COAL ECONOMICS

IN THIS MODULE

ECONOMICS

COAL MEANS BUSINESS IN CANADA

Canada's coal industry is like an invisible giant: it's huge, but we don't even notice it. The fact is, coal mining exists in Canada on a massive scale. Coal is Canada's single-most valuable export to Japan. It's mined by the world's largest land machines and hauled in some of the biggest trucks in the world. Coal trains of up to 125 cars in length can handle over 13,000 tonnes of coal per trip. The majority of the electricity in Alberta, Saskatchewan and Nova Scotia is generated from coal and the industry creates jobs across the country, directly enriching Canada's economy by $5 billion every year.

ENERGY, STEEL AND MORE

ONE RESOURCE WITH MANY USEFUL FUNCTIONS

Coal's major use worldwide is for the generation of electricity. Coal is burned in power plants to produce steam in huge boilers*. The steam drives turbines that in turn generate electric power.

Coal's second-largest use is for the manufacture of steel. Metallurgical or coking coal is converted into coke* by heating the coal to 700 C. These extreme temperatures separate out the gases and purify the coal into the porous, rocklike coke that is used in the steelmaking process.

Coal is also an important source of energy for heating and industrial processes such as cement making and pulp and paper manufacturing. New technologies enable coal to be processed into liquid fuels—like gasoline and diesel fuel—and into feedstock* for chemical industries. Until recently, it had been more cost-efficient to produce these fuels and feedstock from petroleum products like crude oil and natural gas. However, as petroleum reserves shrink, crude oil and natural gas prices will likely increase. Coal may become the economically viable alternative.

Coal is primarily used for generating electricity and manufacturing steel, but it can also be made into fuels and chemical feedstocks.

Draglines* like this are the largest earth-moving machines in the world. It dwarfs the men and the truck on the ground.

* See Glossary

A RICH HISTORY

WITH AN EVEN RICHER FUTURE

Coal has been around for so long, it's easy to take it for granted. After all, the early inhabitants of Wales burned coal in their campfires 4,000 years ago and the Chinese were using coal in 100 BCE*.

In 300 BCE, the Greek philosopher Theophrastus described how blacksmiths burned a black substance that was quite different from the charcoal that came from wood. Here in North America, the Pueblo Indians in the southwest United States used coal in the 1200s to fire their ceramic pots and utensils.

The Pueblo Indians in the southwest United States used coal in the 1200s to fire their ceramic pots and utensils.

Around the same time, coal was being mined in parts of Europe, although wood was the preferred fuel. So it remained until European forests were depleted in the 1600s.

The switch to coal was led by Britain. During the 1700s and 1800s, this small island nation produced 80 per cent of the world's coal. Because it was the fuel of choice for heat and energy, coal use expanded significantly. This growth was given a huge boost in 1709 when industry learned how to use coke to make steel. This new steelmaking process helped drive the Industrial Revolution.

In 1711, a coal-fired steam engine in Cornwall, England, proved that machine power was much more productive than human power. That small engine became the prototype for larger coal-driven steam engines that literally revolutionized industry. Factories sprang up, railways spread across the land and coal-fired steamships soon dominated the seas.

This industrial growth created a huge demand for steel. By 1877, advances in steelmaking technologies made coke an essential component of the process, a role that it has maintained to this day.

As the largest moving man-made object of its day, the Titanic was powered by huge 15,000-horsepower steam-driven engines. The incredible amount of steam required to power these engines came from boilers heated by 162 coal-fired furnaces. These furnaces had to be fed continuously and it took 160 stokers, working in shifts, to shovel as much as 600 tonnes of coal a day.

* See Glossary

CHANGE IS GOOD

HOW COAL HELPED BUILD A MODERN AND PROSPEROUS NATION

Coal was one of the key building blocks in the economic foundation of Canada. By providing jobs, energy, industry and export sales, coal helped the country develop into an industrialized nation.

The first coal mine in Canada opened in 1639 in Grand Lake, New Brunswick. However, mining on a commercial basis did not begin until 1720. That's when the mine at Port Morien, Cape Breton Island, Nova Scotia, began producing coal for the French fortress at Louisburg. In 1763, New France passed into British hands and the Port Morien mine was expanded to supply coal to the British fort at Halifax.

