

**COAL INFORMATION
2009 EDITION**

**DOCUMENTATION FOR
BEYOND 2020 FILES**

LIST OF ELECTRONIC TABLES

Coal Information 2009 - Electronic tables

Data for all available years are provided here, generally from 1960 to 2007. Some data are available for 2008 and these should be considered preliminary.

World coal statistics: World coal statistics.ivt

In this table, a balance for different types of coal and coal products, including manufactured gases is shown. These products are: anthracite, coking coal, other bituminous coal, sub-bituminous coal, lignite/brown coal, peat, patent fuel, coke oven coke, gas coke, coal tar, BKB brown coal briquettes, gas works gas, coke oven gas, blast furnace gas and oxygen steel furnace gas. The aggregates hard coal and brown coal are also included. This table provides full balances of coal such as primary energy supply, transformation sector, energy sector and final consumption based in *kilotonnes* for *OECD and Non-OECD countries*.

OECD coal imports: coal imports.ivt

This table presents detailed coal import data by origin for *OECD member states* for the following coal products and aggregates: anthracite, coking coal, sub-bituminous coal, lignite/brown coal, coke oven coke, hard coal, brown coal, steam coal, other bituminous coal + anthracite. The data is reported in *kilotonnes*.

OECD, coal exports: coal exports.ivt

This table presents detailed coal export data by destination for *OECD member states* for the following coal products and aggregates: anthracite, coking coal, sub-bituminous coal, lignite/brown coal, coke oven coke, hard coal, brown coal, steam coal, other bituminous coal + anthracite. The data is reported in *kilotonnes*.

1. PRODUCT DEFINITIONS

Coal

Coal is a family name for a variety of solid organic fuels and refers to a whole range of combustible sedimentary rock materials spanning a continuous quality scale. For convenience, this continuous series is often divided into four categories:

- Anthracite
- Bituminous coal
- Sub-bituminous coal
- Lignite/Brown coal

Classification of different types of coal into practical categories for use at an international level is difficult for two reasons:

Divisions between coal categories vary between classification systems, both national and international, based on calorific value, volatile matter content, fixed carbon content, caking and coking properties, or some combination of two or more of these criteria.

Although the relative value of the coals within a particular category depends on the degree of dilution by moisture and ash and contamination by sulphur, chlorine, phosphorous and certain trace elements, these factors do not affect the divisions between categories.

Coal quality can vary and it is not always possible to ensure that available descriptive and analytical information is truly representative of the body of coal to which it refers.

The International Coal Classification of the Economic Commission for Europe (UN/ECE) recognises two broad categories of coal:

- i) **hard coal** - Coal of gross calorific value greater than 5 700 kcal/kg (23.9 GJ/t) on an ash-free but

moist basis and with a mean random reflectance of vitrinite of at least 0.6.

- ii) **brown coal** - Non-agglomerating coal with a gross calorific value less than 5 700 kcal/kg (23.9 GJ/t) containing more than 31 per cent volatile matter on a dry mineral matter free basis.

The IEA has adopted this definition of Hard Coal and Brown Coal in this book and in other publications for presenting statistics relating to coal production, trade and consumption.

It should be stressed that this classification system is based on the inherent qualities of the coal in question and not on the final use of the coal. In this way the classification system attempts to be objective and simple to apply.

Furthermore, in order to improve the information base for coal market analysis and projections, these two categories of coal have been further sub-divided in IEA/OECD Coal Statistics from 1978 as follows:

Hard coal

Hard coal is calculated as the sum of *coking coal* and *steam coal*.

Coking coal: defined as hard coal with a quality that allows the production of coke suitable to support a blast furnace charge.

Steam coal: defined as all other hard coal not classified as coking coal. Also included are recovered slurries, middlings and other low-grade coal products not further classified by type. Coal of this quality is also commonly known as thermal coal.

Note that for the countries listed below, steam coal also includes sub-bituminous coal - Australia, Belgium, Finland, France, Iceland, Japan, Korea, Mexico, New Zealand, Portugal and the United States.

Except for these 11 countries, *steam coal* for all other countries in the world is equivalent to the sum of *anthracite* and *other bituminous coal*.

Brown coal/lignite

Brown coal is calculated as the sum of *sub-bituminous coal* and *lignite*.

Sub-bituminous coal: defined as non-agglomerating coals with a gross calorific value between 4 165 kcal/kg (17.4 GJ/t) and 5 700 kcal/kg (23.9 GJ/t).

Lignite: defined as non-agglomerating coal with a gross calorific value less than 4 165 kcal/kg (17.4 GJ/t).

Note that for 11 countries (listed above), *sub-bituminous coal* is included in *steam coal* and not *brown coal*.

Primary coal used in pulverised (or granular) coal injection in blast furnaces is commonly abbreviated to PCI (or GCI) coal. (In this book PCI should be read to include GCI).

The IEA does not have a separate category for PCI as the term defines a particular end-use for coal. In IEA statistics, PCI is included in steam coal (except for Japan where it is included with coking coal).

Data presented in this book may be different from that presented in the national publications of countries

because countries may have adopted a different coal classification and reporting system that better suits their particular national needs. As far as possible national coal statistics reported by the IEA in this book and in other publications have been adjusted to be consistent with the IEA definitions noted above.

In cases where data presented in Mtoe or Mtce in this book and sourced to OECD/IEA *Energy Balances*, the term “Coal” includes all primary coal types (including hard coal and brown coal), peat and coal products (including patent fuel, coke oven coke, gas coke, coal tar, BKB, coke oven gas, blast furnace gas, and oxygen steel furnace gas).

Peat is defined as a combustible soft, porous or compressed fossil sedimentary deposit of plant origin with high water content (up to 90 per cent in the raw state), easily cut, of light to dark brown colour.

Coal Products

Derived solid fuels are products resulting from the transformation or manufacturing of hard coal, brown coal or other primary solid fuels, sometimes with the addition of other materials

| Coal and coal products | | |
|-------------------------------|-------------------|---|
| Flow | Short name | Definition |
| Hard Coal | HARDCOAL | Hard Coal refers to coal of gross calorific value greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis and with a mean random reflectance of vitrinite of at least 0.6. Hard coal is the sum of Coking Coal and Steam Coal. |
| Anthracite | ANTCOAL | A high rank coal used for industrial and residential applications. It is generally less than 10% volatile matter and a high carbon content (about 90% fixed carbon). Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis. |
| Coking Coal | COKCOAL | Coal with a quality that allows the production of a coke suitable to support a blast furnace charge. Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis. |
| Other Bituminous Coal | BITCOAL | Other bituminous coal is used for steam raising and space heating purposes and includes all bituminous coal that is not included under coking coal. It is usually more than 10% volatile matter and a relatively high carbon content (less than 90% fixed carbon). Its gross calorific value is greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis. |
| Steam Coal | STEAM | Steam coal is coal used for steam raising and space heating purposes and includes all Anthracite coals and Bituminous coals not included under Coking coal. For some countries (see Note on Coal Classification above) Steam Coal includes sub-bituminous coal. |
| Brown Coal | BROWN | Brown coal is the sum of lignite and sub-bituminous coal. For some countries (see Note on Coal Classification above) Brown Coal excludes sub-bituminous coal. |
| Sub-Bituminous Coal | SUBCOAL | Non-agglomerating coals with a gross calorific value between 17 435 kJ/kg (4 165 kcal/kg) and 23 865 kJ/kg (5 700 kcal/kg) containing more than 31 per cent volatile matter on a dry mineral matter free basis. |
| Lignite | LIGNITE | Non-agglomerating coal with a gross calorific value of less than 17 435 kJ/kg (4 165 kcal/kg), and greater than 31 per cent volatile matter on a dry mineral matter free basis. Oil shale and tar sands produced and combusted directly are included in this category. Oil shale and tar sands used as inputs for other transformation processes are also included here. |
| Peat | PEAT | Combustible soft, porous or compressed, fossil sedimentary deposit of plant origin with high water content (up to 90 per cent in the raw state), easily cut, of light to dark brown colour. Peat used for non-energy purposes is not included. |
| Patent Fuel | PATFUEL | A composition fuel manufactured from hard coal fines with the addition of a binding agent. The amount of patent fuel produced is, therefore slightly higher than the actual amount of coal consumed in the transformation process. |

| Coal and coal products | | |
|-------------------------------|-------------------|---|
| Flow | Short name | Definition |
| Coke Oven Coke | OVENCOKE | The solid product obtained from the carbonisation of coal, principally coking coal, at high temperature. It is low in moisture content and volatile matter. Also included are semi-coke, a solid product obtained from the carbonisation of coal at a low temperature, lignite coke, semi-coke made from lignite/brown coal, coke breeze and foundry coke. |
| Gas Coke | GASCOKE | A by-product of hard coal used for the production of town gas in gas works. Gas coke is used for heating purposes. |
| Coal Tar | COALTAR | Coal tar is a result of the destructive distillation of bituminous coal. Coal tar is the liquid by-product of the distillation of coal to make coke in the coke oven process. Coal tar can be further distilled into different organic products (e.g. benzene, toluene, naphthalene), which normally would be reported as a feedstock to the petrochemical industry. |
| Brown Coal Briquettes | BKB | Composition fuels manufactured from lignite/brown coal, produced by briquetting under high pressure. These figures include peat briquettes, dried lignite fines and dust. |
| Gas Works Gas | GASWKS GS | Covers all types of gas produced in public utility or private plants, whose main purpose is the manufacture, transport and distribution of gas. It includes gas produced by carbonisation (including gas produced by coke ovens and transferred to gas works), by total gasification (with or without enrichment with oil products), by cracking of natural gas, and by reforming and simple mixing of gases and/or air. This heading also includes substitute natural gas, which is a high calorific value gas manufactured by chemical conversion of a hydrocarbon fossil fuel. |
| Coke Oven Gas | COKEOVGS | Obtained as a by-product of the manufacture of coke oven coke for the production of iron and steel. |
| Blast Furnace Gas | BLFURGS | Produced during the combustion of coke in blast furnaces in the iron and steel industry. It is recovered and used as a fuel partly within the plant and partly in other steel industry processes or in power stations equipped to burn it. |
| Oxygen Steel Furnace Gas | OXYSTGS | Obtained as a by-product of the production of steel in an oxygen furnace and is recovered on leaving the furnace. The gas is also known as converter gas, LD gas or BOS gas. |

