OIL

ANNUAL QUESTIONNAIRE

2022-2023

AND HISTORICAL REVISIONS

July 2024

Attached is the annual questionnaire for oil which provides for the submission of 2022-2023 data and historical revisions where applicable.

Countries reporting to the IEA are requested to complete the questionnaire at the latest by **30 September**. Earlier submissions are welcome.

Countries reporting to Eurostat are requested to complete the questionnaire by **31 October** (Regulation (EC) No 1099/2008 on energy statistics). Earlier transmissions are welcome.

Please send your questionnaire to:

- International Energy Agency (IEA/OECD), Energy Data Centre
  (the IEA will forward the data to the United Nations Economic Commission for Europe in Geneva).
- European Commission, Eurostat, Energy Statistics
  (for EU Member States, European Economic Area countries, EU Candidate Countries and Potential Candidates, Energy Community Contracting Parties)
- United Nations Statistics Division, Energy Statistics Section

Transmission details are provided in the "Data communication procedures" section.

Data Communication Procedures

IEA

9 rue de la Fédération, 75739, Paris, Cedex 15, France

Please complete data for your country on the Energy Validation Outlet:

https://evo.iea.org

Alternatively send the completed questionnaire to the IEA in a CSV or Excel file as an e-mail attachment to oilaq@iea.org

For questions regarding the questionnaire, contact oilaq@iea.org.

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Eurostat

European Commission – Eurostat, Unit E.5: Energy, L-2920 Luxembourg
(for EU Member States, European Economic Area countries, EU Candidate Countries and Potential Candidates, Energy Community Contracting Parties)

The completed MS Excel file questionnaire should be transmitted via the Single Entry Point following the implementing procedures of **EDAMIS** (Electronic Data Files Administration And Management Information System): https://webgate.ec.europa.eu/edamis selecting the electronic data collection **ENERGY_PETRO_A**.

Countries reporting to Eurostat are reminded of the *Revision Policy for Energy Statistics*. If you plan to revise historic data, please remember to transmit to Eurostat the *Revision pre-announcement form* as soon as possible.

All countries reporting to Eurostat are required to indicate "**years to load**". Countries can select only the most recent period(s), full time series or any combination of years. Eurostat will load into its database only the time periods marked.

For questions regarding the questionnaire, contact estat-energy-annual@ec.europa.eu. The fuel manager will get back to you.

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United Nations

United Nations Statistics Division, Energy Statistics Section
2 UN Plaza, DC2–1414, New York, NY 10017, USA

The completed questionnaire should be transmitted by e–mail to:
Mr. Leonardo Souza, Chief, Energy Statistics Section, United Nations Statistics Division

E–MAIL ADDRESS energy_stat@un.org

FAX (1–212)–963–0623

REPORTING INSTRUCTIONS

Data should be reported for calendar years. If fiscal year data have to be used, please state this clearly and specify the period covered.

A consistent reporting scheme should be used (of 0, 1, 2 or 3 decimal places), and communicated in the Remarks page. In order to ensure that for example 18.130 is actually 18.130, and not 18.132, rounded to, and displaying as, 18.13.

Reporting should be consistent across all time series for any given year, avoiding any inconsistencies between flows or products or technologies.

The definitions and reporting conventions used in this questionnaire are the same as those used in the other annual questionnaires (Coal (Solid fossil fuels and manufactured gases), Natural gas, Renewables and Wastes, and Electricity and heat). Please ensure that data on fuel used for electricity and heat production reported in this questionnaire are consistent with those reported for the same categories in the Electricity and heat questionnaire. Similarly, please ensure that data on liquid biofuels for blending with fuels reported in this questionnaire are consistent with those reported for the relevant flows in the Renewables and Wastes questionnaire.

Where data are not available, estimates should be given and identified as such in the Remarks page.

Any data under Not elsewhere specified should be explained in the Remarks page.

UNITS AND CONVERSION TO TONNES

Report all figures in thousands of tonnes, with up to 3 decimal places.

(Examples: 18,436 tonnes may be reported as "18",“18.4”, “18.44” or “18.436”; 1,728 tonnes may be reported as "2", “1.7”,”1.73” or “1.728”.

Please provide the Net calorific values (NCV) for all quantities reported.

Average Net calorific values should be reported in kilojoules per kilogram (kJ/kg) to the nearest whole number.

Conversion from volume to mass:

- ***Barrels to tonnes***

  Barrels are to be converted to tonnes by using conversion factors based on actual density. Where conversion from barrels per day is necessary, units should be multiplied by the actual number of days. Please specify on the Remarks page the factor that has been used.

- ***Kilolitres (cubic metres) to tonnes***

  Kilolitres should be converted to tonnes by using conversion factors based on actual density. Please specify on the Remarks page the factor that has been used.

INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION

In 2008, the United Nations and the European Commission have published in parallel their revised classification codes.

United Nations:
International Standard Industrial Classification of all Economic Activities – ISIC, Rev.4

European Commission:
Statistical classification of economic activities in the European Community – NACE, Rev.2

DEFINITIONS OF CRUDE OIL AND OIL PRODUCTS

Please note: in the definitions, petrochemical feedstocks refer to all oil products (naphtha, LPG, light and heavy gasoil, etc.) which are used as raw material in the petrochemical industry e.g. for steamcracking and aromatics plants.

1. Crude oil

Crude oil is a mineral oil of natural origin comprising a mixture of hydrocarbons and associated impurities, such as sulphur. It exists in the liquid phase under normal surface temperature and pressure and its physical characteristics (density, viscosity, etc.) are highly variable. This category includes field or lease condensate recovered from associated and non–associated gas where it is commingled with the commercial crude oil stream.

2. Natural gas liquids (NGL)

NGL are liquid or liquefied hydrocarbons recovered from natural gas in separation facilities or gas processing plants. Natural gas liquids include ethane, propane, butane (normal and iso–), (iso) pentane and pentanes plus (sometimes referred to as natural gasoline or plant condensate).

3. Refinery feedstocks

These are processed oils destined for further processing (e.g. straight run fuel oil or vacuum gas oil) excluding blending. With further processing, it will be transformed into one or more components and/or finished products. This definition also covers returns from the petrochemical industry to the refining industry (e.g. pyrolysis gasoline, C4 fractions, gasoil and fuel oil fractions).

4. Additives/oxygenates

Additives are non–hydrocarbon compounds added to or blended with a product to modify fuel properties (octane, cetane, cold properties, etc.):

- Oxygenates, such as alcohols (methanol, ethanol), ethers (such as MTBE (methyl tertiary butyl ether), ETBE (ethyl tertiary butyl ether), TAME (tertiary amyl methyl ether));
- Esters (e.g. rapeseed or dimethylester, etc.);
- Chemical compounds (such as TML, TEL and detergents).

Note: Quantities of Additives/oxygenates (alcohols, ethers, esters and other chemical compounds) reported in this category should relate to the quantities blended with fuels.

Biofuels

Report under this category the following. 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.

- **Biogasoline:** This category includes liquid biofuels suitable to be blended with or replace motor gasoline from fossil origin. For example it includes: bioethanol (ethanol produced from biomass and/or the biodegradable fraction of waste), biomethanol (methanol produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl–tertio–butyl–ether produced on the basis of bioethanol: the percentage by volume of bioETBE that is calculated as biofuel is 47%) and bioMTBE (methyl–tertio–butyl–ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%).
- **Biodiesels:** This category includes liquid biofuels suitable to be blended with or replace gas/diesel oil from fossil origin. For example it includes: biodiesel (a methyl–ester produced from vegetable or animal oil, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsch (Fischer Tropsch produced from biomass), cold pressed biooil (oil produced from oil seed through mechanical processing only).
- **Bio jet kerosene:** Liquid biofuels suitable to be blended with or replacing Jet kerosene from fossil origin.