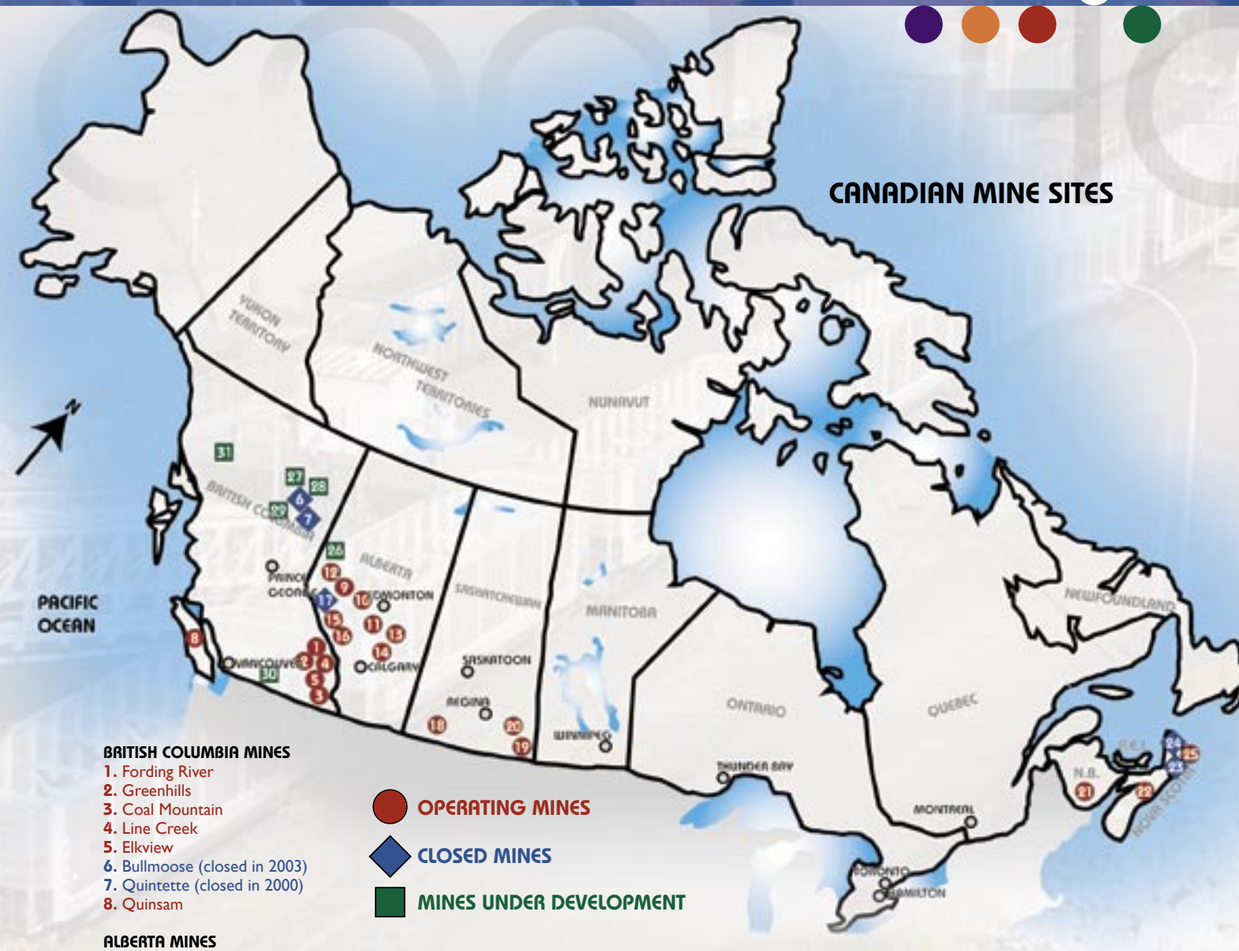
Coal production increased in the 1800s when the United States began to import Nova Scotia coal to power steamships. By 1870, there were 21 coal mines operating in Nova Scotia. In 1893, a number of small Nova Scotia mining companies consolidated to form the Dominion Coal Company.

In western Canada, coal mining began on Vancouver Island in 1836. The Hudson's Bay post in Victoria needed coal, as did the new steamships sailing the Pacific coastal waters. The California gold rush attracted new settlers to the coast and coal mining expanded to meet their needs. From 1836 to 1962, the mines around Nanaimo on Vancouver Island produced 72 million tonnes of coal.

In the prairie provinces, coal mining followed on the heels of the settlers who came after the railroad's expansion across the country. The first coal mine in Manitoba opened in 1890. Saskatchewan opened its first underground mine in 1891 at Roche Percée, near Estevan. In the early 1900s, Saskatchewan coal was being used to produce "smokeless fuel" briquettes*, pitch* and methane* gas. By 1930, Saskatchewan had a coal-fired electricity plant, and underground mining had given way to surface strip mines.

In the early days of the coal industry, all mining was done by hand. It was hard, dirty and dangerous work. Miners laboured underground with shovels and picks. The coal was loaded into shuttle cars and pulled to the surface by manpower, pit ponies or mules.