2. BALANCE FLOW DEFINITIONS

| Supply | | |
|--------------------------------------|-------------------|--|
| Flow | Short name | Definition |
| Production | INDPROD | Production refers to the quantities of fuels extracted or produced, calculated after any operation for removal of inert matter or impurities (e.g. sulphur from natural gas). For “other hydrocarbons” (shown with crude oil), production should include synthetic crude oil (including mineral oil extracted from bituminous minerals such as oil shale and tar sands, etc.). Production of secondary oil products represents the gross refinery output. Secondary coal products and gases represent the output from coke ovens, gas works, blast furnaces and other transformation processes. |
| From Other Sources – Coal | OSCOAL | From other sources refers to both primary energy that has not been accounted for under production and secondary energy that has been accounted for in the production of another fuel. For example, under additives: benzol, alcohol and methanol produced from natural gas; under refinery feedstocks: backflows from the petrochemical industry used as refinery feedstocks; under “other hydrocarbons” (included with crude oil): liquids obtained from coal liquefaction and GTL plants; under primary coal: recovered slurries, middlings, recuperated coal dust and other low-grade coal products that cannot be classified according to type of coal from which they are obtained; under gas works gas: natural gas, refinery gas, and LPG, that are treated or mixed in gas works (i.e. gas works gas produced from sources other than coal). |
| From Other Sources – Natural Gas | OSNATGAS | |
| From Other Sources – Oil Products | OSOIL | |
| From Other Sources – Non - Specified | OSNONSPEC | |
| Imports | IMPORTS | Imports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit should not be included. |
| Exports | EXPORTS | Exports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit should not be included. |

| Supply | | |
|--------------------------------|-------------------|--|
| Flow | Short name | Definition |
| International Marine Bunkers | MARBUNK | International marine bunkers covers those quantities delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship. Consumption by fishing vessels and by military forces is also excluded. See definitions of transport, fishing, and non-specified "other sectors". |
| International Aviation Bunkers | AVBUNK | As per international marine bunkers, International aviation bunkers covers those quantities delivered to aircraft of all flags that are engaged in international aviation. Consumption by aircraft engaged in domestic aviation is excluded. The domestic/international split is determined on the basis of airport of departure and airport of arrival, and not by the flag or nationality of the aircraft. Consumption by military forces is also excluded. |
| Stock Changes | STOCKCHA | Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. Oil and gas stock changes in pipelines are not taken into account. With the exception of large users mentioned above, changes in final users' stocks are not taken into account. A stock build is shown as a negative number, and a stock draw as a positive number. |
| Domestic Supply | DOMSUP | Domestic supply is defined as production + from other sources + imports - exports - international marine bunkers \pm stock changes. |
| Transfers | TRANSFER | Transfers comprises interproduct transfers, products transferred and recycled products. Interproduct transfers results from reclassification of products either because their specification has changed or because they are blended into another product, e.g. kerosene may be reclassified as gasoil after blending with the latter in order to meet its winter diesel specification. The net balance of interproduct transfers is zero. Products transferred is intended for petroleum products imported for further processing in refineries. For example, fuel oil imported for upgrading in a refinery is transferred to the feedstocks category. Recycled products 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). |
| Statistical Differences | STATDIFF | Statistical difference is defined as deliveries to final consumption + use for transformation and consumption within the energy sector + distribution losses - domestic supply - transfers. Statistical differences arise because the data for the individual components of supply are often derived from different data sources by the national administration. Furthermore, the inclusion of changes in some large consumers' stocks in the supply part of the balance introduces distortions which also contribute to the statistical differences. |

| Transformation sector | | |
|---|-------------------|--|
| Flow | Short name | Definition |
| Transformation Sector | TOTTRANF | The transformation sector comprises the conversion of primary forms of energy to secondary and further transformation (e.g. coking coal to coke, crude oil to petroleum products, and heavy fuel oil to electricity). |
| Main Activity Producer Electricity Plants | MAINELEC | Electricity plants refers to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs can not be distinguished on a unit basis) then the whole plant is designated as a CHP plant. Main activity producers (formerly referred to as public supply undertakings) generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid. |
| Autoproducer Electricity Plants | AUTOELEC | Electricity plants refers to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs can not be distinguished on a unit basis) then the whole plant is designated as a CHP plant. 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. |
| Main Activity Producer CHP Plants | MAINCHP | Combined heat and power plants refers to plants which are designed to produce both heat and electricity (sometimes referred to as co-generation power stations). If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plant basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above should be adopted. Main activity producers (formerly referred to as public supply undertakings) generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the public grid. |
| Autoproducer CHP Plants | AUTOCHP | Combined heat and power plants refers to plants which are designed to produce both heat and electricity (sometimes referred to as co-generation power stations). If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plant basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above should be adopted. Note that for autoproducer's CHP plants, all fuel inputs to electricity production are taken into account, while only the part of fuel inputs to heat sold is shown. Fuel inputs for the production of heat consumed within the autoproducer's establishment are not included here but are included with figures for the final consumption of fuels in the appropriate consuming sector. Autoproducer undertakings generate electricity and/or heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned. |

| Transformation sector | | |
|--|-------------------|---|
| Flow | Short name | Definition |
| Main Activity Producer Heat Plants | MAINHEAT | Heat plants refers to plants designed to produce heat only and who sell heat to a third party (e.g. residential, commercial or industrial consumers) under the provisions of a contract. Main activity producers (formerly referred to as public supply undertakings) generate 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 Heat Plants | AUTOHEAT | Heat plants refers to plants designed to produce heat only and who sell heat to a third party (e.g. residential, commercial or industrial consumers) under the provisions of a contract. Autoproducer undertakings generate 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. |
| Heat Pumps | THEAT | Heat pumps includes heat produced by heat pumps in the transformation sector. Heat pumps that are operated within the residential sector where the heat is not sold are not considered a transformation process and are not included here – the electricity consumption would appear as residential use. |
| Electric Boilers | TBOILER | Includes electric boilers used to produce heat. |
| Chemical heat for electricity production | TELE | Includes heat from chemical processes that is used to generate electricity. |
| Gas Works | TGASWKS | Gas works covers the quantities of fuels used for the production of town gas. |
| Coke Ovens | TCOKEOVS | Coke plants covers the use of fuels for the manufacture of coke and coke oven gas. |
| Patent Fuel Plants | TPATFUEL | Patent fuel plants covers the use of fuels for the manufacture of patent fuels. |
| BKB Plants | TBKB | BKB plants covers the use of fuels for BKB. |
| Petroleum Refineries | TREFINER | Petroleum refineries covers the use of hydrocarbons for the manufacture of finished petroleum products. |
| Petrochemical Industry | TPETCHEM | Petrochemical industry covers backflows returned from the petrochemical sector. Note that backflows from oil products that are used for non-energy purposes (i.e. white spirit and lubricants) are not included here, but in non-energy use. |
| Coal Liquefaction Plants | TCOALLIQ | Includes coal liquefaction plants. |
| Gas-to-Liquids (GTL) Plants | TGTL | Includes gas-to-liquid plants. |
| For Blended Natural Gas | TBLENDGAS | Includes other gases for blending with natural gas. |

| Transformation sector | | |
|--------------------------------|-------------------|---|
| Flow | Short name | Definition |
| Charcoal Production Plants | TCHARCOAL | Includes the transformation of solid biomass into charcoal. |
| Blast Furnaces | TBLASTFUR | Blast furnaces covers the quantities of fuels used for the production of blast furnace gas and oxygen steel furnace gas. The production of pig-iron from iron ore in blast furnaces uses fuels for supporting the blast furnace charge and providing heat and carbon for the reduction of the iron ore. Accounting for the calorific content of the fuels entering the process is a complex matter as transformation (into blast furnace gas) and consumption (heat of combustion) occur simultaneously. Some carbon is also retained in the pig-iron; almost all of this reappears later in the oxygen steel furnace gas (or converter gas) when the pig-iron is converted to steel. In the 1992/1993 annual questionnaires, Member Countries were asked for the first time to report in the transformation sector the quantities of all fuels (e.g. pulverised coal injection [PCI] coal, coke oven coke, natural gas and oil) entering blast furnaces and the quantity of blast furnace gas and oxygen steel furnace gas produced. The Secretariat then needed to split these inputs into the transformation and consumption components. The transformation component is shown in the row blast furnaces/gas works in the column appropriate for the fuel, and the consumption component is shown in the row iron and steel, in the column appropriate for the fuel. Originally, the Secretariat assumed that there was a transformation efficiency of 100%, which meant that the energy going into the transformation process was equal to the energy coming out (i.e. equivalent to the energy content of the gases produced). However, when the IEA data were used to calculate CO ₂ emissions from fuel combustion using the Intergovernmental Panel on Climate Change (IPCC) methodology, as published in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, the blast furnaces were showing a carbon gain. Starting with the 1998 edition, the Secretariat decided to assume a transformation efficiency such that the carbon input into the blast furnaces should equal the carbon output. This is roughly equivalent to assuming an energy transformation efficiency of 40%. |
| Non-specified (Transformation) | TNONSPEC | Includes non-specified transformation. |