All liquid biofuels which have **not been blended** (i.e. in their pure form) should be reported in the Renewables questionnaire. The liquid biofuels blended should be reported in the appropriate product indicating the biofuel portion.

Note: Reporting of natural gas used as a raw material for methanol production.

Natural gas used as raw material for methanol production, should be reported as non-energy use in the chemical sector in the natural gas questionnaire (Table 2b). *Except* if the methanol is further used for energy purposes by refineries. In the oil questionnaire (Table 1), the output of this transformation is reported in additives/oxygenates under from other sources natural gas. In the natural gas questionnaire the corresponding input (portion of natural gas transformed into methanol to be further used by refineries) should be reported under non-specified transformation (Table 2a).

5. Other hydrocarbons

This category includes synthetic crude oil from tar sands, shale oil, etc., liquids from coal liquefaction, (see the Annual coal questionnaire), output of liquids from natural gas conversion into gasoline (see the Annual natural gas questionnaire), hydrogen and emulsified oils (e.g. Orimulsion).

Note on the reporting of emulsified oils:

All imports of emulsified oils (e.g. Orimulsion) should be reported as imports of Other hydrocarbons (cell F5 in Table 1). As these oils do not need further processing in a refinery, report these quantities as Direct use (cell F7 in Table 1) and Primary product receipts in the Bitumen category of the Supply of oil products report (Table 2A). Any production of emulsified oils should appear as Indigenous production of Other hydrocarbons (cell F1 in Table 1). Report all quantities in physical weight of the emulsion (i.e. including the water content).

Note on the reporting of shale oil:

Oil shale production and direct use should be reported in the Annual coal questionnaire. The production of shale oil (secondary product) is to be reported as Receipts from other sources in the Other hydrocarbons category.

Note on the reporting of natural gas receipts:

The output of liquids from gas-to-liquids (GTL) transformation should be reported as “receipts from other sources (natural gas)” of other hydrocarbons.

For the reporting of natural gas used as raw material for the production of methanol that is further used for energy purposes in refineries see additives and oxygenates.

6. Refinery gas

Refinery gas includes a mixture of non–condensed gases mainly consisting of hydrogen, methane, ethane and olefins obtained during distillation of crude oil or treatment of oil products (e.g. cracking) in refineries. This also includes gases which are returned from the petrochemical industry.

7. Ethane

A naturally gaseous straight–chain hydrocarbon, (C_2H_6) extracted from natural gas and refinery gas streams.

8. Liquefied petroleum gases (LPG)

LPG are light paraffinic hydrocarbons derived from the refinery processes, crude oil stabilisation and natural gas processing plants. They consist mainly of propane (C_3H_8) and butane (C_4H_{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.

9. Naphtha

Naphtha is a feedstock destined for either the petrochemical industry (e.g. ethylene manufacture or aromatics production) or for gasoline production by reforming or isomerisation within the refinery. Naphtha comprises material in the 30ºC and 210ºC distillation range or part of this range.

Naphtha imported for blending is reported as an import of Naphtha, then shown on the Interproduct transfer row, as a negative entry for Naphtha, and a positive entry for the corresponding finished product.

10. Motor gasoline

Motor gasoline consists of a mixture of light hydrocarbons distilling between 35ºC and 215ºC. It is mainly used as a fuel for land based spark ignition engines. Motor gasoline may include additives, oxygenates and octane enhancers, including lead compounds such as TEL (tetraethyl lead) and TML (tetramethyl lead).

This category includes motor gasoline blending components e.g. alkylates, isomerate, reformate, cracked gasoline destined for use as finished motor gasoline.

Biogasoline

This category includes liquid biofuels suitable to be blended with or replace motor gasoline from fossil origin. For example it includes: bioethanol (ethanol produced from biomass and/or the biodegradable fraction of waste), biomethanol (methanol produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl–tertio–butyl–ether produced on the basis of bioethanol: the percentage by volume of bioETBE that is calculated as biofuel is 47%) and bioMTBE (methyl–tertio–butyl–ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%).

Non–biogasoline

This category covers motor gasoline as defined above excluding Biogasoline.

11. Aviation gasoline

This is motor spirit prepared especially for aviation piston engines, with an octane number suited to the engine, a freezing point of –60ºC and a distillation range usually within the limits of 30ºC and 180ºC.

12. Gasoline type jet fuel (naphtha type jet fuel or JP4)

This includes all light hydrocarbon oils for use in aviation turbine power units, distilling between 100ºC and 250ºC. They are obtained by blending kerosene and gasoline or naphthas in such a way that the aromatic content does not exceed 25% in volume, and the vapour pressure is between 13.7kPa and 20.6kPa.

13. Kerosene type jet fuel

This is a distillate used for aviation turbine power units. It has the same distillation characteristics between 150ºC and 300ºC (generally not above 250ºC) and flash point as kerosene. In addition, it has particular specifications (such as freezing point) which are established by the International Air Transport Association (IATA).

This category includes kerosene blending components.

Bio jet kerosene

Liquid biofuels suitable to be blended with or replacing Jet kerosene from fossil origin.

Non–bio jet kerosene

This category covers jet kerosene as defined above excluding Bio jet kerosene.

14. Other kerosene

Kerosene comprises refined petroleum distillate and is used in sectors other than aircraft transport. It distils between 150ºC and 300ºC.

15. Gas/diesel oil (distillate fuel oil)

Gas/diesel oil is primarily a medium distillate distilling between 180ºC and 380ºC. Several grades are available depending on uses:

Road diesel:

- On–road diesel oil for diesel compression ignition (cars, trucks, etc.), usually of low sulphur content;

Heating and other gasoil:

- Light heating oil for industrial and commercial uses;
- Marine diesel and diesel used in rail traffic;
- Other gas oil including heavy gas oils which distil between 380°C and 540°C and which are used as petrochemical feedstocks.

Note for countries reporting to Eurostat: The split between Road Diesel and Heating and other gas oil is not mandatory under Regulation (EC) No 1099/2008 on energy statistics.

This category includes blending components.

Biodiesels

This category includes liquid biofuels suitable to be blended with or replace gas/diesel oil from fossil origin. For example it includes: biodiesel (a methyl–ester produced from vegetable or animal oil, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsch (Fischer Tropsch produced from biomass), cold pressed biooil (oil produced from oil seed through mechanical processing only).

Non–bio gas/diesel oil

This category consists of gas diesel oil as defined above excluding Biodiesel.

16. Fuel oil

This covers all residual (heavy) fuel oils (including those obtained by blending). Kinematic viscosity is above 10 cSt at 80ºC. The flash point is always above 50ºC and density is always more than 0.90 kg/l.

Low sulphur content: Heavy fuel oil with sulphur content lower than 1%.

High sulphur content: Heavy fuel oil with sulphur content of 1% or higher.

17. White spirit and SBP

White spirit and SBP are defined as refined distillate intermediates with a distillation in the naphtha/kerosene range. They are sub–divided as:

i. ***Industrial spirit (SBP):*** Light oils distilling between 30º and 200ºC. There are 7 or 8 grades of industrial spirit, depending on the position of the cut in the distillation range. The grades are defined according to the temperature difference between the 5% volume and 90% volume distillation points (which is not more than 60ºC).

ii. ***White spirit:*** Industrial spirit with a flash point above 30ºC. The distillation range of white spirit is 135º to 200ºC.

18. Lubricants

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

19. Bitumen

Bitumen is a solid, semi–solid or viscous hydrocarbon with a colloidal structure, being brown to black in colour, obtained as a residue in the distillation of crude oil, by vacuum distillation of oil residues from atmospheric distillation. Bitumen is often referred to as asphalt and is primarily used for construction of roads and for roofing material. This category includes fluidized and cut back bitumen.

