



BC's Dirty Secret:

Big Coal & the Export of Global-Warming Pollution





Above

Skeena Headwaters
Photo: turtleisland.org

Strip mine
Photo: wired.com blog 08/12/18

Cover

Delta Coal Port
Photo: MEMPR

Truck works a strip mine
Photo: flickr

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Acknowledgements

BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution is intended for broad public consumption. It was written to inform affected individuals, First Nations and other stakeholders about British Columbia's growing role in the global trade of coal. The report is designed to provide a comprehensive look at the coal industry in BC and its broader climate-change, environmental and socioeconomic impacts.

This guide is the product of Dogwood Initiative's staff, volunteers and contractors. Many people played an important role in its completion. Shannon McFadyen was the primary researcher and author of the report, with my assistance. Matt Takach, Charles Campbell, Cliff Stainsby, Paul Mably, David R. Boyd and Kevin Washbrook provided in-depth comments and suggestions. Michael Begg provided excellent advice about structure and readability as well as his usual expert editing skills. Vyvyan Rousseaux helped with proofreading the report. Aldea Wood provided the design and layout template and Matt Takach did the layout and design. Hugh Stimson contributed his Geographic Information Systems (GIS) expertise and produced many of the report's maps. The endnote expertise of Peter Kahrel and Karl Hardin was indispensable.

The creation of this report would not have been possible without the generous assistance of our funders at Mountain Equipment Co-op and the YWCA's Youth Eco Internship Program. We appreciate their support.

As with any major research project, some errors and omissions are inevitable. We used the best available data and attempted to be as accurate as possible. Any mistakes are mine.

Executive Director, Dogwood Initiative



*Funding for the project provided
by MEC. Thank You!*



Acid mine drainage (left)

Skeena headwaters (right)

Photo: turtleisland.org

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Davie Bay, Texada Island
Photo: Tom Scott

Abstract

The BC government has proclaimed it will reduce BC's greenhouse gas emissions by 33 per cent below 2007 levels by the end of the decade. This goal conceals a double secret: the government does not fully account for heat-trapping pollution from coal mined in BC; and coal mining is expanding in BC. To end the secrecy, this report describes coal mining in BC today, its effect on global warming, and the rules the BC government and its Western Climate Initiative partners use to exclude coal from their emissions calculations. The report also catalogues all current and proposed mines and mining companies. It concludes with examples of resistance to coal's expansion, and with a call for a much-needed conversation about our province's true role in global warming.



Coal barge
Photo: jimwalterresources.com

Executive Summary

We live in a province that prides itself on being “The Best Place on Earth.” The BC government and BC business leaders are competing against Ontario to lead Canada in clean-energy investment.¹ Building on one of his “golden goals” for a golden decade,² former Premier Gordon Campbell has articulated his ambition this way: “We want British Columbia to become a leading North American supplier of clean, reliable, low-carbon electricity and technologies that reduce greenhouse gas emissions while strengthening our economy in every region.”³ He set a target of reducing emissions by 33% from 2007 levels by 2020. This is a laudable goal, but it conceals a dirty secret.

While all the attention is focused on green energy, British Columbia is quietly becoming a major global player in perhaps the dirtiest, most polluting industry on the planet: coal.

This report seeks to end the secrecy about coal. It first describes the coal industry in British Columbia: Who are the key players? Where are the mines and ports located? Who is planning to expand BC’s dirtiest industry? To set this story in context, the report starts by shedding light on facts the BC government would like to keep in the dark.

BC’s darkest secrets

Here are six of the facts that few residents of “Beautiful British Columbia” are aware of:

1. For its emissions target, the BC government does not include the emissions from the burning of coal mined here. Mining, processing, transporting and burning BC coal produce a staggering amount of heat-trapping pollution. The total global pollution from BC coal in 2008—a total of 61.4 million tonnes⁴—almost doubles BC’s reported contribution to global warming.⁵
2. 54.2 million tonnes of heat-trapping pollution⁶ were created when the coal mined in BC in 2008 was burned outside our province.⁷ The pollution created is equivalent to adding over two new vehicles to the road for each and every man, woman and child in BC.⁸

3. Teck, the largest coal miner in BC with five mines, produced 23 million tonnes of coal in 2008. Producing, transporting and burning this coal produced 51.9 million tonnes of heat-trapping pollution,⁹ equivalent to the annual emissions from almost 14 coal-fired power plants, making Teck by far BC's largest atmospheric polluter.
4. If mined and burned, the total heat-trapping pollution from the reserves of BC's *proposed and operating coal mines* will be approximately 14.8 billion tonnes.¹⁰ This would amount to an unbelievable 6.35 per cent of the total heat-trapping pollution scientists believe humanity can emit globally between now and 2100.¹¹ Put another way, it is equivalent to adding almost 2.8 billion additional passenger cars to the road. That's almost 3.5 times the total number of cars on the road worldwide today.¹²

These are just a few of the dirty secrets in the story of how a few big coal companies and the BC government are exporting global warming on a scale few British Columbians can comprehend. And that scale is quietly, but rapidly, growing.

BC: a growing player in coal

British Columbia's role in the global coal industry has avoided scrutiny because not much coal is burned in the province. There are no coal-fired power plants in BC, so it surprises many British Columbians to discover that BC is now the seventh-largest coal producer in North America. But our role in the global coal industry is not limited to mining; BC is also integral to the global trade in coal, particularly for steel-making.

Coal comprises a third of the industrial traffic at the Port of Vancouver, the largest port in Canada. Eighty per cent of Canada's seaborne coal exports are shipped through coal terminals in Vancouver.¹³ In 2008, BC shipped approximately 37.2 million tonnes of coal to more than 20 countries worldwide.¹⁴ Most of the exports were metallurgical coal destined for the steel smelters of Japan, South Korea and Europe.¹⁵

Meanwhile coal mining in BC is expanding—also below the public radar. Eighteen new coal mines are at various stages in the government's approval process. Six mines await environmental assessment certificates, one has already received its certificate, and eleven more are conducting feasibility and pre-feasibility studies. Exploration is under way for a dozen more. The government's

environmental assessment process ignores the largest harm these mines would cause—warming the planet above safe levels.

Counting coal's hidden costs

The hidden costs of coal are enormous. Coal's largest hidden cost is the one that directly affects all British Columbians: the devastating amount of heat-trapping pollution produced when coal is burned. Leading experts, including Dr. James Hansen, NASA's top climate scientist, believe that "coal is the single greatest threat to civilization and all life on our planet".¹⁶

Scientists like Hansen single out coal because burning it to generate electricity and make steel is the world's leading source of global-warming pollution.

Exploitation of coal is growing because coal is widely considered a cheap resource for making electricity and steel. But whether coal is cheap or not depends on how, and what, you count. Or, more importantly, what you do not count.

Carbon accounting rules allows the BC government to claim progress on its goal of reducing provincial carbon emissions by 33 per cent, while our province's true climate pollution is rising dramatically.

While claiming progress at home, the government ignores the burning of BC coal elsewhere. That burning adds 54.2 million tonnes of heat-trapping pollution to the atmosphere,¹⁷ raising the total unaccounted-for heat-trapping pollution to at least 58.3 million tonnes.¹⁸ These uncounted emissions are equal to 85 per cent of BC's officially acknowledged emissions total.¹⁹

By contrast, at most only five per cent of the actual global pollution from coal mining in BC is accounted for in the province's annual acknowledged pollution total.²⁰

These are just the figures for currently operating mines. Adding the eight coal mines that have recently received or are awaiting environmental assessment certificates adds another 34.2 tonnes of heat-trapping pollution²¹ to the province's annual total—almost equal to the annual emissions of nine coal-fired power plants.²²

None of the BC government's current proposals for reducing heat-trapping pollution (carbon tax, cap and trade) remotely addresses the rapidly expanding pollution from the production and burning of BC coal.

For information on coal's potential impact on people's health, and on the health of our land, water and communities, see our upcoming companion report *The Citizen's Handbook on Coal Mining in British Columbia*.

Dodging responsibility

Since 2005, the individuals and corporations involved in the coal industry in BC have collectively contributed \$913,338 to the governing BC Liberal Party. These contributions are among the highest of any industry.²³

Considering these donations, perhaps it is no surprise that the BC government's rules for achieving its targeted 33 per cent reduction in heat-trapping pollution will not count the fugitive emissions (the pollution that escapes from coal seams)²⁴ resulting from open-pit coal mining, and will not count the burning of BC coal outside BC.

The justification that this coal is being burned elsewhere is disingenuous, even though other countries also use the same accounting rules. These rules veil which jurisdictions are truly responsible for producing and exporting toxic products that warm the planet and threaten the future of our children and grandchildren.

It's similar to Colombian cocaine cartels or Asian heroin growers claiming they have no responsibility, because most of their addictive products are consumed in other countries.

Imagine if they said, "We don't use it, we just sell it."

It is irresponsible for British Columbia to dodge responsibility for the production of what we now recognize as one of the world's most toxic and damaging commodities. We expect arguments like this from drug cartels, not from our political and business leaders.

Climate change demonstration
Photo: Fossil Fools Day of Action



Demanding full accounting—and accountability

Fortunately, people are beginning to hold governments and corporations to account, and are resisting the expansion of the coal industry in all its forms: mining; transportation by truck, rail and ship; and coal-fired power plants. Coal is increasingly becoming a lightning rod for people concerned about the looming climate catastrophe.

People are coming together to stand against coal in the major coal-producing countries around the world—in the United States, Australia, the United Kingdom, and recently in BC.

In British Columbia, proposals for new coal-fired power plants in Princeton and Tumbler Ridge were mothballed after protests forced the provincial government to impose a moratorium on coal-fired power in 2007. The Tahltan and West Moberly First Nations have stopped coal mines in their territories using a combination of direct action, financial pressure and lawsuits. CoalWatch, a grassroots group opposing the new Raven coal mine proposal in the Comox Valley, is gaining strength.

A necessary conversation

The expansion of BC's coal industry is inconsistent with the BC government's attempts to position the province as a global climate leader. The government has committed to a 33 per cent reduction in greenhouse gases. Preventing global warming, however, requires more than promises. It requires honest, transparent, co-ordinated action, specifically phasing out the mining and burning of coal.

As responsible citizens of the world, British Columbians must re-examine the full impact of coal in order to decide what role, if any, it should have in our collective future.

Coal mining equipment
Photo: siemens.com

Dogwood Initiative hopes *BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution* will help jump-start that discussion among citizens, rural and First Nations communities, academics and



non-governmental organizations.

Our province's dirty secret needs to be brought into the light. Dialogue needs to begin about the relationship between being a climate leader and exporting polluting resources like coal.

So let's begin the conversation.



Coal protest , Massachusetts
(left)



Coal seam (right)

Key Questions

- In calculating its contribution to global warming, how should BC account for pollution from products such as coal, which is produced within the province but mostly burned abroad?
- Should BC be expanding its coal terminals primarily to rapidly expand the export of U.S.-mined thermal coal to Asia?
- Should there be a moratorium on the development of any new coal mines until measures can be taken to decrease the footprint and pollution of these mines?
- Should the emissions from leaking (fugitive) coalbed methane from all coal mines be included under the cap and trade system? What is the best method to account for all the heat-trapping pollution from open-pit coal mines?
- How do we phase out production from existing coal mines and clean up played-out mines in the most safe and environmentally friendly manner?
- How do we ensure that just and equitable consultation and transition policies are put in place to protect the communities attached to, and workers in, existing and prospective coal mines?
- How do we make steel without burning coal, or find less polluting alternatives to steel?

How British Columbia answers these questions will not only have an impact on our province's air, land and water; it will have an impact on the livability of the planet we call home.



Coal ship accident, China (left)
Photo: chinadaily.com.cn



Coal-fired power plant at night,
Poland (right)

BC Coal: Facts & Figures

1. British Columbia is gaining on Alberta as the biggest coal producer in Canada. Our ten operating mines produced 26.2 million tonnes of coal in 2008.²⁵
2. British Columbia is the seventh largest North American coal-producing state or province, behind such climate-unfriendly jurisdictions as Alberta, West Virginia, Kentucky, Pennsylvania, Texas and Montana.²⁶
3. In 2008, at least 54.2 million tonnes of heat-trapping pollution were created when the coal mined in BC was burned in other jurisdictions.²⁷ This pollution is not being counted in the province's emissions. It is equivalent to the annual pollution from:
 - a. 10.4 million passenger cars,²⁸ which works out to an additional 2.6 cars for each and every man, woman and child in BC;²⁹ or
 - b. 14 coal-fired power plants,³⁰ which is more than are currently operating in all of Canada.
4. Over six million tonnes of U.S.-mined thermal coal bound for Asia was shipped out of the Port of Vancouver in last year, **a 60 percent increase over 2010**.³¹ An additional 4.2 million tonnes of heat-trapping pollution are produced to transport coal outside BC.³² This pollution is also not being accounted for in British Columbia.
5. Including all the heat-trapping pollution from the mining, processing, transporting and burning of BC coal would almost double what the government reports as British Columbia's annual contribution to global warming.³³ This total, 61.4 million tonnes,³⁴ is equivalent to the annual heat-trapping pollution created by:
 - a. 11.7 million passenger cars,³⁵ which is enough to stack four new cars on top of every car in BC,³⁶ or
 - b. almost 16 coal-fired power plants.³⁷
6. Only five per cent of the annual emissions from BC coal mining are accounted for in the province's annual acknowledged pollution total.³⁸

7. Teck, the largest coal miner in BC with five mines, each year produces 23 million tonnes of coal. In 2008, Teck produced approximately 51.9 million tonnes of heat-trapping pollution.³⁹ This is equivalent to the annual global-warming pollution from:
 - a. 12 coal-fired power plants;⁴⁰ or
 - b. almost 10 million additional passenger cars,⁴¹ which is equal to adding 50 per cent more cars to Canada's roads.⁴²
8. The Elk Valley region in southeastern BC is the world's second-largest producer of metallurgical coal. In 2008, BC exported approximately 22.3 million tonnes of bituminous coal, mostly for steel-making.⁴³
9. The production plans of existing BC coal mines over their operating lifespan are staggering. They would produce **enough coal to build a wall 10.5 inches wide and as tall as the CN Tower**, stretching across Canada from the Pacific to the Atlantic coasts.⁴⁴
10. The coal industry in BC is expanding. Twelve companies are proposing eighteen new coal mines that are at various stages of approval. Six mines await environmental assessment (EA) approval from the BC government. One mine has its EA certificate. Eleven more are undergoing feasibility and pre-feasibility studies, and have not yet entered the assessment process. Exploration is underway on many more.
11. British Columbia's pollution rates increase dramatically if the coal mines currently being proposed are ultimately approved and become operational. If the proposed coal mines currently in the environmental assessment process get approved, they would add almost 34.2 million tonnes to pollution produced by BC industries.⁴⁵ This is equivalent to the annual pollution produced by 6.5 million additional passenger cars,⁴⁶ which is more than double the number of cars in BC today.⁴⁷
12. The total heat-trapping pollution produced by the reserves of proposed and operating BC coal mines will be approximately 14.8 billion tonnes of pollution.⁴⁸ This is equivalent to the annual pollution of almost 2.7 billion passenger cars, or more than quadrupling the total number of cars in the world.⁴⁹
13. If their reserves are fully mined and burned, the existing and proposed coal mines in BC would account for an astounding 6.35 per cent of the total heat-trapping pollution scientists believe humanity can emit between now and 2100.⁵⁰
14. British Columbia is becoming an important player in the global trade of coal. Coal represents a third of the industrial traffic at the Port of Vancouver, the largest port in Canada. Eighty per cent of Canada's coal

is shipped overseas through our ports.⁵¹

15. Approximately 70 per cent of BC's coal exports go to Asia, 19 per cent to Europe, 8 per cent to South America, and 3 per cent to North American destinations.⁵²

For a comparative look at the production of, and pollution from, each operational mine and proposed mine, see Appendixes 1, 2a and 2b.



Coal-fired power plant, Germany
Photo: Bruno D Rodrigues, flickr

Glossary

Brown Coal – A soft brown fuel, formally named lignite, with characteristics that put it somewhere between coal and peat.⁵³

Carried Interest – A fractional interest in a resource property, most often a lease. Its holder has no obligation for operating costs. The owner or owners of the remaining fraction, who reimburse themselves out of profits from production, pay the operating costs. The person paying the costs is the carrying party; the other person is the carried party.⁵⁴

Clean Coal – Coal that has been sized, washed and dried in preparation for shipment to customers. Washing coal removes impurities such as rock and ash.⁵⁵

Coal Reserve – The economically mineable part of a measured or indicated mineral resource, using existing technology under prevailing economic conditions, and for which there is no legal impediment to mining. It is based on at least a preliminary feasibility study. Sub-divided, in decreasing order of confidence, into proven and probable reserves (*see proven-in-place reserve*).⁵⁶

CO₂e (CO₂ Equivalent) – For a given greenhouse gas, the amount of CO₂ that would have the same effect on global warming.⁵⁷

Fugitive Emissions – Unintentional emissions from the production, processing, transmission, storage and delivery of fossil fuels.

Hard Coal – A hard natural coal, known as anthracite, which burns slowly and gives intense heat.⁵⁸

Heat Value – The amount of heat produced when burning a certain quantity of coal.

Indicated Mineral Resource – The second-most reliable measure of a resource, used to determine the economic viability of a proposed mine, and then for planning mine operations (*see also Mineral Resource*).⁵⁹

Inferred Mineral Resource – The least reliable estimate of a resource, giving an approximate value for quantity and grade (or quality), based on a mix of geological evidence and limited sampling.⁶⁰ Inferred Mineral Resources cannot be used in disclosure statements, feasibility reports, or other economic studies (*see also Mineral Resource*).⁶¹

Measured Mineral Resource – The most certain estimate of a resource, based on concrete measures including sampling (*see also Mineral Resource*).⁶²

Mineral Resource – Total physical quantity of coal in a defined area, regardless of economic viability. Divided into three categories, in decreasing level of geological confidence: Measured, Indicated, and Inferred. The quantity and quality of Measured Resources are computed from the results of detailed sampling so that the size, shape, depth, and mineral content of the resource are well established. Indicated Resources are computed from similar information, but the sites for inspection, sampling and measurement are farther apart or are otherwise less adequately spaced. Inferred Resources may or may not be supported by samples or measurements, but are primarily determined using geological evidence.⁶³

Proven-In-Place Reserve (a.k.a. proven reserve) – Portion of a mineral reserve (*see coal reserve*) that has been sampled extensively and in sufficient detail to accurately estimate grade and tonnage. It is usually only a small fraction of a reserve.⁶⁴

Rank – The position of a coal relative to other coals in the “coalification” series from brown coal (low rank) to anthracite (high rank), indicating the maturity of its general chemical and physical properties.

Resource – Total number of tonnes of coal underground or at the surface, measured according to the government’s regulatory criteria. This quantity is technically extractable—i.e., physically possible to mine—but not necessarily economically feasible—i.e., may cost more to remove than it is worth.⁶⁵

Run-of-Mine Coal – Coal moved from the mine to the coal preparation plant.⁶⁶

Steam Coal – A grade of coal between bituminous coal and anthracite, once used as a fuel for steam locomotives.⁶⁷

Important Abbreviations

BCEA – British Columbia Environmental Assessment

BCEAO – British Columbia Environmental Assessment Office

MEM – Ministry of Energy and Mines (known as the Ministry of Energy, Mines and Petroleum Resources until autumn 2010)

SARA – Species at Risk Act



Overhead view of mountain top removal

Part I: Introduction to Coal

"Coal is the most dangerous substance on the planet, in almost every way—I mean, for the people who have to mine it and for the landscapes where it exists ... for the people who have to breathe the smoke around power plants, mostly in our inner cities, but most fundamentally for the climate. Coal produces more carbon per BTU (unit of energy) than anything else you can burn. And as a result, more than anything, it's what's driving our climate problem."

– Bill McKibben, on Democracy Now⁶⁸

To the surprise of many British Columbians, our province has a major role in the global production of coal, the world's most pollution-intensive form of energy. Yet, instead of taking leadership in the battle to reduce heat-trapping pollution from coal, the BC government is allowing the coal industry to expand.

It may also surprise British Columbians to learn how concentrated the province's coal industry is. Four corporations control British Columbia's coal industry. The Teck group of companies owns five of the ten operating coal mines in the province. Western Coal owns three mines, and Peace River Coal and Vitol Anker International B.V. own one each. Twelve corporations, including these four, have made eighteen proposals to expand existing mines, or open new ones.

The transport of coal through BC by rail is controlled by two railway corporations, Canadian National (CN Rail) and Canadian Pacific (CP Rail). Finally, the export of coal overseas passes through only four port facilities.

The coal industry has deep and influential roots in BC. The first coal mine was opened on Vancouver Island near Nanaimo in 1849. While the industry has experienced economic ups and downs since the late 1800s, it is currently experiencing a boom, with several mine expansions and nineteen proposed new coal mines, along with dozens of less developed proposals.

Since 2005, collectively, the individuals and corporations involved in the

coal industry have contributed \$913,338 to the governing BC Liberal Party.⁶⁹ Individuals and corporations associated with Teck are the BC Liberal Party's largest donors, having contributed \$657,170 since 2005.⁷⁰

From industrial-era chimney sweeps through Charles Dickens' memorable Scrooge and Oliver Twist characters, to Santa's present for bad boys and girls, coal has been deeply entangled with issues of economic progress and social justice. This is as true in BC as it is in other coal-producing regions.

BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution provides a comprehensive look at the who, what, where and how of coal mining in BC, as well as its broader climate-change impacts.

The hidden costs of coal are enormous. This report concentrates on the hidden impact of BC coal on the planet, including global warming. For information on coal's potential impact on people's health, and on the health of British Columbia's land, water and communities, please see our upcoming companion report, *The Citizen's Handbook on Coal Mining in British Columbia*.