* See Glossary



BRITISH COLUMBIA MINES
1. Fording River
2. Greenhills
3. Coal Mountain
4. Line Creek
5. Elkview
6. Bullmoose (closed in 2003)
7. Quintette (closed in 2000)
8. Quinsam

ALBERTA MINES
9. Highvale
10. Whitewood
11. Genesee
12. Obed Mountain
13. Paintearth
14. Sheerness
15. Cardinal River Coal
16. Coal Valley
17. Gregg River (closed in 2000)

SASKATCHEWAN MINES
18. Poplar River
19. Bienfait
20. Boundary Dam

NEW BRUNSWICK MINES
21. Salmon Harbour

NOVA SCOTIA MINES
22. Pioneer
23. Phalen (closed in 1999)
24. Prince (closed in 2001)
25. Brogan

UNDER DEVELOPMENT
26. Grande Cache
27. Willow Creek
28. Burnt River
29. Wolverine
30. Tulameen
31. Mount Klappan

Map Source: The Coal Association of Canada • 2003

In Alberta, coal was first mined near Edmonton as early as 1850. Commercial coal operations were started in Lethbridge in 1874 and in Canmore in 1886. Because of Alberta's rich deposits, coal mining spread across the province, creating many mining communities. Mining was particularly active in the Crowsnest Pass region of southern Alberta and the Coal Branch region near Hinton. These original coal mining communities were the foundation of Alberta's coal industry, which is Canada's largest in terms of annual coal production.

In southeastern British Columbia, the Elk Valley region has been a major mining centre for over a century. The Hudson's Bay Company first discovered coal there in 1873, but mining did not start until the rail line was completed in 1898. Then the area boomed with over a dozen coal companies operating underground mines. Workers were paid according to the amount of coal they could dig using picks and explosives. The coal was sent to nearby coking ovens and shipped to Montana and Washington for use as domestic fuel. Today, there are five open-pit mines operating in the area.

In northeastern British Columbia, the "Northeast Coal Project" included the development of the Bullmoose and Quintette operations in 1983. The town of Tumbler Ridge was developed nearby to provide housing and services for the employees of these open-pit metallurgical coal mines. The Quintette mine was closed in 2000.

COAL'S UPS AND DOWNS

HOW COAL HAS SURVIVED AND THRIVED IN CANADA FOR OVER 100 YEARS

In Canada, many homes were heated with coal in the 1800s. Coal was also used to power steam engines in ships, locomotives and factories. By 1885, several cities including Toronto, Ontario and Montréal, Québec, had installed small coal-fired power stations to produce electricity for street lighting, streetcars and factories.

Coal kept its role as the leading industrial fuel throughout the 1930s. During World War II, the demand for Canadian coal soared to support the war effort. Shortly thereafter, however, major reserves of crude oil were discovered in Alberta and Canada's energy mix* changed dramatically. In 1946, railways were the largest consumers of coal. By 1960 they consumed none; all locomotives were fueled by diesel. In 1950, coal contributed more than 50 per cent of Canada's energy supply. By 1960, coal's share had dropped to 20 per cent.

Fortunately for the coal industry, just as petroleum was taking over domestic energy markets, Japan came shopping for coal for its steelmaking industry. At about the same time, electrical utilities began building coal-fired power stations in Alberta to take advantage of its abundant and affordable thermal coal* reserves. The coal industry began its comeback. In 1960, Canada mined 11 million tonnes of coal. In 1979, it mined 33 million tonnes. In 2001, production stood at over 70 million tonnes.

Today, coal is used to generate electricity in six provinces: Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick and Nova Scotia. In 2001, Canada consumed 60 million tonnes of coal. Of that, 90 per cent went into electrical generation. The balance went into steelmaking and other industries like cement manufacturing, charcoal briquettes and pulp and paper.

State-of-the-art computer controls ensure that coal-fired power plants operate as efficiently as possible.

Hanging on tight to Canada's export markets. **Canada's export-coal business began in 1968 with an order from Japan for high-quality metallurgical coal*. Until then, Japan had been using its own coal and supplementing it with imports from the People's Republic of China. When a dispute between the two countries halted coal shipments, Japan chose to buy from Canada.**

This turned out to be very good for Canada. Japan underwent a period of rapid industrialization and its steel industry required increasing amounts of coal. By the late 1990s, Japan was importing over 18 million tonnes of Canadian coal. South Korea and other steelmaking nations were also attracted to Canadian coal because of its diversity, quality and competitive pricing.

Since 1968, Canada managed to increase its share of the export coal market. In 1980, Canada supplied one per cent of the world's thermal coal and 11 per cent of the market for metallurgical coal. By 2001, Canada's share of the thermal market increased to two per cent and our metallurgical market share grew to 15 per cent.