20. Paraffin waxes

These are saturated aliphatic hydrocarbons. These waxes are residues extracted when dewaxing lubricant oils. They have a crystalline structure which is more–or–less fine according to the grade. Their main characteristics are as follows: they are colourless, odourless and translucent, with a melting point above 45ºC.

21. Petroleum coke

Petroleum coke is a black solid by–product, obtained mainly by cracking and carbonising petroleum derived feedstock, vacuum bottoms, tar and pitches in processes such as delayed coking or fluid coking. It consists mainly of carbon (90 to 95%) and has 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.

22. Other oil products

All products not specifically mentioned above, for example: tar and sulphur. This category also includes aromatics (e.g. BTX or benzene, toluene and xylene) and olefins (e.g. propylene) produced within refineries. This can also include the sulphur output resulting from production of hydrogen in refineries.

GEOGRAPHICAL NOTES

Australia excludes its external territories;

Denmark excludes the Faroe Islands and Greenland;

France includes Monaco and the French overseas departments of Guadeloupe, Martinique, French Guiana, Réunion and Mayotte;

Italy includes San Marino and the Vatican (Holy See);

Japan includes Okinawa;

The Netherlands excludes the Antillean constituent countries of the Kingdom of the Netherlands (Aruba, Curaçao and Sint Maarten) and the special municipalities of the Caribbean Netherlands (Bonaire, Sint Eustatius and Saba);

Portugal includes the Azores and Madeira;

Spain includes the Canary Islands, the Balearic Islands, and Ceuta and Melilla

Switzerland includes Liechtenstein[1];

United Kingdom includes Jersey, Guernsey and the Isle of Man.

United States includes the 50 States, the District of Columbia, the U.S. Virgin Islands, Puerto Rico and Guam;

[1] Imports from and exports to Liechtenstein must be entered in the total of Switzerland. Such amounts may also be reported separately under Liechtenstein - if available – and will not be double counted in the totals.

ELEMENTS NOT COVERED BY REGULATION (EC) No 1099/2008

The following elements are not covered by Regulation (EC) No 1099/2008 on energy statistics. Therefore its transmission to Eurostat is not mandatory:

All tables: the split between "Road diesel" and "Heating and other gas oil"

Table 2b: Of which: backflows for direct export or sale

Table 6 (kt): Of which not in operation and not in active repair

Table 6 (kt): Of which Naphtha/Gasoline/Other light distillates

Table 6 (kt): Of which Middle distillates

Table 6 (kt): Of which Heavy distillates

Table 6 (kt): Hydrogen

Table 6 (kt): Other upgrading units

Table 6 (Bbl): all elements in this table are not mandatory for Eurostat.

INSTRUCTIONS FOR COMPLETING INDIVIDUAL TABLES IN THE QUESTIONNAIRE

TABLE 1
SUPPLY OF CRUDE OIL, NGL, REFINERY FEEDSTOCKS, ADDITIVES AND OTHER HYDROCARBONS

This table covers all flows of Crude oil, NGL, Refinery feedstocks, Additives (including biofuels for blending), and Other hydrocarbons. For individual definitions see section 2 above.

1. Indigenous production

Report all production within national boundaries including off–shore production. Production should only include marketable production, excluding volumes returned to formation. Such production should include all crude oil, NGL, condensates and oil from shale and tar sands, etc. It should also include the receipts of Additives/oxygenates by refineries and blending plants from outside the refinery sector.

2. Receipts from other sources

Report supplies of Additives (including biofuels) and Other hydrocarbons, the production of which has already been covered in other fuel balances.

Memo items: Receipts from other sources

Solid fuels: e.g. report the liquids produced from coal liquefaction plants, and the liquid output from coke ovens.

Natural gas: e.g. in NZ the manufacture of synthetic gasoline requires natural gas as feedstock. The amount of gas for methanol manufacture is accounted for in the natural gas balance, while the receipts of methanol are reported as Receipts from other sources in the oil balance.

Renewables: e.g. the biofuels which are for blending with transport fuels. The supply balance is accounted for in the Renewables questionnaire, while amounts "*for blending*" should correspond to quantities reported as Receipts from other sources in the oil questionnaire.

3. Backflows from the petrochemical industry (Backflows)

Backflows are deliveries from the petrochemical industry of finished or semi-finished oil products which are either returned to refineries for further processing, blending or sale or that are delivered to other consumers directly (can be either exported to foreign destinations or sold to the internal market).

They are usually by–products of petrochemical manufacturing. For integrated petrochemical industries this flow should be estimated. Transfers from one refinery to another within the country should be excluded. Total Backflows on Table 1 (cell G3) must be equal to Backflows (cell AD5) in Table 2B.

4. Products transferred

These are usually imported petroleum products which are reclassified as feedstocks for further processing in the refinery, without delivery to final consumers. For example, Naphtha imported for upgrading would be first reported as imports of Naphtha (cell F5 on Table 2A), and then appear also as Products transferred of Naphtha (cell F9 on Table 2A). Products transferred can also correspond to NGL coming from natural gas processing plants and blended with crude oil in pipelines before being exported or supplied to refineries. In that case, the corresponding quantity of NGL needs to be reported as Direct use (cell B7 on Table 1), then in both Primary product receipts (cell B1 on Table 2A) and Products transferred (cell B9 on Table 2A). Finally, the same quantity would need to appear in Product transferred of crude oil (cell A4 on Table 1). The sum of the cells for Products transferred (cell AD19, Table 2A) should correspond to the value calculated in cell G, Table 1.

5. Imports and Exports

Data should reflect amounts having crossed the national territorial boundaries, whether customs clearance has taken place or not. Quantities of crude oil and products imported or exported under processing agreements (i.e. refining on account) should be included. Crude oil and NGLs should be reported as coming from the country of ultimate origin; Refinery feedstocks and finished products should be reported as coming from the country of last consignment. Any gas liquids (e.g. LPG) extracted during the regasification process of imported LNG should be reported under inputs “Receipts from other sources” of Other hydrocarbons in the annual oil questionnaire. Petroleum products imported or exported directly by the petrochemical industry should be included.

Note: Imports or exports of ethanol (reported in the Additives/oxygenates column) should relate to the quantities destined for fuel use.

Re–exports of oil imported for processing within bonded areas should be included as an export of product from the processing country to the final destination.

Imports and exports reported in Table 1, 2A should correspond to total imports, line 164 on Table 4 and to total exports, line 164 on Table 5.

6. Direct use

Crude oil, NGL, Refinery feedstocks, Additives/oxygenates (of which biofuels) and Other hydrocarbons which are used directly without being processed in petroleum refineries are reported as Direct use. This includes, for example, crude oil burned for electricity generation. Report here all liquid biofuels for blending with oil products whether the blending takes place in the refinery or outside the refinery.

Such quantities will also be reported in the supply of products under Primary product receipts on Table 2A (See notes for Table 2A).

7. Stock changes

Stock changes should reflect the difference between Opening stock level and Closing stock level for stocks held on national territory. A stock build is shown as a negative number, and a stock draw as a positive number. (Please note that the stock change reported in the Monthly Oil Statistics (MOS) questionnaire is closing minus opening stock level.)

8. Refinery intake (Calculated)

This is defined as the total amount of oil calculated to have entered the refinery process. It is defined as:

+ Indigenous production
+ Receipts from other sources
+ Backflows
+ Products transferred
+ Imports (Balance)
– Exports (Balance)

– Direct use

+ Stock changes

9. Statistical difference

This is equal to the difference between the calculated refinery intake (as defined above) and observed Refinery intake which corresponds to the total amount of oil observed to have entered the refinery process. National administrations sometimes obtain the data components of refinery intake from a variety of sources. Owing to differences in concepts, coverage, timing and definitions, observed and calculated refinery intake are often not identical.