Ship at port loading with coal
Photo: maritimejournal.com





Coal transport by rail
Photo: Christopher Muller, flickr

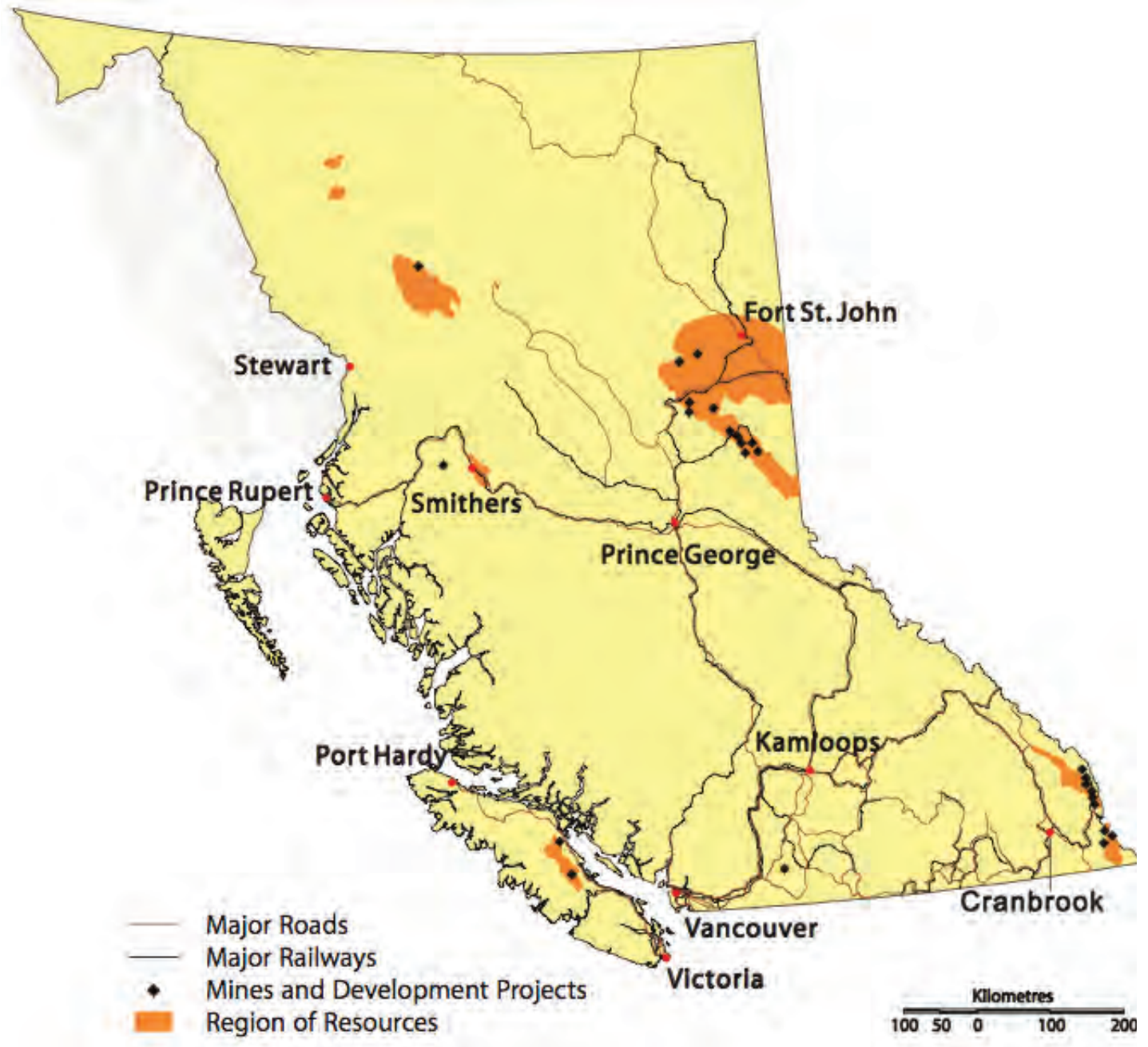
Where Is Coal Mined in BC?

British Columbia's coal industry is concentrated on three large geological coal deposits. The Rocky Mountain coalfield has large deposits in the southeast and northeast of the province. The coal mines located in this coalfield, specifically those in the Elk Valley region, are the world's second-largest suppliers of metallurgical coal. The Insular Coalfield includes deposits on Vancouver Island and small deposits on the Queen Charlotte Islands. The Intermontane coalfield includes a number of deposits throughout the centre of the province.⁷¹

Almost all coal produced in BC is bituminous, which includes coking, thermal and metallurgical coal. These types of coal play an important role in steel and iron manufacturing, and, to a lesser extent, in electricity production.

A small portion of the coal in BC is anthracite. The hardest form of coal, anthracite can be used for household heating and cooking, and by a variety of industries. This form of coal is not currently mined in Canada, but an anthracite mine is being proposed in BC as part of the Mount Klappan coal mine project near Iskut, north of Terrace (*see page 80*).⁷²

Map: Coal Deposits and Infrastructure in BC





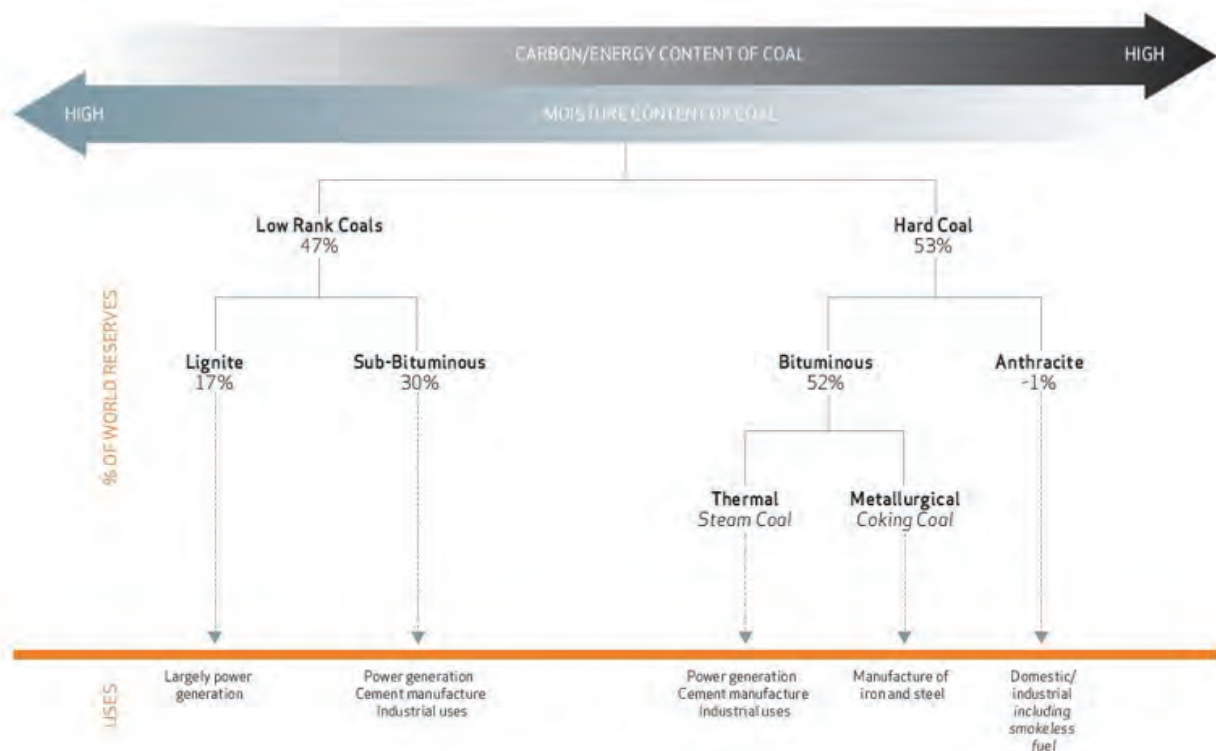
Types of Coal

Coal conveyer belt

There are three types of coal currently mined in Canada: bituminous, sub-bituminous and lignite. Most of the coal currently mined in British Columbia is bituminous. No lignite is currently mined in BC.

The type of coal in a particular deposit is a function of the vegetation from which the coal is derived, and the depth, pressure, temperature and duration of the coal's formation. The amount of mineral matter surrounding the coal also affects its type.

Coal is ranked based on the degree of transformation of the original plant matter into carbon. The longer the coal has been exposed to heat and pressure, the higher it is ranked, as it will have higher carbon content and heat value.



Source: <http://www.tsl.uu.se/uhdsg/Popular/CoalBasics.pdf>

Anthracite

Anthracite, the highest-ranked and hardest coal, is found in remote regions of northern British Columbia and parts of the Yukon. Often referred to as “smokeless,” this form of coal can be used for household heating and cooking, and by a variety of industries. This form of coal is not currently mined in Canada, but there are proposals to do so, including the Mount Klappan project in BC (*see page 80*).

Bituminous Coal

Ranked second-highest, bituminous coal is found in Alberta, British Columbia and the Maritimes. This type of coal is referred to as either metallurgical or coking coal, and is used to produce coke, a key ingredient in iron and steel manufacturing. It can also be thermal coal, which is used to generate electricity. Bituminous coal is sub-classified according to its "volatility", i.e., how easily it vapourizes when heated. It is divided into high-, medium-, and low-volatile.

Sub-Bituminous Coal

Sub-bituminous coal, which is not mined in BC, is a form of brown coal burned to generate energy. It is softer and contains more moisture than bituminous coal, which makes it less economical to transport long distances. In Canada, sub-bituminous coal is mined only in Alberta, where it is used to generate over 70 per cent of that province's electricity.

Lignite

In Canada, most of the lignite, the lowest-ranked and softest coal, is found in Alberta, Saskatchewan and southwestern Manitoba, but there is some in the Eocene Hat Creek deposit in BC (*see page 25*). It is used primarily in steam-electric power generation. In Canada, lignite is currently mined only in Saskatchewan.



Coal power plant, Germany
Photo: Bruno D Rodrigues, flickr

Types of Coal Mining

The main objective of a commercial mine is to exploit the mineral deposit at the lowest cost, while maximizing profits. The method used to extract the mineral depends on where the deposit is found.

There are four main methods used to mine coal: open-pit, underground, contour-strip, and mountain-top. Mountain-top removal is the most controversial and destructive form of mining.

Only open-pit mining and underground mining are currently used in British Columbia. There are no active contour-strip or mountain-top coal mines in the province.

Open-Pit Mining

Open-pit mining is the dominant technique for extracting coal in British Columbia. Nine of the ten operating mines use open-pit methods, as would five of the seven proposed new mines that await or have received environmental assessment approval.

Open-pit mining techniques are used to extract coal that lies near the surface. The process involves excavating the overlying material to expose the mineral ore, and hauling large amounts of waste rock away. Even though most of Canada's coal lies 300 or more metres deep, more than 90 per cent of the coal now mined comes from surface mines.⁷³

For more information on types of coal mining see our companion report, *The Citizen's Handbook on Coal Mining in British Columbia*

The amount of pollution released during coal mining depends on a number of factors, including the type and rank of coal, depth of coal seam, and method of mining. As described above, coal rank reflects the differences in the stages of coal formation and depends on the temperature history of the coal seam. As the rank of coal increases, so does the amount of heat-trapping pollution produced when it is burned.

In open-pit coal mines, pollution is produced from:

1. The energy (coal, natural gas or electricity) used to process the ore, clean it and ultimately dry the coal product;
2. The diesel and other fuels that trucks and other heavy mobile equipment use to mine, process and transport coal; and
3. Leaking or fugitive coalbed methane that escapes to the atmosphere during the mining process.

Underground Mining

The Quinsam coal mine near Campbell River is the only operating underground coal mine in BC. In addition to Quinsam, Compliance Energy's Raven proposal, near Courtenay on Vancouver Island, and Dehua's Gething proposal, near Henderson Hope in northeastern BC, are being planned as underground mines.

Underground mining techniques are used when coal seams lie deep below the Earth's surface. Some argue that underground coal mining releases more methane than surface or open-pit mining, because of the higher gas content of deeper seams. However, no definitive studies corroborate this claim.⁷⁴



Surface mine, New Mexico
Photo: emnrd.state.nm.us

How Much Coal Is There?

British Columbia is a growing player in the global trade of coal. The province's role in the production and distribution of what Bill McKibben calls the "world's most dangerous substance" is best understood if placed in a national and global context.

World Coal Reserves and Production

There are varying estimates of how much coal remains in the ground worldwide. The estimates vary partly because of different methodologies for estimating grade and tonnage, which is called the "proven reserve" or "proven-in-place reserve," depending on the source. Proven reserves usually amount to only a small fraction of a reserve. (*See Glossary for the terms that describe degrees of accuracy of different estimates of "mineral reserves" and "mineral resources."*)

In 2006, one estimate concluded that there were over 847 billion tonnes of proven recoverable coal reserves worldwide, while the Coal Yearbook estimated there were 935 billion tonnes in reserve.⁷⁵

Coal Information (a report published by the International Energy Agency) states that the world's total coal production was 6.5 billion tonnes in 2007,⁷⁶ and the world's consumption was 4.6 billion tonnes of coal. Global trade for the same year was 917 million tonnes.⁷⁷

These figures lead some to claim that there is enough coal to last over 130 years at current rates of production. In contrast, proven reserves of oil and of gas are equivalent to around 42 and 60 years, respectively, at current production and consumption levels.⁷⁸

The economic viability of mining much of this coal depends, however, on whether the hidden costs of coal will be borne by the coal industry, or by the rest of us. In other words, the economics of coal depend on whether the true cost of the pollution it produces is incorporated into its price.

Canadian Coal Reserves

Coal has been mined in Canada since 1639, when a small mine was opened at Grand Lake, New Brunswick. In BC, coal was first mined on Vancouver Island in the 1850s. While coal mining began in the east, by 1911 Western Canada dominated the Canadian coal industry. Despite serious downturns in the 1950s and 1960s, Western Canada now produces over 95 per cent of Canada's coal. Recently, coal exports from Canada and British Columbia have increased significantly, partly because of Canada's growing reputation as a stable and reliable coal supplier, with large port capacity.

Canada contains nearly four per cent of the world's coal resources, depending on the estimate, and somewhere between six and ten per cent of the proven, recoverable reserves of coal, exceeded only by the former Soviet Union, the United States, the People's Republic of China and Australia.⁷⁹ In 2007, Canada was the 13th largest coal-producing country in the world.⁸⁰ Canada has at least 80 billion tonnes of coal that is exploitable using today's technology with about 8.7 billion tonnes of proven coal reserves classified as commercially feasible under today's conditions, which includes 6.6 billion tonnes of proven recoverable reserves.⁸¹ Canada's reserves have the potential to provide more than 100 years of production at the 2008 production rate.⁸² An additional 193 billion tonnes of coal resources have been identified in Canada.⁸³

Canada's Coal Trade

In 2008 Canada exported approximately 32 million tonnes of coal, which accounted for 47 per cent of the country's coal production.⁸⁴

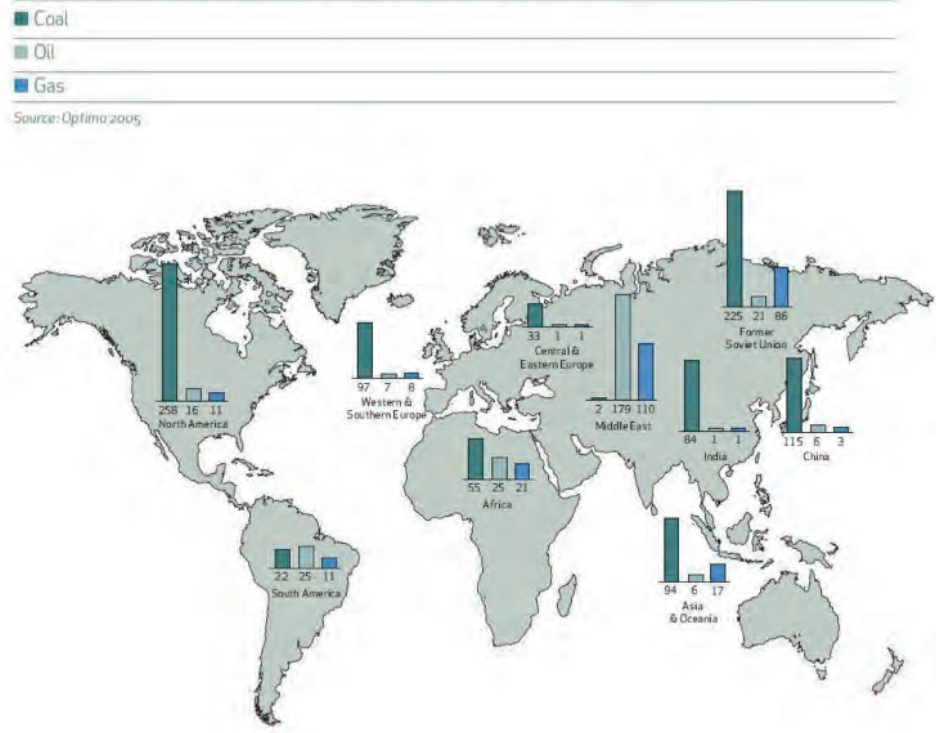
Canada is becoming one of the leading metallurgical coal suppliers to world markets. Almost all of this steel-making coal, produced in Western Canada, is being shipped to offshore markets. Generally, approximately 90 per cent of Canada's coal exports are metallurgical coal, with thermal coal making up the remainder.⁸⁵ In 2008, Canada exported 26.5 million tonnes of metallurgical coal and 5.7 million tonnes of thermal coal.⁸⁶

In 2008, approximately 80 per cent of the coal Canada exported overseas was shipped from the coal terminals in Vancouver.⁸⁷ The largest market for Canadian coal is Asia, which accounts for approximately 59 per cent of coal produced in Canada. Smaller amounts are sold to Europe, the United Kingdom, and the United States.

In 2008, an estimated 18.5 million tonnes of coal from Canada were exported to Asia. This was 500,000 tonnes more than were shipped in 2007, suggesting a growing market.⁸⁸ The largest importers of Canadian

coal in 2007 were Japan and South Korea, taking 10.6 million tonnes and 6.1 million tonnes, respectively. Japan now takes 35 per cent of Canada's coal (up from 24 per cent in 2004), and South Korea accounts for 21 per cent (up from 14 per cent in 2004).⁸⁹

Location of the World's Main Fossil Fuel Reserves (Gigatonnes of coal equivalent)



Major coal reserves around the globe - Source: Coal fundamentals
<http://www.tsl.uu.se/uhdsg/Popular/CoalBasics.pdf>

Canada also imports coal. In 2008, Canada imported 20.6 million tonnes of coal, of which 17.4 million tonnes was thermal coal used in coal-fired power generation, mostly in Alberta and Ontario. Overall, coal provides 10 per cent of Canada's electricity. No coal-fired power is produced in BC, but when demand is high, BC Hydro imports electricity from coal-fired power plants in Alberta. The other 3.2 million tonnes of coal Canada imported in 2008 was coking coal for use in various industrial process.

Most imported coal comes to Canada from the United States (17.9 million tonnes in 2008), and the remainder comes from Colombia, Venezuela, Russia and the Ukraine (about 2.7 million tonnes).⁹⁰

BC Coal Reserves

British Columbia holds extensive coal reserves, measuring over 23 billion tonnes (13 billion tonnes metallurgical and 10 billion tonnes thermal).⁹¹

Based on extensive sampling of grade and tonnage, the Kootenay

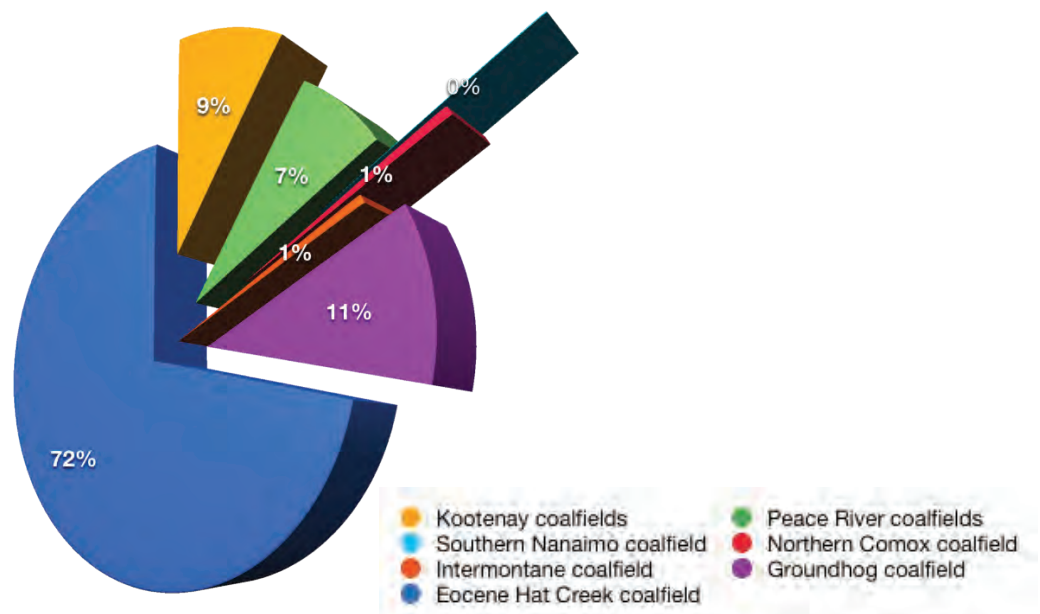
coalfields have “proven-in-place” reserves exceeding 1.3 billion tonnes of coal. Kootenay coal is mostly medium-volatile bituminous coal.⁹²

Peace River coalfields have proven-in-place reserves of over one billion tonnes of coal. The coal found in the Peace River coalfields is also ranked as medium-volatile bituminous coal.⁹³

The Insular coalfields are broken up into the Southern Nanaimo coalfield, which contains reserves of less than 10 million proven in-place, high-volatile bituminous coal, and the Northern Comox coalfield, which contains over 90 million tonnes of mineable, measured high-volatile coal.⁹⁴

The Intermontane coalfield has proven resources of approximately 85 million tonnes of anthracite coal, found in the Klappan coalfield. In addition to the Klappan, the Groundhog coalfield reserves bring the Intermontane total to 1.5 billion tonnes of probable coal reserves.⁹⁵

The largest coal deposit found in BC is the Eocene Hat Creek deposit, which has approximately 500 million tonnes of coal ranging from lignite to sub-bituminous, and an ultimate resource that may exceed 10 billion tonnes.⁹⁶