* See Glossary

MODERN DANCE

LEARN TODAY'S COAL INDUSTRY IN SIX EASY STEPS

There's much more to today's coal industry than mining. In fact, there are six major stages in the industry. Each stage contributes to the economy, providing jobs, paying fees and taxes, and buying support services.

Every year, Canada's coal industry spends over $1.2 billion to purchase machinery, goods and services, and to pay license fees, royalties, income and sales taxes.

1. The first stage is exploration. At this stage, new coal deposits and existing coalfields are identified, qualified and quantified. Though the direct economic impact of exploration activities is quite modest, its long-term potential is impressive when the future value of new deposits, mining operations and revenues are considered.

2. At the development stage, social, economic, logistical and environmental plans are prepared and reviewed by various stakeholders. These plans are designed with input from local residents, environmental agencies, government departments, corporate managers and consultants. This input helps ensure that the construction and operation of mines are sensitive to stakeholders' needs.

The direct economic contribution of the development of a coal mine is very significant. Start-up and construction of a new or expanded mining operation can cost hundreds of millions of dollars.

3. The mining stage, which includes coal extraction and land reclamation, is an undertaking of staggering proportions. With almost all of the jobs, much of the investment and most of the operating costs occurring at this stage, mining is the economic heart of the coal industry.

4. The coal processing stage is often an extension of mining, as it is performed near the mine site before the coal is transported elsewhere. In Canada, processing usually involves crushing the coal into smaller pieces and removing the impurities. This process makes for easier handling and shipping. Coal bound for export is sprayed with a dust suppressant to minimize coal dust while the coal is being transported by train to port.

5. While long-distance transportation is not controlled by coal producers, export coal volumes are so large that very close relationships with railways and port facilities are needed to coordinate the timely delivery of coal to markets. On average, the industry pays approximately $660 million a year to Canadian railways and ship loaders to cover transportation costs and the loading of ocean-going vessels.

At strip mines, where thermal coal is mined for nearby power plants, transportation is usually coordinated with the local utility company. Because the mine is usually close to the power plant, coal is transported with trucks and conveyor systems.

6. Finally, there are the end users. Because most steelmakers, industrial coal users and many power plant operators are so closely tied to coal, they are considered part of the coal industry. By using coal in their processes, steelmakers, power generation companies, cement makers and pulp and paper manufacturers extend coal's value-added contributions to Canada in two ways. First, as buyers, they purchase an average of $5 billion of Canadian coal every year. Second, using coal, they produce the steel, electricity, cement and paper we use in our daily lives.

BRAWN GIVES WAY TO BRAINS

CAREERS IN COAL CALL FOR CONTINUOUS LEARNING

Computerized automation, state-of-the-moment technologies, an increased emphasis on environmental protection and a very competitive marketplace characterize today's coal industry.

Productivity has increased significantly because mining companies now use sophisticated heavy equipment to extract coal. Production personnel have become highly efficient operators of very complicated and powerful equipment and machinery. Increasingly, coal industry employees are using computer technology to control their vehicles, operate plant systems and perform administrative functions. They work closely with engineers and other specialists to ensure their work is safe and that it is performed in an environmentally responsible manner.

These sophisticated systems demand more from employees than ever before. New job applicants must have good literacy skills so they can read and understand complex operating and training manuals. The number of positions requiring a technical college or university education is continually increasing.

Because of the growing demand for skills, employees within the coal industry are encouraged to participate in ongoing training and development programs. Such programs are linked to advancement for operators, tradespeople and engineers. Most supervisory and management positions in the industry are held by employees with at least some post-secondary education. University degrees are strongly recommended for those who want to advance to senior management positions.

Today's successful coal industry employees put their brains, not their backs, into their work.

TYPICAL CANADIAN COAL INDUSTRY EDUCATIONAL REQUIREMENTS

POSITION/FUNCTION	SECONDARY SCHOOL	COMMUNITY/TECHNICAL COLLEGE DIPLOMA OR APPRENTICESHIP	UNIVERSITY DEGREE
Labourers	Diploma		
Heavy Equipment Operators	Some	Apprenticeship Preferred	
Clerical/Computer Operators	Diploma	Preferred	
Trades (Mechanics, Electricians, Welders, Machinists, Millwrights)	Minimum Grade 9	Apprenticeship Required	
Technologists (Mine/ Survey/Environment/ Geology)	Diploma	Diploma Required	
Buyers/Purchasing Agents	Diploma	Diploma	May be required for some positions
Material Handlers	Some		
Truck Drivers	Some		
Crane Operators	Some	Apprenticeship Required	
Drillers/Blasters Surface Mining	Some		
Accounting		Diploma	Preferred
Information Services		Diploma	Preferred
Foremen/Supervisory	Diploma	Preferred	May be required
Human Resources Series	Diploma	Preferred	
Geological Engineer			Degree
Mining Engineer			Degree

HIGH-TECH TIMES

SKILLS AND TRAINING NEEDED IN TODAY'S COAL INDUSTRY

The coal industry directly employs over 4,200 Canadians in a wide range of well-paid occupations. The positions can be sorted into four general categories:

- Earth and environmental sciences;
- Technical services;
- Operations; and
- Administration and marketing.

