BC's Dirty Secret:
Big Coal & the Export of Global-Warming Pollution
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.

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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
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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.
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. Building on one of his “golden goals” for a golden decade, 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.” 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 pollution⁴ 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”.

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, raising the total unaccounted-for heat-trapping pollution to at least 58.3 million tonnes. These uncounted emissions are equal to 85 per cent of BC’s officially acknowledged emissions total.

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.

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 pollution to the province’s annual total—almost equal to the annual emissions of nine coal-fired power plants.

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.\(^2\)

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)\(^3\) 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.
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.

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.
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.
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. This is equivalent to the annual global-warming pollution from:
   a. 12 coal-fired power plants; or
   b. almost 10 million additional passenger cars, which is equal to adding 50 per cent more cars to Canada’s roads.

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.

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.

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. This is equivalent to the annual pollution produced by 6.5 million additional passenger cars, which is more than double the number of cars in BC today.

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. 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.

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.

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.\textsuperscript{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.\textsuperscript{52}

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

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

**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.

**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.

**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).

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

**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.

**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).

**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. Inferred Mineral Resources cannot be used in disclosure statements, feasibility reports, or other economic studies (see also Mineral Resource).
**Measured Mineral Resource** – The most certain estimate of a resource, based on concrete measures including sampling *(see also Mineral Resource).*

**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.

**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.

**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.

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

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

**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
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 Now

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. Individuals and corporations associated with Teck are the BC Liberal Party’s largest donors, having contributed $657,170 since 2005.

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.*
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.  

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).
Map: Coal Deposits and Infrastructure in BC

where is coal mined in bc?
Types of Coal

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 if 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.
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.3

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
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. Canada was the 13th largest coal-producing country in the world. 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. Canada’s reserves have the potential to provide more than 100 years of production at the 2008 production rate. An additional 193 billion tonnes of coal resources have been identified in Canada.

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.

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. In 2008, Canada exported 26.5 million tonnes of metallurgical coal and 5.7 million tonnes of thermal coal.

In 2008, approximately 80 per cent of the coal Canada exported overseas was shipped from the coal terminals in Vancouver. 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. The largest importers of Canadian
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).  

**BC Coal Reserves**

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

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

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 Exports by Region in CAD 2008

- Europe: 70%
- North America: 19%
- South America: 3%
- Africa: 0%
- Asia: 8%
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.\(^\text{101}\)

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.\(^\text{102}\)

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.\(^\text{103}\) Smaller amounts were shipped to Europe, Germany and South America.\(^\text{104}\)

“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.\textsuperscript{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.\textsuperscript{106} Combined, these ports can ship over 26 million tonnes of coal annually.\textsuperscript{107}

**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).\textsuperscript{108} In 2009, the port shipped approximately 20 million tonnes of coal,\textsuperscript{109} increasing to 24.7 million tonnes in 2010.\textsuperscript{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.\textsuperscript{111}
In 2008, 82 per cent of the volume shipped from Westshore was metallurgical coal, and the remaining 18 per cent was thermal.\textsuperscript{112} By 2010, 30 per cent of coal exports were thermal, half of which were destined for China.\textsuperscript{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.\textsuperscript{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.

<table>
<thead>
<tr>
<th>Destination</th>
<th>2008 thousands of metric tonnes</th>
<th>%</th>
<th>2007 thousands of metric tonnes</th>
<th>%</th>
<th>2006 thousands of metric tonnes</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>69</td>
<td>13,004</td>
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<td>26</td>
<td>7,144</td>
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<td>3</td>
<td>747</td>
<td>4</td>
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</tr>
<tr>
<td>Other</td>
<td>372</td>
<td>3</td>
<td>265</td>
<td>1</td>
<td>146</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>21,079</td>
<td>100</td>
<td>21,160</td>
<td>100</td>
<td>18,959</td>
<td>100</td>
</tr>
</tbody>
</table>