Reasons for any major differences should be stated on the Remarks page.

10. Refinery intake (Observed)

This is defined as the total amount of oil (including Other hydrocarbons and Additives) observed to have entered the refinery process.

11. Memo item – refinery losses

Are the difference between Refinery intake observed and Gross refinery output. Losses may occur during the distillation processes due to evaporation. The reported losses are a positive number in a mass balance. Although there may be volumetric gains in a volume balance, there are no gains in mass.

12. Total stock level on national territory

All stocks on national territory, including stocks held by governments, by major consumers or by stockholding organisations, stocks held on board incoming ocean vessels, stocks held in bonded areas and stocks held for others, whether under bilateral government agreement or not.

13. Net calorific value (NCV)

This is the quantity of heat released by unit quantity of fuel, when it is burned completely with oxygen, and the products of combustion are returned to ambient temperature. (This quantity of heat will ***not*** include the heat of condensation of the water vapour formed by the combustion of the hydrogen in the fuel, as it cools to ambient conditions.) Heat value is measured in kilojoules per kg. One joule is equivalent to 0.2388 cal. Heat value should be reported for Indigenous production, imported and exported crude oil, NGL, Additives and Other hydrocarbons and for imported and exported Refinery feedstocks. The average of the values of Indigenous production, imports and exports should also be reported.

14. Density

Please report the average density of each fuel, in kilograms per litre.

TABLE 2A
SUPPLY OF OIL PRODUCTS

These tables cover the supply of finished products. Finished products comprise: Refinery gas, Ethane, LPG, Naphtha, Motor gasoline, Aviation gasoline, Gasoline type jet fuel, Kerosene type jet fuel, Other kerosene, Gas/diesel oil, Low and high sulphur fuel oil, White spirit and SBP, Lubricants, Bitumen, Paraffin waxes, Petroleum coke and Other products. In addition, crude oil and NGL used for direct burn should be included in deliveries of finished products. For definitions of individual products, see section 2.

1. Primary product receipts

Quantities which are ***used directly*** without being processed in a petroleum refinery.

For example, indigenous or imported crude oil used to generate electricity should be placed in Primary product receipts of crude oil (cell A1 on Table 2A). Quantities of NGL which are not included in Refinery intake should be reported in Primary product receipts of NGL (cell B1), then transferred through the Interproduct transfers line to the allocated product type. Please note that this flow includes the amounts of Backflows from the petrochemical industry which, although not primary fuel, are used directly. Total of Biogasoline (cell H1), Bio Jet Kerosene (cell M1) and Biodiesels (cell S1) should not be greater than the Direct Use for Additives/oxygenates of which biofuels in Table 1 (cell E7).

2. Refinery gross output

This is production of finished products at a refinery or blending plant. This category excludes Refinery losses, but includes Refinery fuel. The total (cell AD2 on Table 2A) must be equal to the total Observed refinery intake minus Refinery losses (cells G11 and G12 respectively of Table 1).

3. Recycled products

These are finished products which pass a second time through the marketing network, ***after*** having been once delivered to final consumers (e.g. used lubricants which are reprocessed). These quantities should be distinguished from petrochemical Backflows (see definitions).

4. Refinery fuel

These are all petroleum products consumed in support of the *operation* of a refinery. This should not include products used by oil companies outside the refining process, e.g. bunkers or oil tankers. Fuels used for the production at the refineries of electricity and heat sold should also be included in this category. Note that these amounts should not be included or reported under the Transformation sector.

Memo item: Refinery fuel used for

Please indicate here the amounts of Refinery fuel (row 4) which are used to produce electricity and/or sold heat. Note that these amounts should *not* be included or reported under the Transformation sector.

Electricity production **-** Report the amounts (included with Refinery fuel on row 4) which are used to produce electricity at refineries.

CHP production **-** Report the amounts (included with Refinery fuel on row 4) which are used for CHP production at refineries. For heat, report quantities of fuels that correspond to the quantity of heat sold.

Heat plants **-** Report the amounts (included with Refinery fuel on row 4) which are used for production of heat sold by refineries.

5. Imports and Exports

See definitions under Table 1.

6. International marine bunkers

Report the quantities of oil delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Exclude consumption by ships engaged in domestic navigation (see domestic navigation). The domestic/international split should be determined on the basis of port of departure and port of arrival, and

not by the flag or nationality of the ship. Exclude consumption by fishing vessels (see Fishing – Other sectors) and consumption by military forces (see Not elsewhere specified – Other sectors).

7. Interproduct transfers

Result from reclassification of products either because their specification has changed, or because they are blended into another product. For example, quantities of kerosene may be reclassified as gasoil after blending with the latter in order to meet its winter diesel specification. A negative entry for one product must be compensated by a positive entry (or several entries) for one or several products and vice versa. The total net effect should be zero (cell AD8 on Table 2A).

8. Products transferred

See definitions under Table 1.

9. Stock changes

See definitions under Table 1.

10. Gross inland deliveries (Calculated)

This is defined as:

+ Primary product receipts
+ Refinery gross output
+ Recycled products
– Refinery fuel
+ Imports
– Exports
– International marine bunkers
+ Interproduct transfers
– Products transferred
+ Stock changes

11. Statistical difference

This is equal to the difference between the calculated gross consumption (as defined above) and the observed gross consumption which corresponds to the Final energy and non-energy consumption plus the Transformation sector, the Energy sector and Distribution losses. National administrations sometimes obtain the data components of domestic availability from a variety of sources. Owing to differences in concepts, coverage, timing and definitions, observed and calculated inland consumption are often not identical. Reasons for any major statistical difference should be stated in the section provided for on the Remarks page.

12. Gross inland deliveries (observed)

This is the observed delivery of finished petroleum products from primary sources (e.g. refineries, blending plants, etc.) to the inland market. This figure may differ from the calculated figure due, for example, to differences in coverage and/or differences of definition in different reporting systems.

13. Stock level on national territory

See definitions under Table 1.

14. Memo item – stock changes at main activity plants

This row is to be used for reporting changes in stocks which are held by main activity plants and which are not included in the Stock levels and Stock changes reported elsewhere in this questionnaire.

15. Memo item – net calorific value of gross inland deliveries (kJ/kg)

This is the quantity of heat released by unit quantity of fuel, when it is burned completely with oxygen, and the products of combustion are returned to ambient temperature. (This quantity of heat will ***not*** include the heat of condensation of the water vapour formed by the combustion of the hydrogen in the fuel, as it cools

to ambient conditions.) Heat value is measured in kilojoules per kg. One joule is equivalent to 0.2388 cal. Heat value should be reported for Gross inland deliveries.

TABLE 2B
DELIVERIES TO THE PETROCHEMICAL INDUSTRY

1. Gross inland deliveries (Observed)

See definitions under Table 2A. These data should also be equal to row 1, Gross inland deliveries, of Table 3.

of which: Gross deliveries to the petrochemical industry: Report only those quantities of fuels delivered to the petrochemical industry.

of which: Energy use in the petrochemical industry: Report quantities of oil used as fuel for petrochemical processes such as steam cracking. This includes oil products transformed into by-product gases used as fuel in the petrochemical industry.

of which: Non–energy use in the petrochemical industry: Report quantities of oil used as raw materials in the manufacture of chemical feedstocks and non-energy products (e.g. ethylene, propylene, butylene, synthesis gas, aromatics, butadiene and other hydrocarbon–based raw materials) in processes such as steam cracking, aromatics plants and steam reforming. Exclude amounts of oil used for fuel purposes or transformed into by-product gases subsequently used as fuel in the petrochemical industry. These should also exclude quantities reported under petrochemical plants in the Transformation sector (see definition under Tables 3A, 3B and 3)

2. Backflows from the petrochemical industry (Backflows to refineries)

Backflows are deliveries from the petrochemical industry of finished or semi-finished oil products which are either returned to refineries for further processing or blending or that are delivered to other consumers directly (can be either exported to foreign destinations or sold to the internal market). They are usually by–products of petrochemical manufacturing.