| Energy sector | | |
|---|-------------------|--|
| Flow | Short name | Definition |
| Energy Sector | TOTENGY | The energy sector covers the amount of fuels used by the energy producing industries (e.g. for heating, lighting and operation of all equipment used in the extraction process, for traction and for distribution). Energy producing industries' own use includes energy consumed by transformation industries for heating, pumping, traction and lighting purposes [ISIC ¹ and NACE ² Divisions 10, 11, 12, 23 and 40]. |
| Coal Mines | EMINES | For hard coal and lignite mining, this represents the energy which is used directly within the coal industry. It excludes coal burned in pit-head power stations (included under electricity plants in the transformation sector) and free allocations to miners and their families (considered as part of household consumption and therefore included under residential). |
| Oil and Gas Extraction | EOILGASEX | For oil and gas extraction, flared gas is not included. |
| Gas Works | EGASWKS | Comprises consumption of fuels at the gas works and gasification plants. |
| Gasification Plants for Biogas | E BIOGAS | Includes own consumption of biogas necessary to support temperatures needed for anaerobic fermentation. |
| Coke Ovens | ECOKEOVS | Companies' own consumption of fuels at the coking plant. |
| Patent Fuel Plants | EPATFUEL | Comprises own consumption of fuels by patent fuel plants. |
| BKB Plants | EBKB | Comprises own consumption of fuels by briquetting plants. |
| Petroleum Refineries | EREFINER | Comprises own consumption of fuels in refineries. |
| Coal Liquefaction Plants | ECOALLIQ | Comprises own consumption of fuels at coal liquefaction plants. |
| Liquefaction (LNG) / Regasification Plants | ELNG | Comprises own consumption of fuels at liquefaction (LNG)/ regasification plants. |
| Gas-to-Liquids (GTL) Plants | EGTL | Comprises own consumption of fuels at gas-to-liquids (GTL) plants. |
| Own Use in Electricity, CHP and Heat Plants | EPOWERPLT | Companies' own consumption of fuels in electricity plants, combined heat and power plants (CHP) and heat plants. |
| Used for Pumped Storage | EPUMPST | Electricity consumed in hydro-electric plants. |
| Blast Furnaces | EBLASTFUR | Companies' own consumption of fuels in operating a furnace. |
| Non-specified (Energy) | ENONSPEC | Includes non-specified energy sector's use. |

¹. International Standard Industrial Classification of all Economic Activity, Series M, No. 4/Rev. 3, United Nations, New York, 1990.

². Classification of the economic activities in the European Community (NACE) published in the J.O.L. 293 of 24 October 1990.

| Final consumption | | |
|--------------------------|-------------------|--|
| Flow | Short name | Definition |
| Distribution Losses | DISTLOSS | Distribution losses includes losses in gas distribution, electricity transmission, and coal transport. |
| Final Consumption | FINCONS | The term final consumption (equal to the sum of the consumption in the end-use sectors) implies that energy used for transformation and for own use of the energy producing industries is excluded. Final consumption reflects for the most part deliveries to consumers (see note on stock changes). Backflows from the petrochemical industry are not included in final consumption (see from other sources under supply and petrochemical industry in the transformation sector). |

| End use sectors | | |
|----------------------------|-------------------|--|
| Flow | Short name | Definition |
| Industry Sector | TOTIND | Energy used for transport by industry is not included here but is reported under transport. The following industrial categories are defined with reference to their ISIC (International Standard Industrial Classification of All Economic Activities) division or group member. Coal and coal products used for production of electricity in the different industry categories (autoproducers) are included in the Transformation Sector. Petrochemical feedstocks are no longer included with chemical industry in the industry sector, but are now shown as part of non-energy use since most of these quantities are not combusted. This change could make a significant difference to industry consumption for countries which have significant quantities of natural gas and/or oil consumed as petrochemical feedstocks. Note: Most countries have difficulties supplying an industrial breakdown for all fuels. In these cases, the non-specified industry has been used. Regional aggregates of industrial consumption should therefore be used with caution. |
| Iron and Steel | IRONSTL | Iron and steel industry [ISIC Group 271 and Class 2731] |
| Chemical and Petrochemical | CHEMICAL | Chemical and petrochemical industry [ISIC Division 24] excluding petrochemical feedstocks. In previous editions the petrochemical feedstocks were included in energy use in the industry sector: in this edition they have been included with non-energy use. |
| Non-Ferrous Metals | NONFERR | Non-ferrous metals basic industries [ISIC Group 272 and Class 2732] |
| Non-Metallic Minerals | NONMET | Non-metallic minerals such as glass, ceramic, cement, etc. [ISIC Division 26] |
| Transport Equipment | TRANSEQ | Transport equipment [ISIC Divisions 34 and 35] |
| Machinery | MACHINE | Fabricated metal products, machinery and equipment other than transport equipment [ISIC Divisions 28, 29, 30, 31 and 32] |
| Mining and Quarrying | MINING | Mining (excluding fuels) and quarrying [ISIC Divisions 13 and 14] |
| Food and Tobacco | FOODPRO | Food and tobacco [ISIC Divisions 15 and 16] |

| End use sectors | | |
|--------------------------|-------------------|--|
| Flow | Short name | Definition |
| Paper, Pulp and Print | PAPERPRO | Paper, pulp and print [ISIC Divisions 21 and 22] |
| Wood and Wood Products | WOODPRO | Wood and wood products (other than pulp and paper) [ISIC Division 20] |
| Construction | CONSTRUC | Construction [ISIC Division 45] |
| Textile and Leather | TEXTILES | Textile and leather [ISIC Divisions 17, 18 and 19] |
| Non-specified (Industry) | INONSPEC | Non-specified (any manufacturing industry not included above) [ISIC Divisions 25, 33, 36 and 37] |
| Transport Sector | TOTTRANS | Consumption in the transport sector covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing [ISIC Divisions 60, 61 and 62]. Note: International marine bunkers are shown in supply and are not included in the transport sector as part of final consumption. |
| World Aviation | WORLDAV | International aviation includes deliveries of aviation fuels to aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. For many countries this incorrectly excludes fuel used by domestically owned carriers for their international departures. |
| Domestic Aviation | DOMESAIR | Domestic aviation includes deliveries of aviation fuels to aircraft for domestic aviation - commercial, private, agricultural, etc. It includes use for purposes other than flying, e.g. bench testing of engines, but not airline use of fuel for road transport. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Note that this may include journeys of considerable length between two airports in a country (e.g. San Francisco to Honolulu). For many countries this incorrectly includes fuel used by domestically owned carriers for outbound international traffic. |
| Road | ROAD | Road includes fuels used in road vehicles as well as agricultural and industrial highway use. Excludes military consumption as well as motor gasoline used in stationary engines and diesel oil for use in tractors that are not for highway use. |
| Rail | RAIL | Rail includes quantities used in rail traffic, including industrial railways. |
| Pipeline Transport | PIPELINE | Pipeline transport includes energy used in the support and operation of pipelines transporting gases, liquids, slurries and other commodities, including the energy used for pump stations and maintenance of the pipeline. Energy for the pipeline distribution of natural or manufactured gas, hot water or steam (ISIC Division 40) from the distributor to final users is excluded and should be reported in the energy sector, while the energy used for the final distribution of water (ISIC Division 41) to household, industrial, commercial and other users |

| End use sectors | | |
|--------------------------------|-------------------|---|
| Flow | Short name | Definition |
| | | should be included in commercial/public services. Losses occurring during the transport between distributor and final users should be reported as distribution losses. |
| Domestic Navigation | DOMESNAV | Domestic navigation includes fuels delivered to vessels of all flags not engaged in international navigation (see international marine bunkers). The domestic/international split should be determined on the basis of port of departure and port of arrival and not by the flag or nationality of the ship. Note that this may include journeys of considerable length between two ports in a country (e.g. San Francisco to Honolulu). Fuel used for ocean, coastal and inland fishing and military consumption are excluded. |
| Non-specified (Transport) | TRNONSPE | Non-specified includes all transport not elsewhere specified. |
| Other Sectors | TOTOTHER | Covers the fuels consumed in sectors other than the above-mentioned. |
| Residential | RESIDENT | Residential includes consumption by households, excluding fuels used for transport. Includes households with employed persons [ISIC Division 95] which is a small part of total residential consumption. |
| Commercial and Public Services | COMMPUB | Commercial and public services [ISIC Divisions 41, 50-52, 55, 63-67, 70-75, 80, 85, 90-93 and 99] |