**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.\textsuperscript{115} In early 2011, infrastructure improvements increased Neptune’s coal handling capacity to to 9 million tonnes per year.\textsuperscript{116} Plans are underway to further increase capacity to 12.5 million tonnes of coal by 2013.\textsuperscript{117} Neptune has the capacity to store 600,000 tonnes of coal.\textsuperscript{118} Neptune shipped 8 million tonnes of coal in 2010.\textsuperscript{119}

Teck holds a 46 per cent interest in the company that owns Neptune Terminal.\textsuperscript{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.\textsuperscript{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 terminals 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, which have the capacity to store 15,000 tonnes of coal.

**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.

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.

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. The rest is exported to the international power industry in Japan, Chile and Central America.

**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.
Part II: Coal’s Impacts on the Planet

“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. 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.

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

\textit{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.\textsuperscript{147}

As the rank of coal increases, the amount of heat-trapping pollution also increases.\textsuperscript{148} Deeper coal seams usually hold more methane than shallow seams of similar rank.\textsuperscript{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.\textsuperscript{150} If the data from Pembina’s study of Elk Valley coal mines is extrapolated\textsuperscript{151} 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's impact on the planet
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. 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.

**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.)
Every kilometre a tonne of coal is shipped produces an average of 15.84 grams of heat-trapping pollution.\textsuperscript{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 (\textit{see Appendix 4}).

\textit{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 (\textit{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,\textsuperscript{161} which is more than four times the number of cars registered in BC in 2009;\textsuperscript{162} or

2. almost 16 new coal-fired power plants.\textsuperscript{163}

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

\textbf{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 BC\textsuperscript{165} have coal quotas to collectively mine 33.8 million tonnes annually (\textit{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, exceeding the heat-trapping pollution from all other non-coal sources in BC combined.

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.

**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.

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.

**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.

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. 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. (See Appendix 3c.)

With a population of 4.45 million, British Columbia currently has only 0.065 per cent of the world’s population. 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.)
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.
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:

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Tax Rate (as of July 1, 2009) ($ per tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal - high heat value</td>
<td>31.16</td>
</tr>
<tr>
<td>Coal - low heat value</td>
<td>27.66</td>
</tr>
</tbody>
</table>

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:
l aws regulating coal in bc

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
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”.

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.

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.

**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.

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.

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. 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 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.”

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).

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.

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. 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.

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,
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.” Teck is also the largest coal miner in BC, with five mines.


Producing, transporting and burning the coal from Teck’s five coal mines produced approximately 51.9 million tonnes of heat-trapping pollution in 2008. 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.

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. 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.
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), or the annual emissions from 330 coal-fired power plants.

### Company: Teck

<table>
<thead>
<tr>
<th>Company's permitted capacity</th>
<th>24 million tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company's proven reserves</td>
<td>613.3 million tonnes</td>
</tr>
<tr>
<td>Company's carbon emissions 2008</td>
<td>51.9 million tonnes</td>
</tr>
<tr>
<td>Company’s pollution as a percentage of BC’s reported emissions in 2008</td>
<td>75.5%</td>
</tr>
</tbody>
</table>

### 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.

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. 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.

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.\textsuperscript{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.

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

\textbf{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Elkview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>In production</td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous (metallurgical)</td>
</tr>
<tr>
<td>Annual Permitted Production</td>
<td>5.6 million tonnes annually</td>
</tr>
<tr>
<td>Proven reserves</td>
<td>232.2 million tonnes</td>
</tr>
<tr>
<td>2008 pollution</td>
<td>10.1 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>481.5 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.</td>
</tr>
</tbody>
</table>
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. Since 1982, mining has been centred at Eagle Mountain, producing bituminous, metallurgical coal, and a small amount of thermal coal. 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. The mine site’s area is 20,304 hectares, of which 4,220 are currently being mined or are scheduled to be mined.

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.

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.