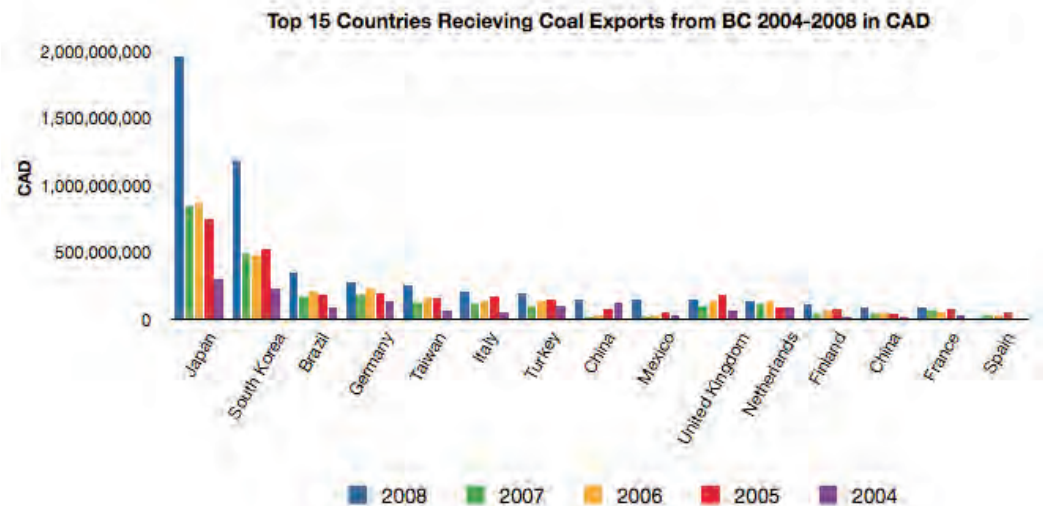
Above: Percentage of BC's coal located in each coalfield – Source: MEM

Exports from BC

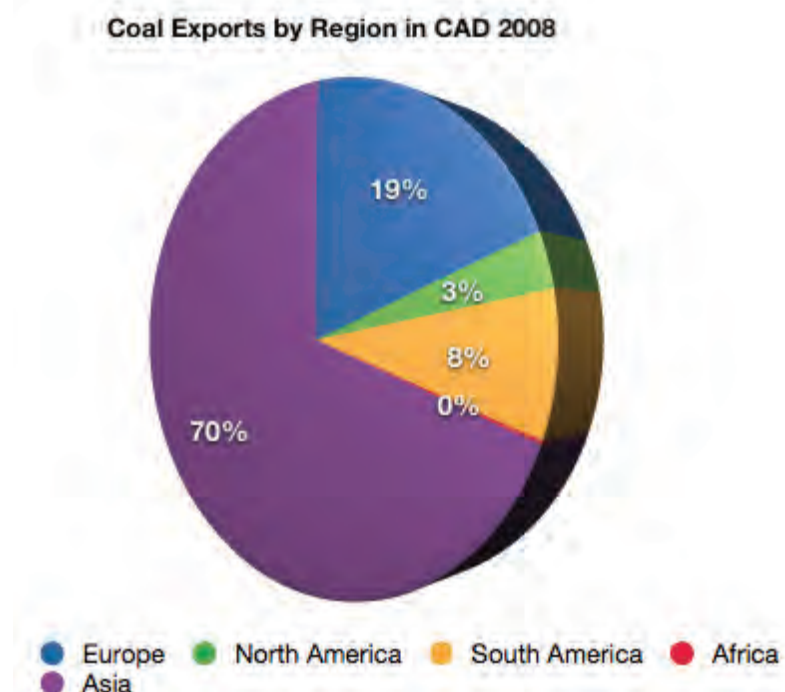
British Columbia is by far Canada's biggest exporter of coal.⁹⁷ Coal is not only the province's largest mining export; it represented 86 per cent of the value of all products shipped from BC in 2008.⁹⁸ Coal was the largest

contributor to provincial net revenues (\$6.8 billion in 2008), with net mining revenues for metallurgical coal increasing from \$1.4 billion in 2007 to \$3.2 billion in 2008, the most recent year for which statistics are available.⁹⁹

The volume of coal being shipped from BC between 2007 and 2008 increased by 8 per cent, from 20.7 million tonnes of metallurgical coal in 2007 to 22.3 million tonnes, contributing an additional \$1.8 billion to BC's net mining revenues.¹⁰⁰



Above & below: BC coal exports by country & region in Canadian dollars – Source: Statistics Canada





Coal ship sailing from port
Photo: ticono-photos.com

BC's Coal Export Facilities

British Columbia is becoming a major player in the global trade of coal, with coal exports rising by 367 per cent between 2001 and 2008, from \$1.269 billion to \$4.663 billion.¹⁰¹

A vast network of railroads and coal terminals (detailed below) allow for the growing volume of coal crossing BC for export, either overseas on freighters, or, to a lesser extent, overland south to the United States.

In 2008, about 80 per cent of the coal exported from Canada by freighter was shipped through coal terminals in Vancouver. The majority of the remaining 20 per cent was shipped through the Ridley Terminals in Prince Rupert, in northern BC.¹⁰²

The majority of metallurgical coal from BC is destined for steel smelters in Japan and South Korea. In 2008, 59 per cent of BC's coal exports were shipped to Asia for steel production.¹⁰³ Smaller amounts were shipped to Europe, Germany and South America.¹⁰⁴

"Coal represents a third of the industrial traffic at the Port of Vancouver, the largest port in Canada"

– Vancouver Port Authority

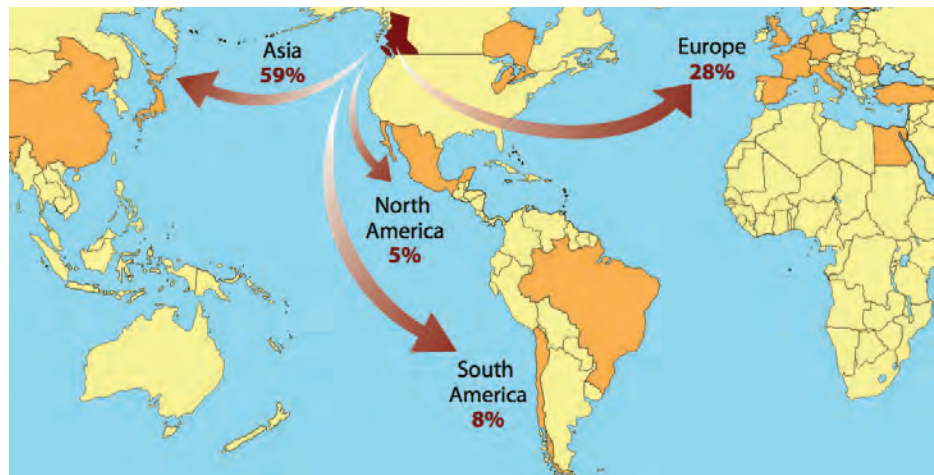
Five port facilities are used to export coal. These are, listed geographically from south to north:

1. Roberts Bank Coal Terminal
2. Neptune Terminal
3. Texada Island Loading Facility
4. Middle Point Barge Loading Facility
5. Ridley Terminal (Ridley Terminals Inc.)

The Roberts Bank, Neptune and Ridley Terminals are the largest export facilities. Collectively they can ship approximately 37.2 million metric tonnes of coal to more than 20 countries worldwide.¹⁰⁵

BC's Coal Ports

Port Metro Vancouver (PMV) is Canada's largest and most diversified port, processing more than \$75 billion in goods shipped to more than 130 countries annually. Rail infrastructure from PMV, including CN Rail and CP Rail, keeps PMV connected to every key market in North America. Two major terminals in Port Metro handle coal: Roberts Bank and Neptune.¹⁰⁶ Combined, these ports can ship over 26 million tonnes of coal annually.¹⁰⁷



Source: http://www.empr.gov.bc.ca/Mining/investors/Documents/Opps_24Oct2010web.pdf

Roberts Bank Terminal

Roberts Bank is by far the largest and busiest coal-loading port on the west coast of North America. Located 35 km south of Vancouver in Delta, BC, next to the Tsawwassen Ferry Terminal, Roberts Bank recently expanded its annual capacity to 29 million tonnes of coal (more than all other west coast coal port facilities combined).¹⁰⁸ In 2009, the port shipped approximately 20 million tonnes of coal,¹⁰⁹ increasing to 24.7 million tonnes in 2010.¹¹⁰

The coal facility at Roberts Bank, called Westshore Terminals since the port opened in 1970, is one part of the Roberts Bank terminal (the other being the Deltaport container terminal). The Jim Pattison Group acquired Westshore in 1994, and reorganized it as a limited partnership. Pattison set up an open-ended trust called Westshore Terminals Income Fund in 1996, which owns all of Westshore Terminals Ltd. Partnership. The Fund has signed a long-term, renewable contract to have Westar Management Ltd. (also run by Pattison) run the coal facility.¹¹¹



In 2008, 82 per cent of the volume shipped from Westshore was metallurgical coal, and the remaining 18 per cent was thermal.¹¹² By 2010, 30 per cent of coal exports were thermal, half of which were destined for China.¹¹³

In 2008, coal-loading revenues at Roberts Bank were \$260 million. In 2007 they were \$156 million, and in 2006 they totalled almost \$158 million.¹¹⁴ The chart below shows exports by destination, as well as the trend of an overall increase in total tonnes shipped from 2006 to 2008, particularly an increase in the amount shipped to Asia.

Destination	2008 thousands of metric tonnes	%	2007 thousands of metric tonnes	%	2006 thousands of metric tonnes	%
Asia	14,591	69	13,004	61	12,246	65
Europe	5,488	26	7,144	34	5,928	31
S. America	628	3	747	4	639	3
Other	372	3	265	1	146	1
Total	21,079	100	21,160	100	18,959	100

Source: <http://www.westshore.com/pdf/2008ar.pdf>

Neptune Terminal

Neptune Bulk Terminal is located on Burrard Inlet in North Vancouver on the north shore of Vancouver's Inner Harbour. It is operated by Neptune Bulk Terminals Canada Ltd.

A variety of materials are shipped from this port, including metallurgical and thermal coal, potash, grains, special crops, animal feed, bulk fertilizers and canola oil.¹¹⁵ In early 2011, infrastructure improvements increased Neptune's coal handling capacity to 9 million tonnes per year.¹¹⁶ Plans are underway to further increase capacity to 12.5 million tonnes of coal by 2013.¹¹⁷ Neptune has the capacity to store 600,000 tonnes of coal.¹¹⁸ Neptune shipped 8 million tonnes of coal in 2010.¹¹⁹

Teck holds a 46 per cent interest in the company that owns Neptune Terminal.¹²⁰ Additionally, Teck and CN Rail have an agreement that allows for the interchange of coal trains between CP Rail and CN Rail at Kamloops, for delivery by CN Rail to Neptune Terminal.¹²¹



Ridley Coal Terminal



The Ridley Coal Terminal is located on Ridley Island in Prince Rupert, in northwestern BC. Ridley is 450 nautical miles closer to Asian ports than Vancouver.¹²²

Ridley is owned and operated by Ridley Terminals Inc. (RTI), a federal crown corporation, which has indicated it would like to privatize the terminal. The Ridley Terminals Users Group, which includes Western Coal, Peace River Coal, First Coal, Canfor's Houston Pellet plant, Grande Cache Coal, Teck Coal, Coal Valley Resources and Suncor, have expressed interest in leasing and managing the Crown corporation. The federal government has, however, yet to disclose its plans.¹²³

The port is the closest major North American port to Asia, making it an attractive port for Western Canadian and Powder River coal being shipped to Asia.¹²⁴

The primary product shipped through Ridley is metallurgical and thermal coal from northern BC and Alberta, although the terminal also ships petroleum, coke and wood pellets.

Coal accounts for more than 80 per cent of Ridley's revenues. Currently Ridley can ship 12 million tonnes of coal, and has capacity to store 1.2 million tonnes.¹²⁵

Historically Ridley operated at less than capacity. That changed in 2010 when Ridley shipped 8.3 million tonnes of coal, its highest total since opening.¹²⁶ Ridley is expected to reach its capacity for the first time in 2011.¹²⁷

In early 2011, Arch Coal, the second-largest U.S. coal producer, signed a five-year agreement with Ridley which will allow the St. Louis-based company with mines in the Powder River Basin in Montana and Wyoming to export up to two million tonnes of coal in 2011, and up to 2.5 million tonnes a year between 2012 through 2015 out of the Prince Rupert terminal.¹²⁸ Ridley also signed smaller contracts with U.S. producers Cloud Peak and Enserco. All three U.S. companies produce low-sulphur coal used in power generation.¹²⁹

Canadian producers are not happy with the increased capacity committed to U.S. coal interests and have called for the terminal's capacity to be expanded to 24 million tonnes a year.¹³⁰

In September, Teck Resources Limited (signed a 10-year deal with Ridley to allow Teck to ship 2.5 million tonnes of coal per year throughout the contract period.¹³¹



Middle Point Barge Facility

Middle Point Barge Facility is located 8 km north of Campbell River on Vancouver Island.

Middle Point is now owned and operated by Vitol Anker International B.V. as a result of its acquisition of Hillsborough Resources in 2009. Coal mined at the Quinsam Mine (*see page 63*) near Campbell River is transported to the Middle Point Barge Facility by underground conveyors, where coal is loaded onto 5,000- to 10,000-tonne barges. Coal is then shipped to the Texada Loading Facilities on Texada Island,¹³² which have the capacity to store 15,000 tonnes of coal.¹³³

Texada Loading Facilities

International buyers of coal from the Quinsam mine receive their coal shipments via Texada Loading Facilities on Texada Island, located southeast of Campbell River in the Strait of Georgia.¹³⁴

Coal from barges at Middle Point is received at the loading facility on Texada Island, where the coal can be loaded onto both Handy (35,000-tonne) and Panamax (65,000-tonne) ships.¹³⁵

Thirty per cent of this coal is barged directly to power plants in Tacoma, Washington, and to cement plants in the Vancouver and Seattle areas, where it is burned to heat their kilns.¹³⁶ The rest is exported to the international power industry in Japan, Chile and Central America.¹³⁷

How Does BC Coal Get to the Ports?

BC has extensive rail capacity that is used for coal transport. Two main rail lines are used to connect the coal mines of BC to the ports on the coast. CN Rail primarily delivers coal from northern BC to Ridley Terminals Inc. in the Port of Prince Rupert. CP Rail serves largely the southern parts of BC, transporting coal to the Roberts Bank and Neptune terminals in Metro Vancouver. CP Rail also ships a small amount of coal east for consumption by steel mills in the Great Lakes region.¹³⁸



Part II: Coal's Impacts on the Planet

Coal plant, Conesville, OH

"Coal is dirty and nasty. It destroys our land when it's strip-mined and messes up the globe when it's burned."

– Robert Moen, Founder, Energy Plan USA

Coal is widely considered a cheap source of energy. This energy source is tolerated only because the chronic health, economic and environmental costs of coal are unreported, underestimated and often overlooked.

The hidden costs of coal are enormous. They include death (from mine accidents and chronic disease), pollution of streams, lakes and aquifers—and most important, our planet's atmosphere.

Coal is arguably more environmentally disruptive than any other type of fossil fuel production. Throughout the mining, production and burning processes, coal raises a number of environmental challenges, including soil erosion, dust, noise, acid mine drainage, ground subsidence, water pollution, and impacts on local biodiversity. These impacts are described in our upcoming companion report, *The Citizen's Handbook on Coal Mining in British Columbia*.

Coal's largest and most devastating impact is on the planet's ability to maintain a safe temperature. In fact, burning coal has been singled out as the largest cause of global warming.

Heat-Trapping Impact of Coal

Coal-fired power plants are the biggest source of man-made heat-trapping pollution world-wide.¹³⁹ A third of all global carbon dioxide emissions come from burning coal. Coal is used to produce nearly 40 per cent of the world's power, and hundreds of new coal plants are planned over the coming years.¹⁴⁰

Coal produces more heat-trapping pollution when it is burned than other fossil fuels.¹⁴¹ This means "coal is the single greatest threat to civilization and all life on

"BC's coal exports are a dirty secret that contradict our province's image as a green leader."³⁸³

– Kevin Washbrook,
Director of Voters Taking
Action on Climate Change

our planet”, according to James Hansen, NASA’s top climate scientist.

In addition to the pollution created when coal is burned, mining coal can also produce a lot of methane, a powerful heat-trapping gas. Methane is a naturally occurring byproduct of the decay of organic matter. As coal develops over time, large quantities of methane form and become trapped in the coalbed. This methane can be released when coal is mined.¹⁴² The released coalbed methane is often referred to as “fugitive emissions.” The release of fugitive coalbed methane can continue for years, even after a mine has been closed.¹⁴³ Estimating and accounting for fugitive emissions, particularly from open-pit coal mines, is one of the most controversial issues in putting a price tag on coal’s impact on the atmosphere.

Methane pollution is a major problem, because it traps more heat in the atmosphere than other greenhouse gases such as carbon dioxide, thus producing more global warming.

Coalbed methane (CBM) has 25 times the potential global-warming impact than carbon dioxide has over a 100-year time span.^{144 145} This means that methane emissions will have 25 times the impact on the planet’s temperature compared to carbon dioxide emissions of the same mass.¹⁴⁶

Industry sometimes extracts CBM from coal seams and uses it for the same purposes as traditional natural gas. This activity comes, of course, with its own array of environmental impacts (for more information on CBM see Dogwood Initiative’s *Citizen’s Guide to Coalbed Methane*).

Coalbed methane also poses safety risks to coal miners. If not managed properly, it can become concentrated in underground mines, raising the risk of explosions. (For more on the dangers of mine explosions, see our upcoming companion report, *The Citizen’s Handbook on Coal Mining in BC*.)

Heat-Trapping Impact of BC Coal Mines

British Columbia has avoided scrutiny of its large (and growing) coal industry partly because there are no coal-fired power plants in the province. However, power plants are not the only way that coal produces heat-trapping pollution.

The mining, processing and transporting of coal, as well as the burning of coal to manufacture steel, also produce significant pollution. Although British Columbia does not, for the moment, burn coal for power, these other processes in the province produce an enormous volume of pollution.

The amount of heat-trapping pollution released during the mining, production and transport of coal depends on a number of factors,

including the type and rank of the coal, depth of the coal seam, method of mining, processing method, and distance and means by which the coal travels to market.¹⁴⁷

As the rank of coal increases, the amount of heat-trapping pollution also increases.¹⁴⁸ Deeper coal seams usually hold more methane than shallow seams of similar rank.¹⁴⁹

Deceptive Accounting of Pollution from Coal Mining in BC

Because it is burned in other jurisdictions, only a small percentage of the actual global-warming pollution that results from coal mined in BC is accounted for in Canada. For example, Environment Canada indicates that Teck contributes only 0.9 million tonnes of heat-trapping pollution to British Columbia's total. In fact, if the total global lifecycle of coal production, transport and burning is fully counted, Teck's five BC coal mines contribute 51.9 million tonnes of heat-trapping pollution to the planet's atmosphere. This is equivalent to 75.5 per cent of BC's total reported pollution (*see Appendix 1*).

In 2007 the Pembina Institute measured the total footprint of the five operational coal mines in the Elk Valley Region using 2005 greenhouse gas pollution figures.¹⁵⁰ If the data from Pembina's study of Elk Valley coal mines is extrapolated¹⁵¹ and applied to all of BC's operational mines, an estimated 3.1 million tonnes of heat-trapping pollution was produced by the mining and processing of coal in 2008 (*see Appendix 3b*).

Pollution from coal mined in BC that is burned outside the province dramatically increases the true impact on global warming of the four corporations with active coal mines in BC.

Of course, when it comes to warming the planet to levels unsafe for humans and other species, it doesn't matter where the pollution from BC coal is released. Heat-trapping pollution is heat-trapping pollution; the whole planet and future generations suffer the effects of BC coal.

Unfortunately, global carbon accounting rules are rigged to allow British Columbia and other fossil fuel-producing jurisdictions to ramp up production of coal, oil and gas for export without counting the resulting pollution when the fossil fuel is burned in another jurisdiction. This allows actual global heat-trapping pollution to skyrocket, while governments claim reductions in their jurisdictions.

These deceptive accounting rules allow BC to increase exports of climate-unfriendly fossil fuels such as coal and shale gas without increasing their reported pollution levels.

For example, British Columbia does not count pollution from BC-mined

coal burned in other provinces and countries. Nor does the provincial government count any of the fugitive emissions, such as methane, released during mining at open-pit coal mines. Counting the pollution from exported BC coal burned abroad would almost double BC's reported contribution to global warming.

If you believe that carbon accounting rules should place the burden of responsibility for the use of toxic commodities on the jurisdiction where it is used, try a thought experiment.

Imagine what would happen if Latin American cocaine cartels, or Asian heroin growers could avoid responsibility because the majority of their addictive products are consumed in other countries?

Imagine if they said, "We don't use it, we just sell it."

It is irresponsible for British Columbia to dodge responsibility for the production of what is increasingly understood as one of the world's most dangerous toxins. British Columbians expect arguments like this from drug cartels, not from our political and business leaders.

The scale of the deception is particularly egregious given the fact that if the reserves of existing coal mines plus coal mines currently seeking environmental assessment approval are fully mined, BC's coal industry would be responsible for releasing 7.9 billion tonnes of heat-trapping pollution. This would amount to 3.38 per cent of the total amount of heat-trapping pollution all humanity can safely release into the atmosphere through 2100.¹⁵²

For these reasons, the amount and effect of heat-trapping pollution created from coal mined in BC is vastly larger than is being reported.

Actual Heat-Trapping Pollution Produced by BC Coal

In 2008, 26.2 million tonnes of coal were produced in BC,¹⁵³ most of which was bituminous coal exported to markets outside BC.¹⁵⁴ Each tonne of coal produces an estimated 2.07 tonnes of CO₂.¹⁵⁵ This means that 54.1 million tonnes of heat-trapping pollution will be created when that coal mined in BC is burned outside the province.¹⁵⁶

To put this amount in perspective, it is equivalent to adding over 10.4 million passenger cars to the roads, or more than two additional cars for every woman, man and child in BC.¹⁵⁷

Although it is the burning of BC coal to make steel that produces the majority of the heat-trapping pollution, the mining, processing and transport of coal also produce significant pollution.

The Pembina Institute conducted research that shows that all but 2.3 million tonnes of pollution from coal mined in BC in 2005 was produced during steel-making processes in other countries.¹⁵⁸ This trend continues through 2010.

Pollution from Mining Coal in BC

An estimated 3.1 million tonnes of pollution was created when coal was mined and processed in BC in 2008. This includes the pollution produced in mining, processing and transporting coal to port (*see Appendix 3b*).