Salvaged top soil is inspected and monitored at a strip mine in Alberta. The top soil will be used in reclamation activities.

EARTH AND ENVIRONMENTAL SCIENCES

The earth and environmental sciences employ geologists and environmental specialists. Their roles are to locate the coal seams and ensure the mining processes employed minimize environmental impact.

GEOLOGISTS locate and evaluate coal deposits. They identify mineable coal reserves using drilling and advanced technologies in geophysics*, and by creating sophisticated three-dimensional computer models that define the shape, size and quality of the coal seams to be mined. They then provide information to help recover coal reserves by increasing mining and processing efficiencies, while maintaining product quality.

ENVIRONMENTAL SPECIALISTS have post-secondary degrees in biology, soils, agriculture or forestry. They help the Canadian coal industry follow some of the highest environmental standards in the world. Their work focuses on protecting the land and wildlife, as well as monitoring water and air quality.

This geologist is assessing the quality of the coal deposit at a mine in Alberta.

Environmental specialists are intimately involved throughout the entire mining cycle. They analyze development plans to identify the potential impacts on wildlife, vegetation, water, soil, air and surrounding communities. They also monitor operations to ensure that environmental standards are met. Finally, they work to restore each mine site to a productive state for agriculture, forestry, wildlife habitat, recreation and other accepted uses.

* See Glossary

Operations, administration and marketing are driven by high-tech devices, from Global Positioning System* (GPS) navigational technology to Internet marketing tools.

TECHNICAL SERVICES

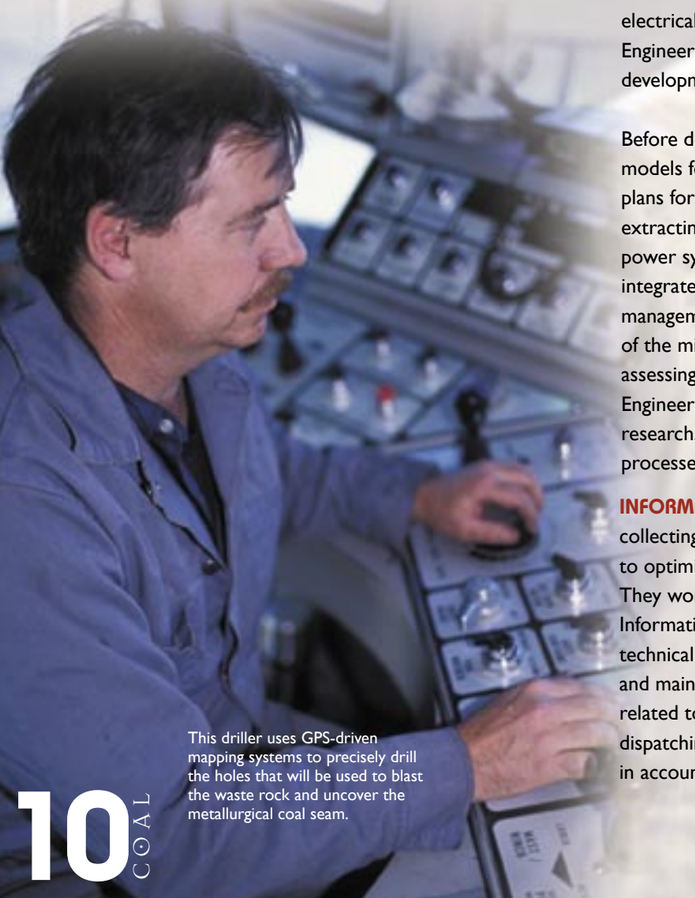
Technical services professionals include engineers and information systems specialists. They work to maximize mine safety, efficiency and production by applying the latest technological processes.

Coal industry **engineers** specialize in such fields as mining, electrical, mechanical, civil and computer engineering. Engineers are directly involved in all stages of mine development and technical operations.

Before development can begin, engineers evaluate geological models for technical and economic viability. They develop plans for mining and materials handling, and processes for extracting, loading and hauling coal. They design roadways, power systems and processing facilities. Engineers then integrate all these operations with plans for reclamation and management of water and air quality. Throughout the life of the mine, engineers are responsible for monitoring and assessing all construction and production activities. Engineers also participate in equipment maintenance, research, marketing, management and regulatory approval processes.

