

## THE COAL PRICES, CONSUMPTION and USE

November 2009 lettre n°8-8 Dr Thomas Chaize

Coal is the fossil fuel more abundant. He enjoyed his heyday in the 19th century with the industrial revolution, but its use is still widespread despite the problems it poses to the environment. Indeed, its CO<sub>2</sub> emissions and sulfur dioxide are responsible

### I. Coal and its use.

The coal is black and organic (accumulation of plant material: trees, algae, vegetation). It is formed by the accumulation of vegetable waste in a shallow water and free air for millions of years, they ferment and grow rich in carbon. For this reason it also contains water, minerals (silica, aluminum, calcium, sulfur, chlorine, fluorine, sodium, phosphorus), gas and volatiles (methane, argon, hydrogen). More coal is subjected to time pressure and heat, and the better its thermal (less water, minerals and gas). Deposits of plants were processed as and extent of peat, lignite, bituminous coal and anthracite.

Coal is a term that covers several types of fuels (peat, lignite and coal) that have the same origin, but their processing stages are different.

**The anthracite**, coke or coal tar are varieties of coal, a coal of better quality.

**Lignite** is a coal whose calorific value is lower. It contains 50 to 60% of carbon must be dried to remove some of the water (25 to 50% humidity). Its low calorific value due to its water content, because lignite is used close to its place of production to generate electricity in power stations. Lignite has a double disadvantage: it has a lower calorific value and sulfur emissions are higher. The advantage of lignite mines is that they are often closer to the surface and more easily exploitable with opencast mining. The anthracite mines are often deeper, they often require more underground mines.

### II. Coal consumption in the world.

Graph shows the correlation between the increase in coal consumption and rising oil prices.

Until 1973, coal consumption is stable, then from the first oil shock the world consumption of coal increases, the second oil shock has the same effect on global consumption of coal.

for acid rain. In 2008, the record for the world's coal production is achieved with 6.7 billion tonnes of coal extracted from coal mines. It has never produced as much coal as now ...

**Bituminous coal** and coke has a calorific value higher with 75 to 90% carbon and 5 to 10% humidity. Bituminous coking coal, after processing in coke (removal of impurities and addition of oil) is used for reducing iron ore and ferroalloys, in blast furnaces for making steel. It is also used in power stations to generate steam and electricity. It is rivaled in this by using natural gas produces less CO<sub>2</sub> emissions.

**Anthracite** coal is the hardest, it has the calorific value as high and contains 93 to 97% carbon and less than 5% moisture. Anthracite is used for heating or for the production of steel. Ash and volatile matter, it also diminishes the quality of coal?

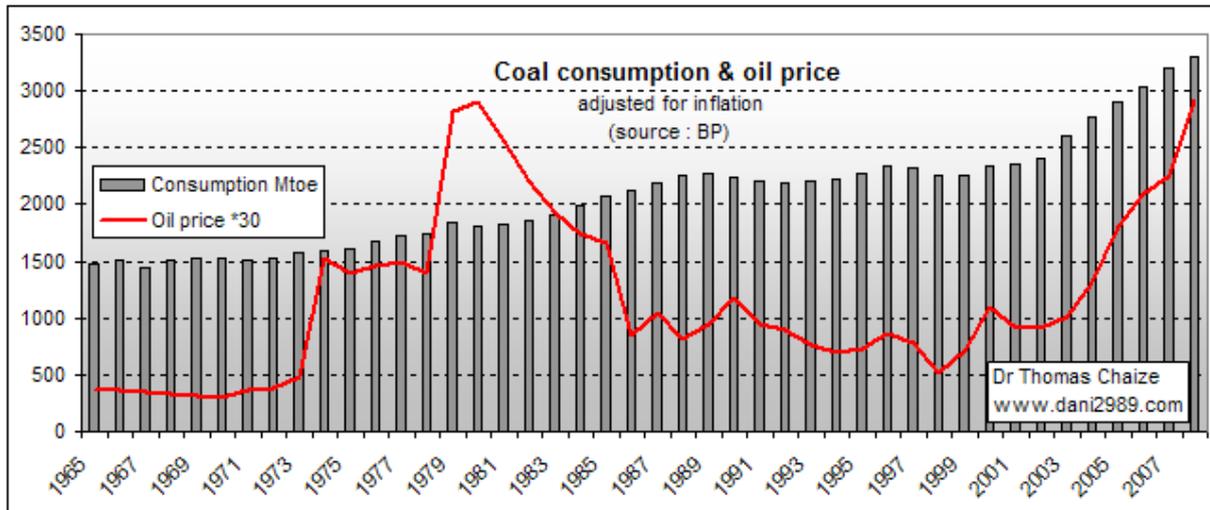
The purest form of carbon gives the diamond. And its most stable form gives graphite.

Coal is used for half of the electricity generation in coal power plants. The steel industry consumes 15%, cement 5%, heating 15%, domestic heating 5% and the rest (11%) is used by industry (eg Carbochemistry).