This pollution is accounted for and reported in the BC government's Greenhouse Gas Inventory. However, this acknowledged amount is at most only five per cent of the actual global pollution from coal mining in BC.¹⁵⁹

Uncounted Pollution from Transporting BC Coal to Markets Outside BC

Most of BC's coal is exported to Asia (Japan, South Korea and Taiwan), Europe (Germany, UK, Netherlands, and Italy), South America (Brazil) and the Middle East (Turkey). A small amount is shipped east by rail to other Canadian provinces. (*See Appendix 4.*)

Most of the customers for BC coal are a long way from the west coast coal terminals. The shortest routes to market are Japan and South Korea at just over 8,000 kilometres, while ports in Taiwan are over 10,000 kilometres from coal ports in Vancouver and Prince Rupert. Shipping coal to Europe through the Panama Canal is at least 16,000 kilometres, while Brazil is more than 10,000 kilometres from all BC ports. (*See Appendix 4.*)

Open pit mining
Photo: Vivian Stockman,
ohvec.org



Every kilometre a tonne of coal is shipped produces an average of 15.84 grams of heat-trapping pollution.¹⁶⁰

Using average shipping distances for each country importing BC coal, we have calculated an additional 4.1 million tonnes of pollution resulting from the transport of coal from BC ports to markets outside Canada (see *Appendix 4*).

Total Pollution Produced by BC Coal

Adding together the pollution from producing coal, transporting coal from BC ports to market, and the pollution from BC coal burned abroad reveals that the four corporations with active coal mines in BC were responsible for 61.4 million tonnes of heat-trapping pollution in 2008 (see *Appendix 3b*).

Some examples will illustrate the staggering scale of global-warming pollution from BC coal. Including all the uncounted pollution, BC's existing coal mines produce the same amount of annual pollution as:

1. 11.7 million passenger cars,¹⁶¹ which is more than four times the number of cars registered in BC in 2009;¹⁶² or
2. almost 16 new coal-fired power plants.¹⁶³

Totalling all counted and uncounted sources of pollution shows that coal mining by the four corporations with **active coal mines in BC produces emissions equal to 85 per cent of BC's currently reported domestic emissions** of heat-trapping pollution.¹⁶³ This means that including all the pollution from BC-mined coal would almost double the figure the government reports as the province's contribution to global warming.

Pollution if BC Coal Mines Increase Production to Permitted Levels

Coal production, and thus the total heat-trapping pollution produced each year by BC coal mines, fluctuates because of many factors. For example, the economic downturn in 2008 slowed the demand for coal for steel-making; as a result, production of BC coal was less than forecast.

The currently permitted coal mines in BC¹⁶⁵ have coal quotas to collectively mine 33.8 million tonnes annually (see *Appendix 1*). Production levels vary by year depending on a variety of factors, including coal price and demand. When markets exist, existing BC coal mines can produce significantly more coal, and heat-trapping pollution, than they did in 2008.

If the four coal corporations fully mined their permitted volume of coal, they would create almost 70 million tonnes of pollution annually when

this coal was burned,¹⁶⁶ exceeding the heat-trapping pollution from all other non-coal sources in BC combined.¹⁶⁷

This means that if markets improve and BC coal mines begin operating at full capacity, the annual pollution from mining, processing, transporting and burning BC coal would be larger than all other reported heat-trapping pollution from all sources in BC in 2008.¹⁶⁸

Pollution from BC Coal Mine Reserves

Even more disturbing is the staggering amount of heat-trapping gases that will pollute the atmosphere from coal produced in BC coal mines over their operating lifespan. The coal reserves from BC's currently operating coal mines, if burned, would produce an estimated 1.7 billion tonnes of heat-trapping pollution.¹⁶⁹

This is equivalent to almost 331 million passenger cars being added to the road in BC, which would be an additional 74 cars for every man, woman and child in BC.¹⁷⁰

Pollution from Proposed BC Coal Mine Reserves

British Columbia's pollution numbers increase dramatically if the coal mines currently being proposed are approved and become operational. If the reserves of all proposed coal mines are fully mined, and the coal is burned, it would produce 13.1 billion tonnes of heat-trapping pollution.¹⁷¹

While the reserves of the proposed coal mines in early stages of development may be less exact, if just the reserves of all existing and more advanced proposed coal mines are mined and burned, 7.9 billion tonnes of heat-trapping pollution would enter the atmosphere.¹⁷² This would be equal to the annual emissions from 2,043 additional coal-fired power plants.

Over 14.8 billion tonnes of pollution would be produced by existing and proposed mines over their lifespan if their reserves were fully mined and burned (*See Appendix 3b*)

Impact of Burning BC Coal Reserves on Global Carbon Budget

The enormous volume of pollution that would result from burning BC's coal reserves is even more overwhelming when compared to the globe's estimated "budget" for heat-trapping pollution.

Scientists agree that, for humanity to survive, the average global temperature must not increase by more than two degrees Celsius. They have estimated the maximum amount of heat-trapping pollution

humanity can emit between now and 2100 without exceeding the two-degree limit. This maximum amount—or budget—is 233 billion tonnes.

If the reserves of all existing and proposed coal mines are burned, 14.8 billion tonnes of pollution would be released into the atmosphere. This is an astonishing 6.35 per cent of the total amount of heat-trapping pollution scientists believe all of humanity can safely emit over the next 90 years. ¹⁷³(*See Appendix 3c.*)

With a population of 4.45 million, British Columbia currently has only 0.065 per cent of the world's population.¹⁷⁴ Allowing our coal industry to produce over six per cent of total pollution that can be safely emitted by all of humanity through 2100—almost 100 times our per-capita amount — is unacceptable.

(For a comparative look at each operational mine and proposed mine see Appendixes 1, 2a and 2b.)



Rail cars loaded with coal
Photo: Jeff Williams

Part III: Laws Regulating Coal in BC

A variety of laws and policy initiatives regulate coal in BC. These govern not only coal's contribution to global warming but its impacts on water, land, wildlife, communities and human health. Rules on the latter impacts are covered in detail in our upcoming companion report, *The Citizen's Handbook on Coal Mining in British Columbia*.

BC's Dirty Secret focuses on the overlapping laws, policies, regulations and proposals that will govern the global-warming effects of British Columbia's coal industry. Primary among these are the:

1. *Carbon Tax Act*,
2. *Greenhouse Gas Reduction (Cap and Trade) Act*, and
3. Western Climate Initiative (WCI)

Each is discussed in more detail below the following overview.

Coal processing
Photo: coal-is-dirty.com



The greatest weakness of the BC government's program to reduce heat-trapping gas pollution is not what it regulates but what it omits.

The fact is, the government can only achieve its goal in one of two ways: Either it can continue to ignore its own hypocrisy; or it can phase out coal mining in BC. It is choosing the former.

In fact, none of the BC government's current proposals for reducing heat-trapping pollution (carbon tax, cap and trade) will offset the rapidly expanding pollution from the production and burning of BC coal.

The rules BC and its partners in the Western Climate Initiative (WCI) are adopting ignore the pollution from fuels burned in other jurisdictions. The WCI rules also exclude some of the pollution that mining itself produces, such as the fugitive coalbed methane pollution released from nine out of BC's ten operating coal mines (i.e., the open-pit mines). These are not counted in the tally of provincial emissions (*see discussion of WCI, page 45*).

While expanding the coal industry may be enticing to BC's cash-strapped government, it raises serious questions about the provincial government's commitment to being a global climate leader. Real climate leaders do not mislead people and take advantage of accounting loopholes.

While governments clamour to prevent Latin American cocaine cartels or Asian heroin growers from systematically exporting toxic substances to North America, British Columbia is ramping up production of toxic coal to countries addicted to its use.

We do not accept drug lords' arguments that "we don't use it, we just sell it."

British Columbians cannot allow our government, or coal companies operating in our province, to dodge responsibility for the production of what is increasingly understood as one of the world's most dangerous toxins.

BC Carbon Tax and Coal

In 2008, the BC government introduced a revenue-neutral carbon tax: the *Carbon Tax Act*.

The tax is based on the amount of pollution that results from the specific fossil fuel being used. The law puts a price on each tonne of heat-trapping pollution emitted. The amount of tax attached to the particular fuel depends on the fuel's carbon content. Coal would garner a higher tax than natural gas if burned in BC, since it produces more heat-trapping carbon pollution.¹⁷⁵

Supporters of the carbon tax hope the tax will send a price signal that will, over time, elicit a powerful market response across the entire economy, resulting in reduced emissions. The theory is that taxing emissions will change behaviour by providing an incentive, without favouring any one way of reducing emissions over another.

Tax rates were originally set at \$10 per tonne of CO₂ equivalent (CO₂e) emissions. The government proposes to increase this rate by \$5 per tonne each year over the next four years. In 2012, the rate is intended to be \$30 per tonne. Different fuels generate different amounts of greenhouse gases, so the standard rate of \$10 per tonne of CO₂e must be translated into tax rates for each specific type of fuel.¹⁷⁶

Due to the high amount of greenhouse gas emitted from coal, it is taxed accordingly:

	Tax Rate (as of July 1, 2009) (\$ per tonne)
Coal - high heat value	31.16
Coal - low heat value	27.66

Source: BC Climate Action Plan

Limitations of the Carbon Tax

Unfortunately, the carbon tax only applies to fossil fuels that are burned in British Columbia. The tax does not apply to resources such as coal and natural gas that are produced in BC but burned abroad. Given the volume of BC coal burned abroad (equal to 85% of all emissions within BC), this is a crippling limitation on the effectiveness of the tax.

One solution would be to simply apply the tax to exported coal and gas. However, there are considerable difficulties in establishing such a tax, since to be effective, it would require global agreement. Although Dr John L. Perkins, a research economist for the National Institute of Economic and Industry Research in Australia, has advocated the adoption of coal export tax in the hopes that other countries will fall in line with the idea,¹⁷⁷ there seems to be no political will to attempt this in BC.

BC's Climate Change Legislation: *Cap and Trade Act*

In February 2007, BC's Premier committed to a 33 per cent reduction in heat-trapping pollution (from 2007 levels) by 2020. At the time, the goal was the highest standard set by any North American jurisdiction.

A series of statutes in 2007 and 2008 established these and additional greenhouse gas reduction targets in legislation. These legislated targets include:

1. 6 per cent below 2007 levels by 2012,
2. 18 per cent by 2016, and
3. 80 per cent by 2050.

In 2010, the government promised to expand the targets to apply to all emissions from government operations, as well as to schools, colleges, universities, health authorities, Crown corporations and other public-sector organizations.

Unfortunately, the legislation takes a narrow view of what types of pollution will be monitored and reduced. It does not cover pollution from

Rail cars loaded with coal
Photo: celsias.com



BC mining products that are burned abroad.

This means that BC's polluting industries such as coal and natural gas can massively ramp up, while the government can still claim British Columbia is reducing its emissions. This already appears to be happening.

BC and Cap and Trade

In April 2008, Environment Minister Barry Penner introduced the *Greenhouse Gas Reduction (Cap and Trade) Act*: "The *Cap and Trade Act* will make British Columbia the first Canadian province to introduce legislation authorizing hard caps on greenhouse gas emissions".¹⁷⁸

Once the rules come into effect, large emitters will be assigned a cap, or a number of tradable compliance units for a given time period (called a compliance period). The large emitters are required to obtain a number of compliance units equal to the amount of regulated greenhouse gas pollution they release during the compliance period. These units must be surrendered to the government as proof of compliance.¹⁷⁹

BC has set a compliance unit equal to one tonne of CO₂ or its equivalent, a measure adopted by other systems, including the Western Climate Initiative. There are three types of compliance units identified in the Act:

1. BC Allowance Units (issued by the government according to the cap specified for a given compliance period).
2. BC Emissions Reduction Units (offset credits from approved emissions reduction or removal projects in BC).
3. Recognized Compliance Units from other cap and trade systems, such as those established by the WCI.¹⁸⁰

How Cap and Trade is Supposed to Work

Cap and trade systems try to reduce emissions by setting a cap, or limit, on the total amount of emissions for those who emit. Emitters are issued emission allowances (or credits), which are equivalent to the amount of emissions permitted by the cap. In BC, the cap is supposed to be lowered over time, with the goal of reducing the overall amount of emissions.¹⁸¹

If an emitter exceeds the credits permitted by its allowance, the system allows it to purchase credits from the allowance of other emitters (the "trade" part of the regime). If an emitter is able to reduce emissions and has extra credit from its allowance, it can then sell this excess allowance for a profit.¹⁸²

In the end, emitters that reduce their emissions are rewarded with the

profit from their credit, and those which emit beyond their allowance are forced to pay for the additional emissions.

Unfortunately, neither BC's *Cap and Trade Act* nor the Western Climate Initiative applies to exported products like coal, where the pollution occurs abroad. Since these exported emissions are not covered, the cap and price signal does not occur.

In BC this means that only 3.1 million tonnes of coal's true heat-trapping pollution are accounted for—or about five per cent of the total pollution for the production, transport and burning of BC coal.¹⁸³ This is a serious flaw of cap and trade, a flaw that will allow the heat-trapping emissions from BC's coal to skyrocket, while the province claims progress toward its legislated reduction targets.

Western Climate Initiative

The *Greenhouse Gas Reduction Act* is BC's blueprint for implementing the Western Climate Initiative (WCI), a multi-jurisdictional partnership launched in February 2007.

The WCI's partnership includes seven US states (California, Oregon, Washington, New Mexico, Arizona, Utah and Montana) and four provinces (Quebec, Ontario, Manitoba and British Columbia). British Columbia is working with the WCI to develop a broad cap and trade program that will “develop new green technologies, build strong, diverse, green economies and reduce dependence on foreign oil.”^{184, 185}

By 2015, the WCI is supposed to be fully implemented, and will cover an estimated 90 per cent of greenhouse gas emissions that occur in the participating provinces and states. Sources from which emissions will be recorded include electricity generation, direct industrial emissions, and transportation, residential and commercial fuel use. The program is intended to cover the emissions of six main greenhouse gases (carbon dioxide, methane, nitrous oxide, hydro fluorocarbons, perfluorocarbons, and sulfur hexafluoride).¹⁸⁶

In partnership with the WCI, BC has formed the Climate Action Plan. In this plan, the *Cap and Trade Act* lays the foundation for a cap and trade system for large emitters of greenhouse gases, such as coal mines and those who use coal as a fuel source within the province. This system is supposed to allow BC to compete and succeed in a new marketplace with room for growth.¹⁸⁷

Unfortunately, as described above, the WCI proposal does not cover the pollution in other jurisdictions from the use of highly polluting exports, such as coal.

WCI and Coal

Furthermore, the WCI will not cover some of the heat-trapping pollution that is produced by the process of mining coal. WCI only accounts for the methane emissions from underground coal mining, not from open-pit coal mining, which is practised in nine of ten coal mines in BC.

Due to the limited scope of what can be measured, the WCI's participants say they do not intend to include surface coal mining in the list of industries that must record their fugitive emissions. In BC, nine of the ten operational coal mines are open-pit. Thus, the WCI will be limited to recording the emissions from only one of BC's ten current coal mines, and will therefore take into account only three per cent of the coal produced over the lifetime of existing coal mines.

In addition, of the estimated 19 proposed mines (including those in the very early stages), only two are proposed to be underground coal mines, the Raven Underground Coal Mine and the Gething Coal Project. Therefore, WCI would require a mere 0.5% of the coal in the proven reserves of BC's proposed mines to measure and record their emissions, if the mines continue to the operational phase.

The reason WCI excludes fugitive methane emissions from surface coal mines is that they are relying on the International Panel on Climate Change (IPCC) Tier 3 methodology for quantifying the heat-trapping pollution from coal mines. Methane has 25 times the global-warming potential of carbon dioxide. The applicability of IPCC's Tier 3 methodology is inadequate in relation to coal, because it omits open-pit and mountain-top-removal mines.

The IPCC justifies excluding these fugitive emissions by arguing that it is difficult to measure heat-trapping pollution from surface coal mines, given the lack of accurate quantification methods.¹⁸⁸ In addition, the quantification of heat-trapping pollution is further limited by the difficulty in measuring particular sources. Some of these sources include post-mining operations (transportation of coal, processing, etc.), remediating abandoned mines, low-temperature oxidation (oxidation when coal is exposed to air), and uncontrolled combustion.¹⁸⁹

For this reason, the mountain-top, open-pit, and contour-strip forms of coal mining are not covered by the WCI's rules. Their emissions will be ignored by the government.



Part IV: The BC Coal Industry

The coal industry has undergone a massive consolidation over the last century. In the 1930's over 400 small producers were in operation; today, Canada has only eight large producers, and a few minor producers.¹⁹⁰

Currently Approved Coal Mines

The industry is even more concentrated in British Columbia. Four corporations currently dominate the coal industry in BC (*see page 67*). These corporations own ten coal mines in the Province (nine are operational and one has been idle since 2008).¹⁹¹ All of the corporations currently mining coal in BC are planning to increase their coal production by expanding existing mines, or by seeking approval for new mines.

These are the corporations that dominate the BC coal industry:

1. The Teck group of corporations is by far the biggest coal miner, with five mines currently operating (Elkview, Coal Mountain,

Coal mining equipment
Photo: siemens.com



NOTES

All estimates of pollution from proposed production and coal reserves were calculated using a factor of 2.07 tonnes of greenhouse gas per tonne of coal burned. (See Appendix 1.)

All calculations to determine the equivalent annual pollution from cars or coal-fired power plants were calculated using the US Environmental Protection Agency's online "Greenhouse Gas Equivalencies Calculator"

Fording River, Greenhills, Line Creek), one proposed (Mount Michael), and two being reclaimed (Quintette and Bullmouse).

2. Western Coal is the second biggest, with three mines (Brule, Wolverine and Willow Creek, which is idle) as well as another (Hermann) that has received its environmental assessment approval, but is delayed.
3. Peace River Coal Ltd Partnership owns one operating mine (Trend) and has two proposed mines (Roman and Horizon) awaiting environmental assessment approval.
4. Vitol Anker International B. V., which recently acquired Hillsborough Resources, owns one mine (Quinsam) and has two proposed mines (Wapiti and Bingay) moving towards approval.

Below are short descriptions of each of the ten existing coal mines and the companies that own them. The mines are grouped by company.

For each company and mine, a chart is provided which details the type of mine; type of coal produced; mine's annual output, proven reserves and shareholders; an estimate of the total global-warming pollution produced; and the percentage of BC's currently counted pollution that this total represents. (All tonnage figures are metric. See Appendix 1 for a summary of all figures.)

Company: Teck

The Teck family of companies is the second-largest producer of steel-making coal in the world, "supplying about one-sixth of the global seaborne steelmaking coal market."¹⁹² Teck is also the largest coal miner in BC, with five mines.

Teck produced 21.6 million tonnes in 2007 and 23 million tonnes of coal in 2008.^{193 194}

Producing, transporting and burning the coal from Teck's five coal mines produced approximately 51.9 million tonnes of heat-trapping pollution in 2008.¹⁹⁵ Although these numbers vary slightly each year depending on production levels and the location of customers, it makes Teck year in and year out by far the biggest heat-trapping polluter in BC.¹⁹⁶

In 2008, pollution from Teck's BC coal mines was equal to 75.5 per cent of the heat-trapping pollution that comes from all other sources in British Columbia.¹⁹⁷ In 2008 Teck's BC coal mines produced heat-trapping pollution equivalent to 9.9 million passenger cars added to the road (two additional cars for every resident of BC), or the annual emissions from 14 coal-fired power plants.¹⁹⁸

The five mines Teck operates in British Columbia are: Coal Mountain, Elkview, Fording River, Greenhills and Line Creek. These mines produce mostly metallurgical coal, i.e., coal burned to manufacture steel.

These mines, along with Teck's single coal mine in Alberta, make Teck the world's second-largest overseas exporter of hard coking coal. Most of this coking coal is used in the production of steel.

The proven reserves from these five mines, if burned, would produce a staggering 1.27 billion tonnes of global-warming pollution. This is equivalent to the annual pollution from 242.7 million passenger cars (or seven additional cars for every resident of Canada ¹⁹⁹), or the annual emissions from 330 coal-fired power plants.

Company	Teck
Website	http://www.teck.com/
Headquarters	Vancouver, BC
Mines	Coal Mountain, Line Creek, Elkview, Greenhills, Fording River
Company's permitted capacity	24 million tonnes
Company's proven reserves	613.3 million tonnes
Company's carbon emissions 2008	51.9 million tonnes
Company's pollution as a percentage of BC's reported emissions in 2008	75.5%

Mine: Coal Mountain

Owned and operated by Teck through its subsidiary Teck Coal, Coal Mountain is located 30 km southeast of Sparwood, BC. Coal Mountain is an open-pit, bituminous coal mine, which produces both metallurgical and thermal coal. Comprised of 2,521 hectares of coal lands, 950 hectares are currently being mined or are scheduled for mining.²⁰⁰

This site was first mined underground in 1905. Open-pit mining began in the 1920s, and large-scale open-pit mining began in the 1940s. It is estimated that there has been more than 40 million tonnes of coal mined at this site.²⁰¹ Generally, Coal Mountain produces 2.2 million tonnes of coal each year, with remaining proven reserves of more than 28 million tonnes. The mine is expected to continue operating for 12 more years. More exploration drilling is taking place to extend the life of the mine beyond current estimates.²⁰²

Once coal is extracted from Coal Mountain, it is loaded into trains, and transported 1,175 km to Westshore Terminals at Roberts Bank outside Vancouver, or to Neptune Terminal in the Port of Vancouver. A portion of



the coal is also shipped east by rail directly from the mine to Thunder Bay, Ontario, and some is sent south by rail to the central and eastern United States.²⁰³

In 2008, Coal Mountain produced an estimated 4.95 million tonnes of heat-trapping pollution. This is equivalent to the annual pollution from 945,946 passenger cars, or 1.3 coal-fired power plants.

If burned, the proven reserves from Coal Mountain would produce 58 million tonnes of global-warming pollution, equivalent to 11 million passenger cars, or 15 coal-fired power plants.

Mine	Coal Mountain
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, thermal)
Annual Permitted Production	2.7 million tonnes annually
Proven reserves	28 million tonnes
2008 pollution	4.95 million tonnes
Pollution from reserves, if burned	58 million tonnes
Shareholders	Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.

