coal liquefaction plants are where coal is used as a feedstock to produce liquid fuels by hydrogenation or carbonisation.
Remark:	Also known as coal to liquid (CTL) plants.

GAS WORKS (and other conversion to gases)

Definition:	Plants manufacturing gases for distribution to the public either directly or after blending with natural gas.
Remark:	The gases are collectively referred to as 'gas works gas and other ~~distributed~~manufactured gases for distribution'; short name - gas works gas. Some gas works may produce coke as well as gas.

BLAST FURNACES

Definition:	Blast furnaces produce blast furnace gas as a by-product when making pig iron from iron ore.
Explanation:	Carbon, mainly in the form of coke, is added to the blast furnace to support and reduce the iron oxide charge and provide heat. Blast furnace gas comprises carbon monoxide and other gases formed during the heating and reduction process.

PEAT BRIQUETTE PLANTS

Definition:	Plants manufacturing peat briquettes.

NATURAL GAS BLENDING PLANTS

Definition:	Plants, separate from gas works, in which substitute natural gas (see gas works gas), ~~or~~ petroleum gases or biogases are mixed with natural gas for distribution in the gas mains. ~~Plants where the calorific value and density of natural gas for distribution is adjusted through blending with nitrogen, gases from oil and/or coal, Substitute Natural Gas or with biogases.~~
Remark:	Where blending of substitute natural gas with natural gas takes place within gas works the blending is considered part of the gas works process.

GAS TO LIQUIDS (GTL) PLANTS

Definition:	Plants in which natural gas is used as feedstock for the production of liquid fuels.
Remark:	The liquid fuels are usually used as vehicle fuels. Note that the gas-to-liquid plants are quite different from LNG plants which convert gaseous natural gas into liquid natural gas.

OIL REFINERIES

Definition:	Oil refineries are plants which transform crude oil and other hydrocarbons into finished oil~~petroleum~~ products.
Explanation:	Typical finished products are liquefied petroleum gases, naphtha, motor gasoline, gas oils, aviation fuels and other kerosenes and fuel oils.

PETROCHEMICAL PLANTS

Definition:	Petrochemical plants convert hydrocarbon feedstock into organic chemicals, intermediate compounds and finished products such as plastics, fibres, solvents and surfactants.
Explanation:	Feedstock used by the plant is usually obtained from the refinery and includes naphtha, ethane, propane and middle distillate oils (for example, gas oil). The carbon and hydrogen in the feedstock is largely transferred to the basic chemicals and products subsequently made from them. However, certain by-products are also created and returned to the refinery (such as pyrolysis gasoline) or burned for fuel to provide the heat and electricity required for the cracking and other processes in the petrochemical plant.

CHARCOAL PLANTS

Definition:	Plants in which wood or other vegetal matter is carbonised through slow pyrolysis to produce charcoal.

OTHER TRANSFORMATION PROCESSES

Definition:	Transformation processes not elsewhere specified.

ENERGY INDUSTRY OWN USE

Definition:	Consumption of fuels and energy for the direct support of the production, and preparation for use of fuels and energy.
Explanation:	Quantities of fuels which are transformed into other fuels or energy are not included here but within the transformation use. Neither are quantities which are used within parts of the energy industry not directly involved in the activities listed in the definition. These quantities are reported within final consumption.
Remark:	The headings listed in energy industry own use are:
	Electricity and heat plants Coal mines Coke ovens Patent fuel plants Brown coal briquette plants Coal liquefaction plants Gas works (and other conversion to gases) Blast furnaces Gas separation plants Gas to liquid (GTL) plants LNG plants / regasification plants Oil and gas extraction Oil refineries Pumped storage plants Charcoal plants Biogas production plants Nuclear fuel extraction and fuel processing Energy industry own use not elsewhere specified

LOSSES

Definition:	Losses during the transmission, distribution and transport of fuels, heat and electricity. Losses also include venting and flaring of manufactured gases, losses of geothermal heat after production and pilferage of fuels or electricity.
Remark:	Production of secondary gases includes quantities subsequently vented or flared. This ensures that a balance can be constructed between the use of the primary fuels from which the gases are derived and the production of the gases.

FINAL CONSUMPTION

Definition: Final consumption is all fuel and energy that is delivered to users for both their energy and non–energy uses not involving transformation processes. The main user groups comprise:

- Industry (excluding the energy industry)
- Transport
- Residential
- Commerce and public services
- Agriculture, forestry
- Fishing
- Not elsewhere specified (includes military consumption)

Explanation: Energy uses are for heat raising, transportation and electrical services. Non-energy uses are those for fuels used for chemical feedstocks and non-energy products.