INFORMATION SYSTEMS SPECIALISTS are responsible for collecting, managing and organizing the information needed to optimize productivity and efficiency in the coal industry. They work at the mine site or in the corporate offices. Information systems personnel tend to specialize in either technical or commercial systems. The technical group installs and maintains computer hardware and performs services related to functions like mine planning, equipment dispatching and surveying. The commercial group specializes in accounting and administration.

* See Glossary



This driller uses GPS-driven mapping systems to precisely drill the holes that will be used to blast the waste rock and uncover the metallurgical coal seam.

OPERATIONS

Operations employees, the frontline workers at the mine site, fall into three broad categories:

- Equipment operators;
- Skilled tradespeople; and
- Supervisors.

EQUIPMENT OPERATORS run the heavy equipment that is used to recover, load and transport coal. This includes draglines, shovels, scrapers, bulldozers and haul trucks. In coal processing plants, specialized personnel working in automated control rooms and on the plant floor monitor and control the equipment used to crush, wash and dry the coal. They are also responsible for loading the coal into the unit trains.

SKILLED TRADESPEOPLE—including electricians, heavy-duty mechanics and welders—are vital to the operation of every mine. Tradespeople must have college training in combination with their apprenticeship, particularly in the trades of heavy-duty mechanics, welders, electricians, machinists and millwrights. Their contributions are so important, the coal industry often works with colleges to ensure that training programs are tailored to the mining industry's specific needs.

Traditionally, mine **supervisory** positions were filled by operators and tradespeople who were promoted because they had demonstrated strong leadership and management skills. But times are changing. The tendency today is to fill supervisory positions with operations or engineering professionals with post-secondary qualifications. Graduates of universities or technical schools now hold almost all senior mine management positions.

ADMINISTRATION AND MARKETING

As in most industries, coal company **administrative** personnel support those directly involved in the coal production. This administrative group monitors and manages the business side of the mining industry. Accountants oversee revenue and expenditures. Human resource professionals manage personnel matters. Safety officers and other specialists provide training in industry procedures. Legal, transportation and public affairs also fall into this category. Senior managers and executives come from a variety of professional backgrounds, with engineering and accounting being the most common.

The **marketing** segment of the coal industry is a small, specialized group with a very big responsibility. Their role is to identify customers and negotiate sales agreements for the coal produced by their company. To accomplish this, marketers must find international customers for nearly half of all the coal produced in Canada. Their job is challenging, but is made easier because of the quality and value of Canada's coal products.

EXPORT AWAY, BENEFIT AT HOME

COAL EXPORTS ADD SIGNIFICANT ECONOMIC BENEFITS IN CANADA

A great many benefits have been derived from Canada's participation in the worldwide coal market. For example, coal exports have led to the creation of one of the world's most advanced systems for hauling coal over long distances and through mountainous terrain. Almost half of Canada's coal is transported by rail, either 1,200 kilometres from mines in British Columbia and Alberta to the West Coast, or 2,300 kilometres to Thunder Bay for shipment to southern Ontario or the United States.

Canada's export coal trade provided the impetus for the expansion and development of new mines in British Columbia and in the mountains and foothills of western Alberta.

Unit trains are the most efficient way of transporting vast quantities of coal across Canada

Canada's four coal terminals provide an efficient gateway to international coal customers. Neptune Terminals are located in the Port of Vancouver.

Trains as long as two kilometres, with up to 125 rail cars, can be loaded with 13,750 tonnes of coal in less than four hours. These unit trains can make a trip from a mine in southeastern British Columbia to the West Coast and back in just four days. Unit trains bound for Thunder Bay, Ontario make the return trip in less than six days.

This efficient train system contributes to Canada's competitive position because it gives us one of the lowest transportation costs in the world.

Coal exports have also led to the modernization of Canada's ports. Updated loading facilities can now manage millions of tonnes of coal every year. Westshore Terminals, at Roberts Bank near Vancouver, British Columbia, was expanded to enable the facility to load up to 9,000 tonnes of coal onto ships every hour. This terminal alone can now handle up to 26 million tonnes of coal a year.

Two other British Columbia ports, Neptune Bulk Terminals in the Port of Vancouver and Ridley Terminals at Prince Rupert, have similar facilities for handling coal. Neptune can load seven million tonnes of coal a year, while Ridley has a 12-million tonne capacity.

Thunder Bay Terminals can handle up to 11 million tonnes a year. Currently, about one million tonnes of coal are loaded onto bulk carrier vessels that sail the Great Lakes. This coal is delivered to Canadian and U.S. steel plants. The terminal also handles lignite coal from Saskatchewan, which is delivered to the nearby Thunder Bay and Atikokan power stations.