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

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.
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. Greenhills is currently permitted to produce up to 5.2 million tonnes of coal annually. In 2008 it produced 4.6 million tonnes. The lifespan of the mine is estimated to be 18 more years at current production rates.

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. 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.

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.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Greenhills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>In production</td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous (metallurgical, thermal)</td>
</tr>
<tr>
<td>Annual Permitted Production</td>
<td>5.2 million tonnes annually</td>
</tr>
<tr>
<td>2008 forecast production</td>
<td>4.6 million tonnes</td>
</tr>
<tr>
<td>Proven reserves</td>
<td>81.3 million tonnes</td>
</tr>
<tr>
<td>2008 pollution</td>
<td>9.5 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>168.3 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Pohang Steel Canada Limited, Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.</td>
</tr>
</tbody>
</table>
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. The Line Creek mine 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. The mine is estimated to hold 14.9 million tonnes of coal reserves under 1,900 hectares of land.

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.

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.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Line Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>In production</td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
</tbody>
</table>
### Coal Type

<table>
<thead>
<tr>
<th></th>
<th>Bituminous (metallurgical, coking, thermal)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual permitted Production</strong></td>
<td>2.5 million tonnes annually</td>
</tr>
<tr>
<td><strong>2008 forecast production</strong></td>
<td>2.2 million tonnes</td>
</tr>
<tr>
<td><strong>Proven reserves</strong></td>
<td>14.9 million tonnes</td>
</tr>
<tr>
<td><strong>2008 pollution</strong></td>
<td>4.55 million tonnes</td>
</tr>
<tr>
<td><strong>Pollution from reserves, if burned</strong></td>
<td>30.8 million tonnes</td>
</tr>
<tr>
<td><strong>Shareholders</strong></td>
<td>Keevil Holding Corporation, Sumitomo Metal Mining Co. Ltd.</td>
</tr>
</tbody>
</table>

### 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. Walter Energy now operates Western Coal as a wholly owned subsidiary. 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.

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.

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.

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.

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

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.
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.
**Mine: Brule**

The Brule Mine is located 45 km south-southwest of Chetwynd, BC. 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. The Brule project has been in production since 2007. The Mine currently produces 1.3 million tonnes of coal annually. Current market conditions suggest the rate of production could increase to 2 million tonnes per year.

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.

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.

In 2008, Western Coal's Brule Mine was responsible for 2.7 million tonnes of heat-trapping pollution. 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.
<table>
<thead>
<tr>
<th>Mine Site</th>
<th>Brule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>In production</td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous (metallurgical)</td>
</tr>
<tr>
<td>Annual Permitted Production</td>
<td>1.3 million tonnes annually</td>
</tr>
<tr>
<td>2008 forecast production</td>
<td>1.3 million tonnes</td>
</tr>
<tr>
<td>Proven reserves</td>
<td>34.3 million tonnes</td>
</tr>
<tr>
<td>2008 pollution</td>
<td>2.7 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>71 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Cambrian Mining PLC</td>
</tr>
</tbody>
</table>

**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. 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. 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: 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.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Permitted Production</strong></td>
<td>3 million tonnes</td>
</tr>
<tr>
<td><strong>Proven reserves</strong></td>
<td>34.6 million tonnes</td>
</tr>
<tr>
<td><strong>2008 Pollution</strong></td>
<td>4.6 million tonnes</td>
</tr>
<tr>
<td><strong>Pollution from reserves, if burned</strong></td>
<td>71.6 million tonnes</td>
</tr>
<tr>
<td><strong>Shareholders</strong></td>
<td>Cambrian Mining PLC</td>
</tr>
</tbody>
</table>

**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.\(^{252}\)
*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.\(^{258}\)

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

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.

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.

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. Approximately one third of production is exported to be used for coal-fired power in Japan, Chile and Central America.