- Chemical feedstocks are fuels used as raw materials for the manufacture of products which contain the hydrogen and/or carbon taken from the fuel.
- Non-energy products are fuel products mainly used for their physical and chemical properties. Examples are lubricants, paraffin waxes, coal tars and oils as timber preservatives, etc.

Remark: Any fuel use for a transformation process should not be classified as final consumption.

Studies of the non-energy use of fuels also classify the use of reductants as non-energy use.

- Reductants are carbon from fuels (usually cokes) which are heated with metal oxides. During the process the formation of carbon monoxide removes the oxygen from the metal oxides and produces the pure metal.

This use (mostly for the manufacture of iron and steel) is considered as use for energy purposes within energy statistics because the gases created by the reduction process, and which contain most of the carbon from the reductant, are used as fuels to sustain the process or for other heat raising purposes.

INDUSTRY

Definition:	Use of fuels within the mining (non-fuel), manufacturing and construction industries.
Remark:	Transformation processes and energy industry own use areis excluded as is fuel use for coke manufacture and in blast furnaces within the iron and steel industrysector. Consumption of fuels for transport of goods is classified under transport.

Activity	Activity Classification
Iron and steel	ISIC Group 241 and Class 2431 (NACE Groups 24.1, 24.2, 24.3, and Classes 24.51, and 24.52). Consumption in coke ovens and blast furnaces are defined as part of ransformation processes and energy industry own use.
Chemical and petrochemical	ISIC/NACE Divisions 20 and 21, excluding 2011.
Non-ferrous metals	ISIC Group 242 and Class 2432 (NACE Group 24.4, and Classes 24.53 and 24.54).
Non-metallic minerals	ISIC/NACE Division 23. Report glass, ceramic, cement and other building materials industries.
Transport equipment	ISIC/NACE Divisions 29 and 30.
Machinery	ISIC/NACE Divisions 25, 26, 27 and 28. Fabricated metal products, machinery and equipment other than transport equipment.
Mining and quarrying	ISIC Divisions 07 and 08 and Group 099. This excludes the mining of uranium and thorium ores (Class 0721) and the extraction of peat (Class 0892).
Food and tobacco	ISIC/NACE Divisions 10, 11 and 12.
Paper, pulp and print	ISIC/NACE Divisions 17 and 18. Includes production of recorded media.
Wood and wood products (other than pulp and paper)	ISIC/NACE Division 16.
Textile and leather	ISIC/NACE Divisions 13, 14 and 15.
Construction	ISIC/NACE Divisions 41, 42 and 43.
Industries not elsewhere specified	ISIC Divisions 22, 31, 32 as well as any manufacturing industry not listed above.

TRANSPORT

Definition:	Consumption of fuels and electricity used to~~in~~ transport ~~of~~ goods or persons between points of departure and destination within the national territory irrespective of the economic sector within which the activity occurs.
Remark:	Classification of the consumption of fuels by merchant ships and civil aircraft undertaking transport of goods or persons beyond the national territory is covered under the definitions for international marine and aviation bunkers and are therefore excluded from this definition. However, deliveries of fuels to road vehicles going beyond national borders cannot be readily identified and by default are included here.

DOMESTIC AVIATION

Definition:	Quantities of aviation fuels delivered to all civil aircraft undertaking a domestic flight transporting passengers or goods or for purposes such as crop spraying and the bench testing of aero engines.
Explanation:	A domestic flight takes place when the departure and landing airports are on national territory. In cases where distant islands form part of the national territory this may imply long flights through the air space of other countries but the flights are, nevertheless, part of domestic aviation.
Remark:	Military use of aviation fuels should not be included in domestic aviation but included under 'not elsewhere specified'. The use of fuel by airport authorities for ground transport *within* airports is also excluded here but included under 'commerce and public services'. Domestic aviation is part of ISIC Division 51.

ROAD

Definition:	Fuels and electricity delivered to vehicles using public roads.
Explanation:	Fuels delivered for 'off-road' use and stationary engines should be excluded. Off-road use comprises vehicles and mobile equipment used primarily on commercial, industrial sites or private land, or in agriculture or forestry. The deliveries of fuels related to these uses are included under the appropriate final consumption heading. Deliveries for military uses are also excluded here but included under 'not elsewhere specified'. The road fuel use by ISIC 4923 (freight transport by road) is included here.