Mine: Elkview

Elkview is the largest coal mine in Canada, with approximately 232.6 million tonnes of proven coal reserves. Approximately 5.6 million tonnes of coal is produced at the mine each year. The mine is located in the Elk Valley region of the Kootenays, approximately 3 km from Sparwood, BC.²⁰⁴

The Elkview mine is owned by Teck Resources Ltd. and operated by Teck Coal Ltd. Elkview produces bituminous, metallurgical coal. Depending on future production rates, the mine's lifespan will be 30 to 40 more years. Exploration drilling has indicated that there may be up to 1.6 billion tonnes of coal in inferred reserves.²⁰⁵

Underground mining began at Elkview in the late 1800s. In 1969 surface mining commenced, and in the mid-1980s underground operations were halted. Currently, there are six open pits, five of which are active. Since surface mining commenced, 165 million tonnes of coal have been produced.²⁰⁶

The metallurgical coal produced is shipped primarily to Japan, but also



to Korea, Brazil, the United States, Britain, Germany, Sweden, Spain and Taiwan, for use in the steel industry. A train transports the coal across BC to Roberts Bank Terminal, where it is loaded into ships bound for Asian ports.²⁰⁷

In 2008, Teck's Elkview mine was responsible for 10.1 million tonnes of heat-trapping pollution. This was equivalent to the annual pollution from 1.94 million passenger cars, or 2.6 coal-fired power plants.²⁰⁸

If burned, the proven reserves from Elkview would produce a staggering 481.5 million tonnes of global-warming pollution, equivalent to 92 million passenger cars, or 125 coal-fired power plants.

Mine	Elkview
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical)
Annual Permitted Production	5.6 million tonnes annually
Proven reserves	232.2 million tonnes
2008 pollution	10.1 million tonnes
Pollution from reserves, if burned	481.5 million tonnes
Shareholders	Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.



Mine: Fording River

The Fording River mine is located in the Kootenays on Eagle Mountain, 29 km northeast of Elkford, BC. Owned by Teck Resources Ltd. and operated by Teck Coal Ltd., this open-pit mine has been in operation since 1971.²⁰⁹

Since 1982, mining has been centred at Eagle Mountain, producing bituminous, metallurgical coal, and a small amount of thermal coal.²¹⁰ Proven coal reserves are in the range of 256.5 million tonnes. With current production rates of 8 million tonnes per year, the remaining lifespan of the mine is estimated to be 27 years.²¹¹ The mine site's area is 20,304 hectares, of which 4,220 are currently being mined or are scheduled to be mined.²¹²

Coal from the mine travels by rail from Elk Valley to Roberts Bank Terminal (1,100 km), then is shipped to Japan. Fording River has a 15-year contract with Japanese steel mills to supply coking coal.²¹³

In 2008, Teck's Fording River mine was responsible for 16.97 million tonnes of heat-trapping pollution. This is equivalent to the annual pollution from 3.25 million passenger cars, or 4.4 coal-fired power plants.

If burned, the proven reserves from the Fording River mine would produce 531 million tonnes of global-warming pollution, equivalent to 101.5 million passenger cars, or 138 coal-fired power plants.

Mine	Fording River
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, thermal)
Annual Permitted Production	8.2 million tonnes annually
Proven reserves	256.5 million tonnes
2008 Pollution	16.97 million tonnes
Pollution from reserves if burned	531 million tonnes
Shareholders	Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.

Mine: Greenhills

The Greenhills open-pit coal mine is located in southeastern BC, 8 km from Elkford. The mine is operated under a partnership agreement between Pohang Steel Canada Limited and Teck, with Teck owning 80 per cent.²¹⁴



The mine site is comprised of 10,892 hectares of coal lands, of which approximately 2,200 hectares are currently being mined or are scheduled for mining from the 81.3 million tonnes of metallurgical and thermal coal reserves.^{215 216} Greenhills is currently permitted to produce up to 5.2 million tonnes of coal annually. In 2008 it produced 4.6 million tonnes.²¹⁷ The lifespan of the mine is estimated to be 18 more years at current production rates.²¹⁸

The majority of coal from Greenhill is shipped by rail, approximately 1,200 km to Roberts Bank Terminal, or to Neptune Terminal in Vancouver. Most of the coal is exported by ship to buyers in Southeast Asia, India and Europe and is used in the manufacturing of steel.^{219 216} Some of the coal is shipped east to buyers in Canada.

In 2008, Teck's Greenhill mine was responsible for 9.5 million tonnes of heat-trapping pollution. This is equivalent to the annual pollution from 1.8 million passenger cars, or 2.5 coal-fired power plants.²²¹

The proven reserves from Greenhill, if burned, would produce 168.3 million tonnes of global-warming pollution, equivalent to 32.2 million passenger cars, or 43.7 coal-fired power plants.

Mine	Greenhills
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, thermal)
Annual Permitted Production	5.2 million tonnes annually
2008 forecast production	4.6 million tonnes
Proven reserves	81.3 million tonnes
2008 pollution	9.5 million tonnes
Pollution from reserves, if burned	168.3 million tonnes
Shareholders	Pohang Steel Canada Limited, Keewil Holding Corporation, Sumitomo Metal Mining Co. Ltd.



Mine: Line Creek

The Line Creek mine is located in southeastern BC in the Rocky Mountains, approximately 27 km north of Sparwood. The mine is owned by Teck and operated by its subsidiary Teck Coal.²²²

Line Creek is an open-pit mine that began production in 1981. The mine is permitted to produce up to 2.5 million tonnes of metallurgical, coking and thermal coal annually.²²³ The mine is estimated to hold 14.9 million tonnes of coal reserves under 1,900 hectares of land.^{223 224}

The metallurgical coal from Line Creek is used primarily in steel manufacturing. After being loaded into CPR trains, the coal travels to Roberts Bank Terminal and from there by ship to customers in Japan, Korea, Brazil and the United States. Some coal goes east by rail to Thunder Bay for distribution to other North American markets.

Thermal coal produced at the Line Creek Mine is shipped by truck to be used for electricity generation and cement manufacturing in western Canada.²²⁵

In 2008, Teck’s Line Creek Mine was responsible for 4.55 million tonnes of heat-trapping pollution each year. This is equivalent to the annual pollution from 870,000 passenger cars, or the annual emissions from 1.2 coal-fired power plants.

The proven and probable reserves from Line Creek, if burned, would produce 30.8 million tonnes of global-warming pollution, equivalent to 5.8 million passenger cars, or 8 coal-fired power plants.

Mine	Line Creek
Status	In production
Mine Type	Open-pit

Coal Type	Bituminous (metallurgical, coking, thermal)
Annual permitted Production	2.5 million tonnes annually
2008 forecast production	2.2 million tonnes
Proven reserves	14.9 million tonnes
2008 pollution	4.55 million tonnes
Pollution from reserves, if burned	30.8 million tonnes
Shareholders	Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.

Company: Western Coal

In March 2011, U.S.-based Walter Energy Inc. completed a \$3.3 billion takeover of Western Coal, BC's second-largest coal producer.²²⁶ Walter Energy now operates Western Coal as a wholly owned subsidiary.²²⁷ Walter Energy Inc. also has Western has coal mining operations in the southern Appalachia region of the eastern U.S. and Alabama's Blue Creek coal region.²²⁸

Western Coal currently operates three mines in British Columbia, two of which are operational. Through the takeover Walter Energy Inc. also acquired Western Coal's rights to two large, multi-deposit coal properties in northeastern BC—the Wolverine group (Wolverine mine) and Brazion group (Brule and Willow Creek mines). Western Coal's properties include approximately 35,000 hectares under licence or lease, all in northeastern British Columbia.²²⁹

Western Coal's operations in BC have an estimated 98.5 million tonnes of proven and probable reserves and over 230 million tonnes of resources.²³⁰

All three of Western Coal's mines are located in close proximity to rail and road networks that are available year round. According to contracts the company signed in 2006 with Ridley Terminals Inc. and CN Rail, Western Coal will move all its coal on the former BC Rail main line from the Willow Creek and Brule Mines to the port in Prince Rupert, 950 km away. The port services agreement expires in 2015.²³¹

All of Western Coal's 2010 coal production is under contract for sale to international steel producers.²³²

The coal from Western Coal's Wolverine and Brule mines has been sold to major steel mills throughout Asia and Europe, with long-term supply agreements in place for the next three years.²³³

Since 2008, Western Coal, sometimes referred to as Western Canadian Coal, operates some of its mines through its subsidiary, Falls Mountain Coal Inc. (FMC). For example, the Willow Creek Mine, part of the Brazion property group located west of the town of Chetwynd in northeastern BC, is operated by FMC. In addition to Willow Creek, FMC has interests in nearby coal properties, including Pine Pass, Crassier Creek, Falling Creek and Fisher Creek. These properties are referred to as “Willow Creek Coal Properties,” and they will run as offshoots of the Willow Creek Mine.

Western Coal also owns mines in the U.S. and United Kingdom as well as 40 per cent of the shares in Xtract Energy Plc of London (an investor in early stage energy sector businesses), NEMI Northern Energy & Mines Inc (which owns approximately a 12% interest in Peace River Coal Limited Partnership) and Mandalay Resources Corporation (which operates a gold and antimony mine in Australia and has copper and silver interests in Chile).²³⁴

In 2008, Western Coal’s three coal mines were responsible for 8.2 million tonnes of heat-trapping pollution. This equals 11.9 per cent of the heat-trapping pollution from all other sources in British Columbia.²³⁶ It is equivalent to the annual pollution from 1.6 million passenger cars, or 2.1 coal-fired power plants.

The proven reserves from Western Coal’s three mines, if burned, would produce 203.9 million tonnes of global-warming pollution, equivalent to 39 million passenger cars, or 53 coal-fired power plants.

Ship docking at a coal port



Company	Western Coal
Website	http://www.westerncoal.com/
Headquarters	Vancouver, BC
Mines	Willow Creek, Wolverine, Brule
Annual permitted production	5.2 million tonnes
2008 forecast production	3.5 million tonnes
Company's 2008 pollution	8.2 million tonnes
Pollution from reserves, if burned	203.9 million passenger cars
Company's carbon emissions as percentage of BC's reported emissions in 2008	11.9%

Mine: Brule

The Brule Mine is located 45 km south-southwest of Chetwynd, BC.²³⁷ Brule, part of the Brazion property group, is the successor to the Dillon mine, and is now owned and operated by Western Coal.

Brule is an open-pit mine, and material produced there includes bituminous and metallurgical coal for export, primarily to Korean markets. Proven and probable reserves are 34.3 million tonnes of coal.²³⁸ The Brule project has been in production since 2007. The Mine currently produces 1.3 million tonnes of coal annually.²³⁹ Current market conditions suggest the rate of production could increase to 2 million tonnes per year.²⁴⁰

The main local issue with the Brule mine is its proposal to more than double the size of the trucks allowed at the mine, to 100-tonne-capacity trucks. The current haul capacity is limited to 40-tonne trucks on government highways.²⁴¹

In the summer of 2010, the Environmental Assessment Office is expected to amend the mine's environmental assessment certificate, to allow the coal produced at the Brule mine to be hauled on the highway to the Willow Creek Mine. Once the corresponding application to MEM is approved, coal from Brule will be sent to Willow Creek, where it will be shipped by rail to port.²⁴²

In 2008, Western Coal's Brule Mine was responsible for 2.7 million tonnes of heat-trapping pollution.²⁴³ This is equivalent to the pollution from 514,000 passenger cars.

If burned, the proven reserves from Brule would produce an alarming 71 million tonnes of global-warming pollution, equivalent to 13.6 million passenger cars, or 18.4 coal-fired power plants.

Mine Site	Brule
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical)
Annual Permitted Production	1.3 million tonnes annually
2008 forecast production	1.3 million tonnes
Proven reserves	34.3 million tonnes
2008 pollution	2.7 million tonnes
Pollution from reserves, if burned	71 million tonnes
Shareholders	Cambrian Mining PLC

Mine: Willow Creek

The Willow Creek Mine is owned by Falls Mountain Coal Inc. (FMC), which operates as a subsidiary of Western Coal. Willow Creek is part of the Brazion property group, located west of the town of Chetwynd, in northeastern BC. The mine has additional properties associated with it that are located within the Pine Pass area, in the Peace River District.²⁴⁴ Willow Creek is an open-pit mine that produces metallurgical, hard coking, and bituminous coal.

Mining commenced at Willow Creek on October 16, 2008, and approximately six weeks later was idled due to significant market collapse and uncertainty about demand for metallurgical coal. Willow Creek's proven and probable coal reserves are estimated to be 29.6 million tonnes.²⁴⁵ When operational, the mine's production is 0.9 million tonnes per year of metallurgical coal, and 0.6 million tonnes per year of hard coking coal.

When operating, Western Coal's Willow Creek Mine is responsible for approximately 3.1 million tonnes of heat-trapping pollution each year. This is equivalent to the pollution of 593,000 passenger cars.

If burned, the proven and probable reserves from Willow Creek would produce 61.3 million tonnes of global-warming pollution, equivalent to 11.7 million passenger cars, or 16 coal-fired power plants.



Mine	Willow Creek
Status	Idle
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, coking)
Annual Permitted Production	1.5 million tonnes annually
Proven reserves	29.6 million tonnes
2008 pollution	unknown ²⁴⁶
Pollution from reserves, if burned	61.3 million tonnes
Shareholders	Cambrian Mining PLC

Mine: Wolverine

Owned and operated by Western Coal, the Wolverine project is an open-pit coal mine that produces bituminous, hard coking and metallurgical coal. Currently, the project includes 6,016 hectares under licence or lease.²⁴⁷

The Wolverine Mine opened in 2006 with a capacity to produce 2.4 million tonnes of coal per year, and has estimated reserves of 34.6 million tonnes.²⁴⁸ The mine has since obtained an environmental assessment certificate, which will allow annual coal production to increase to 3 million tonnes of coal per year.²⁴⁹

Wolverine encompasses the Perry Creek operation and the “EB” and Hermann deposits. EB, although not yet active, was evaluated as part of the Wolverine Mine’s previous approval process. Hermann received environmental assessment approval, but has not yet gone into production.

Western Coal’s Wolverine Mine was responsible for approximately 4.6 million tonnes of heat-trapping pollution in 2008. This is equivalent to the annual pollution from 870,000 passenger cars.

If burned, the proven and probable reserves from Wolverine would produce an alarming 71.6 million tonnes of global-warming pollution, equivalent to 13.7 million passenger cars, or 18.6 coal-fired power plants.

Mine	Wolverine
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, coking)

Annual Permitted Production	3 million tonnes
Proven reserves	34.6 million tonnes
2008 Pollution	4.6 million tonnes
Pollution from reserves, if burned	71.6 million tonnes
Shareholders	Cambrian Mining PLC

Company: Peace River Coal Ltd. Partnership

Peace River Coal Limited Partnership (PRC) is a limited partnership among Anglo American PLC, NEMI Northern Energy & Mining Inc. and Vitol Anker International B.V. (formerly Hillsborough Resources Limited). PRC holds significant coal resources in western Canada, and conducts mining operations in the Tumbler Ridge area. In 2009, it was projected that PRC projects would generate 800,000 million tonnes of hard coking coal.²⁵⁰

Anglo American PLC's coal interests are held through its wholly owned Anglo Coal business, one of the world's largest private-sector coal producers and exporters. Anglo Coal has mining operations in South Africa, Australia, Colombia and Venezuela, and develops Canadian coal properties through Anglo Coal Canada Inc. Anglo Coal produces thermal and metallurgical coals for international customers in the Atlantic and Indo-Pacific markets, as well as local customers in South Africa and Australia.²⁵¹

PRC has metallurgical coal development projects under investigation at the Roman and Horizon properties, near Tumbler Ridge. PRC also owns 50 per cent of The Belcourt-Saxton coal property, located near Tumbler Ridge.²⁵²

Delta Coal Port
Photo: MEMPR



Mine: Trend

Peace River Coal owns the Trend Coal Mine, located approximately 25 km south of Tumbler Ridge, in northeastern BC.²⁵³

Mining began at Trend in December 2005. In 2008, the Trend Mine produced 0.8 million tonnes of coal, comprised of 632,000 tonnes of metallurgical coal and 140,000 tonnes of thermal coal.²⁵⁴

In early 2010 the Ministry of Energy and Mines estimated that the Trend Mine had proven and probable reserves of 17 million tonnes.²⁵⁵ Trend is permitted to produce up to 2 million tonnes of coal per year.²⁵⁶

In 2008, the mine was responsible for over 2.9 million tonnes of heat-trapping pollution.²⁵⁷ This is equivalent to the annual pollution from 568,000 passenger cars.

If burned, the proven and probable coal reserves from Trend would produce 35.2 million tonnes of global-warming pollution, equivalent to 6.7 million passenger cars, or nine coal-fired power plants.

Coal from Trend is transported from the mine by CN Rail and shipped to markets in Japan, Korea, China and other Pacific Rim countries through Ridley Terminals in Prince Rupert. The primary customers for coal from Trend are steel mills in Asia.²⁵⁸

Company	Peace River Coal Ltd. Partnership
Website	http://www.peacerivercoal.com/
Headquarters	Vancouver, BC
Proposed Mines	Belcourt-Saxon, Roman, Horizon,
Mine	Trend
Status	In production
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, thermal)
Annual Permitted Production	2 million tonnes
2008 forecast production	1.4 million tonnes
Proven reserves	17 million tonnes
2008 pollution	2.9 million tonnes
Pollution from reserves, if burned	35.2 million tonnes
Company's carbon emissions as percentage of BC's reported emissions in 2008	4.7 percent
Shareholders	Anglo American PLC., Northern Energy & Mining Inc., and Hillsborough Resources Limited

Company: Vitol Anker International B.V.

Vitol Anker International B.V. (Vitol) is relatively new to the coal sector, having begun operations in 2006. Since then, Vitol has acquired thermal coal projects in Europe, as well as anthracite coal contracts in Russia, Ukraine, South Africa and Belgium.²⁵⁹

At the end of 2009, European-based Vitol acquired Hillsborough Resources, which owned the Quinsam coal mines, shares in Peace River Coal Corporation, and the proposed Watipi and Bingay projects. Before the takeover, Vitol had owned 24 per cent of Hillsborough common shares. Under the takeover agreement, Vitol paid cash for all of the remaining Hillsborough shares.²⁶⁰

In addition to coal, Vitol conducts business in the areas of crude oil, gasoline and naphtha, fuel oil, jet gas and oil, liquefied petroleum gas, liquefied natural gas, natural gas, power, carbon emissions, shipping, derivatives, ethanol, chemicals, methanol, non-ferrous metals and sugar.²⁶¹

Mine: Quinsam

Previously owned by Hillsborough Resources Limited, the Quinsam Coal Mine was acquired by Vitol Anker in 2009.

The Quinsam Mine site is 27 km southwest of Campbell River, on Vancouver Island. Coal from the site was first mined from an open pit starting in 1987. Since 1990, however, the majority of the coal has been mined underground, making it the province's only active underground mine. The Quinsam Mine produces high-volatile, low-sulphur, bituminous, thermal coal. In 2008, the mine had an estimated 22.1 million tonnes of proven coal reserves.²⁶²

In 2008, the Quinsam Coal Mine produced half a million tonnes of coal.

In 2008, the mine was responsible for 1.2 million tonnes of heat-trapping pollution, equivalent to the annual pollution from 198,000 passenger cars.

The proven reserves from Quinsam Mine, if burned, would produce 45.7 million tonnes of global-warming pollution, equivalent to 8.7 million passenger cars, or 12 coal-fired power plants.

The Quinsam Mine's main customers are international power utility companies and the cement industry in Vancouver and the Pacific Northwest.²⁶³ Approximately one third of production is exported to be used for coal-fired power in Japan, Chile and Central America.²⁶⁴

Quinsam's coal is shipped from the Middlepoint Barge Loading Facility. The site has the capacity to store 15,000 tonnes of coal. Trucks haul coal



37 km from the mine site to the loading facility. International shipments depart from nearby Texada Loading Facilities.²⁶⁵

Vitol is attempting to expand the Quinsam mine. Plans for extension and development of Quinsam North are under way, with potential development scheduled for 2012 to 2014. Quinsam North has measured and indicated resources of 1.5 million tonnes. In December 2008, Vitol began development of an underground access route, which will allow pillar mining of up to 700,000 additional tonnes of raw coal per year.²⁶⁶

Recently, Quinsam Coal also applied for a mining permit amendment to develop a new underground mine, called 7-South. The site is near the Quinsam River, approximately 3.5 km from the operation's coal preparation plant. An open-pit mine was originally proposed, but public concerns about arsenic in the lake sediment and sulphate levels from the mine halted the project. Now, Quinsam Coal is proposing to build an underground mine to access the coal, which will include a 7-hectare surface disturbance for the mine portal, and will overburden the local dump as well as topsoil stockpiles and water-management structures.²⁶⁷

The 7-South proposal is for development of the pit in late 2010, with operation commencing in 2011. The company wants to extract 1,706,800 tonnes of raw coal, which is estimated to take two years at current mine production rates.²⁶⁸

The 7-South expansion has the potential to produce coarse coal rejects (CCR) that have high sulphur content, and can generate acid when exposed to air. High-sulphur CCR is potentially toxic to aquatic life and requires secure underwater storage and disposal, forever, to prevent oxidation.²⁶⁹

In April 2009, the BC Environmental Assessment Office stated that the project does not constitute a reviewable project under the *Environmental Assessment Act*.²⁷⁰ In its place, the Vancouver Island Mine Development Review Committee will conduct a 60-day review process.

Company	Vitol Anker International B.V
Website	http://www.vitol.com/
Headquarters	Calgary, AB and Vancouver, BC
Proposed Mines	Wapiti
Mines	Quinsam
Status	In production
Mine Type	Underground
Coal Type	Bituminous

Annual Permitted Production	1.9 million tonnes annually
Proven reserves	22.1 million tonnes
2008 pollution	1.2 million tonnes
Pollution from reserves, if burned	45.7 million tonnes
Company's carbon emissions as percentage of BC's reported emissions in 2008	1.7 per cent
Shareholders	Privately owned company



Smoke stacks , Conesville power plant, OH
Photo: Martin Evans

Inactive Mines Being Re-Commissioned

Company: Compliance Energy

Compliance Energy Corporation is a Vancouver-based publically-traded company listed on the Toronto Ventures Exchange (TSX – “CEC”).²⁷¹ Compliance, through its Comox Joint Venture agreement with Itochu International and LG International, holds “approximately 29,000 hectares of freehold coal and mineral interests and 2,046 hectares of Crown Coal licences in the Comox Coal Basin on Vancouver Island.”²⁷² Compliance owns 60 per cent of these interests, and Itochu International and LG International each own 20 per cent.²⁷³ Compliance also holds 100% of the gas rights for the same lands.²⁷⁴ Compliance also has interests in the Basin Thermal mine near Princeton.

