Background

The principal aim of the original 2004 project was to assess the potential of the UK onshore coal resources for both exploitation by conventional (mining) and new technologies and to represent this on a series of maps that would identify prospective areas. This dataset was built using GIS software by BGS to create the original cartographic paper maps and digital CD publication. The Coal for New Technologies digital data is a facsimile of the paper map created in 2004, no update to the original work on resource potential has been carried out and this data reflects the findings of the original study.

Coal-bearing strata dataset includes:

1. Coal-bearing strata at surface
2. Concealed coal-bearing strata <1200 m from surface datum
3. Concealed coal-bearing strata >1200 m from surface datum

The mining technologies dataset includes:

1. Underground and opencast mining
2. Coal mine methane (CMM)
3. Abandoned mine methane (AMM)

The new technologies dataset includes:

1. Underground coal gasification (UCG)
2. Virgin coalbed methane (VCM)
3. Coal seam-related carbon dioxide (CO_2) sequestration

The UK contains extensive resources of coal, both at surface and in the subsurface. It is estimated that onshore these surface and subsurface deposits cover an area of approximately 40 000 km². The potential for mining was mainly considered because it has a bearing on the scope for the new exploitation technologies rather than to identify resources or potential mine development areas (Jones et al, 2004[1]).

Who might require these datasets?

The coal data will be of use for companies involved in:

- Identifying coal-mining prospects
- Exploration for coalbed methane
- Exploration for underground coal gasification (although all the current licences are offshore)
- Vent gas exploration
- Potential future CO_2 sequestration projects
- Assessing infrastructure needed for coalbed methane and other gas sources
Additional data on the boreholes and depths are likely to be useful for other types of subsurface work including conventional hydrocarbon exploration and academic research. Together with the CO₂ and methane hazards reports they may also be of use to planning authorities.

**What the datasets show?**

The data are supplied as nine layers of spatial information in a GIS format:

**Coal-bearing strata**

This dataset was derived from the 1999 BGS/Coal Authority Coal Resources Map of Britain (published in paper format), including both the ‘at surface’ and ‘concealed’ areas of lignite and coal-bearing strata.

1. *Coal-Bearing Strata at Surface*. This represents the area where coal-bearing strata could be expected to be present at the surface. In most instances, the coal-bearing strata will be buried below a thin covering of more recent superficial deposits such as drift or alluvium. There is no differentiation between the different ages of the coal-bearing strata on these maps.

2. *Concealed Coal-Bearing Strata <1200 m from Surface Datum*. This represents the area where coal-bearing strata, buried below younger strata, are present in the subsurface at depths less than 1200 m. The downdip limit is the 1200m line, drawn on the top of the coal-bearing unit. This area has potential for further underground mines, as long as suitable geology is present. In most instances, the cover rocks immediately overlying the coal-bearing strata are Permo-Triassic in age, although in Kent the Permo-Triassic is absent and the Coal Measures are overlain by younger Mesozoic strata. In some areas, e.g. South Wales, the Coal Measures are not concealed below younger strata, so the presence of coal-bearing strata is represented by the 'Coal-bearing strata at surface' pattern. It should be borne in mind that coal-bearing strata in this coalfield do continue to depths in excess of 1200 m, but they are not concealed.

3. *Concealed Coal-Bearing Strata >1200 m from Surface Datum*. This represents the area where coal-bearing strata, buried below younger strata, are present in the subsurface at depths in excess of 1200 m. The updip limit is the 1200 m line, drawn on the top of the coal-bearing unit. The downdip limit is the known extent of coal-bearing strata.

4. *Lignite at Surface*. This represents the extent of outcrop of the main lignite-bearing geological units.

**Area with technical potential for opencast working**

Areas with technical potential for opencast working is defined as an area of coal- or lignite-bearing strata containing seams with <50 m non-coal-bearing overburden. It extends to depths of 200 m below the ground surface, the normal limit of opencast workings in the UK. It excludes a small area of non-coal bearing strata at the base of the Coal Measures.

**Extent of Underground Workings with 500 m Buffer Zone**

Areas with the technical potential for underground coal mining are defined here as unmined areas where coal seams >1.5 m thick are present between depths of 200 and 1200 m. A 500 m arbitrary buffer was applied to encapsulate potential variability in our understanding of the coal-bed geometry.
at depth. However, in reality, areas with potential for underground mining must satisfy a very wide-ranging set of geological and engineering constraints that are not described in this dataset or discussed within the scope of the associated report (Jones et al, 2004[1]).