For integrated petrochemical industries this flow should be estimated. Transfers from one refinery to another within the country should be excluded.

Total product Backflows reported in cell AD5 in Table 2B must equal total Backflows reported in cell G3 in Table 1. (See Backflows from petrochemical industry in Table 1).

- Quantities of Backflows returned to refinery and further processed should be shown as Backflows on Table 1 and subsequently as a part of Refinery intake, Refinery output and of Gross inland deliveries of the relevant products.
- Quantities of Backflows that are used directly as finished products by the refinery (for example for blending) should be included in the data reported under Backflows to refineries and subsequently as Direct use on Table 1 and Primary product receipts on Table 2A.
- Quantities of Backflows that are delivered to consumers directly (either exported to foreign destinations or sold to the internal market) should be reported under Backflows to refineries and subsequently as Direct use on Table 1 and Primary product receipts and subsequently Total Exports or Gross Inland Deliveries on Table 2A. These quantities should correspond to the quantities under of which: backflows for direct export or sale.

Example: 500 units of Naphtha are input to the petrochemical industry. Of the 500, 300 are used as feedstock for the production of petrochemicals, 200 units are returned directly to refineries for further processing of which 120 are pyrolysis gasoline and 80 are Fuel oil. This should result in an entry of 500 under Gross inland deliveries, 200 under Backflows to refineries (fully included in Backflows from petrochemical industry in Table 1), 120 for Motor gasoline and 80 for Fuel oil. The 200 in Backflows to refineries will be included in Gross refinery output divided between products.

***Of which*: Backflows of finished products for direct export or sale (Of which: backflows for direct export or sale):** Please report the portion of deliveries from the petrochemical industry of finished oil products which are either exported to foreign destinations or sold to the internal market without having undergone additional transformation in a refinery.

Note for countries reporting to Eurostat: This element is not mandatory under Regulation (EC) No 1099/2008 on energy statistics.

3. Net deliveries to the petrochemical industry

The total product amount of net deliveries to the petrochemical industry should correspond to Total Gross deliveries to the petrochemical industry minus the Backflows to refineries.

4. Total net inland deliveries of total products

This is defined as Total Gross inland deliveries (observed) of total products minus Backflows to refineries.

TABLE 3A, 3B AND 3
GROSS INLAND DELIVERIES BY SECTOR

TABLE 3A Gross inland deliveries by sector – ENERGY USE

Please enter all amounts of oil consumed for energy use according to the instructions below.

TABLE 3B Gross inland deliveries by sector – NON ENERGY USE

Please enter all amounts of oil consumed for non–energy use according to the instructions below.

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. An example is bitumen used for asphalt.

TABLE 3 Gross inland deliveries by sector – TOTALS

Please note that this table is the sum of Table 3A and Table 3B. **This is not a fillable table**. If data must be entered or changed please use Table 3A or Table 3B.

I. TRANSFORMATION SECTOR

For a proper appreciation of the reporting of ***oil*** used in the generation of electricity and heat, respondents are urged to read the notes relating to this sector in Annex 2.

1. Main activity producer electricity

Report quantities of oil products used to produce electricity by all main activity producers. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

2. Autoproducer electricity

Report quantities of oil products used to produce electricity by all autoproducers. Fuels used by plants containing at least on CHP unit are to be reported under Autoproducer CHP. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

3. Main activity producer combined heat and power (CHP)

Report quantities of oil products used to produce electricity and heat by all main activity producers. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

4. Autoproducer combined heat and power (CHP)

Report quantities of oil products used that correspond to the quantity of electricity produced and heat sold by all autoproducers. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

5. Main activity producer heat

Report quantities of oil products used to produce heat by all main activity producers. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

6. Autoproducer heat

Report quantities of oil products that correspond to the quantity of heat sold by all autoproducers. For countries reporting to Eurostat, reported quantities should be aggregated by type of unit and not by type of plant.

7. Gas works (and other conversion to gases)

Report quantities of oil used to produce gas at gas works and gasification plants. Oil used for heating and operation of equipment should not be reported here, but reported as consumption in the Energy sector.

8. Natural gas blending plants

Report quantities of petroleum gas products blended with natural gas.

9. Coke ovens

Report quantities of oil used in coke ovens. Oil used for heating and operation of equipment should not be reported here, but reported as consumption in the Energy sector.

10. Blast furnaces

Report quantities of oil in blast furnaces. Oil used for heating and operation of equipment should not be reported here, but reported as consumption in the Energy sector. To avoid double counting, fuels used in blast furnaces should not be reported in the Iron and steel sector.

11. Petrochemical industry

Report quantities of oil that are inputs into petrochemical processes resulting in an output of oil products (this output is reported under Backflows whether returned to refineries for further processing/blending or used directly). Quantities should be reported only in Table 3a.

Exclude quantities of oil products that are used as a raw material in the manufacture of chemical feedstocks and non-energy products (include these quantities under final non-energy consumption in the chemical and petrochemical sector in Table 3b and non-energy use in the petrochemical sector in Table 2b).

Fuel use in the petrochemical sector should also be excluded. These quantities should be reported under final energy consumption in the chemical and petrochemical sector in Table 3a and energy use in the petrochemical sector in Table 2b.

The product allocation can be calculated using the same proportion of product split for Gross deliveries to petrochemical industry. *Example: 500 units (430 of Naphtha and 70 of LPG) are input to the petrochemical industry. Of the 500, 300 are used as feedstock for the production of petrochemicals, 200 units are used to manufacture oil products which are later returned as Backflows. The total amount of input into the Transformation sector is 200 which is split over Naphtha and LPG (e.g. for LPG Backflows: (70/500) x 200 = 28, for Naphtha Backflows: (430/500) x 200 = 172, assuming full efficiency of the process).*

12. Patent fuel plants

Report quantities of oil used as binding material for the production of patent fuel.

13. Not elsewhere specified – Transformation

Data should be reported here only as a last resort. If a final breakdown into the above sectors is not available, administrations should explain on the Remarks page the basis for any estimates.

II. ENERGY SECTOR

Report oil consumed by the Energy sector to support the extraction (mining, oil and gas production) or plant operation of transformation activities. For example: oil used for heating, lighting or operating pumps or compressors. Note that quantities of oil transformed into another energy form should be reported under the Transformation sector. Oil consumed in support of the operation of oil and gas pipelines should be reported in the Transportation sector.

The Energy sector includes ISIC[2] Divisions 05, 06, 19, 35, Group 091, Class 0892 and 0721 (NACE[3] Divisions 05, 06, 19, 35, Group 09.1, Class 08.92 and 07.21).

2. International Standard Industrial Classification of all Economic Activity, Series M, No 4/Rev. 4, United Nations, New York, 2008

The Energy sector includes the manufacture of chemical materials for atomic fission and fusion and the products of these processes.

1. Coal mines

Report oil consumed as a fuel to support the extraction and preparation of coal within the coal mining industry.

2. Oil and gas extraction

Report oil consumed as a fuel in the oil and gas extraction process and in natural gas processing plants. Pipeline losses should be reported as Distribution losses, and fuels used to operate the pipelines should be reported in the Transportation sector.

3. Coke ovens

Report oil consumed as a fuel at coking plants.

4. Blast furnaces

Report oil consumed in blast furnaces operations.

5. Gas works

Report oil consumed as a fuel at gas works and coal gasification plants.

6. Own use in electricity, CHP and heat plants

Report oil consumed as a fuel at electricity plants, combined heat and power plants, and heat plants.