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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{269}

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

<table>
<thead>
<tr>
<th>Company</th>
<th>Vitol Anker International B.V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td><a href="http://www.vitol.com/">http://www.vitol.com/</a></td>
</tr>
<tr>
<td>Headquarters</td>
<td>Calgary, AB and Vancouver, BC</td>
</tr>
<tr>
<td>Proposed Mines</td>
<td>Wapiti</td>
</tr>
<tr>
<td>Mines</td>
<td>Quinsam</td>
</tr>
<tr>
<td>Status</td>
<td>In production</td>
</tr>
<tr>
<td>Mine Type</td>
<td>Underground</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous</td>
</tr>
<tr>
<td>Annual Permitted Production</td>
<td>1.9 million tonnes annually</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Proven reserves</td>
<td>22.1 million tonnes</td>
</tr>
<tr>
<td>2008 pollution</td>
<td>1.2 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>45.7 million tonnes</td>
</tr>
<tr>
<td><strong>Company’s carbon emissions as percentage of BC’s reported emissions in 2008</strong></td>
<td><strong>1.7 per cent</strong></td>
</tr>
<tr>
<td>Shareholders</td>
<td>Privately owned company</td>
</tr>
</tbody>
</table>
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”). 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.” Compliance owns 60 per cent of these interests, and Itochu International and LG International each own 20 per cent. Compliance also holds 100% of the gas rights for the same lands. 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,
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. Currently the proposed Basin project “remains on care and maintenance and is not operating.”

Compliance optioned its Basin Coal Mine near Princeton, to a private Australian company, NWPC Pty Ltd. 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”. 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.

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 indicted that Compliance was negotiating to return "the mine and mine permit to the company from which it was originally acquired."

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. 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.

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.
<table>
<thead>
<tr>
<th>Mine</th>
<th>Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Compliance Energy (optioned to Jameson)</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.complianceenergy.com/">http://www.complianceenergy.com/</a></td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous (thermal)</td>
</tr>
<tr>
<td>Status</td>
<td>Decommissioned</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>0.7 million tonnes</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>87 million tonnes</td>
</tr>
<tr>
<td>Annual pollution</td>
<td>1.4 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if</td>
<td>180.1 million tonnes</td>
</tr>
<tr>
<td>burned</td>
<td></td>
</tr>
</tbody>
</table>
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. 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), or the annual emissions from 3,391 coal-fired power plants.

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”.

NOTES
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.  

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.

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. 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), or 28 coal-fired power plants.

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

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.

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.

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. 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), or 8 coal-fired power plants.

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

**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.

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. 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.”

If Belcourt-Saxon becomes operational, it could produce more than 8.28 million tonnes of heat-trapping pollution per year. 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).

Proven reserves are estimated to be 30 million tonnes of coal. 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. If coal is produced, it will be destined for foreign steel markets.

Peace River 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.

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), or 16 new coal-fired power plants.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Roman Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Peace River Coal Ltd. Partnership</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.peacerivercoal.com/">http://www.peacerivercoal.com/</a></td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Bituminous (metallurgical, coking)</td>
</tr>
<tr>
<td>Status</td>
<td>Awaiting approval of BCEAO (Pre-approval since Sept ’07)</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>4 million tonnes annually</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>30 million tonnes</td>
</tr>
<tr>
<td>Annual pollution</td>
<td>8.28 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>62.1 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Anglo American PLC., NEMI Northern Energy &amp; Mining Inc., and Hillsborough Resources Limited</td>
</tr>
</tbody>
</table>
**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.\textsuperscript{102}

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.\textsuperscript{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.\textsuperscript{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.

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

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.

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.

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

**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.

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

**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.³³³

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.³³⁴

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.  

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. Projected to produce 2 million tonnes of metallurgical coal per year, the lifespan of the mine is expected to reach 40 years. Coal will be processed on site, with washed coal trucked to a rail-load-out facility on the CN Rail mainline in Chetwynd.

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.

