COAL

Definition: A solid fossil fuel consisting of carbonised vegetal matter.

Explanation: There are two main categories of coal, hard coal (comprising medium- and high rank coals) and brown coal (low-rank coals) which can be identified by their Gross Calorific Value - GCV and the Vitrinite mean Random Reflectance per cent - Rr.
The relationship between the coal types defined below is illustrated here:

- Hard Coal
  - Anthracite
  - Bituminous Coal
    - Coking Coal
    - Other Bituminous Coal
- Brown Coal
  - Sub-Bituminous Coal
  - Lignite

Remark: Peat is not included in the Coal group.

Consultant's comments
For this definition and for those related to it the substance of the UNECE classification system for In-Seam and Low-Rank coals has been adopted.

HARD COAL

Definition: Coals with a gross calorific value (moist, ash-free) basis which is not less than 24 MJ/kg or which is less than 24 MJ/kg provided that the coal has a Vitrinite mean Random Reflectance greater than, or equal to 0.6 per cent.

Remark: Hard coal comprises Anthracite and Bituminous coals. Note that hard coal may include coals with a GCV ≥ 24 MJ/kg and a mean Rr < 0.6 per cent.

ANTHRACITE

Definition: A high-rank, Hard Coal with a gross calorific value (moist, ash-free basis) greater than, or equal to, 24 MJ/kg and a Vitrinite mean Random Reflectance greater than, or equal to 2.0 per cent.
Explanation: It usually has less than 10% volatile matter, a high carbon content (about 86-98% carbon) and is non-agglomerating.

Remark: It is used for industrial and residential heat raising.

Consultant's comment:
In keeping with the principles adopted for the UNECE classification of In Seam coal the minimum GCV for anthracite has been reduced from 27 MJ/kg to 24 MJ/kg. This lower value is not, however, not consistent with the minimum fixed carbon content of 86% which would suggest a lower GCV of about 27 MJ/kg.

BITUMINOUS COAL

Definition: a medium-rank Hard Coal with either a gross calorific value (moist, ash-free basis) not less than 24 MJ/kg and with a Vitrinite mean Random Reflectance less than 2.0 per cent, or with a gross calorific value (moist, ash-free basis) less than 24 MJ/kg provided that the Vitrinite mean random reflectance is equal to, or greater than 0.6 per cent.

Remark: Bituminous coals are agglomerating and have a higher volatile matter and lower carbon content than anthracite. They are used for industrial coking and heat raising and residential heat raising.

Consultant's comment:
The UNECE definition as proposed excludes coals with a GCV not less than 24 MJ/kg and an Rr < 0.6 per cent. However, the original paper on In Seam coals and the remark to the definition proposed in the OCG comments effectively classify such coals as bituminous. Consequently the definition here has been adapted to include them.

COKING COAL

Definition: Bituminous Coal that can be used in the production of a coke capable of supporting a blast furnace charge.

Consultant's comments

Coking coal is defined here in terms of its use and not the properties of coals which produce coke capable of supporting the blast furnace charge. The charge for coke ovens often consists of a blend of different bituminous coals some of which would not produce suitable coke if used on their own. However, their presence assists the coking process.

The implicit assumption is that the definition should be practical in its application. A definition written in terms of only those coals which could produce satisfactory coke when used individually would be difficult to implement and verify by statisticians.

OTHER BITUMINOUS COAL

Definition: Bituminous Coal not included under coking coal.

Remark: Sometimes referred to as ‘Steam Coal’.

BROWN COAL

Definition: Coals with a gross calorific value (moist, ash-free basis) less than 24 MJ/ kg and a Vitrinite mean Random Reflectance less than 0.6 per cent.

Remark: Brown coal comprises Sub-Bituminous coal and Lignite.

SUB BITUMINOUS COAL

Definition: Brown Coal with a gross calorific value (moist, ash-free basis) equal to, or greater than 20 MJ/kg and less than 24 MJ/kg.

LIGNITE

Definition: Brown Coal with a gross calorific value (moist, ash-free basis) not greater than 20 MJ/kg.

PEAT

Definition: A solid formed from the partial decomposition of dead vegetation under conditions of high humidity and limited air access (initial stage of coalification).

Explanation: It is available in two forms for use as a fuel, Sod Peat and Milled Peat.

Remark: Peat is not considered a renewable resource as its regeneration period is long. Peat is also used for horticultural purposes.

SOD PEAT

Definition: Slabs of peat, cut by hand or machine, and dried in the air.

MILLED PEAT

Definition: Granulated peat produced by special machines.
Remark: Used in power stations or for briquette manufacture.

OIL SHALE

Definition: A sedimentary rock which contains organic matter in the form of kerogen.

*Explanation:*Kerogen is a waxy hydrocarbon-rich material regarded as a precursor of petroleum. Oil shale may be burned directly or processed by heating to extract shale oil.

COMPOSITION FUELS

Definition: Aggregates of fines from solid fuels with or without the addition of a binder.

PATENT FUEL

Definition: A composition fuel made by moulding hard coal fines into briquette shapes with the addition of a binding agent.

Remark: Sometimes referred to as ‘hard coal briquettes’.

Consultant’s comment

The U.S. practice of producing a ‘coal synfuel’ through treatment of coal fines by spraying with diesel fuel emulsions, pine tars, or latex without briquetting is not included here as a composition fuel is not produced. There may be a case for a new, separate fuel product if the sprayed coal differs materially from the coals used in the process but no evidence for this has been found at present.

PEAT BRIQUETTES

Definition: A fuel comprising of small blocks of dried, highly compressed peat made without a binding agent.