7. Not elsewhere specified – Energy

Data should be reported here only as a last resort. If a final breakdown into the above sectors is not available, administrations should explain on Remarks page the basis for any estimates.

III. DISTRIBUTION LOSSES

Report all losses which occur outside the refinery due to transport and distribution, including pipeline losses.

IV. TOTAL FINAL CONSUMPTION

Final consumption is all oil delivered to final consumers (in the Transport, Industry and Other sectors). It excludes deliveries for transformation, own use of the energy producing industries, distribution losses and statistical differences

IV.1 TRANSPORT SECTOR

Report oil used for all transport activity, regardless of the sector in which the activity occurs (except for military fuel use, see sector Not elsewhere specified – Other sectors).

Oil used for heating and lighting at railway, bus stations, shipping piers and airports should be reported in the Commercial sector and **not** in the Transport sector.

1. International aviation

Report quantities of aviation fuels delivered to aircraft for international aviation bunkers (‘also known as International Aviation Bunkers’). The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Exclude fuels used by airlines for their road vehicles (see Not elsewhere specified – Transport sector) and military use of aviation fuels (see Not elsewhere specified – Other sectors).

3. Statistical classification of the economic activities in the European Community (NACE Rev.2) EC-Eurostat 2008.

2. Domestic aviation

Report quantities of aviation fuels delivered to aircraft for Domestic aviation – commercial, private, agricultural, etc. Include fuel used for purposes other than flying, e.g. bench testing of engines. The domestic/international split should be determined on the basis of departure and landing locations[1] and not by the nationality of the airline. Note that this may include journeys of considerable length between two airports in a country (e.g. San Francisco to Honolulu). Exclude fuels used by airlines for their road vehicles (see Not elsewhere specified – Transport sector) and military use of aviation fuels (see Not elsewhere specified – Other sectors).

3. Road

Report oil for use in road vehicles. Include fuel used by agricultural vehicles on highways and lubricants for use in road vehicles. Exclude motor gasoline and diesel used in stationary engines (which should be reported under the relevant economic sector), diesel oil for non–highway use in tractors (see Agriculture/forestry – Other sectors), military use (see Not elsewhere specified – Other sectors) and gasoil used in engines at construction sites (see Construction – Industry sector).

4. Rail

Report oil consumed in rail traffic, including industrial railways. It includes oil used in rail transport as part of urban or suburban transport systems.

5. Domestic navigation

Report fuels delivered to vessels of all flags not engaged in international navigation (see international marine bunkers). The domestic/international split should be determined on the basis of port of departure and port of arrival and not by the flag or nationality of the ship. Note that this may include journeys of considerable length between two ports in a country (e.g. San Francisco to Honolulu).

6. Pipeline transport

Report oil used as energy 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. Oil used as energy for the pipeline distribution of natural or manufactured gas, hot water or steam (ISIC 35) from the distributor to final users is excluded and should be reported in the Energy sector, while the oil used for the final distribution of water (ISIC 36) to household, industrial, commercial and other users should be included in the Commercial/public sector. Losses occurring during this transport between distributor and final users should be reported as Distribution losses.

7. Not elsewhere specified – Transport

Report fuels used for transport activities not included elsewhere. Include fuels used by airlines for their road vehicles. If a final breakdown into the above sectors is not available, administrations should explain on the Remarks page the basis for any estimates.

IV.2 INDUSTRY SECTOR

Report oil consumed by the industrial undertaking in support of its primary activities.

Report quantities of oil consumed in heat plants and CHP plants for the production of heat used by the plant itself. Quantities of oil consumed for the production of heat that is sold, and for the production of electricity, should be reported under the appropriate Transformation sector.

1. Iron and steel

ISIC Group 241 and Class 2431 (NACE Groups 24.1, 24.2, 24.3; and Classes 24.51 and 24.52). To avoid double counting, oil used in Blast furnaces should be reported in the Energy or Transformation sector.

2. Chemical and petrochemical

ISIC Division 20 and 21 (NACE Division 20 and 21).

Note: This heading includes petroleum products used as fuel and as feedstock (non-energy use). To avoid double counting, the quantities reported in the transformation sector Petrochemical industry should not be included in final consumption in the chemical and petrochemical sector.

The breakdown of consumption by product should be calculated applying the same proportion of product split for Gross deliveries.

Example: 500 units (430 of Naphtha and 70 of LPG) are input to the petrochemical industry. Of the 500, 300 are used as feedstock for the production of petrochemicals, 200 units are used to manufacture oil products which are later returned as Backflows. The total amount reported for the petrochemical industry consumption is 300 (500 – 200) which is split over Naphtha and LPG (e.g. for LPG consumption: (70/500) x 300 = 42, for Naphtha consumption: (430/500) x 300 = 258).

3. Non–ferrous metals

ISIC Group 242 and Class 2432 (NACE Group 24.4 and Classes 24.53, 24.54).

4. Non–metallic minerals

ISIC Division 23 (NACE Division 23). Report glass, ceramic, cement and other building materials industries.

5. Transport equipment

ISIC Divisions 29 and 30 (NACE Divisions 29 and 30).

6. Machinery

ISIC Divisions 25, 26, 27 and 28 (NACE Divisions 25, 26, 27, and 28). Report fabricated metal products, machinery and equipment other than transport equipment.

7. Mining (excluding energy producing industries) and quarrying

ISIC Divisions 07, 08 and Group 099 (NACE Divisions 07, 08 and Group 09.9).

8. Food, beverages and tobacco

ISIC Divisions 10, 11 and 12 (NACE Divisions 10, 11 and 12).

9. Paper, pulp and printing

ISIC Divisions 17 and 18 (NACE Divisions 17 and 18). This category includes reproduction of recorded media.

10. Wood and wood products (other than pulp and paper)

ISIC Division 16 (NACE Division 16).

11. Construction

ISIC Division 41, 42 and 43 (NACE Division 41, 42 and 43).

12. Textile and leather

ISIC Divisions 13, 14 and 15 (NACE Divisions 13, 14 and 15).

13. Not elsewhere specified – Industry

If your country's industrial classification of oil consumption does not correspond to the above ISIC (or NACE) codes, please estimate the breakdown by industry and include in Not elsewhere specified only consumption in sectors which is not covered above. ISIC Division 22, 31 and 32. For NACE, it covers Divisions 22, 31 and 32.

IV.3 OTHER SECTORS

1. Commercial and public services

ISIC Divisions and NACE Divisions 33, 36, 37, 38, 39, 45, 46, 47, 52, 53, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 70, 71, 72, 73, 74, 75, 77, 78, 79, 80, 81, 82, 84 (exclude Class 8422), 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96 and 99. Oil consumed by businesses and offices in the public and private sectors. Note that oil use at railway, bus stations, shipping piers and airports should be reported in this category and not shown in the Transport sector. Also includes fuel used by all non-transport activities of ISIC and NACE Divisions 49, 50 and 51.

2. Residential

Report fuels consumed by all households including "households with employed persons (ISIC and NACE Divisions 97 and 98).

3. Agriculture

Report fuels consumed by users classified as agriculture and hunting as specified in ISIC Division 01 (NACE Division 01).

4. Forestry

Report fuels consumed by users classified as forestry by ISIC as specified in ISIC Division 02 (NACE Division 02).

5. Fishing

Report fuels used for inland, coastal and deep–sea fishing. Fishing should cover fuels delivered to ships of all flags that have refuelled in the country (include international fishing). Also include energy used in the fishing industry as specified in ISIC Division 03 and NACE Division 03.

6. Not elsewhere specified – Other

Report activities not included elsewhere. This category includes military fuel use 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 military of that country or for the military of another country. Please specify on the Remarks page what is included under this heading.

TABLES 4 AND 5
IMPORTS BY ORIGIN AND EXPORTS BY DESTINATION

For geographical definitions see Geographical notes section.