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. Due to a lack of underground mines in Canada, Dehua wishes to bring over experienced, skilled foreign labour to meet staffing requirements.

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.
**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.
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”).

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. 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.

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.

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. 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.

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. 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.

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.\(^{312}\)

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.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Mt. Klappan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Fortune Minerals</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.fortuneminerals.com/">http://www.fortuneminerals.com/</a></td>
</tr>
<tr>
<td>Mine Type</td>
<td>Open-pit</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Anthracite</td>
</tr>
<tr>
<td>Status</td>
<td>Awaiting approval of BCEAO (Pre-approval phase since October ’04)</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>1.5 million tonnes</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>2.57 billion tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>5.3 billion tonnes</td>
</tr>
</tbody>
</table>
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. 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. It would be located in the Tsable River and Cowie Creek watersheds on Vancouver Island. The company claims the mine site “holds 71.998 million tonnes of measured and indicated and 59.4 million tonnes of inferred coal resource.”

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.

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. 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. 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. 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.

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

**Company: Cline Mining Corporation**

Cline is a publicly traded company listed on the Toronto Stock Exchange (TSX – “CMK”). Cline describes itself as “in the business of acquiring, exploring and developing mine mineral resource properties to production in Canada, United States and overseas.” 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.
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.

**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.

<table>
<thead>
<tr>
<th>Company</th>
<th>Cline Mining Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td><a href="http://www.clinemining.com/">http://www.clinemining.com/</a></td>
</tr>
<tr>
<td>Headquarters</td>
<td>Toronto, ON and Vancouver, BC</td>
</tr>
<tr>
<td>Proposed Mines</td>
<td>Lossan, South Bullmouse/Waterfall, Crown Mountain</td>
</tr>
<tr>
<td>Company’s proposed annual production</td>
<td>Lossan (1 million tonnes) Waterfall and Crown Mountain (n/a)</td>
</tr>
<tr>
<td>Company’s estimated reserves</td>
<td>Lossan + Waterfall (201 million tonnes) Crown Mountain (n/a)</td>
</tr>
<tr>
<td>Pollution from company’s reserves, if burned</td>
<td>416.3 million tonnes</td>
</tr>
</tbody>
</table>

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

**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.

<table>
<thead>
<tr>
<th>Mine</th>
<th>South Bullmoose and Waterfall Creek</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Cline Mining Corp.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.clinemining.com/">http://www.clinemining.com/</a></td>
</tr>
<tr>
<td>Status</td>
<td>Has not applied for BCEA certificate</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>15 million tonnes (Waterfall)</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>31.1 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Mitsui Matsushima of Japan, Thyssen Krupp of Germany and Pinetree Capital of Canada</td>
</tr>
</tbody>
</table>
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. The project has confirmed coal showings of coal suitable for making steel. The property requires further exploration. The project appears to be on hold.

<table>
<thead>
<tr>
<th>Mine</th>
<th>Crown Mountain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Cline Mining Corp.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.clinemining.com/">http://www.clinemining.com/</a></td>
</tr>
<tr>
<td>Status</td>
<td>Has not applied for BCEA certificate</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>n/a</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Mitsui Matsushima of Japan, Thyssen Krupp of Germany and Pinetree Capital of Canada</td>
</tr>
</tbody>
</table>

Company: First Coal Operations

According to its website, “First Coal Corporation is a private Canadian company exploring and developing coal properties in northeastern BC.” 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.

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. Recently, First Coal submitted a bulk permit application that, if approved, will allow it to extract up to 50,000 tonnes of coal. First Coal claims to have “gathered sufficient information over the last few years of exploration to establish a mine plan.”

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.

If Central South ever becomes operational, the estimated reserves
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. In BC, 52 per cent of the home range of the Woodland Caribou populations is disturbed. 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.