**Resource area for coal mine methane (CMM)**

Methane trapped in coal and surrounding strata can be released as a result of mining; this gas is known as Coal Mine Methane (CMM)

A CMM resource area is defined as the mining licence around a working mine with methane drainage. CMM resources have not been calculated as part of this study, but resource areas have been defined and mapped. CMM sites are identified by a shaft location for the working mine and the potential area of CMM extraction is represented by the mine licence.

**Good prospects for abandoned mine methane (AMM)**

Abandoned Mine Methane (AMM) consists of the fuel gas (mainly methane) fraction of the free gas trapped within abandoned coal mines, plus any methane that can be desorbed from the coal seams in the strata surrounding the mined seam by applying suction to the mine workings (Creedy et al 2001a[2]).

In AMM areas, methane values are known to be >1 m$^3$/tonne and the mine waters in these workings are thought to have not recovered.

**Coalbed methane (CBM) resource areas**

Coalbed methane is the methane-rich gas found naturally within coal seams. Typically, it consists of 80–95% methane, 0–8% ethane, 0–4% propane and higher hydrocarbons, 2–8% nitrogen and 0.2–6% carbon dioxide, together with traces of argon, helium and hydrogen (Creedy 1991[3]). In mines it can be explosive when mixed with air. It is known as firedamp in the mining industry.

The criteria used to define and map the location of Coalbed methane (CBM): · Coal seams greater than 0.4 m in thickness at depths >200m · Maximum depth of 1200 m · Seam gas content >1 m$^3$/tonne · 500 metres or more horizontal separation from underground coal workings · Vertical separation of 150 m above and 40 m below a previously worked seam · Vertical separation of >100 m from major aquifers, and · Vertical separation of >100 m from major unconformities · Areas with a CMM resource (current underground coal mining licences) were excluded.

**Areas with good coalbed methane (CBM) potential**

Following application of the criteria as established above, regions with potential for CBM were derived. In order to refine these CBM regions and produce a more accurate resource calculation these regions were divided into smaller areas across which the methane values are believed to be fairly consistent. These areas were defined using methane point and contoured data, available in Creedy (1986, 1988, and 1991[3]) and Wardell Armstrong (2002).

**Underground coal gasification (UCG) potential**

Underground Coal Gasification describes the process whereby combinations of air, oxygen, hydrogen and steam are injected into one or more in-situ coal seams to initiate partial combustion of the coal and liberation of further combustible gases.
Areas of Underground Coal Gasification (UCG) are subdivided into three categories:

1. **Area with good UCG potential.** This represents an area that meets all the criteria for UCG below:
   - Seams of 2 m thickness or greater
   - Seams at depths between 600 and 1200 m from the surface
   - 500 m or more horizontal and vertical separation from underground coal workings and current coal mining licences
   - Greater than 100 m vertical separation from major aquifers
   - Greater than 100 m vertical separation from major overlying unconformities

2. **Area with poor UCG potential.** This represents an area that does not meet all the criteria for UCG, specifically seams are present at suitable depths, but do not meet the required thickness of >2 m.

3. **Area with unverifiable UCG potential.** This represents an area in which coal is believed to be present at suitable depths, but borehole information is lacking. Hence the potential cannot be verified. Unverifiable areas require further investigation to determine their resource potential.

**Area greater than 1200 m from surface with potential for CO₂ sequestration**

These are defined as areas of unminable coal seams where the seams are at depths greater than 1200 m below surface and more than 500 m from known mine workings (as known in 2004). These are primary areas for potential CO₂ sequestration. Because carbon dioxide sequestration requires that CO₂ remains in place for very long time periods, areas of coal seams deemed suitable for potential mining or underground gasification are NOT suitable for CO₂ sequestration.

**References**


Retrieved from  
'http://earthwise.bgs.ac.uk/index.php?title=OR/15/055_About_the_UK_coal_resource_for_new_exploitation_technologies_dataset&oldid=31698'

**Category:**

- OR/15/055 User guide for the BGS UK Coal resource for new exploitation technologies (Version 1) Dataset