Amounts are considered as imported or exported when they have crossed the political boundaries of the country, whether customs clearance has taken place or not.

The tables concern imports of oil by ultimate origin (the country in which the oil was produced) for use in the country and exports of oil produced to the ultimate country of consumption.

Where no origin or destination can be reported, consider whether the quantities can be reported under one of the non-specified regional aggregates (Other Africa, Other Asia Oceania, etc.) otherwise the country “Not elsewhere specified” might be used.

Statistical differences may arise if only imports and exports are available on a total basis (from customs or refinery surveys) while the geographical breakdown is based on a different survey, source or concept. In this case, report the differences in the ‘Not elsewhere specified’ category.

TABLES 6 (kt) AND 6 (Bbl)
REFINERY CAPACITIES IN THOUSAND TONNES OR THOUSAND BARRELS PER YEAR

Note for countries reporting to Eurostat: The following elements in Table 6 are not covered by Regulation (EC) No 1099/2008 on energy statistics.

- Table 6 (kt): Of which not in operation and not in active repair
- Table 6 (kt): Of which Naphtha/Gasoline/Other light distillates
- Table 6 (kt): Of which Middle distillates
- Table 6 (kt): Of which Heavy distillates
- Table 6 (kt): Hydrogen
- Table 6 (kt): Other upgrading units
- Table 6 (Bbl): all elements in this table are not mandatory for Eurostat

Therefore it is not mandatory to transmit it to Eurostat.

Please report in barrels only if mass data are not available.

Existing capacity at year end:

Report capacity in operation at the beginning of the year (1 January for countries reporting in calendar year in the Joint Annual Oil Questionnaire; start of fiscal year for the others (e.g. Australia, Japan)). The capacity may include components under active repair.

Operating capacity is the amount of capacity that, at the beginning of the period, is in operation. Refineries in research facilities are excluded.

If operating capacity is not available, please report nameplate capacity and specify this in the Remarks sheet.

The nameplate capacity is, the theoretical maximum of input that a facility can process within a year period when running at full capacity under optimal crude and product slate conditions with no allowance for downtime. For USA, this includes operable and non-operable capacity.

1. Name/Location

Indication of the name and the location or site.

2. Atmospheric Distillation

The refining process of separating crude oil components at atmospheric pressure by heating to temperatures of about 326 ºC to 400ºC (depending on the nature of the crude oil and desired products) and subsequent condensing of the fractions by cooling.

Of which not in operation and not in active repair: this refers to the portion of *nameplate* capacity that is not in operation and not under active repair, but capable of being placed in operation within 30 days. As well as capacity not in operation but under active repair that can be completed within 90 days.

3. Vacuum Distillation

Vacuum Distillation takes place under reduced pressure (less than the atmospheric) which lowers the boiling temperature of the liquid being distilled.

4. Cracking (Thermal)

Thermal Cracking is a refining process in which heat and pressure are used to break down, rearrange, or combine hydrocarbon molecules.

Of which Visbreaking: A thermal cracking process in which heavy atmospheric or vacuum-still bottoms are cracked at moderate temperatures to increase production of distillate products and reduce viscosity of the distillation residues.

Of which Coking: A refining process which produces light and intermediate distillates by the thermal cracking of molecules of higher molecular weight. As a by-product of this process, fuel gas and petroleum coke is obtained.

5. Cracking (Catalytic)

Catalytic cracking breaks complex hydrocarbons into simpler molecules using a catalyst. This process rearranges the molecular structure of hydrocarbon compounds to convert heavy hydrocarbon feedstock into lighter fractions such as kerosene, gasoline, LPG, heating oil and petrochemical feedstock.

Of which Fluid catalytic cracking (FCC): Fluid catalytic cracking is a process for converting high boiling gas oils to lighter liquids, primarily gasoline range naphtha and diesel range gas oils, using a fluidized, powdered catalyst. The most widely practiced refinery conversion process.

Of which Hydro-cracking (HCK): Hydrocracking is a two-stage process combining catalytic cracking and hydrogenation, wherein heavier feedstocks are cracked in the presence of hydrogen to produce more desirable products. The process employs high pressure, high temperature, a catalyst and hydrogen.

6. Desulphurisation, including hydrotreating

Desulphurisation units are used in feedstock desulphurisation and finished product desulphurisation to remove sulphur and its compounds from petroleum products during the refining process. The process implies high pressure and Hydrogen consumption.

Of which Naphtha/Gasoline/Other Light distillates: Motor gasoline, naphtha, refinery gas, liquid petroleum gases, ethane, aviation gasoline, gasoline type jet fuel, white spirit.

Of which Middle distillates: Gas/diesel oil, kerosene type jet fuel, other kerosene, paraffin waxes

Of which Heavy distillates: Fuel oil, bitumen, petroleum coke, non-specified

7. Reforming

Reforming is a technique by which the molecular structure of a hydrocarbon is rearranged to alter its properties. The process is frequently applied to low-quality gasoline stocks to improve their combustion characteristics and to produce Hydrogen (H2) which will be used in downstream units. Examples are thermal reforming and catalytic reforming.

8. Alkylation, Polymerisation, Isomerisation:

Alkylation: A refining process for chemically combining isobutane with olefin hydrocarbons (e.g. propylene, butylene) through the control of temperature and pressure in the presence of an acid catalyst (Hydrofluoric acid or Sulfuric acid).

Polymerisation: A process of converting light olefin gases including ethylene, propylene, and butylene into hydrocarbons of higher molecular weight and higher octane number that can be used as gasoline blending stocks.

Isomerisation: A process for converting n-butane, n-pentane and n-hexane into their respective isoparaffins of substantially higher octane number. Butane isomerisation produces feedstock for alkylation.

9. Etherification

Etherification units are mainly used to produce methyl tertiary butyl ether (MTBE), tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE) and other fuel ethers.

10. Other upgrading units

This category can include Dimerization units, Dewaxing units, Solvent Deasphalting Units (SDA) and other upgrading units not specifically mentioned before.

Please specify on the remarks page.

11. Hydrogen production capacity

The lightest of all gases, occurring chiefly in combination with oxygen in water; exists also in acids, bases, alcohols, petroleum, and other hydrocarbons. Production of hydrogen in refineries can occur in steam methane reformers or as a by-product of other processes such as the catalytic reforming of naphtha into high-octane products.

ANNEX 1: DEFINITIONS FOR ELECTRICITY AND HEAT

The questionnaires seek information on the fuel requirements for, and the generation of electricity and heat according to producer and generating plant types.

Types of producer:

Producers are classified according to the purpose of production:

- ***Main activity producer*** 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.
- ***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.

Types of Units:

Units are classified according to their technical design:

- ***Electricity unit*** refers to a unit designed to produce/generate electricity only.
- ***Combined heat and power (CHP) unit*** refers to a unit which is designed to produce/generate both heat and electricity simultaneously. It is sometimes referred to as a co-generation.
- ***Heat unit*** refers to a unit which is designed to produce/generate only heat.

Types of Plants:

Plant is defined as a set of units. Plants are classified according to the combination of units:

- ***Electricity plant*** refers to a plant which is composed of electricity units only.
- ***Heat plant*** refers to a plant which is composed of heats units only.
- ***Combined heat and power (CHP) plant*** refers to all other combinations of units. For example, it can be a plant that has one CHP unit. Another example of CHP plant is a combination of one electricity unit and one heat unit.

Reporting conventions for Electricity and Heat:

It should be noted that:

- ***Electricity*** production reported for *Autoproducers* should be the total quantity of electricity generated.
- All ***heat*** production from *Main activity producers* should be reported. However, heat production reported for *Autoproducers* should comprise only the heat sold to third parties. Heat consumed by autoproducers should not be reported as heat production and heat consumption.
- Report in the transformation sector only those quantities of fuels used to generate the amounts of electricity and heat reported in the questionnaire. Thus the quantities of fuel consumed for the production of heat by autoproducers which is not sold will remain in the figures for the final consumption of fuels by the relevant sector of economic activity.