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

<table>
<thead>
<tr>
<th>Mine</th>
<th>Central South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>First Coal</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.firstcoal.com/">http://www.firstcoal.com/</a></td>
</tr>
<tr>
<td>Status</td>
<td>Has not applied for BCEA certificate</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>1 million tonnes (2013)</td>
</tr>
<tr>
<td></td>
<td>1.2 million tonnes (2014)</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>43.4 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>89.8 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Privately owned company</td>
</tr>
</tbody>
</table>

**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.\textsuperscript{366} First Coal hopes to begin production at South Cirque in 2016 at an initial rate of 1.5 million tonnes per year.\textsuperscript{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.\textsuperscript{368} This is equivalent to the annual pollution of 227 million passenger cars, or 309 coal-fired power plants.

<table>
<thead>
<tr>
<th>Mine</th>
<th>South Cirque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>First Coal</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.firstcoal.com/">http://www.firstcoal.com/</a></td>
</tr>
<tr>
<td>Status</td>
<td>Has not applied for BCEA certificate</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>1.5 million tonnes</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>575 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>1.190 billion tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Privately owned company</td>
</tr>
</tbody>
</table>
**Company: Anglo Pacific Group**

Anglo Pacific Group PLC describes itself as a “global natural resources royalties company.” 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.” 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.

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

**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. 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.

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. This is equivalent to the annual pollution of 15.4 million passenger cars, or 21 coal-fired power plants.
### Proposed Mine: Trefi

<table>
<thead>
<tr>
<th>Company</th>
<th>Anglo Pacific Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Has not applied for BCEA certificate</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>39 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>80.9 million tonnes</td>
</tr>
<tr>
<td>Shareholders</td>
<td>Ransome’s Dock Limited, AXA Investment Managers UK, Rathbone Brothers PLC, Legal and General Group PLC</td>
</tr>
</tbody>
</table>

### 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.  

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.

### Proposed Mine: South Haslar

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

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. This is equivalent to the annual pollution of 118.7 million passenger cars, or 161 coal-fired power plants.

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

**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. 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.

<table>
<thead>
<tr>
<th>Proposed Mine</th>
<th>BC Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>Unicorn International Mines Group Inc.</td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.theunicorn.ca/aboutus.html">http://www.theunicorn.ca/aboutus.html</a></td>
</tr>
<tr>
<td>Mine Type</td>
<td>n/a</td>
</tr>
<tr>
<td>Coal Type</td>
<td>Metallurgical</td>
</tr>
<tr>
<td>Status</td>
<td>Exploration and pre-feasibility phase</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>600 million tonnes</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>1,242 million tonnes</td>
</tr>
</tbody>
</table>
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.” 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.

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

**Environmental and Social Costs of Mining**


## Appendix 1: Production, Pollution and Reserves of Permitted Coal Mines in BC

(all figures in million tonnes)