Remark: Used mainly as a household fuel.

Consultant's comments
The definitions make no reference to whether a fuel is primary or secondary. The only place in which these concepts are introduced is in the definition of 'Production'.

BROWN COAL BRIQUETTES

Definition: A composition fuel made of brown coal produced by briquetting under high pressure with or without the addition of a binding agent.

Remark: Either Sub-bituminous Coal or Lignite may be used including dried lignite fines and dust.

COAL COKE

Definition: The solid, cellular, infusible material remaining after the carbonisation of certain coals.

Remark: Various cokes are defined according to the type of coal carbonised and their conditions of carbonisation or use.

- Coke Oven Coke
- Gas Coke
- Coke Breeze
- Semi Cokes
- Brown Coal Coke

COKE OVEN COKE

Definition: The solid product obtained from carbonisation of coking coal at high temperature.

Remark: Coke oven coke is low in moisture and volatile matter and has the mechanical strength to support the blast furnace charge. It is used mainly in the iron and steel industry acting as heat source and chemical agent.

Consultant's comments

No references to the use of PCI in coke ovens have been found.

The comment attached to the definition for Coking Coal explains that it may indeed comprise a blend of different coals in order to achieve the desired coke quality. As defined, the use of 'coking coal' in this definition embraces a range of coals with qualities which suit the coking process.

GAS COKE

Definition: A by-product from the carbonization of bituminous coal for the manufacture of Gas Works Gas.

Remark: Gas Coke is used mainly for heating purposes.

COKE BREEZE

Definition: Coke Breeze comprises particles of coke of sizes less than 10 mm.

Remark: It is the residue from screening coke. The coke which is screened may be made from bituminous or brown coals.

Consultant's comments
Anthracite is a non-agglomerating hard coal unsuitable for coke manufacture. Bituminous is therefore appropriate.

SEMI COKES

Definition: Cokes produced by low temperature carbonization.

Remark: Note that semi cokes may be made from bituminous and brown coals and are used as a heating fuel.

Consultant's comments
As Hard Coal contains anthracite which is non-agglomerating it is better to leave bituminous in place.

BROWN COAL COKE

Definition: A solid product obtained from low temperature carbonization of brown coal.

Consultant's comments

The only references found to the manufacturing process state that briquettes are used. However, as this does not preclude the manufacture of a coke of a different quality from brown coal which is not in the form of briquettes the word 'briquettes' has been removed.

COKE OVEN BY-PRODUCTS

COKE OVEN GAS

Definition: A gas produced from coke ovens during the manufacture of Coke Oven Coke.

Consultant's comments
An umbrella category has been provided.

GAS WORKS GAS (TOWN GAS)

Definition: A gas produced from coke ovens operated for the manufacture and distribution of the gas by piped network as a heating fuel.

Remark: Sometimes known as 'Town Gas', it is similar in its characteristics to Coke Oven Gas but the manufacturing process uses coals different from those used for Coke Oven Coke.

Consultant's comments
See the covering report for an explanation for the changes here and in related products.

COAL TAR

Definition: A liquid by-product of the carbonization of coal in coke ovens.

RECOVERED GASES

Definition: Combustible gases of solid carbonaceous origin recovered from manufacturing and chemical processes of which the principal purpose is other than the production of fuel.

Explanation: Gases containing carbon monoxide resulting from the partial oxidation of carbon present as coke acting as a reductant in the process, or carbon anodes, or carbon dissolved in iron.

Remark: They may also be referred to as waste or off gases.

Consultant's comments

The definition is deliberately restricted to gases of solid carbonaceous origin because of its presence in this section dealing with Solid Fuels. There is, however, an important group of recovered gases of petroleum origin which arise from the cracking of petroleum feedstock in petrochemical works. At present energy statistics at the international level does not include them as data are not easily available. The question as to how or whether they could be introduced into the present body of definitions needs to be considered separately.

BLAST FURNACE GAS

Definition: A by-product gas of blast furnace operation.

Explanation: Its heating value arises from the carbon monoxide produced by the partial combustion of coke and other carbon bearing products in the blast furnace.

Remark: It is used to heat blast air and as a fuel in the iron and steel industry. It may also be used by other industrial plants. Note that where charcoal is used in blast furnaces part of the carbon supply may be considered renewable.

BASIC OXYGEN STEEL FURNACE GAS

Basic Oxygen Steel Furnace Gas

Definition: A by-product of the production of steel in a basic oxygen furnace. The gas is recovered as it leaves the furnace.

Remark: The gas is also known as converter gas, LD gas or BOSF gas.

OTHER RECOVERED GASES

Definition: Combustible gases of solid carbonaceous origin recovered from manufacturing and chemical processes not elsewhere defined.

Remark: Examples of fuel gas production from metals and chemicals processing are in the production of zinc, tin, lead, ferroalloys, phosphorus and silicon carbide.

Consultant's comments

The introduction of a 'primary' classification for recovered gases, which are not currently recognised within the set of definitions, could lead to classification of a gas as a primary fuel when in fact it is a secondary fuel. This would lead to double counting. In the investigations I have made to date all chemical processes which use carbon as a reductant have used a fuel (usually coke) as the reductant. The recovered gas is therefore a secondary fuel. If the quantity of the gas produced is known then the quantity of coke used can be requested or estimated and the transformation process recorded, probably under 'Other transformation'. An adjustment to the final consumption of coke would be necessary.

Umbrella categories for 'Coke Oven By-Products' and 'Recovered Gases' have been introduced and the various gases and liquids divided between them.