talk about **coal**

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Facts on Coal

Quick Facts

Coal is the world's most plentiful fossil fuel and is widely distributed around the world. It is a mineral formed from the remains of land-based plants buried hundreds of millions of years ago then subjected to tremendous heat and pressure (referred to as coalification).

Coal consists of a complex range of materials and varies greatly in quality from deposit to deposit, depending on the varying types of vegetation from which the coal originated, the temperatures and pressures exerted on the deposit, and the length of time the coal has been forming.

Coal is classified according to the degree of transformation of the original plant material into carbon, ranging from anthracite – the hardest – down through bituminous, sub-bituminous and lignite, also known as brown coal. The coal mined in Alberta is primarily bituminous or sub-bituminous.

Canada places within the top 15 in the world in total proven coal reserves. Alberta's sedimentary basins contain an estimated 70 per cent of these coal reserves and produce about half of the coal currently mined in the country each year.

The Alberta Energy Resources Conservation Board (ERCB) estimates about 33.6 billion tonnes of established reserves of all types of coal remain in Alberta, an amount that will meet today's level of demand for several centuries. This coal contains more than twice the energy of all the province's other conventional non-renewable energy resources, including oil, natural gas and oil sands.

Today, coal remains an enormously important fuel because it generates the largest single source of electricity worldwide, helps produce over 70 per cent of the world's steel, and is used by other industrial processes like cement manufacturing.

Over the years, with the use of advanced technology, there have been dramatic changes in the processing and uses of coal, thereby positioning coal as a higher value energy source.

In the future, technology, including emissions management technology, will allow coal to continue to provide a significant contribution in areas such as power generation and the provision of chemical feed-stocks.

The Past

Coal has been used as a fuel since about 1000 B.C. Although it is abundant in most parts of the world, it was not used extensively for fuel until the industrial revolution.

Over 1800 coal mines have operated in Alberta since the 1800s.

In the 1860s coal mining began near the then future site of Lethbridge. In 1882 Alexander Galt began mining coal in Lethbridge to supply the Canadian Pacific Railway (CPR).

During World War I, up to 10 mines operated in the Lethbridge area, with the last mine closing in 1957. The first mine in Edmonton began operating in 1883.

By the turn of the century several mines extracted coal from thick seams exposed in the North Saskatchewan River valley.

Some of the earliest mining in Alberta was within what is now Banff National Park. Coal was mined at Bankhead, a community just a few miles east of the Banff town site, to supply the CPR. Coal mining soon moved to Canmore where a coal mine operated for 80 years. The Crowsnest Pass in southern Alberta was a coal mining centre that supplied coal to the CPR.

A similar role was established in west-central Alberta for an area known as the "Coal Branch". In this area south of Hinton, a number of mines and towns developed to supply coal to the Grand Trunk and Canadian National Railways. The towns of Nordegg and Grande Cache were also developed for the purpose of coal mining.

The Present

The majority of the coal in Alberta is owned by the Alberta Crown. However, there is also freehold ownership of coal (owned by private individuals and companies or held by the federal government in National Parks or Indian Reserves). In a typical year, 50 to 60 per cent of Alberta's mined coal is extracted from Crown leases, the rest from privately owned leases.

In 2009, Alberta produced 31 million tonnes of marketable coal. Around 73 per cent is used in electricity generation facilities. The remainder is exported to Asia - mainly to Japan and South Korea.

Coal Mining in Alberta

Most Alberta coal is produced by surface mining, either strip mining or open pit. In strip mining, when extraction is completed, overburden is replaced creating a landscape which is often better suited to agricultural or recreational uses than the original land. Strip mining is only a temporary use of land and continuing reclamation programs return the land to full productivity in only a few years.

Open pit mining is used most often in the mountainous areas. When a pit is abandoned, final reclamation is carried out.

Some coal that is too deep for economic recovery using surface mining technology employs underground mining techniques.

The coal mine at Grande Cache has underground operations.

Newest of techniques now emerging in Alberta is underground coal gasification often referred to as UCG.

UCG is an *in-situ* gasification process carried out in non-mined coal seams using injection of oxidants, and bringing the product gas to surface through production wells drilled from the surface. The product gas could be used as a chemical feedstock or as fuel for power generation. The technique can be applied to resources that are otherwise not economical to extract and also offers an alternative to conventional coal mining methods for some resources. Compared to traditional coal mining and gasification, UCG has less of an environmental footprint and social impact.

The Future

Worldwide, the use of coal as an energy source remains crucial to the economies of many developed and developing countries. Particularly with the latter, as industrialization and urbanization spread and national energy requirements soar, and as clean coal technologies are proven and become economically commercial, coal looks set to retain its position as a secure, reliable source of energy, particularly for the generation of electricity.

The energy systems of tomorrow will rely on a mix of advanced, clean and efficient technologies for energy use and supply. In order to reduce its environmental impact, development and application of Clean Coal Technologies (CCTs), designed to convert coal to a cleaner source of energy, should continue.

Further development of CCTs will lead to a number of technology options that will eliminate or reduce atmospheric emissions that currently are of concern.

Alberta Innovates - Energy and Environment Solutions works with industry, universities, and federal and provincial research agencies to pursue the goal of identifying and adopting the best, most environmentally sound technologies that may be employed to produce and use Alberta coal and coal products. Additional information about Alberta Innovates - Energy and Environment Solutions is available at www.albertainnovates.ca/energy

For more information on the coal industry, please visit www.coal.ca or www.coalminer.ca