RAIL

Definition:	Fuels and electricity delivered for use in rail vehicles, including industrial railways.
Remark:	This includes urban rail transport (including trams) and is part of the fuel and energy consumption by ISIC Group 491 (transport via railways).

DOMESTIC NAVIGATION

Definition:	Fuels delivered to vessels transporting goods or people and undertaking a domestic voyage.
Explanation:	A domestic voyage is between ports of departure and destination in the same national territory without intermediate ports of call in foreign ports. Note that this may include journeys of considerable length between two ports in a country (e.g. San Francisco to Honolulu).
Remark:	Fuels delivered to fishing vessels are excluded here but included under 'fishing'. Domestic navigation is part of ISIC Division 50.

PIPELINE TRANSPORT

Definition:	Fuels and electricity used in the support and operation of pipelines transporting gases, liquids, slurries and other commodities between points within the national territory.
Explanation:	It comprises the consumption at pumping stations and for maintenance of the pipeline. Consumption for maintaining the flow in pipelines carrying ~~water,~~ natural gas, manufactured gas, hot water and steam in distribution networks is excluded here but included under the appropriate heading within 'energy industry own use'. However, ~~C~~consumption for the transport of natural gas in transmission networks is included. Consumption of fuels or electricity for maintaining the flow in pipelines carrying water is included in 'commerce and public services'.
Remark:	A transmission pipeline transports its contents to distribution pipelines for eventual delivery to consumers. Transmission pipelines for gas usually operate at pressures considerably higher than those used in the distribution pipelines. Pipeline transport is classified as ISIC Group 493 (transport via pipeline).

TRANSPORT NOT ELSWHERE SPECIFIED

Definition:	Deliveries of fuels or electricity used for transport activities not covered within the modes of transport defined elsewhere.
Remark:	Most of the forms of transport listed in ISIC Class 4922 (other land transport) are included in the modes of transport defined elsewhere. However, consumption of electricity for téléphériques (telfers), and ski and cable lifts would be included here.

RESIDENTIAL

Definition:	Fuels and energy consumed by all households.
Remark:	Also includes those households with employed persons or producing undifferentiated goods and services. (ISIC/NACE Divisions 97 and 98).
	Exclude fuels and electricity used by households for transport.

COMMERCIAL AND PUBLIC SERVICES

Definition:	Fuels and energy consumed by business and offices in the public and private sectors.
Explanation:	The activities covered are those listed within the following ISIC divisions:
	33, 36-39, 45-47, 52-53, 55-56, 58-66, 68-75, 77-82, 84 (excluding Class 8422), 85-88, 90-96 and 99.

AGRICULTURE/FORESTRY

Definition:	Deliveries of fuels and energy for agriculture, hunting and forestry.
Remark:	It includes fuels and energy consumed for traction or for power or heating (ISIC Divisions 01 and 02). Exclude fuels used for aerial crop spraying. See 'domestic aviation'.

FISHING

Definition:	Deliveries to all vessels engaged in ocean, coastal and inland fishing as well as for aquaculture and fisheries (ISIC/NACE Division 03). Include also fuel and energy use in gathering of marine materials; natural pearls, sponges, coral and algae; and service activities incidental to fishing.

NOT ELSEWHERE SPECIFIED

Definition:	Consumption for activities not classified elsewhere.
Remark:	This category includes fuels and electricity delivered to military services based in the national territory. The energy consumption is for all mobile and stationary consumption (e.g. ships, aircraft, road and energy used in living quarters), regardless of whether the fuel delivered is for the nation's military services or for the military services of another country based on the national territory. Bunker fuels for military ships and aircraft (ISIC Class 8422) is included here. ~~ISIC Class 8422.~~

NON-ENERGY USE (not in flow classification)

Definition: Fuels used for chemical feedstocks and non-energy products.

- Chemical feedstocks are fuels used as raw materials for the manufacture of products which contain the hydrogen and/or carbon taken from the fuel.
- Non-energy products are fuel products used mainly for their physical and chemical properties. Examples are lubricants, paraffin waxes, coal tars and oils as timber preservatives, etc.

Remark: Studies of the non-energy use of fuels also classify the use of reductants as non-energy use but~~, however,~~ in energy statistics the use of reductants is considered an energy use.

- Reductants are carbon from fuels (usually cokes) which are heated with metal oxides. During the process the formation of carbon monoxide removes the oxygen from the metal oxides and produces the pure metal.

This use (mostly for the manufacture of iron and steel) is considered as use for energy purposes within energy statistics because the gases created by the reduction process, and which contain most of the carbon from the reductant, are used as fuels to sustain the process or for other heat raising purposes.