| Non-energy use | | |
|---|-------------------|---|
| Flow | Short name | Definition |
| Non-Energy Use | NONENUSE | Non-energy use covers use of other petroleum products such as white spirit, paraffin waxes, lubricants, bitumen and other products. It also includes the non-energy use of coal (excluding peat). These products are shown separately in final consumption under the heading non-energy use. It is assumed that the use of these products is exclusively non-energy use. It should be noted that petroleum coke is included as non-energy use only when there is evidence of such use; otherwise it is included as energy use in industry or in other sectors. |
| Non-Energy Use Industry/ Transformation/ Energy | NEINTREN | Non-energy use in the industry, in the transformation sector or in the energy sector. |
| Memo: Feedstock Use in Petrochemical Industry | NECHEM | Of which: petrochemical feedstocks. The petrochemical industry includes cracking and reforming processes for the purpose of producing ethylene, propylene, butylene, synthesis gas, aromatics, butadiene and other hydrocarbon-based raw materials in processes such as steam cracking, aromatics plants and steam reforming [part of ISIC Group 241]. In previous editions the petrochemical feedstocks were included in energy use in the industry sector: in this edition they have been included with non-energy use. This change could make a significant difference to industry consumption for countries which have significant quantities of natural gas and/or oil consumed as petrochemical feedstocks. |
| Non-Energy Use in Transport | NETRANS | Non-energy use in the transport sector. |
| Non-Energy Use in Other Sectors | NEOTHER | Non-energy use in other sectors. |

| Electricity output (GWh) | | |
|--|-------------------|--|
| Flow | Short name | Definition |
| Electricity Output in GWh | ELOUTPUT | Shows the total number of GWh generated by thermal power plants separated into electricity plants and CHP plants, as well as production by nuclear and hydro, geothermal, etc. |
| Electricity Output-main activity producer electricity plants | ELMAINE | Total electricity generated in main activity producer electricity plants. |
| Electricity Output-autoproducer electricity plants | ELAUTOE | Total electricity generated in autoproducer electricity plants. |
| Electricity Output-main activity producer CHP plants | ELMAINC | Total electricity generated in main activity producer CHP plants. |
| Electricity Output-autoproducer CHP plants | ELAUTOC | Total electricity generated in autoproducer CHP plants. |

| Heat output (TJ) | | |
|---|-------------------|---|
| Flow | Short name | Definition |
| Heat Output in TJ | HEATOUT | Shows the total amount of TJ generated by power plants separated into CHP plants and heat plants. |
| Heat Output-main activity producer CHP plants | HEMAINC | Total heat generated in main activity producer CHP plants. |
| Heat Output-autoproducer CHP plants | HEAUTOE | Total electricity generated in autoproducer CHP plants. |
| Heat Output-main activity producer heat plant | HEMAINH | Total electricity generation in main activity producer heat plants. |
| Heat Output-autoproducer heat plants | HEAUTOH | Total electricity generation in autoproducer heat plants. |

3. GEOGRAPHICAL COVERAGE (WORLD)

| Countries and regions | | |
|------------------------------|-------------------|---|
| Flow | Short name | Definition |
| Australia | AUSTRALI | Excludes the overseas territories. |
| Austria | AUSTRIA | |
| Belgium | BELGIUM | |
| Canada | CANADA | |
| Czech Republic | CZECH | |
| Denmark | DENMARK | Excludes the Danish Faroes and Greenland |
| Finland | FINLAND | |
| France | FRANCE | Includes Monaco, and excludes the following overseas departments and territories (Guadeloupe, Guyana, Martinique, New Caledonia, French Polynesia, Reunion, and St.-Pierre and Miquelon). |
| Germany | GERMANY | |
| Greece | GREECE | |
| Hungary | HUNGARY | |
| Iceland | ICELAND | |
| Ireland | IRELAND | |
| Italy | ITALY | Includes San Marino and the Vatican. |
| Japan | JAPAN | Includes Okinawa. |

| Countries and regions | | |
|------------------------------|-------------------|---|
| Flow | Short name | Definition |
| Korea | KOREA | |
| Luxembourg | LUXEMBOU | |
| Mexico | MEXICO | |
| Netherlands | NETHLAND | Excludes Suriname and the Netherlands Antilles. |
| New Zealand | NZ | |
| Norway | NORWAY | |
| Poland | POLAND | |
| Portugal | PORTUGAL | Includes the Azores and Madeira. |
| Slovak Republic | SLOVAKIA | |
| Spain | SPAIN | Includes the Canary Islands. |
| Sweden | SWEDEN | |
| Switzerland | SWITLAND | Does not include Liechtenstein. |
| Turkey | TURKEY | |
| United Kingdom | UK | |
| United States | USA | Includes the 50 states and the District of Columbia. |
| OECD Total | OECDTOT | Includes Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. |
| OECD North America | OECDNAM | Includes Canada, Mexico and the United States. |
| OECD Pacific | OECDPAC | Includes Australia, Japan, Korea and New Zealand. |

| Countries and regions | | |
|------------------------------|-------------------|--|
| Flow | Short name | Definition |
| OECD Europe | OECDEUR | Includes Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom. |
| IEA Total | IEATOT | Includes Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. |
| IEA North America | IEANAM | Includes Canada and the United States. |
| IEA Europe | IEAEUR | Includes Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey and the United Kingdom. |
| Argentina | ARGENTINA | |
| Bolivia | BOLIVIA | |
| Brazil | BRAZIL | |
| Chile | CHILE | |
| Colombia | COLOMBIA | |
| Costa Rica | COSTARICA | |
| Cuba | CUBA | |
| Dominican Republic | DOMINICANR | |
| Ecuador | ECUADOR | |
| El Salvador | ELSALVADOR | |
| Guatemala | GUATEMALA | |
| Haiti | HAITI | |
| Honduras | HONDURAS | |

| Countries and regions | | |
|------------------------------|-------------------|--|
| Flow | Short name | Definition |
| Jamaica | JAMAICA | |
| Netherlands Antilles | NANTILLES | |
| Nicaragua | NICARAGUA | |
| Panama | PANAMA | |
| Paraguay | PARAGUAY | |
| Peru | PERU | |
| Trinidad and Tobago | TRINIDAD | |
| Uruguay | URUGUAY | |
| Venezuela | VENEZUELA | |
| Other Latin America | OTHERLATIN | Includes Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Falkland Islands, French Guiana, Grenada, Guadeloupe, Guyana, Martinique, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Pierre and Miquelon, St. Vincent and Grenadines, Suriname and Turks and Caicos Islands. |
| Latin America | LATINAMERI | Includes Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela and Other Latin America. |
| Albania | ALBANIA | |
| Bulgaria | BULGARIA | |
| Cyprus | CYPRUS | |
| Gibraltar | GIBRALTAR | |
| Malta | MALTA | |
| Montenegro | MONTENEGRO | |
| Romania | ROMANIA | |

| Countries and regions | | |
|----------------------------------|-------------------|--|
| Flow | Short name | Definition |
| Bosnia and Herzegovina | BOSNIAHERZ | |
| Croatia | CROATIA | |
| FY Republic of Macedonia | FYROM | |
| Serbia and Montenegro | SERBIA | |
| Slovenia | SLOVENIA | |
| Former Yugoslavia (if no detail) | YUGOND | |
| Non-OECD Europe | NONOECDEUR | Includes Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Gibraltar, Former Yugoslav Republic of Macedonia (FYROM), Malta, Montenegro, Romania, Serbia, and Slovenia. |
| Armenia | ARMENIA | |
| Azerbaijan | AZERBAIJAN | |
| Belarus | BELARUS | |
| Estonia | ESTONIA | |
| Georgia | GEORGIA | |
| Kazakhstan | KAZAKHSTAN | |
| Kyrgyzstan | KYRGYZSTAN | |
| Latvia | LATVIA | |
| Lithuania | LITHUANIA | |
| Republic of Moldova | MOLDOVA | |
| Russia | RUSSIA | |
| Tajikistan | TAJIKISTAN | |
| Turkmenistan | TURKMENIST | |
| Ukraine | UKRAINE | |

| Countries and regions | | |
|------------------------------|-------------------|-------------------|
| Flow | Short name | Definition |
| Uzbekistan | UZBEKISTAN | |
| Former USSR (if no detail) | USSRND | |
| Algeria | ALGERIA | |
| Angola | ANGOLA | |
| Benin | BENIN | |
| Botswana | BOTSWANA | |
| Cameroon | CAMEROON | |
| Congo | CONGO | |
| Democratic Rep. of Congo | CONGOREP | |
| Cote d'Ivoire | COTEIVOIRE | |
| Egypt | EGYPT | |
| Eritrea | ERITREA | |
| Ethiopia | ETHIOPIA | |
| Gabon | GABON | |
| Ghana | GHANA | |
| Kenya | KENYA | |
| Libya | LIBYA | |
| Morocco | MOROCCO | |
| Mozambique | MOZAMBIQUE | |
| Namibia | NAMIBIA | |
| Nigeria | NIGERIA | |
| Senegal | SENEGAL | |

| Countries and regions | | |
|------------------------------|-------------------|--|
| Flow | Short name | Definition |
| South Africa | SOUTHAFRIC | |
| Sudan | SUDAN | |
| United Republic of Tanzania | TANZANIA | |
| Togo | TOGO | |
| Tunisia | TUNISIA | |
| Zambia | ZAMBIA | |
| Zimbabwe | ZIMBABWE | |
| Other Africa | OTHERAFRIC | Includes Botswana (until 1980), Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Djibouti, Equatorial Guinea, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Namibia (until 1990), Niger, Reunion, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, Somalia, Swaziland and Uganda. |
| Africa | AFRICA | Includes Algeria, Angola, Benin, Botswana (since 1981), Cameroon, Congo, Democratic Republic of Congo, Côte d'Ivoire, Egypt, Eritrea (since 1992), Ethiopia, Gabon, Ghana, Kenya, Libya, Morocco, Mozambique, Namibia (since 1991), Nigeria, Senegal, South Africa, Sudan, United Republic of Tanzania, Togo, Tunisia, Zambia, Zimbabwe and Other Africa. |
| Bahrain | BAHRAIN | |
| Islamic Republic of Iran | IRAN | |
| Iraq | IRAQ | |
| Israel | ISRAEL | |
| Jordan | JORDAN | |
| Kuwait | KUWAIT | |
| Lebanon | LEBANON | |
| Oman | OMAN | |