COAL'S FUTURE IS BRIGHT

ABUNDANT SUPPLIES, INNOVATIVE PRACTICES AND ADVANCED TECHNOLOGIES

Canada has over eight billion tonnes of proven coal reserves. Large deposits are located in British Columbia, Alberta and Saskatchewan, with smaller amounts in Nova Scotia and New Brunswick. There is more energy contained in these reserves than in all of Canada's crude oil, natural gas and oil sands combined. This abundance makes coal a reliable, long-term fuel source for both domestic and export purposes.

The abundance of coal gives it an overwhelming advantage over other fossil fuels. While world petroleum reserves are measured in decades, coal reserves are measured in centuries.

But coal is not important just to Canada. By the year 2020, coal could overtake crude oil as the world's most important source of energy. In fact, on a global basis, coal is the world's most abundant fossil fuel. Though estimates of proven reserves of fossil fuels—coal, crude oil and natural gas—vary considerably, there is general agreement that coal is by far the most plentiful. One recent study put global coal reserves at one trillion tonnes, enough to last 235 years at current rates of consumption. Another study estimated the life of coal reserves at 1,500 years. These same studies estimate that crude oil will only last for another 40 to 60 years and natural gas will be gone within 70 to 120 years.

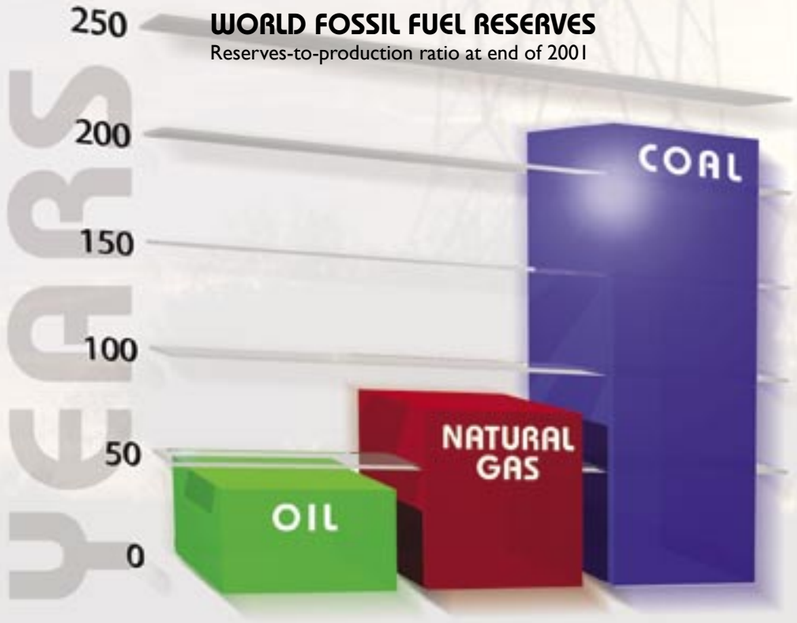
$2 billion is big business. That's what coal exports contribute to our economy, every year. In 2001, Canada exported 30 million tonnes of coal, which represents 43 per cent of our total production. Over 35 per cent of Canada's coal—11 million tonnes—was shipped to Japan. Our next largest coal customer is South Korea, which purchased five million tonnes in 2001.

Most of Canada's export coal is metallurgical, used to make coke for the steel industry. In 2001, 90 per cent—27 million tonnes—of our coal exports were metallurgical. In the same year, thermal coal exports were three million tonnes.

On top of coal's ample reserves, its attractiveness is enhanced by the fact that coal deposits are relatively evenly distributed around the world. The ease of access and relatively low cost make coal the fuel of choice in many countries. Indeed, in some places, coal is the only realistic option because of its economical availability. As a result, countries around the world continue to build and expand their systems and facilities that rely on coal.

WORLD FOSSIL FUEL RESERVES

Reserves-to-production ratio at end of 2001



The world's reserves-to-production ratio for coal is nearly six times that for oil and four times that for natural gas.

Chart Source: BP Statistical Review of World Energy • 2002

It may seem like selling coal into such a coal-dependent market would be easy. But the worldwide coal market is complex. Competition for market share has become very fierce. Low-cost producers in Australia and South Africa are aggressively competing with Canadian producers. To complicate matters further, changing levels of demand and the cyclical nature of world steel production cause fluctuations in the world market. These fluctuations create challenges for the Canadian coal industry. For example, when Asia's economy crashed in 1997, Canadian coal producers had to take decisive steps to stay competitive. That Canadian coal producers have been able to hold onto their international customers is proof of their innovative and efficient strategies.

Coal is currently used to produce 70 per cent of the world's steel and over 35 per cent of the world's electricity. Demand for electricity is growing rapidly and this growth is expected to increase demand for thermal coal.