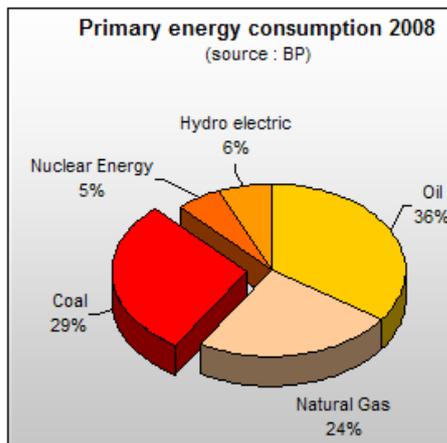
Coal can be converted into synthetic fuel using the Fischer-Tropsch (CTL, coal to liquids), but costs and CO<sub>2</sub> emissions are still too high for widespread use. Methane to cause deadly accidents (the scope of grizou) can be exploited if the conditions of coal deposits are suitable (bed methane gas).

Burning coal releases into the atmosphere of sulfur, nitrogen oxide and greenhouse gas emissions. Solution of burial and sequestration of CO<sub>2</sub> is still not operational solutions to air pollution of coal.

Between 1986 and 2000, oil price stays at a very low level. During this period, coal consumption has stagnated with the price of oil, then in 2000, with rising oil prices the world's coal consumption is rising sharply, even more brutal than in the first and second oil shocks. Thus there is strong correlation between oil prices and coal consumption.



Coal is the second source of primary energy in the world after oil (36%). In 2008, 29% of primary energy consumed in the world originates from coal. Nuclear power (5%) and hydropower (6%) are far behind.

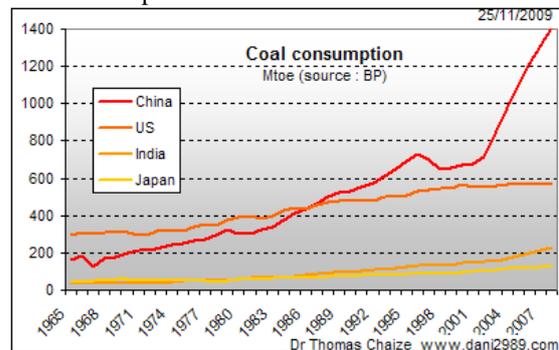


Coal consumption in China accounts for 42.4% of global consumption of coal with a coal consumption of 1406 Mtoe in 2008 (million tonnes oil equivalent). Coal consumption in China has doubled in 6 years and has increased 10% from 2007 to 2008. The United States is the second largest consumer of coal in the world with 565 Mtoe (17%). India is third with 231 Mtoe (7%), followed by Japan (3.8%), South Africa (3.1%) and Russia (3%). These seven countries account for three quarters of world consumption of coal in the world.

### III. Price of coal

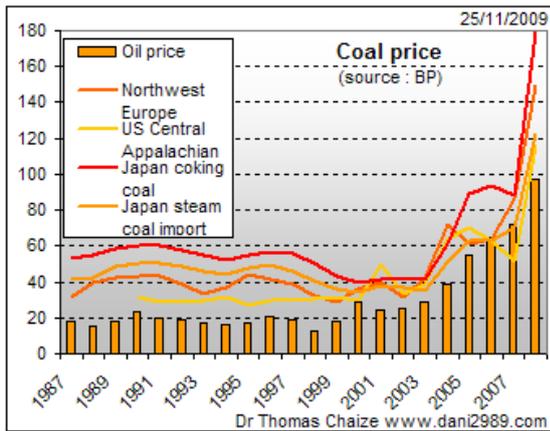
The price of coal or coal (houille) can vary up to threefold depending on if it's brown coal, coking coal and anthracite. Place of production is important, if coal has to travel 7 000 kilometers to

Growth of India and China will continue to weigh on consumption of coal. Japanese steel will continue to need coal coke, and Russia has chosen to focus its consumption of coal to export its natural gas. Only the production of USA seems to stagnate in recent years. South Africa, which is an exporter of coal, is already now choose between export and consumption for its own electricity supply and the country's mines electricity pending the construction of a nuclear plant.



If one makes the parallel between coal consumption and population, the U.S. ahead of China with 1.9 tonnes of oil equivalent of coal consumed per inhabitant per year, 1.1 for China, 1 in Japan and 0.2 for the India. An American consumes nearly twice as much coal per year that Chinese and 9 times more than India.

the consumer that will increase its cost. For this reason, you have some graphs with different coal prices, or origin and (or) geographic destination of coal are shown.



On this chart the price of coal, we can see that there is a strong correlation between price of a barrel of oil and the price per ton of coal. As for price of a pound of [uranium](#) per cubic foot of [gas natural](#) per

Coal, because of the pollution it generates is discreet, so unobtrusive that it seems to have disappeared with the steam trains. Yet it is the second source of primary energy in the world and it might even become one with the drop in oil production. From the [first and second oil crisis](#), and since 2000, rising oil prices have consistently

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ton of coal is strongly linked to the price of a barrel of oil. When we look in detail at the price of coal, we find that the price of coking coal (high quality: bituminous and anthracite) has increased over the period from 2000 to 2008 that the steam coal (lower quality: sub-bituminous). For example, the U.S. price of coking coal increased by 154% while steam coal has increased by 70.9%. In Poland, coal coke increased by 580% and steam coal to 279%. In India from 2000 to 2007, rising coking coal was 81% and steam coal by 38%. Unfortunately, I can not give you figures for China because they are not available. However, I think the trend is the same quality coal (coke or charcoal) rises faster than low-grade coal (lignite coal or steam). This raises many questions which I will elaborate in a forthcoming issue on coal.

resulted in an increase in consumption and price of coal. With [peak oil](#), [growth in China](#) and Asia, [rising global demand for electricity](#) and the upside potential of the Indian consumption, demand and price for **coal quality** will remain high for years ahead.