| Countries and regions | | |
|------------------------------|-------------------|--|
| Flow | Short name | Definition |
| Qatar | QATAR | |
| Saudi Arabia | SAUDIARABI | |
| Syria | SYRIA | |
| United Arab Emirates | UAE | |
| Yemen | YEMEN | |
| Middle East | MIDDLEEAST | Includes Bahrain, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen. |
| Bangladesh | BANGLADESH | |
| Brunei | BRUNEI | |
| Cambodia | CAMBODIA | |
| India | INDIA | |
| Indonesia | INDONESIA | |
| DPR of Korea | KOREADPR | |
| Malaysia | MALAYSIA | |
| Mongolia | MONGOLIA | |
| Myanmar | MYANMAR | |
| Nepal | NEPAL | |
| Pakistan | PAKISTAN | |
| Philippines | PHILIPPINE | |
| Singapore | SINGAPORE | |
| Sri Lanka | SRILANKA | |
| Chinese Taipei | TAIPEI | |
| Thailand | THAILAND | |

| Countries and regions | | |
|------------------------------|-------------------|--|
| Flow | Short name | Definition |
| Vietnam | VIETNAM | |
| Other Asia | OTHERASIA | Includes Afghanistan, Bhutan, Cambodia (until 1994), Cook Islands, Fiji, French Polynesia, Kiribati, Laos, Macao, Maldives, Mongolia (until 1984), New Caledonia, Papua New Guinea, Samoa, Solomon Islands, East Timor, Tonga and Vanuatu. |
| Asia excluding China | ASIA | Includes Bangladesh, Brunei Darussalam, Cambodia (since 1995), Chinese Taipei, India, Indonesia, DPR of Korea, Malaysia, Mongolia (since 1985), Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam and Other Asia. |
| Hong Kong (China) | HONGKONG | |
| People's Republic of China | CHINA | |
| Non-OECD Total | NONOECDTOT | |
| World | WORLD | |

4. COUNTRY NOTES

In many cases data submitted by Member countries to the Secretariat do not conform to the standard reporting methodology or have other particular characteristics. Information set out below will assist readers to interpret data for particular countries and aid in the comparison of data among countries.

Australia

All data refer to the fiscal year, (e.g. July 2006 to June 2007 for 2007). For the 2002 data, the Australian Administration has started to use a new survey methodology which has caused shifts in the structure of industry consumption. The Australian Administration is planning to revise the historical series.

Data on blast furnace gas for electricity production by autoproducers begins in 1986. Consumption in wood and wood products is included in paper, pulp and print from 2001 onwards. The drop in BKB production in 2004 was due to a fire in the main production plant. Domestic production and consumption of anthracite is reported as bituminous coal. Usage of PCI in blast furnaces is occurring, but is currently not quantified.

Sub-bituminous coal is included in steam coal.

Austria

Historical revisions by the Austrian Administration have resulted in some breaks in series between 1989 and 1990.

Other bituminous coal includes hard coal briquettes. "Trockenkohle" is included with BKB because of its high calorific value. Since 1994, gas works gas is reported with natural gas because it is distributed in the same network. The amount of gas works gas is negligible and it is mostly consumed by households. The

last lignite mine closed in the second quarter of 2004 and lignite usage for power generation ceased in 2006.

Sub-bituminous coal is included in brown coal.

Belgium

Sub-bituminous coal data refer to recovered coal products. Production of other bituminous coal ceased on 31 August 1992. Production includes the recuperation of coal from coal dumps. The use of coke oven gas in the chemical and petrochemical sector ceased in 1996. The decrease of bituminous coal and coke oven coke in the iron and steel sector in 2002 is due to the closure of several plants.

Sub-bituminous coal is included in steam coal.

Canada

Due to the unavailability of data, non-energy use of coke oven coke and hard coal is included with final consumption sectors prior to 1978 and 1980 respectively. Before 1978, lignite inputs to main activity producer heat plants are included in final consumption. Starting in 1979, these inputs are included in main activity producer electricity plants. Due to a Canadian confidentiality law, starting in 2002, some of the disaggregation of primary coal has been estimated by IEA Secretariat.

Sub-bituminous coal is included in brown coal.

Czech Republic

Data are available starting in 1971.

End-use consumption data were submitted by the Czech Administration starting with 1996 data. Due to economic restructuring in the end-use consumption sectors in the late 1990s (big state enterprises subdividing and/or privatising and the utilisation of new technologies by businesses), there might be breaks in time series in these sectors. Prior to 1993, consumption was estimated by the Secretariat. Data for 1990 to 1995 were estimated based on the Czech publication *Energy Economy Year Book*. In 1995, town gas production ceased. Beginning in 1996, the Czech Administration reported gas works gas in autoproducer CHP. In 1997, coke oven gas consumption in chemical and petrochemical stopped. Also in 1997, other bituminous coal started being extracted at a deeper level, which increased the calorific value of this coal. Revisions by the Czech Administration have resulted in some breaks in series between 2001 and 2002. Production from other sources of sub-bituminous coal in 2004 are coal slurries. In the 2008 edition, the classification was changed between other bituminous coal, sub-bituminous coal and lignite for 1990 onwards.

Sub-bituminous coal is included in brown coal.

Denmark

In the 2004 edition, major revisions were made by the Danish Administration for the 1990 to 2001 data, which may cause breaks in time series between 1989 and 1990.

A large increase of steam coal imports in 2003 is related to a draught in Scandinavia. Thermal power plants were operated more intensively to replace hydro-generated electricity that is consumed in the country. Additionally, more coal-generated electricity was exported to other countries in the region.

Sub-bituminous coal is included in brown coal.

Finland

A new survey system and a reclassification of the data lead to breaks in the time series between 1999 and 2000 for most products and sectors. The new survey system is more detailed and has better product coverage especially in electricity, CHP and heat production, as well as in industry.

A large increase of steam coal imports in 2003 is related to a draught in Scandinavia. Thermal power plants were operated more intensively to replace

hydro-generated electricity that is consumed in the country. Additionally, more coal-generated electricity was exported to other countries in the region. Likewise, peat production is highly dependant upon favourable weather conditions and pricing of other fuels.

The first coking plant started operation in 1987, hence imports of coking coal and production of coke oven coke and coke oven gas started in that year. The increase of other bituminous coal inputs into main activity producer electricity plants from 1993 to 1994 was due to coal replacing imported electricity and hydro power. Production of gas works gas ceased in April 1994.

Sub-bituminous coal is included in steam coal.

France

Prior to 1985, consumption of colliery gas is included with the use of coke oven gas by autoproducers. Final consumption in industry is estimated by the Secretariat from 1986 to 2001 for some products. For 1989 to 1998, the Secretariat has estimated industry consumption based on *Consommations d'Énergie dans l'Industrie*, SESSI. BKB data for 1994 are Secretariat estimates.

Sub-bituminous coal is included in steam coal.

Germany

German data include the new federal states of Germany from 1970 onwards.

Figures for quantities used for non-energy purposes became available from 1970. Prior to this, non-energy uses are included with consumption in the respective final consumption sectors. Due to reclassification of several sectors by the German Administration, breaks in series may occur between 1990 and 1992; this particularly affects BKB, lignite and coke oven coke. BKB inputs to gas works plants stopped in 1997. Breaks in series may occur between 1998 and 1999 for coke oven gas and blast furnace gas. Up to 2003, other bituminous coal includes anthracite. Breaks in the series for coke oven gas from 2007 are due to a change in statistical source. Consumption of non-renewable municipal waste and other solid biomass as a reductant occurs in German blast furnaces, but is not currently quantified. Likewise, coal tar is a by-product of coke ovens, but not currently reported.

Sub-bituminous coal is included in brown coal.

Greece

Electricity production using hard coal ceased in 1989. A new main activity producer electricity plant using imported bituminous coal was brought on-line in 1991. Production of gas works gas ceased in 1997. Lignite is used in main activity producer CHP plants since 1997.

Sub-bituminous coal is included in brown coal.

Hungary

Data are available from 1965.

Due to sale of an autoproducer power plant, breaks in series occur for coke oven gas and blast furnace gas between 1997 and 1998. From 1999, the production of sub-bituminous coal has been included with lignite/brown coal due to the low quality of the coal. The use of this domestic coal in main activity producer electricity and CHP plants has also been reclassified to lignite/brown coal. The time series for coke oven coke transformed into blast furnace gas and consumed for energy purposes in the iron and steel industry have been adjusted by the IEA using standard modeling.

Sub-bituminous coal is included in brown coal.

Iceland

Prior to 1970, final consumption includes inputs and outputs to heat production. The industrial classifications used by the Icelandic Administration were changed in 1987. Final consumption increased in 2000 due to a new iron and steel plant coming on-line.

Sub-bituminous coal is included in steam coal.

Ireland

Production data for peat briquettes (reported as BKB) are available from 1975. Low production of peat in 1985 was due to a poor "harvest". The production of gas works gas ceased in 1987 due to fuel switching to natural gas. Other bituminous coal inputs to main activity producer electricity plants increased from 1986 due to three new generating units at Moneypoint com-

ing on-line. A reclassification causes a break in the series for own use of peat from 1989 to 1990. Patent fuel data from 2007 is confidential.