The good news is that demand for coal continues to grow. For example, China's annual coal consumption has recently grown from 1.2 to 1.5 billion tonnes—a 25 per cent increase. China's consumption is expected to continue to increase as the country turns to coal in lieu of more expensive oil and natural gas. Other countries, including India, Brazil, Poland, Ukraine, as well as countries in the Middle East, are also looking at coal to help meet their electricity needs.

As a result, Canada's coal future is looking very bright. World markets for thermal coal for electrical power are growing and demand for metallurgical coal is expected to remain steady well into the future. With abundant supplies, efficient processes and skilled personnel, Canada is well-positioned to help fill the world's growing demand for quality coal.

World demand for electricity has increased by 150 per cent between 1973 and 2000 and yet coal has retained its share.

WORLD ELECTRICITY GENERATION BY FUEL TYPE

1973 and 2000 Fuel shares of electricity generation

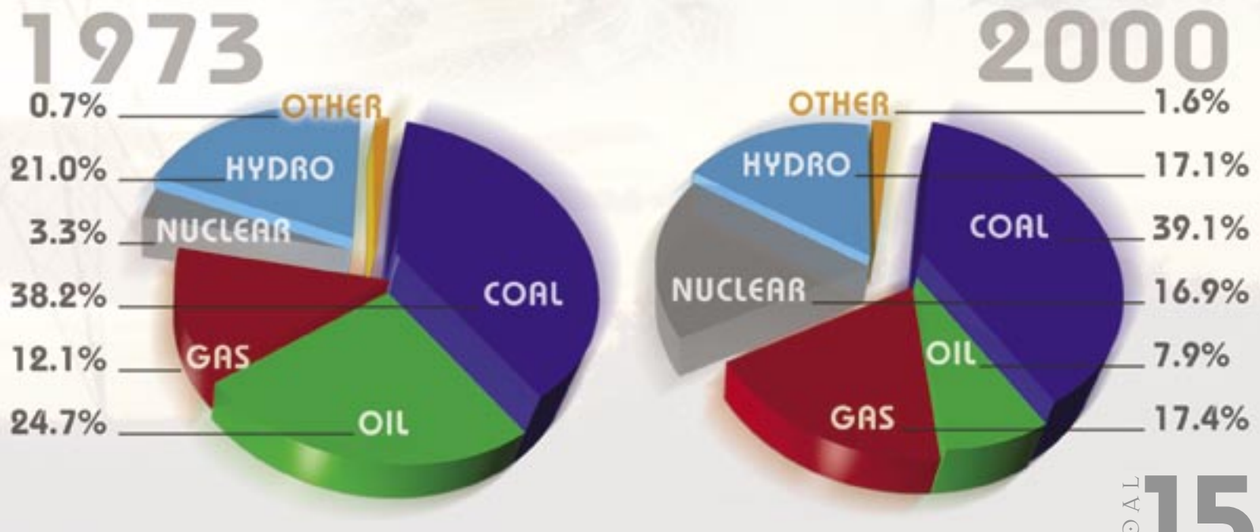


Chart Source: Key World Energy Statistics from The International Energy Agency

GLOSSARY

BCE – in measuring time, it stands for "before the common era". Formerly BC ("before Christ").

BOILER – a tank in which water is turned to steam for heating or for power.

BRIQUETTE – a small block of compressed coal dust used for fuel or kindling.

COKE – a hard, dry foam-like carbon substance produced by heating metallurgical coal to a very high temperature in the absence of air. Coke is used in making steel and iron.

DRAGLINE – an excavating machine that uses a bucket operated and suspended by cables. One set of cables lowers the bucket from the boom, while another set of cables allows the bucket to swing out from the machine or to be dragged toward the machine to remove overburden above a coal seam.

ENERGY MIX –the combination of sources used to provide energy at any given time and place. Energy sources include coal, oil, natural gas, hydro (water), nuclear, wind, sunlight, geothermal and others.

FEEDSTOCK – raw material for industrial processing.

GEOPHYSICS – the science that deals with the physics of the Earth, including weather, winds, tides, earthquakes, etc., and their effect on the Earth.

GLOBAL POSITIONING SYSTEM (GPS) – a navigational system using satellite signals to fix the location of a receiver on or above the surface of the Earth.

METALLURGICAL COAL – a term used to describe varieties of bituminous coal that are converted into coke for use in the steelmaking process. It is also referred to as coking coal.

METHANE – the most simple of the hydrocarbons formed naturally from the decay of vegetable matter, similar to that which formed coal. It is the main component of natural gas.

PITCH – a black, sticky substance distilled from coal tar, and used for purposes such as waterproofing and roofing.

THERMAL COAL – a term used to describe coal which is used primarily to generate heat. It is also referred to as steam coal.

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MODULE 1: EVOLUTION
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MODULE 3: TECHNOLOGY
MODULE 4: ENVIRONMENT
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