Inactive Mine: Basin Thermal

The Basin Thermal Coal Mine is located 30 km northwest of Princeton,

Citizens rally on the steps of a government building
Photo: Martin Evans





BC. Mining at Basin Thermal commenced in 2002, under the ownership of Compliance Energy, but ceased in 2006 when the provincial government banned the use of coal-fired plants in BC. Infrastructure such as roads, a coal-washing process plant and crushers were left behind.

Recent analysis estimates Basin's measured and indicated reserves at 87 million tonnes of coal.²⁷⁵ Currently the proposed Basin project "remains on care and maintenance and is not operating."²⁷⁵

Compliance optioned its Basin Coal Mine near Princeton, to a private Australian company, NWPC Pty Ltd.²⁷⁶ The agreement gave NWPC the "right to mine coal at the Basin Coal Mine as well as all remaining assets of the mine, including the 400,000 tonne per year wash plant".²⁷⁷ In exchange, Compliance was to receive \$4.25 million in cash and \$4 million in shares of Jameson Resources Limited (JAL), a public company in Australia.²⁷⁸

However, prospects of reopening Basin Thermal have dimmed. In its *Management's discussion and analysis* ("MD&A") for the period ending March 31, 2011 Compliance states that it had "submitted a reclamation plan to the Provincial government. The MD&A also indicated that Compliance was negotiating to return "the mine and mine permit to the company from which it was originally acquired." ²⁷⁹

Before apparently abandoning the project Jameson Resources was in the final stages of conducting feasibility studies to recommission the mine, and to expand previous production rates to between 500,000 and 700,000 tonnes per year. The feasibility studies were to have been completed by March 2010, and Jameson had estimated that production could begin as soon as late 2010, but at publication date, these plans have been abandoned

The mine's reserves were recently upgraded from 19 million tonnes to 123.7 million tonnes of thermal coal. This quantity includes 87 million tonnes of measured and indicated reserves.²⁸⁰ The coal on site is defined as high-volatile thermal coal with low sulphur. The coal is, the company claims, ideal for use as an energy source.²⁸¹

The Basin mine is the closest mainland coal mine to BC's shipping ports, and has ample rail and road access.

If Basin is recommissioned and all its reserves are burned, it would produce 180.1 million tonnes of global-warming pollution. This is equivalent to the annual pollution of 34.4 million passenger cars, or 46 coal-fired power plants.

Mine	Basin
Company	Compliance Energy (optioned to Jameson)
Website	http://www.complianceenergy.com/
Mine Type	Open pit
Coal Type	Bituminous (thermal)
Status	Decommisioned
Proposed annual production	0.7 million tonnes
Estimated reserves	87 million tonnes
Annual pollution	1.4 million tonnes
Pollution from reserves, if burned	180.1 million tonnes



Coal power plant, wind turbines
in the distance

Proposed Coal Mines in British Columbia

There are twelve corporations proposing eighteen coal mines that are at various stages of approval. Six mines are currently waiting for environmental assessment approval from the BC government, one mine has received environmental assessment approval, and at least eleven more are conducting feasibility and pre-feasibility studies, but have not yet initiated the assessment process.

If all these proposed mines are approved and become operational, burning the coal they produce from their estimated reserves would generate approximately 13.1 billion tonnes of heat-trapping pollution over the life of the mine.²⁸² This is equivalent to the annual pollution that would be created by 2.496 billion passenger cars (three times the number currently in use worldwide),²⁸³ or the annual emissions from 3,391 coal-fired power plants.

NOTES

All estimates of pollution from proposed production and coal reserves were calculated using a factor of 2.07 tonnes of GHG per tonne of coal burned. (See either Appendix 2a or 2b).

All calculations to determine the equivalent annual pollution from cars or coal-fired power plants were calculated using the US Environmental Protection Agency's online "Greenhouse Gas Equivalencies Calculator".³⁸⁴

Mine shaft, Scranton, PA
Photo: wallyg, flickr



The twelve corporations that are proposing new coal mines in British Columbia:

1. The Teck group of corporations has one proposed coal mine at Mount Michael as well as an expansion of its Line Creek Mine (*see page 54*).
2. Western Coal has one mine, Hermann, which has received environmental assessment approval, but is delayed (*see page 55*).
3. Peace River Coal Ltd. Partnership has two proposed mines, (Roman, Horizon) awaiting environmental assessment approval, and one mine (Belcourt–Saxon) at an earlier stage of development (*see page 60*).
4. Vitol Anker International B.V. has a proposal to expand its Quinsam mine (*see page 63*), and one proposed mine awaiting environmental assessment approval (Wapiti).
5. Centermount Coal Ltd. has one proposed mine (Bingay), but has not yet initiated the environmental assessment process.
6. First Coal has two proposed coal mines (Central South and South Cirque) undergoing feasibility studies.
7. Dehua is awaiting environmental assessment approval for its proposed Gething underground mine.
8. Cline Coal has three proposed coal mines (Lossan, South Bullmoose/Waterfall Creek and Crown Mountain) undergoing feasibility studies.
9. Compliance Energy has proposed an underground thermal coal mine (Raven) that is awaiting environmental assessment approval, and an open-pit mine, Basin, which is not operating.²⁸⁴
10. Fortune Minerals has proposed an open-pit anthracite coal mine (Mount Klappan) that is awaiting environmental assessment approval.
11. Anglo Pacific has one coal mine (Trefi) in the early stages of development.
12. Unicorn International Mines Group Inc. has two proposals (South Halsar and BC Coal) in exploration and discovery phases of development.

Company: Teck

See page 48 for more information on Teck.

Proposed Mine Expansion: Line Creek Operations Phase II, including Mount Michael

Teck Coal is proposing to develop two coal properties 20 km northeast of Sparwood, as a new phase of Teck's existing Line Creek Mine. These projects could produce an estimated 52 million tonnes of coal. Together with the existing mine once the expansion is operational, Line Creek will continue to be able to produce 3.5 million tonnes of coal per year.²⁸⁵

The mine's footprint and operational boundary is 1,800 ha. The expected mine life is approximately 20 years. The project entered the environmental assessment process as "Line Creek Phase II Expansion". Mount Michael is part of Phase II.

If the Line Creek expansion is approved it would produce over 2.07 million tonnes of heat-trapping pollution per year.²⁸⁶ This is equivalent to the annual pollution from 395,000 passenger cars.

If burned, the proven and probable coal reserves from the Line Creek Expansion would produce 107.6 million tonnes of global-warming pollution, equivalent to 20.6 million passenger cars (more cars than are currently registered in all of Canada),²⁸⁷ or 28 coal-fired power plants.

Mine	Mount Michael and Line Creek Operations Phase II
Company	Teck
Website	http://www.teck.com/
Mine Type	Open-pit
Status	Pre-application phase for BCEA approval since September 2000
Proposed annual production	1 million tonnes
Estimated Reserves	52 million tonnes
Pollution from reserves, if burned	107.6 million tonnes
Shareholders	Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.

Company: Western Coal

See page 55 for more information on the company.

Proposed Mine: Hermann

Owned by Western Coal, the Hermann project received environmental assessment approval in 2008. The proposed open-pit mine will have a capacity to produce 0.8 to 1.1 million tonnes of metallurgical coal per year. The total indicated resources are 15.6 million tonnes, and the lifespan of the mine is expected to be 10 years.²⁸⁸

The mine site 16 km west of Tumbler Ridge, in northeast BC. The Hermann property is part of the Wolverine Group's coal properties. The coal will be hauled by truck to the (operational) Wolverine Coal Mine to be processed, then sent 950 km to the Ridley Coal Terminal in Vancouver. As of November 2011, Western is still developing a timetable for the mine.²⁸⁹

The environmental assessment certificate imposed more than 100 commitments on Western Coal that must be implemented at various stages of the process. The company was asked to:

- Ensure adequate diversion and sediment control to minimize stream sedimentation.
- Monitor water quality and implement contingency measures to ensure water quality remains within acceptable limits.
- Manage agreed-upon water quality objectives.
- Monitor and manage the generation of selenium.
- Upon closure, restore wildlife habitat, with a focus on caribou.
- Contribute to further caribou studies and stewardship of the Quintette caribou herd.
- Manage and minimize dust emissions.²⁹⁰

Although it received environmental assessment approval in late 2008, Western Coal stated in its 2009 Annual Report that the Hermann project was on hold: "Given the decision to proceed with EB Pit before proceeding with Hermann, completion of engineering studies and environmental studies and application for a Mine and Reclamation Permit have been deferred." While it plans to open the EB mine in 2013, no dates are set for Hermann.

If Hermann does become operational it could produce over 2.28 million tonnes of heat-trapping pollution per year.²⁹¹ This is equivalent to the annual pollution from 435,000 passenger cars.

If burned, the proven and probable coal reserves from Hermann would

produce 32.3 million tonnes of global-warming pollution, equivalent to 6.2 million passenger cars (more than double the number of cars currently registered in all of British Columbia),²⁹² or 8 coal-fired power plants.

Mine	Hermann
Company	Western Coal
Website	http://www.westerncoal.com/
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical)
Status	In development – BCEA Certificate Issued November 28, 2008
Proposed annual production	1.1 million tonnes
Estimated reserves	15.6 million tonnes
Pollution from reserves, if burned	32.9 million tonnes
Shareholders	Cambrian Mining plc

Company: Peace River Coal

See page 60 for more information on the company.

Proposed Mine: Belcourt-Saxon Joint Venture

The Belcourt-Saxon properties are located 65 km north of Tumbler Ridge. Western Coal and the Peace River Coal Ltd. Partnership each own 50 per cent of the project.²⁹³

Each property (Saxon and Belcourt) consists of two deposits. Exploration of the Belcourt property has revealed 86 million tonnes of proven reserves of metallurgical coal and 4 million tonnes of indicated coal resources.²⁹⁴ The site is still in an early exploration phase of development. The owners claim that there is “potential to produce 4 million tonnes of saleable clean coal per year from these properties.”²⁹⁵

If Belcourt-Saxon becomes operational, it could produce more than 8.28 million tonnes of heat-trapping pollution per year.²⁹⁶ This is equivalent to the annual pollution from 1.6 passenger cars.

If burned, the proven and probable coal reserves from Belcourt-Saxon would produce 178 million tonnes of global-warming pollution, equivalent to 34 million passenger cars, or 46 coal-fired power plants.

Proposed Mine: Roman Coal

The Roman Coal Mine is proposed for Tumbler Ridge, in northeastern BC. It will be run by Peace River Coal Ltd. Partnership, which is comprised of Anglo (66 per cent share of ownership), Vitol (14 per cent) and NEMI (20 per cent) (*see page 60*).²⁹⁷

Proven reserves are estimated to be 30 million tonnes of coal.²⁹⁸ The proposed open-pit coal mine, if approved, would have a production capacity of 2 to 4 million tonnes of metallurgical and hard coking coal per year.²⁹⁹ If coal is produced, it will be destined for foreign steel markets.

Peace Rier Coal applied for environmental assessment in September 2007. On October 2, 2008, the Environmental Assessment Office issued an order under section 11 of the *BC Environmental Assessment Act*, outlining the scope of the assessment and the procedures and methods for assessing the project.³⁰⁰

If Roman becomes operational it would produce up to 8.3 million tonnes of heat-trapping pollution per year. This is equivalent to the annual pollution from 1.58 million passenger cars.

If burned, the proven and probable coal reserves from Roman would produce 62.1 million tonnes of global-warming pollution. This is equivalent to 11.9 million passenger cars (over four times the number of cars currently in BC),³⁰¹ or 16 new coal-fired power plants.

Mine	Roman Coal
Company	Peace River Coal Ltd. Partnership
Website	http://www.peacerivercoal.com/
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical, coking)
Status	Awaiting approval of BCEAO (Pre-approval since Sept '07)
Proposed annual production	4 million tonnes annually
Estimated reserves	30 million tonnes
Annual pollution	8.28 million tonnes
Pollution from reserves, if burned	62.1 million tonnes
Shareholders	Anglo American PLC., NEMI Northern Energy & Mining Inc., and Hillsborough Resources Limited

Proposed Mine: Horizon

The environmental assessment for the Horizon Coal Mine project was originally submitted by Hillsborough Resources in 2005. The project is now under the control of Peace River Coal Ltd. Partnership.³⁰²

The Horizon Mine is to be located 25 km southwest of Tumbler Ridge, close to the closed Quintette and Bullmoose mines. This area has not yet been mined.

The site's measured and indicated coal reserves amount to 45.5 million tonnes of bituminous coking coal.³⁰³ The proposed mine is to consist of several open-pit mines, and planned production for the mine is 1.6 million tonnes per year of metallurgical coal over the 15-year life of the mine.³⁰⁴

If Horizon becomes operational it would produce up to 3.3 million tonnes of heat-trapping pollution per year. This is equivalent to the annual pollution from 633,000 passenger cars.

If burned, the proven and probable coal reserves from Horizon would produce 94.2 million tonnes of global-warming pollution, equivalent to 18 million passenger cars, or 24 coal-fired power plants.

Mine	Horizon
Company	Peace River Coal Ltd. Partnership
Website	http://www.peacerivercoal.com/
Mine Type	Open-pit
Coal Type	Bituminous (coking)
Status	Awaiting approval of BCEAO (Pre-approval phase since Sept '05)
Proposed annual production	1.6 million tonnes annually
Estimated reserves	45.5 million tonnes
Pollution from reserves, if burned	94.2 million tonnes
Shareholders	Anglo American PLC., NEMI Northern Energy & Mining Inc., and Hillsborough Resources Limited

Company: Vitol Anker International B.V.

See page 64 for more information on the company.

Proposed Mine: Wapiti

Vitol obtained control of the Wapiti thermal coal proposal through its acquisition of Hillsborough Resources in late 2009.

The Wapiti property is 23,200 hectares near Dawson Creek, in northeastern BC. The deposit size is estimated to be 80.1 million tonnes, plus 35.2 million tonnes of inferred resources of thermal coal.³⁰⁵ Currently, Vitol is working towards obtaining regulatory approvals for mine development, and is evaluating financial options.

Hillsborough Resources Limited, in its 2009 Quarterly Management's Discussion and Analysis, estimated that Wapiti would have an annual production rate of up to 2.3 million tonnes.³⁰⁶

The Heritage and Centre Blocks of the Wapiti project would produce up to 900,000 tonnes of coal per year. In 2008, the previous owner estimated that the Jackpine Block which lies east of the Heritage and Centre Blocks would support a production level of 1.4 million tonnes per year.³⁰⁷

It is proposed that coal from the Wapiti mine would be used to fuel a 165 megawatt thermal energy generation facility. The facility proposed by Hillsborough and AES Pacific Inc., under the name AES Wapiti Energy, has been in the pre-application phase for BC environmental assessment approval since April, 2006.³⁰⁸

If Wapiti becomes operational it will produce up to 4.76 million tonnes of heat-trapping pollution per year. This is equivalent to the annual pollution from 910,000 passenger cars.

If burned, the proven and probable coal reserves from Wapiti would produce 165.8 million tonnes of global-warming pollution, equivalent to 31.7 million passenger cars, or 43 coal-fired power plants.

Mine	Wapiti
Company	Vitol/Hillsborough
Website	http://www.hillsboroughresources.com/
Mine Type	Open-pit
Coal Type	Bituminous (thermal)
Status	Awaiting approval of BCEAO (Pre-approval phase since April '06)
Proposed annual production	2.3 million tonnes annually
Estimated reserves	80 million tonnes
Pollution from reserves, if burned	165.8 million tonnes
Shareholders	AES Pacific Inc.

Company: Centermount Coal Ltd.

Centermount Coal Ltd. is a wholly-owned subsidiary of Centerpoint Resources Inc., a privately held company incorporated in BC, with headquarters in Vancouver. Centerpoint Resources Inc. has investments in coal and gold mining properties in Canada and Peru.³⁰⁹

Centerpoint also holds share interests in Canadian mining companies seeking iron, nickel, gold and some rare metals.

Centermount purchased rights to the Bingay Creek proposal from Hillsborough Resources in November, 2009, just before that company was acquired by Vitol Anker International B.V.³¹⁰ Centermount now holds 100 per cent of the Bingay Creek metallurgical coal property.

Proposed Mine: Bingay Creek

The Bingay site is located in the Elk Valley Region, in southeastern BC.

Hillsborough held a coal exploration licence from MEM that covered 1,157 hectares. Exploration revealed 15.5 million tonnes of measured and indicated resources, and an additional 17.9 million tonnes of inferred resources.³¹¹

The mine, if developed, will produce various grades of metallurgical coal to be used as coking coals and in making steel. The infrastructure in place from previous mines includes roads and railways, which allow access to terminals in Vancouver for shipment to Asian markets.³¹²

If burned, the proven and probable coal reserves from Bingay Creek would produce 32.1 million tonnes of global-warming pollution. This is equivalent to the annual pollution from 6.1 million passenger cars, or eight new coal-fired power plants.

Mine	Bingay Creek
Company	Centermount Coal Ltd.
Website	http://centerpointcanada.com/
Headquarters	Vancouver, B.C
Mine Type	Open-pit
Coal Type	Bituminous (metallurgical)
Status	Has not applied for BCEA certificate
Estimated reserves	15.5 million tonnes
Pollution from reserves, if burned	32.1 million tonnes
Shareholders	Wholly-owned by Centerpoint Resources Inc., a privately owned company

Company: Canadian Dehua International Mines Group Inc.

Kailuan Clean Coal Corporation Limited has signed an agreement with Canadian Dehua International Mines Group Inc. (Canadian Dehua) to develop the Bri-Dowling portion of the proposed Gething Mine. Kailuan Coal holds 51 per cent stake in the joint venture, with Canadian Dehua holding a 49 per cent stake. The project will involve a total investment of \$50.5 million. Currently, Kailuan has invested approximately \$5.5 million, with Dehua investing the remainder.³¹³

Dehua is a privately owned Vancouver-based company, with many shareholders, including the Chinese steel maker Shougang Group. Shougang Group is one of the most important steel-producing companies in China. Shandong Feicheng Mines Group is a large government-owned coal company. Both of these companies are Dehua's partners for developing the Gething Coal Project. In addition, both of them are shareholders of Dehua.³¹⁴

Canadian Dehua is also seeking to develop an open pit coal mine near Murray River in northwestern BC.

Proposed Mine: Gething

The Gething coal mine project is proposed to be located 25 km from Henderson's Hope, in northeastern BC. The environmental assessment application for the Gething Project was submitted in November, 2006.³¹⁵

The proposal for Gething consists of an underground coal mine, and would require building the infrastructure for a coal preparation plant (where soil and rock are cleaned from the coal, preparing it for transport to market).

Drilling at the Gething site has indicated eight coal seams, two of which will be mined. Combined, these two seams have 98 million tonnes of inferred raw coal.³¹⁶ Projected to produce 2 million tonnes of metallurgical coal per year, the lifespan of the mine is expected to reach 40 years.^{317 318} Coal will be processed on site, with washed coal trucked to a rail-load-out facility on the CN Rail mainline in Chetwynd.³¹⁹

The project is in the early stages of development. If approved, Gething would be Canada's largest underground coal mine. The proposed Gething Coal Project is a reviewable project under the BC *Environmental Assessment Act*. The Project may also trigger a federal review through the *Canadian Environmental Assessment Act*.³²⁰

The coal produced at the Gething Coal Mine will be used primarily for steel manufacturing in China. A *Globe and Mail* article from 2007 reported that Dehua intends to employ 400 skilled workers from China to build and operate the project.³²¹ Due to a lack of underground mines in Canada, Dehua wishes to bring over experienced, skilled foreign labour to meet staffing requirements.³²²

If Gething becomes operational it will produce up to 4.14 million tonnes of heat-trapping pollution per year. This is equivalent to the pollution from over 791,000 additional passenger cars.

If burned, the proven and probable coal reserves from Gething would produce 202.9 million tonnes of global-warming pollution, equivalent to the annual pollution from 38.8 million passenger cars, or 53 new coal-fired power plants.

Mine	Gething
Company	Canadian Dehua International Mines Group Inc.
Website	http://www.dehua.ca/
Headquarters	Vancouver, BC
Mine Type	Underground
Coal Type	Bituminous (metallurgical)
Status	Awaiting approval of BCEAO (Pre-approval phase since Nov '06)
Proposed annual production	2 million tonnes
Estimated reserves	98 million tonnes
Pollution from reserves, if burned	202.9 million tonnes
Shareholders	Kailuan Clean Coal Corporation Limited, Shandong Feicheng Mines, Shougang Group), Beijing Shuailing Corporation

Proposed Mine: Murray River

The proposed Murray River coal mine project is located 5 km southwest of Tumbler Ridge, in northeastern BC. It is owned by Canadian Dehua International Mines Group Inc. and is undergoing preliminary feasibility studies. Exploration in 2009 indicated the property an estimated reserve of 1.5 billion tonnes of metallurgical coal in nine coal seams.³²³

Although the project is at early stage with only broad speculative estimates of potential reserves, if the estimated coal reserves from Murray River were fully mined and burned would produce a staggering 3.1 billion tonnes of global-warming pollution. This is equivalent to the annual pollution from 593 million passenger cars, or 806 coal-fired power plants.

Mine	Murray River
Company	Canadian Dehua International Mines Group Inc.
Website	http://www.dehua.ca/
Mine Type	Open Pit
Coal Type	Coking
Status	Pre- feasibility studies
Proposed annual Production	n/a
Estimated reserves	1.5 billion tonnes
Pollution from reserves, if burned	3.1 billion tonnes
Shareholders	Shandong Feicheng Mines Group, Shougang Group, Beijing Shuailing Corporation

Company: Fortune Minerals

Fortune Minerals is a publicly traded Canadian company, with interests in seven mineral deposits and a number of exploration projects, all in Canada. Fortune Minerals is listed on the Toronto Ventures Exchange (TSX – “FT”).³²⁴

The company states that its principal assets are its NICO gold-cobalt-bismuth-copper deposit in the Northwest Territories and its hydrometallurgical processing plant in Saskatchewan.³²⁵ Fortune Minerals also owns the Mount Klappan anthracite coal deposits in the Sacred Headwaters in northwestern British Columbia, the Sue-Dianne copper-silver-gold deposit, and other exploration projects in the Northwest Territories.