<table>
<thead>
<tr>
<th>Mine</th>
<th>Western Coal mines</th>
<th>Teck mines</th>
<th>Peace River Coal</th>
<th>Vitol</th>
<th>Compliance Energy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal mine’s permitted production capacity (mT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>1.3</td>
<td>0.9</td>
<td>3</td>
<td>2.7</td>
<td>5.6</td>
<td>8</td>
</tr>
<tr>
<td>Coal Mine Production Forecast 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>1.3</td>
<td>0.9</td>
<td>3</td>
<td>2.7</td>
<td>5.6</td>
<td>8</td>
</tr>
<tr>
<td>Company’s BC coal production capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>5.2</td>
<td></td>
<td>24</td>
<td>2</td>
<td>1.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Coal Company Production Forecast 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>3.5</td>
<td></td>
<td>22.27</td>
<td>1.4</td>
<td>0.5</td>
<td>0</td>
</tr>
<tr>
<td>Coal mine’s proven &amp; probable reserves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>34.3</td>
<td>29.6</td>
<td>34.6</td>
<td>28</td>
<td>232.6</td>
<td>256.5</td>
</tr>
<tr>
<td>Company’s proven &amp; probable reserves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>98.5</td>
<td></td>
<td>613.3</td>
<td>17</td>
<td>22.07</td>
<td>87</td>
</tr>
<tr>
<td>Estimated pollution from burning mine’s coal in 2008</td>
<td>2.69</td>
<td>0.00</td>
<td>4.55</td>
<td>4.95</td>
<td>10.14</td>
<td>16.97</td>
</tr>
<tr>
<td>Estimated pollution from burning company’s coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brule Willow Coal mine</td>
<td>7.25</td>
<td></td>
<td>46.10</td>
<td>2.90</td>
<td>1.04</td>
<td>0.00</td>
</tr>
<tr>
<td>Estimated pollution from company’s coal mining activities in 2008</td>
<td>0.4</td>
<td></td>
<td>2.6</td>
<td>0.2</td>
<td>0.1</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated pollution from transporting coal outside BC in 2008</td>
<td>0.5</td>
<td></td>
<td>3.1</td>
<td>0.2</td>
<td>0.1</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated total pollution from coal company in 2008</td>
<td>8.15</td>
<td></td>
<td>51.9</td>
<td>3.26</td>
<td>1.16</td>
<td>n/a</td>
</tr>
<tr>
<td>Estimated pollution from burning coal mine’s proven &amp; probable reserves</td>
<td>71.00</td>
<td>61.27</td>
<td>71.62</td>
<td>57.96</td>
<td>481.48</td>
<td>530.96</td>
</tr>
<tr>
<td>Estimated pollution from burning coal company’s proven &amp; probable reserves</td>
<td>203.90</td>
<td>1269.53</td>
<td>35.19</td>
<td>45.68</td>
<td>180.09</td>
<td>1,734.39</td>
</tr>
<tr>
<td>Company’s pollution as a % of BC’s annual GHG pollution in 2008</td>
<td>11.9</td>
<td>75.5</td>
<td>4.7</td>
<td>1.7</td>
<td>n/a</td>
<td>93.79</td>
</tr>
</tbody>
</table>
## Appendix 2a: Estimated Production, Reserves and Pollution of Proposed BC Coal Mines in Environmental Assessment

*(all figures in million tonnes)*

<table>
<thead>
<tr>
<th>Company</th>
<th>Teck</th>
<th>Western Coal</th>
<th>Peace River</th>
<th>Vitol</th>
<th>Dehua</th>
<th>Fortune Minerals</th>
<th>Compliance Energy</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed mine</td>
<td>Line Creek II/Mount Michael</td>
<td>Hermann</td>
<td>Roman</td>
<td>Horizon</td>
<td>Wapiti</td>
<td>Gething</td>
<td>Mount Klappan</td>
<td>Raven</td>
</tr>
<tr>
<td>Annual proposed coal mine production</td>
<td>1</td>
<td>1.1</td>
<td>4</td>
<td>1.6</td>
<td>2.3</td>
<td>2</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>52</td>
<td>15.6</td>
<td>30</td>
<td>45.5</td>
<td>80.1</td>
<td>98</td>
<td>2,570</td>
<td>71.9</td>
</tr>
<tr>
<td>Mine’s estimated annual pollution from burning coal</td>
<td>2.07</td>
<td>2.28</td>
<td>8.28</td>
<td>3.31</td>
<td>4.76</td>
<td>4.14</td>
<td>6.21</td>
<td>3.11</td>
</tr>
<tr>
<td>Company’s estimated annual pollution from burning coal</td>
<td>2.07</td>
<td>2.28</td>
<td>11.59</td>
<td>4.76</td>
<td>4.14</td>
<td>6.21</td>
<td>3.11</td>
<td>34.16</td>
</tr>
<tr>
<td>Estimated annual pollution from coal mining (no fugitives)</td>
<td>0.12</td>
<td>0.13</td>
<td>0.47</td>
<td>0.19</td>
<td>0.27</td>
<td>0.24</td>
<td>0.35</td>
<td>0.18</td>
</tr>
<tr>
<td>Estimated annual pollution from BC coal transport abroad</td>
<td>0.14</td>
<td>0.15</td>
<td>0.56</td>
<td>0.22</td>
<td>0.32</td>
<td>0.28</td>
<td>0.42</td>
<td>0.21</td>
</tr>
<tr>
<td>Estimated annual pollution from company’s BC coal operations</td>
<td>2.33</td>
<td>2.56</td>
<td>13.04</td>
<td>5.36</td>
<td>4.66</td>
<td>6.99</td>
<td>3.49</td>
<td>38.42</td>
</tr>
<tr>
<td>Estimated pollution from burning of coal company’s reserves</td>
<td>107.64</td>
<td>32.292</td>
<td>156.29</td>
<td>165.81</td>
<td>202.86</td>
<td>5,319.90</td>
<td>148.83</td>
<td>6,133.62</td>
</tr>
<tr>
<td>Company’s pollution (from proposed mines in EA) as a % of BC’s reported GHG pollution (2008)</td>
<td>3.39</td>
<td>3.73</td>
<td>18.98</td>
<td>7.80</td>
<td>6.78</td>
<td>10.17</td>
<td>5.08</td>
<td>55.93</td>
</tr>
</tbody>
</table>
### Appendix 2b: Estimated Production, Pollution and Reserves of Proposed Coal Mines Not Yet in Environmental Assessment