Sub-bituminous coal is included in brown coal.

Italy

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

From 1986 onwards, figures from lignite are given using the same methodology as in the *Bilancio Energetico Nazionale*. In 1991, all industrial activities were reclassified on the basis of ISTAT/NACE 91. This has implied some transfers of activities which may result in some anomalies between 1991 and earlier years. Due to a change in the survey system, breaks in series may occur between 1997 and 1998 for final consumption. From 2000 onwards, the Italian Administration defines electricity production from autoproducers as including generation from producers consuming more than 70% of their own production.

Sub-bituminous coal is included in brown coal.

Japan

For four consecutive years, the IEA received revisions from the Japanese Administration. The first set of revisions received in 2004 increased the 1990 supply by 5% for coal, 2% for natural gas and 0.7% for oil compared to the previous data. This led to an increase of 2.5% in 1990 CO₂ emissions calculated using the reference approach while the sectoral approach remained fairly constant. For the 2006 edition, the IEA received revisions to the coal and oil data which have had a significant impact on both the energy data and the CO₂ emissions. The most significant revisions occurred for coke oven coke, naphtha, blast furnace gas and petroleum coke. These revisions affected consumption rather than supply in the years concerned. As a result, the sectoral approach CO₂ emissions have increased for all the years, however at different rates. For example, the sectoral approach CO₂ emissions for 1990 were 4.6% higher than those calculated for the 2005 edition while the 2003 emissions were 1.1% higher than those of the previous edition. Due to the

impact these successive revisions have had on the final energy balance as well as on CO₂ emissions, the IEA was in close contact with the Japanese Administration to better understand the reasons behind these changes. These changes were mainly due to the Government of Japan's efforts to improve the input-output balances in the production of oil products and coal products in response to inquiries from the UNFCCC Secretariat. To cope with this issue, the Japanese Administration established a working group in March 2004. The working group completed its work in April 2006. Many of its conclusions were incorporated in the 2006 edition, but some further revisions to the time series (especially in the industry and other sectors) were submitted for the 2007 edition.

Starting in 1990, data are reported on a fiscal year basis (e.g. April 2006 to March 2007 for 2006).

From 1982, residential use of coke oven coke is included in commercial/public services sector. Oxygen steel furnace gas data are available from 1982. From 1998, inputs of coke oven gas, blast furnace gas and oxygen steel furnace gas into autoproducer electricity plants include the amount used to produce electricity with TRT technology (top pressure recovery turbines) which was previously included in the industry sector. Starting in 1990, the inputs of coke oven coke to blast furnaces as well as the final consumption of coke oven coke in the iron and steel sector have been estimated by the IEA Secretariat.

Coal injected in blast furnaces (PCI) is classified as coking coal in order to be consistent with Japanese trade statistics. With the 2008 edition, Japan has reclassified part of the coal inputs to coke ovens as inputs to blast furnaces.

In the 2009 edition, the net calorific values for coal for 1990 onwards have been recalculated by the IEA secretariat based upon gross values submitted by Japan and default values used by the IEA. Statistical differences in hard coal since 2004 are primarily due to deliberate stock build by final consumers.

Sub-bituminous coal is included in steam coal.

Korea

Data are available from 1971.

Data for 2002 have been reported on a different basis, causing breaks in series between 2001 and 2002, especially for inputs and outputs to electricity genera-

tion and consumption in the iron and steel industry. The Korean Administration is planning to revise the historical series as time and resources permit.

Data for coal and coal products from 1971 to 2001 are based on information provided by the Korean Administration, as well as information from the *Yearbook of Energy Statistics 2002*, the *Yearbook of Coal Statistics 2001* (both from the Ministry of Commerce, Industry and Energy), and *Statistics of Electric Power in Korea 2001* (from the Korea Electric Power Corporation). Patent fuel series have been estimated by the Secretariat up to 2001. Data on sub-bituminous coal were estimated by the Secretariat based on statistics of the exporting countries. Coal tar production exists prior to 2007, however data is yet to be finalised. Consumption of imported coke oven coke is reported under non-specified industry. Coke oven gas and blast furnace gas used for energy purposes in coke ovens prior to 2002 and in blast furnaces prior to 2007 are reported in the iron and steel industry.

Sub-bituminous coal is included in steam coal.

Luxembourg

Steel production from blast furnaces ceased at the end of 1997 and as a consequence, Luxembourg no longer uses coke oven coke and blast furnace gas.

Sub-bituminous coal is included in steam coal.

Mexico

Data are available starting in 1971 and are partly estimated based on the publication *Balance Nacional - Energía*. The Mexican Administration submitted data directly by questionnaire for the first time with 1992 data. As a result, some breaks in series may occur between 1991 and 1992.

Data for coke oven gas and blast furnace gas are reported for the first time in 1999.

Sub-bituminous coal is included in steam coal.

Netherlands

In the national statistical system of the Netherlands, use of fuel in manufacturing industries for CHP production is considered to be consumption in the transformation sector. However, in IEA statistics, this own

use for heat production (autoproduced heat) is reported under the relevant industry sub-sector, based on estimates provided by the Central Bureau of Statistics.

For 1984 to 1986, production *from other sources* of other bituminous coal represents a stock of "smalls" washed for re-use. Prior to 1989, non-energy use is included with industry consumption. Paper, pulp and print includes furniture. The breakdown of anthracite, coking coal and other bituminous coal has been provided on a preliminary basis and data will be revised.

Coal exports consist of re-exported volumes.

Sub-bituminous coal is included in brown coal.

New Zealand

Where data refer to the fiscal year, April 1994 to March 1995 is shown as 1994.

A reorganisation of government departments during 1987 leading to cessation of certain data series has resulted in several breaks in series between 1987 and 1988.

Production of gas works gas ceased in 1988. Peat, although produced in New Zealand, is not used as a fuel. It is used for agricultural purposes only. In final consumption, non-ferrous metals is included with iron and steel; wood and wood products is included with pulp, paper and print; mining and quarrying is included in agriculture and construction is included with commercial/public services. Sub-bituminous coal inputs into blast furnaces refers to coal that is merged with iron sand to form the inputs for the multi-hearth-furnace (Glenbrook Steel site). Import origins and export destinations are derived from partner reports.

Sub-bituminous coal is included in steam coal.

Norway

Production of coking coal, coke oven coke and coke oven gas ceased in the late 1980s. Other bituminous coal includes lignite. The decrease of bituminous coal production in 2005 is due to a fire in one of the coal mines, that entailed a break in the production for a large part of the year.

Sub-bituminous coal is included in brown coal.

Poland

Sub-bituminous coal is included in brown coal.

Portugal

Since 1998, sub-bituminous coal is not used. As of 2000, gas works gas in the commercial/public services and residential sectors is gradually being replaced by natural gas. The iron and steel industry closed in the first quarter of 2001, leading to decreases in supply and consumption of coking coal, coke oven coke, coke oven gas and blast furnace gas.

Sub-bituminous coal is included in steam coal.

Slovak Republic

Data are available starting in 1971.

There are some breaks in series between 1992 and 1993. A new survey system in 2001 leads to major breaks in series for most products.

Sub-bituminous coal is included in brown coal.

Spain

Other bituminous coal use in the iron and steel industry ceased in 1991 and started again in 1996. Consumption of BKB also ended in 1991. Consumption of blast furnace gas in the chemical industry stopped in 1993 while chemical industry use of coke oven gas ceased between 1993 and 2000. Natural gas inputs into gas works gas stopped in 1999. Lignite mining was halted indefinitely in 2008.

Sub-bituminous coal is included in brown coal.

Sweden

Other bituminous coal production is coal recovered during the quarrying of clay. Autoproducer inputs to waste heat production that is sold are reported in the

respective end-use sectors and not in the transformation sector.

Sub-bituminous coal is included in brown coal.

Switzerland

From 1999, data on consumption result from a new survey and are not comparable with data of previous years.

The breakdown of the industry sector for 2000 was estimated by the Secretariat for gas, oil, electricity and heat. From 1985, industrial consumption of gas works gas is reported in non-specified industry to prevent the disclosure of commercially confidential data.

Sub-bituminous coal is included in brown coal.

Turkey

Production of gas works gas declined in 1989 due to plant closures; the last plant closed in 1994. Use of gas coke and gas works gas ceased in 1994. Due to government regulations in the industry and residential sectors in particular, there has been a shift from the use of domestically produced coal to imported coal and natural gas. Privatisation of state owned coke ovens in recent years results in incomplete information on coke oven gas distribution.

Sub-bituminous coal is included in brown coal.

United Kingdom

Consumption shown for the commercial/public services sector includes consumption of some of the non-specified sector. Prior to 1994, the consumption of

substitute natural gas is included with natural gas while its production is included with gas works gas.

Due to reclassifications, there are breaks in the series between 1998 and 1999 and between 2000 and 2001 for blast furnace gas.

Sub-bituminous coal is included in brown coal.

United States

United States includes the 50 states and the District of Columbia. Imports and exports also include all U.S. territories (i.e. Puerto Rico, Guam, the Virgin Islands and the Hawaiian Trade Zone).

Due to problems in reporting, there are numerous breaks in series for the U.S. data, particularly in 1992, 1999, 2001 and 2002. Care should be taken when evaluating consumption by sector since inputs of fuel to autoproducers are included in final consumption for some years.