Directors in the company own about 10 per cent of the company’s shares. China Mining Resources Group Limited is the largest shareholder in Fortune Minerals.³²⁶

The company states it aspires to evolve from an exploration company into a mining company, and is exploring potential joint ventures to do so. The Mount Klappan coal project and the NICO metals project are the critical vehicles for that evolution.³²⁷

Proposed Mine: Mount Klappan

Fortune Minerals applied for the environmental assessment in October, 2004, and is still awaiting approval from the BC government.

The proposed Mount Klappan Mine site is 160 km northeast of Stewart, in northern BC. The plans include infrastructure for an open-pit mine, and a preparation plant.³²⁸ Fortune claims 231 million tonnes of measured and indicated reserves and 2.57 billion tonnes of inferred reserves of high-rank anthracite coal. The company anticipates a production rate of 3 million tonnes per year.³²⁹

The project will mine four deposits, and the coal extracted from each will be transported through a proposed buried slurry pipeline, as well as rail and trucking operations.³³⁰ The company’s coal licence borders the BC Rail right-of-way northeast of the port of Stewart, and is 330 km from the port of Prince Rupert. If operations begin, the coal will be sent to markets throughout North America, Asia and Europe for steel-making purposes. This is the largest known undeveloped coal deposit in North America, and one of the largest deposits in the world.³³¹

The proposed location for the Mount Klappan mine is in the Sacred Headwaters region of northern British Columbia, which sources three

major rivers: the Nass, Skeena and Stikine. With a licence over 15,000 hectares of land for open-pit mine development, Fortune Minerals will have to essentially dismantle Mount Klappan to reach the deposit. This will require development of roads and infrastructure in the region to haul rock, earth and coal to their destinations, further increasing the footprint of the mine. The building of roads has the potential to affect these important waterways, causing erosion and increasing sediment levels in the water. In addition, the potential for acid mine drainage is high. Pyrite, a common sulphide mineral associated with acid mine drainage, has been identified at the Mount Klappan site. This development could open the door to a pristine and untouched environment for further exploration and industrial activity, jeopardizing this important ecosystem.³³²

Furthermore, Fortune Minerals is proposing the use of a coal-fired plant to provide 300 megawatts of power for its operations, which would harm air and water quality, and cause additional cumulative effects.³³³

If the Mount Klappan Mine becomes operational it will produce up to 6.2 million tonnes of heat-trapping pollution per year.³³⁴ This is equivalent to the annual pollution from 1.2 million passenger cars.

However, the modest annual production estimate hides the staggering amount of heat-trapping pollution Mount Klappan would produce over its lifetime. If burned, the inferred reserves from Mount Klappan would produce over 5.3 billion tonnes of global-warming pollution, equivalent to 1 billion passenger cars (200 million more than are currently in use on the planet),³³⁵ or 1,381 coal-fired power plants.

Mine	Mt. Klappan
Company	Fortune Minerals
Website	http://www.fortuneminerals.com/
Mine Type	Open-pit
Coal Type	Anthracite
Status	Awaiting approval of BCEAO (Pre-approval phase since October '04)
Proposed annual production	1.5 million tonnes
Estimated reserves	2.57 billion tonnes
Pollution from reserves, if burned	5.3 billion tonnes

Company: Compliance Energy

See page 65 for more information on the company.

Compliance's Basin Coal Mine near Princeton has been inactive since 2006. Rights to the mine have been optioned to an Australian Company.³³⁶

Compliance's main project is the proposed Raven Underground Coal Mine Project on Vancouver Island.

Proposed Mine: Raven

The proposed Raven Underground Coal Mine, if approved, would produce up to 2.2 million tonnes of coal per year.³³⁷ It would be located in the Tsable River and Cowie Creek watersheds on Vancouver Island.³³⁸ The company claims the mine site "holds 71.998 million tonnes of measured and indicated and 59.4 million tonnes of inferred coal resource."³³⁹

The Raven Underground Coal Mine is a Compliance Energy project, in partnership with Itochu Corp. of Japan and LG International Corp. of South Korea. The company obtained an exploration permit in May 2009, which allowed it to drill up to 53 holes in 2009.³⁴⁰

The Raven proposal is under fire from many environmental and community groups that feel it is inconsistent with the BC government's climate legislation and will damage local communities.³⁴¹ Concerns include impacts on ground water and the Table River drainage, impacts on local salmon populations, and run-off of water used for washing coal.

The proposal has triggered both a provincial and federal environmental review.³⁴² These processes began in the fall of 2010.

The coal produced at the Raven mine will go to Asian customers (specifically steel manufacturers in Japan, South Korea China and Taiwan), as well as to cement manufacturers in Canada and Washington State. Options for shipping to Asia include truck or rail to Port Alberni; truck or rail to Buckley Bay or Campbell River and then barge to Texada Island; truck or rail to Duke Point; or truck to Gold River.

If approved, Raven will be the first new coal mine on Vancouver Island since 1987. Despite the global recession, this project has gained a lot of international attention.

If Raven becomes operational it will produce up to 3.5 million tonnes of heat-trapping pollution per year.³⁴³ This is equivalent to the annual pollution from 593,000 passenger cars.

If Raven is approved and becomes operational it would produce a staggering amount of heat-trapping pollution over its lifespan. If burned, the inferred reserves from Raven would produce 148.8 million tonnes of heat-trapping pollution, equivalent to 28.5 million passenger cars, or 38 coal-fired power plants.

Mine	Raven Underground
Company	Compliance Energy
Website	http://www.complianceenergy.com/
Mine Type	Underground
Coal Type	Bituminous (thermal)
Status	Awaiting approval of BCEAO (Pre-approval phase since Oct '09)
Proposed annual production	1.5 million tonnes annually
Estimated reserves	71.9 million tonnes
Pollution from reserves, if burned	148.8 million tonnes
Shareholders	Itochu Cor. (Japan), LG International Corp. (South Korea)

Company: Cline Mining Corporation

Cline is a publicly traded company listed on the Toronto Stock Exchange (TSX – “CMK”).³⁴⁴ Cline describes itself as “in the business of acquiring, exploring and developing mine mineral resource properties to production in Canada, United States and overseas.”³⁴⁵ Cline Mining has a “strategic partnership” with Mitsui Matsushima, a Japanese coal miner and conglomerate. Mitsui Matsushima, also a Cline shareholder, is represented on the Cline Board of Directors.

Cline also has interests in copper, gold and iron projects in the United States, Canada and Africa. In addition to its coal proposals in British Columbia, Cline has acquired the New Elk coal project in southern Colorado. Cline is carrying out an extensive diamond drilling program on its Cline Lake gold mine property in the Wawa gold camp in Ontario. Cline owns the Bekisopa iron-ore-deposit properties (Bekisopa East) in Madagascar.

Flathead Protected

On February 10, 2010 the BC Liberal government announced plans to ban all mining and oil and gas development in the Flathead Valley, located in the southeastern corner of the Province.

Following years of protests, international campaigning and opposition by environmentalists, Lt.-Governor Steven Point stated that the BC government would stop all mining, including two large coal mine project proposals by Cline Mining Corp.

Some logging, along with hunting and recreation, will still be allowed.

Company	Cline Mining Corporation
Website	http://www.clinemining.com/
Headquarters	Toronto, ON and Vancouver, BC
Proposed Mines	Lossan, South Bullmouse/Waterfall, Crown Mountain
Company's proposed annual production	Lossan (1 million tonnes) Waterfall and Crown Mountain (n/a)
Company's estimated reserves	Lossan + Waterfall (201 million tonnes) Crown Mountain (n/a)
Pollution from company's reserves, if burned	416.3 million tonnes

Proposed Mine: Lossan

The Lossan Coal Mine project is owned by Cline Mining Corporation, and is located in the Peace River Coal Field, in northeastern BC. The project has total estimated and indicated reserves of 186.1 million tonnes of metallurgical coal (for making steel).³⁴⁶

The proposed mine is located near rail service that runs year round to Ridley Coal Terminal in Prince Rupert. A feasibility study has estimated the initial production rate at 1 million tonnes per year, sustaining the mine for 14 years.³⁴⁷

If Lossan becomes operational it would produce up to 2.07 million tonnes of heat-trapping pollution per year.³⁴⁸ This is equivalent to the annual pollution from 593,000 passenger cars.

The estimated reserves from Lossan, if burned, would produce approximately 385.2 million tonnes of heat-trapping pollution, equivalent to 73.6 million passenger cars, or 100 new coal-fired power plants.

Mine	Lossan
Company	Cline Mining Corporation
Website	http://www.clinemining.com/
Status	Has not applied for BCEA certificate
Coal Type	Bituminous (metallurgical)
Proposed annual production	1 million tonnes
Estimated reserves	186.1 million tonnes
Pollution from reserves, if burned	385.2 million tonnes
Shareholders	Mitsui Matsushima of Japan, Thyssen Krupp of Germany and Pinetree Capital of Canada

Proposed Mine: South Bullmoose and Waterfall Creek

The South Bullmoose and Waterfall Creek project owned by Cline Mining Corp. has confirmed coal showings, and requires further exploration in northeastern BC.³⁴⁹

Currently, Cline Mining is conducting a feasibility study, and has started limited drilling on the Waterfall property.³⁵⁰ The Cline website indicates that the Waterfall deposit contains approximately 15 million tonnes of coal.³⁵¹

If Waterfall ever becomes operational the estimated reserves would produce 31.1 million tonnes of heat-trapping pollution.³⁵² This is equivalent to the annual pollution from 5.9 million passenger cars, or 8 coal-fired power plants.

Mine	South Bullmoose and Waterfall Creek
Company	Cline Mining Corp.
Website	http://www.clinemining.com/
Status	Has not applied for BCEA certificate
Proposed annual production	n/a
Estimated reserves	15 million tonnes (Waterfall)
Pollution from reserves, if burned	31.1 million tonnes
Shareholders	Mitsui Matsushima of Japan, Thyssen Krupp of Germany and Pinetree Capital of Canada

Proposed Mine: Crown Mountain

Cline Mining Corp. began an exploration program on its Crown Mountain coal mine project in 2005. The property is in the Elk Valley, close to Elkview Mine, in southeastern BC.³⁵³ The project has confirmed coal showings of coal suitable for making steel. The property requires further exploration.³⁵⁴ The project appears to be on hold.

Mine	Crown Mountain
Company	Cline Mining Corp.
Website	http://www.clinemining.com/
Status	Has not applied for BCEA certificate
Proposed annual production	n/a
Estimated reserves	n/a
Shareholders	Mitsui Matsushima of Japan, Thyssen Krupp of Germany and Pinetree Capital of Canada

Company: First Coal Operations

According to its website, “First Coal Corporation is a private Canadian company exploring and developing coal properties in northeastern BC.”³⁵⁵ First Coal’s head office is in Vancouver. The company claims to have more than 90,000 hectares under licence or under application for licence in the Peace River Coalfield, near Chetwynd, BC.³⁵⁶

Currently, First Coal has two active projects, including Central South and South Cirque, both near Chetwynd, BC.

Proposed Mine: Central South

Owned by First Coal Operations, the Central South Mine project is located near Chetwynd. The property contains measured and indicated coal resources of 43.4 million tonnes, which First Coal estimates will sustain a mine for 20 years.³⁵⁷ Recently, First Coal submitted a bulk permit application that, if approved, will allow it to extract up to 50,000 tonnes of coal.³⁵⁶ First Coal claims to have “gathered sufficient information over the last few years of exploration to establish a mine plan.”³⁵⁸

First Coal has indicated that it hopes by 2013 to commence operations producing 1 million tonnes per year, rising to 1.5 million tonnes the next year.^{359 360}

If Central South ever becomes operational, the estimated reserves

SARA: First Coal versus West Moberly

The effectiveness of the *Species at Risk Act* (SARA) was tested when the West Moberly First Nations filed a petition with the BC Supreme Court to overturn a decision made by MEM to issue permits for First Coal Corporation to develop a coal mine on their territory.

Members of the West Moberly First Nations, along with community elders and government scientists, all agree that if mining proceeds on this land, it will destroy habitat critical for the survival of the endangered Burnt Pine Caribou Herd. The West Moberly had been struggling to protect the remaining 11 caribou since 2008.

Woodland Caribou need a habitat consisting of large, undisturbed, old-growth forest to avoid predators and for their essential food source of old-growth lichens.³⁶² In BC, 52 per cent of the home range of the Woodland Caribou populations is disturbed.³⁶³ Listed as a “threatened species”, the Woodland Caribou are an integral part of the area’s biodiversity and are important to the Mountain Dunne-za people.

On March 19, 2010 Justice Williamson ordered the BC government to put in place a plan to protect and recover the threatened boreal Burnt Pine caribou herd. The pressing legal issue was whether MEM has an obligation to consider the cumulative impacts of development—not just the impacts of the mine—on the caribou herd, and whether the government needs to respond to West Moberly’s concerns by following through with a plan for the recovery of the herd.³⁶⁴

The judge concluded: “The prime concern of the West Moberly is the real potential for the extirpation of the Burnt Pine caribou herd. I conclude that ... the Crown’s failure to put in place an active plan for the protection and rehabilitation of the Burnt Pine herd is a failure to accommodate reasonably.”

“We’re ecstatic about the decision, but it’s sad that we had to go to court to get them to uphold their promises to protect the caribou. If they’d done what they promised ... and put recovery plans in place we wouldn’t have been in court,” said Chief Willson of the West Moberly First Nations.

This case may be the first time in Canada that Aboriginal treaty rights have been used to force the government to take steps to protect a threatened species. The ruling sends a signal to the crown that, if it fails to develop meaningful recovery plans for endangered species that are of cultural importance to a First Nation, it risks court challenges to subsequent development that affects that species. This decision creates a powerful incentive to get recovery plans in place in other places, and for other species.³⁶⁵

would produce 89.8 million tonnes of heat-trapping pollution.³⁶¹ This is equivalent to the annual pollution from 17.1 million passenger cars, or 23 coal-fired power plants.

Mine	Central South
Company	First Coal
Website	http://www.firstcoal.com/
Status	Has not applied for BCEA certificate
Proposed annual production	1 million tonnes (2013) 1.2 million tonnes (2014)
Estimated reserves	43.4 million tonnes
Pollution from reserves, if burned	89.8 million tonnes
Shareholders	Privately owned company

Proposed Mine: South Cirque

South Cirque, another First Coal operation, is also located just outside Chetwynd. Preliminary drilling has been completed on the site, to determine coal quality for potential buyers. Resources of primarily metallurgical coal are estimated at 575 million tonnes.³⁶⁶ First Coal hopes to begin production at South Cirque in 2016 at an initial rate of 1.5 million tonnes per year.³⁶⁷

Although the project is in its early stages and the estimates of reserves have not been adequately tested, if South Cirque ever becomes operational the currently estimated reserves would produce almost 1.2 billion tonnes of heat-trapping pollution.³⁶⁸ This is equivalent to the annual pollution of 227 million passenger cars, or 309 coal-fired power plants.

Mine	South Cirque
Company	First Coal
Website	http://www.firstcoal.com/
Status	Has not applied for BCEA certificate
Proposed annual production	1.5 million tonnes
Estimated reserves	575 million tonnes
Pollution from reserves, if burned	1.190 billion tonnes
Shareholders	Privately owned company

Company: Anglo Pacific Group

Anglo Pacific Group PLC describes itself as a “global natural resources royalties company”.³⁶⁹ Anglo’s strategy “is to expand its mineral royalty interests in low-cost, long-life mining assets ... through both direct acquisition and investment in projects at the development and production stage.”³⁷⁰ These royalty interests give the company a stake in the profits generated by mines.

In addition to the Kestrel and Crinum coking coal royalties in Queensland, Australia, Anglo owns seven other royalty entitlements.³⁷¹

These are in addition to its royalty rights to mineral exploration on nearly five million acres of the Athabasca Basin in Canada.³⁷²

Proposed Mine: Trefi

Anglo Pacific Group announced on September 10, 2009 that it would be adding the Trefi coal property to its list of other private coal interests in Canada.³⁷³ The site is 30 km south of Chetwynd, in northeastern BC.

In a recent technical report prepared by Moose Mountain Technical Services in March, 2010, the Trefi coal property was estimated to have measured resources of 14.25 million tonnes of weak metallurgical coal, indicated resources of 24.85 million tonnes of weak coking coal, and inferred resources of 51.5 million tonnes of weak coking coal. Anglo plans to carry out a scoping study on the Trefi resource, to move the project towards a point at which the company can earn a royalty entitlement and retain a “carried interest” (*see Glossary*).

The mine site is close to CN Rail’s infrastructure, which could provide direct access to ports in Vancouver and Prince Rupert.³⁷⁴

Although the project is in its early stages and the estimates of reserves have not been subject to adequate testing, if Trefi ever becomes operational the current estimated reserves would produce 80.9 billion tonnes of heat-trapping pollution.³⁷⁵ This is equivalent to the annual pollution of 15.4 million passenger cars, or 21 coal-fired power plants.

Mine	Trefi
Company	Anglo Pacific Group
Website	http://www.anglopacifigroup.com/
Status	Has not applied for BCEA certificate
Proposed annual production	n/a
Estimated reserves	39 million tonnes
Pollution from reserves, if burned	80.9 million tonnes
Shareholders	Ransome's Dock Limited, AXA Investment Managers UK, Rathbone Brothers PLC, Legal and General Group PLC

Company: Unicorn International Mines Group Inc.

Unicorn International Mines Group Inc. is a junior exploration and mining company registered in British Columbia. Unicorn explores for metallurgical and thermal coal.³⁷⁶

Unicorn has rights in three coal properties in northeastern British Columbia and is involved in exploration and pre-feasibility studies on two of the projects.³⁷⁷

Company	Unicorn International Mines Group Inc.
Website	http://www.theunicorn.ca/aboutus.html
Mine Type	n/a
Coal Type	Metallurgical
Status	Exploration and pre-feasibility phase
Proposed annual production	n/a
Estimated reserves	n/a
Pollution from reserves, if burned	n/a
Shareholders	n/a

Proposed Mine: South Haslar

The proposed South Haslar mine is located in northeastern BC, 60 km southwest of Chetwynd.³⁷⁸ Exploration drilling indicates there are approximately 300 million tonnes of inferred coal resources.³⁷⁹

Although the project is in its early stages and the estimates of reserves

have not been adequately tested, if South Haslar ever becomes operational the currently estimated reserves would produce 621 million tonnes of heat-trapping pollution.³⁸⁰ This is equivalent to the annual pollution of 118.7 million passenger cars, or 161 coal-fired power plants.

Proposed Mine	South Haslar
Company	Unicorn International Mines Group Inc.
Website	http://www.theunicorn.ca/aboutus.html
Mine Type	n/a
Coal Type	Metallurgical
Status	Exploration and pre-feasibility phase
Proposed annual production	n/a
Estimated reserves	300 million
Pollution from reserves, if burned	621 million tonnes
Shareholders	n/a

Proposed Mine: BC Coal

Unicorn's BC Coal Project is also located 60 km southwest of Chetwynd, in the Gething and Gates formations. Unicorn claims preliminary drilling shows 600 million tonnes of measured and inferred coal reserves.³⁸¹ Although the project is in its early stages and the estimates of reserves have not been subject to adequate testing, if BC Coal ever becomes operational the currently estimated reserves would produce 1.2 billion tonnes of heat-trapping pollution. This is equivalent to the annual pollution of 237 million passenger cars, or 323 coal-fired power plants.

Proposed Mine	BC Coal
Company	Unicorn International Mines Group Inc.
Website	http://www.theunicorn.ca/aboutus.html
Mine Type	n/a
Coal Type	Metallurgical
Status	Exploration and pre-feasibility phase
Proposed annual production	n/a
Estimated reserves	600 million tonnes
Pollution from reserves, if burned	1,242 million tonnes



Mines in Reclamation Phase

Mining, by definition, disturbs land. Mining Watch Canada points out that “in the 150 year history of mining in Canada, there are few, if any examples, of a major mining operation which has been fully closed out.”³⁸² This is also true in BC, although things have improved in recent years.

Modern mining laws are supposed to require mines to be reclaimed. Reclamation means returning the surface to a useful and productive state after mining is completed. Reclamation usually involves soil replacement, stabilizing, capping, regrading, placing cover soils, re-vegetating, and maintenance, as well as similar measures to attempt to return streams and other watercourses to a functioning condition.

Teck owns both of the mines in BC that are undergoing reclamation: Quintette and Bullmoose. Given the high number of abandoned mine sites in BC, the weak regulatory requirements for reclamation, and the diminishing number of staff tasked with compliance and enforcement, it will be important to monitor Teck to ensure that it follows through on its remediation plans and commitments.

Company: Teck

See page 48 for more information on the company.

Mine: Quintette

Teck’s Quintette mine, situated 22 km from Tumbler Ridge, once held significant coal resources, and produced over 67 million tonnes of metallurgical coal. The mine site closed in 2000, and is now in the reclamation phase.³⁸³

Mine: Bullmoose

Teck’s Bullmoose mine, also near Tumbler Ridge, produced 34 million tonnes of metallurgical coal over its lifespan. The mine operated from 1983 until April, 2003. Teck owned 61 per cent of the mine; BHP Billiton owned 29 per cent, and Sojitz Corporation 10 per cent.³⁸⁴



Part V: What can we do? – Start the conversation

He that blows the coals in quarrels that he has nothing to do with has no right to complain if the sparks fly in his face.

– Benjamin Franklin (1706 – 1790)

The coal industry is expanding in the province, existing rules are inadequate to reign in the massive volume of heat-trapping pollution, and there is public awareness of the growing problem. What is the next step to reverse these alarming trends?

Given that many scientists believe the single most important thing humanity can do to prevent out-of-control global warming is to stop burning coal, the people of British Columbia must, as responsible citizens of the world, re-examine the full impacts of coal, and decide what role it has in our collective future.