The reporting requirements for *transformation sector* activities can be summarised schematically as follows:

	Electricity	CHP	Heat
Main activity producer	Report all production and all fuel used	Report all electricity and heat produced and all fuel used	Report all heat produced and all fuel used
Autoproducer		Report all electricity produced and **only heat sold** and corresponding fuel used	Report **only heat sold** and corresponding fuel used

In this questionnaire, the term **Combustible fuels** refers to fuels that are capable of igniting or burning, i.e. reacting with oxygen to produce a significant rise in temperature.

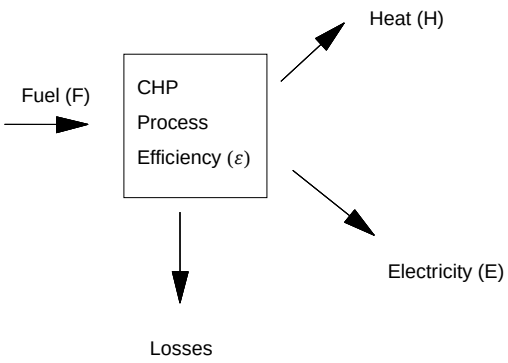
Reporting to **Eurostat** on the basis of **units** is **mandatory**; please see Regulation (EC) No 1099/2008 on energy statistics. To the maximum extent feasible, consistency of reported figures should be ensured with data reported in the *CHP questionnaire* to Eurostat (Directive 2012/27/EU on energy efficiency). Please see the reporting instructions for Eurostat's CHP questionnaire.

Reporting to the **IEA**: If possible, fuel inputs and electricity/heat outputs should be reported 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 plant noted above should be adopted.

METHODOLOGY FOR APPORTIONING FUEL INPUT IN A CHP PLANT

In cases where national administrations have not adopted a more accurate methodology for this purpose, the following approach is proposed where the fuel input is divided between electricity and heat in proportion to their shares of the CHP useful energy output.

In CHP units the relationship between the fuel input and the output electricity and heat, without regard to the type of thermodynamic process, may be modelled simply in the diagram below.



The following relationship defining overall efficiency (ε) is:

$$\varepsilon = (H + E) / F$$

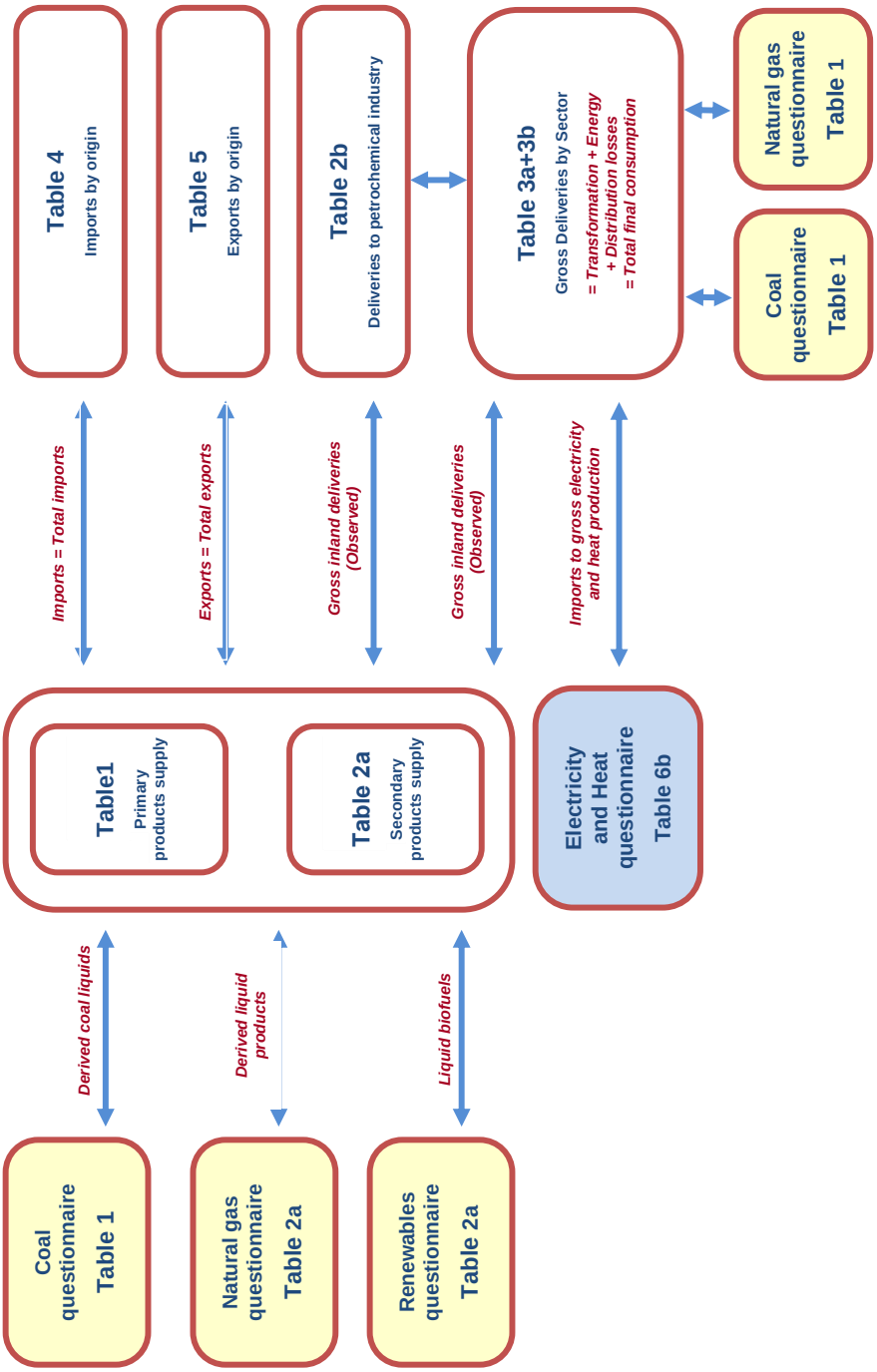
The definition given proposes that the imputed fuel use for electricity, F_e , and (as a consequence) that for heat, F_h , are:

$$F_e = F - H / \varepsilon = F (E / (E + H))$$
$$F_h = F - E / \varepsilon = F (H / (E + H))$$

The formula should be used only where national administrations have not already adopted a methodology for the purpose of reporting CHP on a unit basis. Please note that reporting to Eurostat on the basis of units is mandatory. Please see the reporting instructions for Eurostat's CHP questionnaire.

ANNEX 2: LIST OF ABBREVIATIONS

CHP:	combined heat and power
cSt:	viscosity of oil measured in centistokes
EU:	European Union
GCV:	gross calorific value
HHV:	higher heating value = GCV
IATA:	International Air Transport Association
IEA:	International Energy Agency
ISIC:	International Standard Industrial Classification
kcal:	kilocalorie
kg:	kilogramme
kJ:	kilojoule
kPa:	kilopascals
kt:	kilotonne
LHV:	lower heating value = NCV
LPG:	liquefied petroleum gases
m^3:	cubic metre
Mt:	million tonnes
NACE:	European standard classification of productive economic activities
NCV:	net calorific value
NGL:	natural gas liquids
OECD:	Organisation for Economic Co–Operation and Development
SBP:	special boiling point solvents
t:	metric ton = tonne = 1000 kg
TJ:	terajoule
UN:	United Nations

Formatted: German (Germany)

ANNEX 3: TABLE RELATIONS IN THE OIL QUESTIONNAIRE