Gas works gas production and consumption is included with natural gas starting in 1974. For the period 2002 to 2007, the United States reported "syn-fuel" production as patent fuel. Prior to 2002, the consumption of this fuel was reported with other bituminous coal. Since the Energy Information Administration and the US Department of Commerce do not collect separate data on patent fuel exports by country, total exports of patent fuel are included in the exports of other bituminous coal. This practice ceased in 2007.

Sub-bituminous coal is included in steam coal.

5. PRINCIPLES AND DEFINITIONS

General notes

Energy data for OECD countries in IEA Secretariat databases begin in 1960 with the following exceptions for coal: for Hungary data begin in 1965, and for the Czech Republic, Korea, Mexico and the Slovak Republic data are available from 1971.

Prior to 1970, German statistics refer to the former Federal Republic of Germany. Data from 1970 include the new federal states of Germany.

The fuels listed as “Solar, wind, tide” include wave and ocean, unless otherwise noted.

Energy flows data reported for 2008 (shown as 2008e) are preliminary estimates based on the submissions received in early 2009 and on quarterly submissions to the IEA from member countries.

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

Additional information on methodologies and reporting conventions are included in the notes in *Energy Balances of OECD Countries 2009 Edition* and *Energy Statistics of OECD Countries 2009 Edition*.

Qualifiers

Data marked as ‘e’ are the estimates of the IEA secretariat. Data point marked as ‘c’ means that data are confidential due to country specific regulations. Data point marked as ‘.’ mean that data are not available (either not collected or not submitted by national government). Data point marked as ‘x’ means that this data point is not applicable, there is no meaningful

explanation of a value there (for example we can not show unit price if there was no trade or if the consumption in the country is forbidden).

Revisions to blast furnace coke and PCI data

Data on coke used and pulverised coal injected in the blast furnace (PCI) are harmonized for all OECD countries in order to ensure that steam and coking coal *consumption* data are consistently presented and that comparisons between countries for *consumption* are meaningful. The main effect of these revisions has been to revise the reported *consumption* of coal in the iron and steel industry.

It should be noted that in IEA statistics of coal *trade* and *consumption*, PCI is not separately specified; rather it is included with steam coal for all countries (except Japan). This classification is based on the fact that most PCI coal is of a steam coal quality and not coking coal quality. For Japan, PCI consumption is reported in this book as a coking coal in order to be consistent with the Japanese practice of including imports of PCI coal with coking coal.

Data sources

Historical data (1960-2007)

The annual historical in Part III of this report are taken from the IEA/OECD databases of energy statistics which are based on annual submissions from all OECD Member countries.

i) IEA/OECD coal statistics

This database of annual statistics for OECD countries covers all primary solid fuels, derived fuels and related manufactured gases. It contains detailed supply/demand balances for each fuel, as well as information on coal trade by origin and destination. The main data from this system are published annually in the IEA/OECD publication *Coal Information*.

ii) IEA/OECD electricity statistics

This database of annual statistics for OECD countries covers generating capacity and electricity production from main activity producers (formerly known as public) and autoproducers plants. It includes information on electricity production by fuel type and supply/demand balances for electricity and for heat sold to third parties from different types of power and heat plants. The main data from this system are published annually in the IEA/OECD publication *Electricity Information*.

iii) IEA/OECD oil and gas statistics

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

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

iv) IEA/OECD renewables statistics

This database of annual statistics for OECD countries covers hydro, solid biomass, geothermal, renewable municipal waste, wind, gas from biomass, solar photovoltaics, solar thermal, tide/wave/ocean, non-renewable municipal waste and industrial waste. It includes detailed supply/demand balances.

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

v) IEA/OECD energy statistics

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

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

vi) IEA/OECD energy balances

Overall energy balances are constructed annually for all OECD countries from the basic energy statistics described above. The overall energy balance data are expressed in a common energy unit of tons of oil equivalent (toe) and presented in a standard matrix format. The balances are published annually in the IEA/OECD publication *Energy Balances of OECD Countries* in which detailed country notes referring to historical data can be found.

vii) IEA/OECD energy prices and taxes

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

viii) Energy statistics of non-OECD countries

The annual historical data for non-OECD countries presented in Part IV of this report are taken from IEA/OECD databases of energy statistics of non-OECD countries. These databases are compiled from data submitted annually to the IEA Secretariat in questionnaires from non-OECD Member countries of the UN ECE, from data provided by other international organisations (UN in New York, OLADE in Quito, APEC in Tokyo and FAO in Rome), from direct communications with national administrations, industry contacts and from published sources.

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

Preliminary 2008 data - 2008e

Data reported for the year 2008 in this publication are preliminary and presented as 2008e. Final 2008 data on solid fuels and manufactured gases will be submitted by OECD Member countries to the Secretariat in annual questionnaires in late 2009. As a result, final

data for 2008 and preliminary 2009 data will be published in the 2010 edition of *Coal Information* in July 2010.

Selected coal data for 2008 for some non-OECD countries have been estimated by the Secretariat.

Units and conversions

Conversion (to toe)

All units in this publication are metric units.

Most IEA/OECD publications showing inter-fuel relations and projections present such information in a common energy unit, the ton of oil equivalent (toe). A ton of oil equivalent is defined as 10^7 kcal (41.868 GJ), a convenient measure because it is approximately the net heat content of one ton of average crude oil.

Conversion from native units to tonnes of oil equivalent requires choosing coefficients of equivalence between different forms and sources of energy. Adopting a single equivalence for each major primary energy source in all countries, e.g. 29 307 kJ/kg (7 000 kcal/kg) for hard coal, 41 868 kJ/kg (10 000 kcal/kg) for oil, etc is flawed because it results in distortions due to a wide spread in calorific values between types of coal and individual coal products from country to country and purpose to purpose.

The Secretariat has therefore obtained specific calorific factors supplied by the national administrations for the main categories of each quality of coal and for each flow or use (i.e. production, imports, exports, electricity generation, coke ovens, blast furnaces and industry). The set of particular national calorific values that allow for the conversion of energy sources from original (physical) units to megajoules are presented in the tables on page xxvii.

The balances are expressed in terms of net calorific value. The difference between net and gross being the latent heat of vaporisation of the water produced during combustion of the fuel. For coal and oil, net calorific value is usually around 5 per cent less than gross and for most forms of natural and manufactured gas the difference is 9-10 per cent. The use of net calorific value is consistent with the practice of the Statistical Offices of the European Communities and the United Nations.

In this report some data are reported in terms of *tonnes of coal equivalent* (tce) because this unit is more widely used in the international coal industry. A *tonne of coal equivalent* is defined as 7 million kilocalories. The relation between *tonne of oil equivalent* (toe) and *tonne of coal equivalent* (tce) is therefore:

$$1 \text{ tce} = 0.7 \text{ toe}$$

Note that *billion* refers to *thousand million* (10^9). Also, in many cases totals shown in the tables may not be the sum of their components due to independent rounding.

Factors related to specific fuels

Crude oil

A single net calorific value is used by the IEA for each Member Country; these values are shown in the tables in the IEA/OECD publication *Energy Balances of OECD Countries*.

These are average conversion factors, with the same factor used to convert production, imports, and exports as well as all consumption.

Petroleum products

Up until last year, petroleum products were converted using a single set of net calorific values for all countries. Last year the IEA instigated regional conversion factors (in conjunction with Eurostat for the European countries) for the petroleum products.

The net calorific values shown below are used per regional split for all countries and all years.

Regional net calorific values for petroleum products

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

Coal

Separate net calorific values for coal production, imports, exports, inputs to power plants, coal used in coke ovens, coal used in blast furnaces, coal used in industry and coal other uses are submitted annually by national administrations to the Secretariat. Conversion factors for average net calorific value for each OECD member country for 2006 are shown in the table on page xxvii.

Gas

In the IEA/OECD publication *Energy Statistics of OECD Countries* all data on gases are expressed in terajoules, on the basis of their gross calorific value.

$$1 \text{ terajoule} = 0.00002388 \text{ Mtoe.}$$

To calculate the net heat content of a gas from its gross heat content, multiply the gross heat content by the appropriate following factor:

| | |
|--------------------------|-----|
| Natural gas | 0.9 |
| Gas works gas | 0.9 |
| Coke oven gas | 0.9 |
| Blast furnace gas | 1.0 |
| Oxygen steel furnace gas | 1.0 |

Electricity

Figures for electricity production, trade, and final consumption are calculated using the energy content of the electricity, i.e. at a rate of 1 TWh = 0.086 Mtoe. Hydro-electricity production (excluding pumped storage) and electricity produced by other non-thermal means (wind, tide, photovoltaic, etc.), are accounted for similarly using 1 TWh = 0.086 Mtoe. However, the primary energy equivalent of nuclear electricity is calculated from the gross generation by assuming a 33% efficiency, i.e. 1 TWh = (0.086 ÷ 0.33) Mtoe. In the case of electricity produced from geothermal heat the primary equivalent is calculated assuming an efficiency of 10%, so 1 TWh = (0.086 ÷ 0.1) Mtoe, unless the actual value is known.

Heat

Information on heat is supplied to the Secretariat in terajoules.

Other fuels

The net heat content of other fuels, expressed in terajoules, is also supplied to the Secretariat by administrations. The Secretariat receives information on volumes and other characteristics only for certain aggregates of these fuels.