The discussion around coal mining in BC must start. There is a variety of important policy questions that deserve a full discussion. Here are just a few of them:

- How should BC account for pollution from products such as coal, which is produced within the province but mostly burned abroad, when the province calculates its impact on climate change?
 - How should BC account for pollution from extraction and processing (which is all that is currently counted)?
 - How should BC account for pollution from transport of the product?
 - How should BC account for pollution from combustion, domestically and abroad?
 - How should BC account for pollution from the increasing amounts of U.S. thermal coal being exported through BC ports?
- Should emissions from all coal mines, not just underground coal mines, be included under the cap and trade system?

- Should there be a moratorium on the development of any new coal mines until measures can be taken to decrease the footprint of these mines, or until they are no longer needed because more sustainable forms of energy have been found?
- How do we phase out production from existing coal mines and clean up played-out mines, in the safest and most environmentally friendly manner?
- How do we ensure that just and equitable consultation and transition policies are put in place to protect the communities attached to, and workers in, existing and prospective coal mines?
- If coal mining is to continue in BC, how do we ensure that work associated with the products made from coal stays in Canada and BC, rather than being exported away with the raw resource?
- How do we make steel without burning coal, or find less-polluting alternatives to steel?

We wrote *BC's Dirty Secret: Big Coal and the Export of Global-Warming Pollution* because we believe that these questions are too important to be left to industry experts and politicians. How British Columbia and other jurisdictions answer these questions will not only have an impact on our province's air, land and water. Our answers will help to determine the livability of the planet we all call home.

For more information

Citizen's Guides

Dogwood Initiative, *Citizen's Guide to Coalbed Methane*, online: <http://dogwoodinitiative.org/publications/reports/citizens-guide-to-coalbed-methane-in-british-columbia>

Dogwood Initiative, *The Citizen's Handbook on Coal Mining in British Columbia*. Contact will@dogwoodinitiative.org

Environmental and Social Costs of Mining

The Pembina Institute, "A Fortune at What Cost? The proposed coal mine at Mt. Klappan" (March 2008), online: <http://pubs.pembina.org/reports/Klappan-fs.pdf>

First Nations Land Rights and Environmentalism in BC, "Mining" (2006), online: <http://www.firstnations.eu/mining.htm>

Appendix 1: Production, Pollution and Reserves of Permitted Coal Mines in BC (all figures in million tonnes)

Mine	Western Coal mines			Teck mines					Peace River Coal	Vitol	Compliance Energy	Total
	Brule	Willow Creek	Wolverine	Coal Mtn	Elkview	Fording River	Greenhills	Line Creek	Trend	Quinsam	Basin	
Coal mine's permitted production capacity (mT) ³⁸⁵	1.3	0.9	3	2.7	5.6	8	5.2	2.5	2	1.9	0.7	33.80
Company's BC coal production capacity	5.2			24						1.9	0.7	33.80
Coal Mine Production Forecast 2008 ³⁸⁶	1.3	0 ³⁸⁷	2.2	2.39	4.9	8.2	4.58	2.2	1.4	0.5	0	27.67
Coal Company Production Forecast 2008	3.5			22.27						0.5	0	27.67
Coal mine's proven & probable reserves ³⁸⁸	34.3	29.6	34.6	28	232.6	256.5	81.3	14.9	17	22.07	87	837.87
Company's proven & probable reserves	98.5			613.3						22.07	87	837.87
Estimated pollution from burning mine's coal in 2008	2.69	0.00	4.55	4.95	10.14	16.97	9.48	4.55	2.90	1.04	0.00	57.28
Estimated pollution from burning company's coal	7.25			46.10						1.04	0.00	57.28
Estimated pollution from company's coal mining activities in 2008	0.4			2.6						0.1	n/a	3.27
Estimated pollution from transporting coal outside BC in 2008	0.5			3.1						0.1	n/a	3.89
Estimated total pollution from coal company in 2008	8.15			51.9						1.16	n/a	64.43
Estimated pollution from burning coal mine's proven & probable reserves ³⁸⁹	71.00	61.27	71.62	57.96	481.48	530.96	168.29	30.84	35.19	45.68	180.09	1,734.39
Estimated pollution from burning coal company's proven & probable reserves ³⁹⁰	203.90			1269.53						45.68	180.09	1,734.39
Company's pollution as a % of BC's annual GHG pollution in 2008 ³⁹¹	11.9			75.5						1.7	n/a	93.79

Appendix 2a: Estimated Production, Reserves and Pollution of Proposed BC Coal Mines in Environmental Assessment *(all figures in million tonnes)*

Company	Teck	Western Coal	Peace River		Vitol	Dehua	Fortune Minerals	Compliance Energy		TOTAL
			Roman	Horizon				Mount Klappan	Raven	
Proposed mine	Line Creek II/Mount Michael	Hermann			Wapiti	Gething				
Annual proposed coal mine production	1	1.1	4	1.6	2.3	2	3		1.5	16.50
Estimated reserves	52	15.6	30	45.5	80.1	98	2,570		71.9	2,963.10
Mine's estimated annual pollution from burning coal	2.07	2.28	8.28	3.31	4.76	4.14	6.21		3.11	34.16
Company's estimated annual pollution from burning coal	2.07	2.28	11.59		4.76	4.14	6.21		3.11	34.16
Estimated annual pollution from coal mining (no fugitives)	0.12	0.13	0.47	0.19	0.27	0.24	0.35		0.18	1.95
Estimated annual pollution from BC coal transport abroad	0.14	0.15	0.56	0.22	0.32	0.28	0.42		0.21	2.32
Estimated annual pollution from company's BC coal operations	2.33	2.56	13.04		5.36	4.66	6.99		3.49	38.42
Estimated pollution from burning of coal company's reserves	107.64	32.292	156.29		165.81	202.86	5,319.90		148.83	6,133.62
Company's pollution (from proposed mines in EA) as a % of BC's reported GHG pollution (2008)	3.39	3.73	18.98		7.80	6.78	10.17		5.08	55.93

Appendix 2b: Estimated Production, Pollution and Reserves of Proposed Coal Mines Not Yet in Environmental Assessment *(all numbers are in millions tonnes)*

Company	<u>Peace River Coal</u>	<u>Centermount</u>	<u>Dehua</u>	<u>Cline Mining</u>			<u>First Coal</u>		<u>Anglo Pacific</u>	<u>Unicorn</u>		TOTAL
Proposed mine	Belcourt-Saxon	Bingay Creek	Murray River	Lossan	South Bullmouse/Waterfall	Crown Mtn	Central South	South Cirque	Trefi	South Halsor	BC Coal	
Proposed annual production	4	n/a	n/a	1	n/a	n/a	1	1.5	n/a	n/a	n/a	7.50
Estimated reserves	86	15.5	1500	186.1	15	n/a	43.4	575	39.09	300	600	3,360.09
Annual estimated pollution	8.28	n/a	n/a	2.07	n/a	n/a	2.07	3.11	n/a	n/a	n/a	15.53
Pollution from reserves, if burned	178.02	32.085	3105	385.227	31.05	n/a	89.838	1190.25	80.916	621	1242	6,955.39

Appendix 3 a: Production and Reserves of BC Coal Mines *(all figures in million tonnes)*

Coal in BC	Million tonnes	Calculations and Sources
Coal produced by BC Mines in 2008	26.2	Statistics Canada, "Table 135-0002 - Production and exports of coal, monthly (tonnes) (table), CANSIM database", online: http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&F=CII/CII_1-eng.htm
Capacity of BC Coal Mines if operating at full capacity	33.8	See Appendix 1
Annual production of proposed coal mines (in EA)	16.5	See Appendix 2A
Annual production of proposed coal mines (not yet in EA)	7.5	See Appendix 2B
Coal Reserves		
Total coal reserves of permitted coal mines	838	See Appendix 1
Total coal reserves of proposed coal mines (in EA)	2,963	See Appendix 2A
Estimated coal reserves at proposed mines (not yet in EA)	3,360	See Appendix 2B
Estimated coal reserves of proposed coal mines (in EA and not yet in EA)	6,323	2,963 mT coal reserves (proposed mines in EA) + 3,360 mT coal reserves (proposed mines not yet in EA) = 6,323 mT coal reserves (all proposed mines)
Total estimated coal reserves all coal mines (proposed and permitted)	7,161	838 mT coal reserves (permitted mines) + 2,963 mT coal reserves (proposed mines in EA) + 3,360 mT coal reserves (proposed mines not yet in EA) = 7,161 mT coal reserves (all permitted and all proposed mines)

Appendix 3b: Pollution from BC Coal and Coal Reserves *(all figures in million tonnes)*

Pollution from BC Coal	Pollution (mT)	Calculations and Sources
Estimated pollution from burning coal in Canada (2008)	3.2	26.2 mT (2008 BC coal production) x (2.91 mT (Pembina estimate of pollution from Teck's Elk Valley coal burned domestically)/(Coal produced at Teck's Elk Valley coal mines in 2005)) = 3.24 mT of pollution was produced by BC coal burned domestically in 2008.
Global pollution from burning BC coal (2008)	54.2	26.2 mT coal produced x 2.07 tonnes CO2 created per tonne of coal burned = 52.16
Estimated pollution from mining process	3.1	((26.2 mT (2008 BC coal production) x 2.640 mT (Pembina estimate of pollution from mining processes at Teck's Elk Valley coal mines))/(Coal produced at Teck's Elk Valley coal mines in 2005)) = 3.1 mT of pollution estimated from mining processes in BC in 2008.
Emissions from transport coal abroad	4.17	See Appendix 4
2008 total pollution from BC Coal (burning, mining, transport)	61.4	54.17 mT (pollution from burning coal) + 2.94 mT (pollution from mining processes) + 4.17 mT (pollution from transporting coal abroad) = 61.4 mT
Pollution annually if all permitted coal mined & burned	69.97	33.8 mT coal permitted x 2.07 TCO2 created per tonne of coal burned = 69.97
Pollution from BC Coal Reserves		
Total potential emissions from existing mine reserves	1,734	838 mT coal reserves (permitted mines) x 2.07 T CO2 created per tonne of coal burned = 1.7 billion tonnes
Total potential emissions from EA mines reserves	6,134	2,963 mT coal reserves (proposed mines in EA) x 2.07 T CO2 created per tonne of coal burned = 6.1 billion tonnes
Total potential emissions from proposed mines (not yet in EA)	6,955	3,360 mT coal reserves (proposed mines not yet in EA) x 2.07 T CO2 created per tonne of coal burned = 6.96 billion tonnes
Total potential emissions from coal reserves (proposed and permitted)	14,823	7,161 mT coal reserves (all permitted and all proposed mines) x 2.07 T CO2 created per tonne of coal burned = 14.8 billion tonnes
Total potential emissions from coal reserves (proposed EA and permitted)	7,868	838 mT coal reserves (permitted) plus 2,963 mT coal reserves (proposed mines in EA) x 2.07 T CO2 created per tonne of coal burned = 7.87 billion tonnes
Total potential emissions from all proposed mines (EA and not yet in EA)	13,089	6,323 mT coal reserves (in EA and not yet in EA) x 2.07 T CO2 created per tonne of coal burned = 13.09 billion tonnes
BC GHG Pollution Inventory		
BC total pollution reported in GHG Inventory 2008 (from all reported sources)	68.70	Ministry of Environment, "BC Greenhouse Gas Inventory Report 2008"
Pollution from coal operations currently accounted for by BC	2.94	0.108 mT (GHG from coal mining extract inputs: natural gas, diesel coal) + 0.009 mT (GHG from generating electricity) + 0.997 mT (GHG from transport w/i Canada) + 1.396 mT (GHG from onsite processes) = 2.94 mT
Pollution from coal operations not accounted for by BC	58.3	61.27mT (total pollution from BC coal in 2008) - 2.94 mT (Pollution from coal operations currently accounted for by BC) = 58.3 mT

Appendix 3c: Comparisons of Pollution from BC Coal

Comparison of pollution from BC coal	Value	Calculations and Sources
Percentage of BC's total coal pollution that is included in BC's GHG Inventory	4.8%	2.94 mT (pollution from coal included in GHG Inventory)/61.3 (Total 2008 pollution from coal) = 4.8% of total coal pollution accounted for in GHG Inventory
Percentage of BC's total coal pollution that is not included in BC's GHG Inventory	95%	58.3 mT (pollution from coal not reported in GHG Inventory)/61.3 (Total 2008 pollution from coal) = 95% of total pollution from BC coal is not accounted for in BC GHG Inventory
scientists' estimate of total GHG that can be safely released through 2100	233, 000 mT	Colin Campbell and Cliff Stainsby, Greenhouse Gas Emission Reduction Scenarios for BC: Meeting the Twin Objectives of Temperature Stabilization and Global Equity
Total potential emissions from BC permitted and proposed coal reserves as % of global 2008 - 2100 budget for carbon	6.36%	14.8 billion tonnes pollution if coal reserves (all permitted and all proposed mines) are burned / 233 billion tonnes of GHG = 6.36%
Total potential emissions from coal reserves (permitted + EA) as % global 2008–2100 budget for carbon	3.38%	7.9 billion tonnes pollution if coal reserves (all permitted and proposed mines in EA) are burned / 233 billion tonnes = 3.4%

Appendix 4: Estimates of Pollution Created from Transporting BC Coal to Foreign Markets

Emission factor ocean shipping (g CO₂e/tonne-km): 15.84 grams of CO₂e per tonne of coal shipped³⁹²

Distance Vancouver to Prince Rupert = 469 n.m. = 868.588 k						
Destination	%	km Van	km PR	tonnes CO ₂ e from Van	tonnes CO ₂ e from PR	
Japan	0.33	8,134	10,863	837		279
South Korea	0.20	8,821	7,728	550		120
Taiwan	0.05	10,160	10,601	158		41
Germany	0.07	16,663	17,513	364		96
UK	0.05	16,362	17,212	255		67
Netherlands	0.04	16,663	17,513	208		55
Italy	0.04	17,954	18,804	224		59
Brazil	0.06	10,580	11,430	198		53
Turkey	0.04	17,954	18,804	224		59
total	0.88			3,016.81		828.91
average		13,699	14,496			
rest of export	0.06	13,699	14,496	256.20		68
Total				3,273.00		896.68
Grand Total						4,169.69 (million tonnes)



Aerial view of Texada Island.
Photo: paulhami, flickr

Endnotes

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4. See Appendix 3b. To compare coal mining and its emissions to reported emissions levels we needed both production and emission figures for the same period. The most current emissions data publicly available are in the "BC Greenhouse Gas Inventory Report 2008", but the coal-production data for 2008 are inconsistent. Statistics Canada, Statistics BC and coal mining companies all report slightly divergent figures. To be consistent for all provincial, aggregated production figures, we used data from Statistics Canada, "Table 135-0002 – Production and exports of coal, monthly (tonnes) (table), CANSIM database", online: http://cansim2.statcan.gc.ca/cgi-win/cnsmcgl.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm. For mine- and company-specific production figures, significant variances also exist among sources. To ensure consistency, we used the mine-by-mine forecasts in the BC government's British Columbia Mines and Mineral Exploration Overview 2008. Likewise, for proven and probable reserve figures we used the government's British Columbia Mines and Mineral Exploration Overview 2009.
5. British Columbia reported 68.7 million tonnes of Greenhouse Gas emissions for 2008. Ministry of Environment, "BC Greenhouse Gas Inventory Report 2008", online: www.env.gov.bc.ca/cas/mitigation/ghg_inventory/index.html. See Appendix 3b. Total heat-trapping pollution from coal produced in BC includes pollution from mining processes (3.1 million tonnes) + pollution from transporting coal abroad (4.2 million tonnes) + pollution from burning coal (54.2 million tonnes) = 61.4 million tonnes of heat-trapping pollution.
6. Throughout *Dirty Secret* we use the term "heat-trapping pollution" to refer to emissions of greenhouse gases (GHG) like carbon dioxide (CO₂) or other heat-trapping gases such as methane, perfluorocarbons and nitrous oxide, which collectively are sometimes referred to as CO₂e.
7. Calculations based on 2.07 tonnes of CO₂ created from every tonne of coal burned. Source: Environment Canada "National Inventory Report – Greenhouse Gas Sources and Sinks in Canada" (2005), online: http://www.ec.gc.ca/pdb/ghg/inventory_report/2005_report/2005_report_e.pdf
8. The population of BC is 4,455,200 people, as of January 1, 2010. Statistics Canada, "Population by year, by province and territory", online: <http://www40.statcan.gc.ca/l01/cst01/demo02a-eng.htm>. All calculations to determine the number of passenger cars or coal-fired power plants that would produce the same amount of heat-trapping pollution as that resulting from coal operations in BC were made using the US Environmental Protection Agency's GHG Equivalencies Calculator, online: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>.
9. See Appendix 1.
10. See Appendix 3b.
11. The total potential heat-trapping pollution from the burning of the coal reserves from all existing (1.7 billion) and proposed coal mines (13.1 billion tonnes) equals 14.8 billion tonnes of heat-trapping pollution. Dividing the total potential heat-trapping pollution from the burning of the coal reserves from all existing and proposed coal mines (14.8 billion tonnes) by total global carbon budget (233 billion tonnes) equals 6.35%. For discussion of the global carbon budget see Colin Campbell and Cliff Stainsby, "Greenhouse Gas Emission Reduction Scenarios for BC: Meeting the Twin Objectives of Temperature Stabilization and Global Equity" (August 2008), online: <http://www.policyalternatives.ca/publications/reports/greenhouse-gas-emission-reduction-scenarios-bc>. Also see Appendix 3c.
12. There are a variety of estimates of the number of cars and light trucks on the road worldwide. The estimates vary from 600 million to just over 800 million. To avoid overstating the ratios in the report, we used the highest estimated number, 806 million. Wikipedia, "Automobile", online: <http://en.wikipedia.org/wiki/Automobile>. Total emissions from the estimated reserves of all BC's existing and proposed coal mines (14.8 billion tonnes) divided by average annual heat-trapping pollution from passenger cars (5.23 metric tons CO₂e /vehicle/year—see note 8, above) equals 2.85 billion new passenger cars.
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17. See Appendix 3b.

18. Total pollution from mining, processing, transporting and burning BC coal (61.4 million tonnes) minus the pollution from BC accounted for in the British Columbia Greenhouse Gas Inventory (3.1 million tonnes) equal 58.3 million tonnes of unaccounted-for heat-trapping pollution. The BC government only accounts for a limited type of polluting activities involved in coal mining including pollution from: electricity generated for coal mining; transport inputs within Canada (to coal mining and processing facilities); mine on-site processes (mining and processing coal, on-site transportation); and pollution from transporting product (coal) within Canada.
19. Total coal-related pollution unaccounted for by BC (58.3 million tonnes) divided by BC's reported total inventory of greenhouse gas pollution in 2008 (68.7 million tonnes) equals 85 per cent.
20. Estimated total of emissions from coal mined in BC that are captured in BC's reported total inventory of greenhouse gas pollution (3.1 million tonnes) divided by total emissions from BC coal in 2008 (61.4 million tonnes) equals 5 per cent.
21. See Appendix 2a.
22. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
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28. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
29. Pollution from burning BC coal produced in 2008 (54.2 million tonnes) divided by conversion factor for equivalent car pollution (5.23) divided by population of BC (4,455,200 million people—see note 8) equals 2.32 additional cars per BC resident.
30. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
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35. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
36. Equivalent car pollution from mining, process, transporting and burning BC coal (11.7 million passenger cars) divided by the number of cars in BC (2.7 million) equals 4.26 times the current number of cars in BC.
37. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
38. Estimated total of emissions from coal mined in BC that are captured in BC's reported total inventory of greenhouse gas pollution (2.9 million tonnes) divided by total emission from BC coal in 2008 (61.4 million tonnes) equals 4.8 per cent.
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40. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
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45. See Appendix 2a.
46. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.
47. There are 2,757,534 cars in BC.
48. Adding "total potential emissions from existing mine reserves" (1.7 billion tonnes) with "total potential emissions from EA mines reserves" (6.1 billion tonnes) to "total potential emissions from proposed mines not yet in EA" (6.9 billion tonnes) equals potentially 14.8 billion tonnes of heat-trapping pollution from the BC coal industry.
49. See note 11.
50. The total potential heat-trapping pollution from the burning of the coal reserves from all existing (1.7 billion) and proposed coal mines (13.1 billion tonnes) equals 14.8 billion tonnes of heat-trapping pollution. Divide the total potential heat-trapping pollution from the burning of the coal reserves from all existing and proposed coal mines (14.8 billion tonnes) by total global carbon budget (233 billion tonnes) equals 6.35 per cent. For discussion of the global carbon budget see: Colin Campbell and Cliff Stainsby, Greenhouse Gas Emission Reduction Scenarios for BC: Meeting the Twin Objectives of

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165. Including emissions from the Western Coal Corporation's Willow Creek open pit coal mine, which is currently inactive.
166. Total permitted coal production (33.8 million tonnes) multiplied by the amount of heat-trapping pollution created by each tonne of coal burned (2.07) equals 70 million tonnes of pollution if existing BC coal mines began to operate at full capacity.
167. Pollution from BC mines if operated to permit levels (66 million tonnes). Total reported non-coal pollution is BC's total reported GHG inventory from all sources (68.7 million tonnes) minus estimated pollution from mining, processing and transporting BC coal that are captured by other sectors in BC's Greenhouse Gas Inventory (3.1 million tonnes) equals 65.6 million tonnes.
168. Heat-trapping pollution from BC coal mines operating at their full permitted capacity (70 million tonnes) versus total heat-trapping pollution acknowledged in BC 2008 Greenhouse Gas Inventory Report (68.7 million tonnes).
169. See Appendix 1. The 10 existing BC coal mines claim reserves of 837.9 million tonnes of coal. Multiplying existing coal mines reserves (837.9 million tonnes) by the conversion factor for pollution produced when coal is burned (2.07) means potentially 1.7 billion tonnes of potential heat-trapping pollution could be released into the atmosphere if mines continue to operate through their lifespan.
170. Number of cars that would create as much pollution as BC coal mines if the full reserves are mined and burned (331 million cars) divided by population of BC (4,455,200—see note 8) equals 74 additional cars for every resident in BC.
171. Total potential emissions from coal mines in environmental assessment process (6.2 billion tonnes) plus total potential emissions from proposed coal mines not yet involved in environmental assessment (6.9 billion tonnes) equals 13.1 billion tonnes of heat-trapping pollution.
172. Total potential emissions from existing coal mines (1.7 billion tonnes) plus total potential emissions from coal mines seeking or having received environmental assessment approval (6.2 billion tonnes) equals 7.9 billion tonnes of heat-trapping pollution.
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