6. CONVERSION FACTORS AND CALORIFIC VALUES

General conversion factors for energy

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

Conversion factors for mass

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

Conversion factors for volume

| <i>To:</i> | gal U.S. | gal U.K. | bbl | ft ³ | l | m ³ |
|------------------------------------|--------------|----------|---------|-----------------|--------|----------------|
| <i>From:</i> | multiply by: | | | | | |
| U.S. gallon (gal) | 1 | 0.8327 | 0.02381 | 0.1337 | 3.785 | 0.0038 |
| U.K. gallon (gal) | 1.201 | 1 | 0.02859 | 0.1605 | 4.546 | 0.0045 |
| Barrel (bbl) | 42.0 | 34.97 | 1 | 5.615 | 159.0 | 0.159 |
| Cubic foot (ft³) | 7.48 | 6.229 | 0.1781 | 1 | 28.3 | 0.0283 |
| Litre (l) | 0.2642 | 0.220 | 0.0063 | 0.0353 | 1 | 0.001 |
| Cubic metre (m³) | 264.2 | 220.0 | 6.289 | 35.3147 | 1000.0 | 1 |

Decimal prefixes

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

2007 COUNTRY SPECIFIC AVERAGE NET CALORIFIC VALUES [MJ/t]

| | Anthracite | Coking coal | Other bituminous coal | Sub-bituminous coal | Lignite | Peat | Patent fuels | Coke oven coke | Coal tar | BKB |
|-----------------|------------|-------------|-----------------------|---------------------|---------|--------|--------------|----------------|----------|--------|
| Australia | - | 29,134 | 25,700 | 18,478 | 10,470 | - | - | 25,650 | - | 20,995 |
| Austria | 32,432 | 29,073 | 27,935 | 22,200 | 8,978 | 8,800 | 31,003 | 29,000 | 41,800 | 19,303 |
| Belgium | 25,184 | 29,308 | 25,781 | - | 8,370 | - | 29,308 | 27,696 | - | 20,097 |
| Canada | 27,700 | 27,049 | 25,514 | 17,799 | 14,464 | - | - | 27,389 | - | - |
| Czech Republic | 30,000 | 29,290 | - | 24,880 | 12,834 | - | - | 27,800 | 37,236 | 23,431 |
| Denmark | - | - | 24,487 | - | - | - | - | 29,300 | - | - |
| Finland | - | 29,300 | 25,200 | - | - | 10,200 | - | 29,300 | 37,000 | - |
| France | - | 30,500 | 26,000 | - | 17,000 | - | 32,000 | 28,000 | - | - |
| Germany | 29,054 | 29,000 | 25,630 | - | 9,022 | - | 31,400 | 28,650 | - | 21,324 |
| Greece | - | - | 25,743 | - | 6,545 | - | - | 29,507 | - | 14,201 |
| Hungary | - | 31,430 | 25,717 | 16,578 | 7,534 | - | - | 29,485 | 38,000 | 20,000 |
| Iceland | - | 28,050 | 28,050 | - | - | - | - | 26,670 | - | - |
| Ireland | 27,842 | - | 27,838 | - | 19,820 | 9,714 | - | - | - | 18,548 |
| Italy | - | 30,984 | 26,587 | - | 10,468 | - | - | 29,000 | - | - |
| Japan | 25,619 | 27,714 | 24,476 | - | - | - | - | 27,930 | 35,482 | - |
| Korea | 23,483 | 28,261 | 24,911 | 20,934 | - | - | 20,049 | 27,214 | 37,000 | - |
| Luxembourg | 29,300 | - | 29,300 | - | - | - | - | - | - | 20,100 |
| Mexico | - | 23,483 | 23,483 | 19,405 | 14,100 | - | - | 26,521 | - | - |
| Netherlands | 29,300 | 28,671 | 24,736 | - | 20,000 | - | - | 28,500 | 41,900 | - |
| New Zealand | - | - | 27,590 | 20,980 | 14,280 | - | - | - | - | - |
| Norway | - | - | 28,100 | - | - | - | - | 28,500 | - | - |
| Poland | - | 29,467 | 22,589 | - | 8,684 | - | - | 28,752 | 36,604 | 17,471 |
| Portugal | 27,654 | - | 25,451 | - | - | - | - | 28,050 | - | - |
| Slovak Republic | 27,131 | 27,930 | 25,146 | - | 11,560 | - | 28,000 | 28,740 | - | 23,000 |
| Spain | 19,322 | 30,020 | 23,280 | 11,756 | 6,780 | - | - | 30,290 | - | - |
| Sweden | - | 30,000 | 27,400 | - | - | 12,500 | - | 28,080 | - | - |
| Switzerland | 28,100 | - | 28,100 | - | 20,100 | - | - | 28,100 | - | - |
| Turkey | - | 29,523 | 24,189 | 18,000 | 7,765 | - | - | 29,302 | - | 18,736 |
| United Kingdom | - | 28,813 | 24,965 | - | - | - | 30,875 | 28,310 | - | - |
| United States | 27,861 | 29,107 | 26,536 | 19,433 | 14,195 | - | 27,348 | 27,469 | - | - |

Source: IEA/OECD Coal Statistics

7. ABBREVIATIONS AND NOTES

Units and technical abbreviations

| | |
|----------|---|
| t | : metric ton = tonne = 1000 kg |
| kt | : thousand tonnes |
| Mt | : million tonnes |
| toe | : tonne of oil equivalent |
| Mtoe | : million tonnes of oil equivalent |
| tce | : tonne of coal equivalent (= 0.7 toe) |
| Mtce | : million tonnes of coal equivalent |
| kcal | : kilocalories (10^3 calories) |
| MBtu | : million British thermal units |
| GWh | : million kilowatt hours |
| \$ | : US dollars (unless otherwise specified) |
| CIF | : cost, insurance and freight |
| FAS | : free alongside ship |
| FOB | : free on board |
| GDP | : Gross Domestic Product |
| GCV | : gross calorific value |
| PCI | : coals for pulverised injection |
| TPES | : Total Primary Energy Supply |
| EU | : European Union |
| FSU | : Former Union of Soviet Socialist Republics/Soviet Union |
| OECD | : Organisation for Economic Co-operation and Development |
| UN | : United Nations |
| 0 or 0.0 | : negligible |
| c | : confidential |
| e | : estimated |
| .. | : not available |
| - | : nil |
| x | : not applicable |

Coal Classification

The IEA collects statistics on coal production, trade and consumption according to a technically precise classification based on the quality of coal as follows:

- Coking Coal is coal with a quality that allows the production of coke suitable to support a blast furnace charge;
- Other Bituminous Coal and Anthracite are non-agglomerating coals with a gross calorific value greater than 23 865 kJ/kg (5 700 kcal/kg) on an ash-free but moist basis;
- Sub-bituminous Coal is a non-agglomerating coal with a gross calorific value between 23 865 kJ/kg (5 700 kcal/kg) and 17 435 kJ/kg (4 165 kcal/kg) containing more than 31% volatile matter on a dry mineral matter-free basis;
- Lignite/Brown Coal is a non-agglomerating coal with a gross calorific value less than 17 435 kJ/kg (4 165 kcal/kg) and greater than 31% volatile matter on a dry mineral matter-free basis. Oil Shale combusted directly is reported in this category.

However, when publishing these data, the IEA adopts a simplified classification of Hard Coal and Brown Coal. The correspondence is as follows:

Hard Coal: this is the sum of Coking Coal and Steam Coal;

Coking coal is reported in the category Coking Coal;

Other Bituminous Coal and Anthracite are reported in the category Steam Coal;

Sub-bituminous Coal is reported in the category Brown Coal except for: Australia, Belgium, Finland, France, Iceland, Japan, Mexico, New Zealand, Portugal, South Korea (Republic of Korea) and the United States where it is included in Steam Coal (because of its relatively high calorific value);

Lignite is reported in the category Brown Coal.

The term **Total Coal** refers to the sum of Hard Coal and Brown Coal after conversion to a common energy unit (tonne of coal equivalent - tce). The conversion is done by multiplying the calorific value of the coal in question (the conversion factors are submitted by national Administrations to the IEA Secretariat each year) by the total volume of hard and brown coal used, measured in physical units, i.e. in tonnes. One tce has an energy content of 29.3 gigajoules (GJ) or 7 000 kcal and corresponds to 0.7 tonnes of oil equivalent (toe).

Defining Coal Consumption

Energy statistics are compiled and presented to take account of the complexity in the way fuels are used and to avoid double counting. Misunderstandings can arise when statistics on coal consumption are used because of the particular terminology used by energy statisticians.

Coal is used in four possible ways:

- As a *primary input* to produce electricity or a secondary/tertiary fuel that is used elsewhere or sold - this is referred to as use in the *Transformation Sector*;
e.g. coking coal used to produce coke in a coke oven, steam coal used to *produce* electricity
- As a *fuel* used to *support* (but not used in) a transformation process - this is referred to as use in the *Energy Sector*;
e.g. coke oven gas used to *heat* the coke oven, steam coal used to *operate* the power plant
- As a *fuel* consumed in manufacturing industry, mining and construction, in transport, in agriculture, in commercial and public services and in households - this is referred to as use in the *Final Consumption Sectors*;
e.g. steam coal used to produce heat in cement kilns, steam coal used to produce industrial process steam
- As a *raw material* - this is referred to as *non-energy use*.
e.g. coal used to produce carbon electrodes for the aluminium industry

In the wider community, the term '**Consumption**' is commonly understood to include all four of the above end-uses. However, in this book the term "Consumption" refers only to use in the *Final Consumption Sectors* (i.e. in the third dot point above).