*(all numbers are in millions tonnes)*

<table>
<thead>
<tr>
<th>Company</th>
<th>Peace River Coal</th>
<th>Centermount</th>
<th>Dehua</th>
<th>Cline Mining</th>
<th>First Coal</th>
<th>Anglo Pacific</th>
<th>Unicorn</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed mine</td>
<td>Belcourt-Saxon</td>
<td>Bingay Creek</td>
<td>Murray River</td>
<td>Lossan</td>
<td>South Bullmouse/Waterfall</td>
<td>Crown Mtn</td>
<td>Central South</td>
<td>South Cirque</td>
</tr>
<tr>
<td>Proposed annual production</td>
<td>4</td>
<td>n/a</td>
<td>n/a</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Estimated reserves</td>
<td>86</td>
<td>15.5</td>
<td>1500</td>
<td>186.1</td>
<td>15</td>
<td>n/a</td>
<td>43.4</td>
<td>575</td>
</tr>
<tr>
<td>Annual estimated pollution</td>
<td>8.28</td>
<td>n/a</td>
<td>n/a</td>
<td>2.07</td>
<td>n/a</td>
<td>n/a</td>
<td>2.07</td>
<td>3.11</td>
</tr>
<tr>
<td>Pollution from reserves, if burned</td>
<td>178.02</td>
<td>32.085</td>
<td>3105</td>
<td>385.227</td>
<td>31.05</td>
<td>n/a</td>
<td>89.838</td>
<td>1190.25</td>
</tr>
</tbody>
</table>
## Appendix 3a: Production and Reserves of BC Coal Mines

*All figures in million tonnes*

<table>
<thead>
<tr>
<th>Coal in BC</th>
<th>Million tonnes</th>
<th>Calculations and Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity of BC Coal Mines if operating at full capacity</td>
<td>33.8</td>
<td>See Appendix 1</td>
</tr>
<tr>
<td>Annual production of proposed coal mines (in EA)</td>
<td>16.5</td>
<td>See Appendix 2A</td>
</tr>
<tr>
<td>Annual production of proposed coal mines (not yet in EA)</td>
<td>7.5</td>
<td>See Appendix 2B</td>
</tr>
</tbody>
</table>

### Coal Reserves

<table>
<thead>
<tr>
<th>Coal Reserves</th>
<th>Million tonnes</th>
<th>Calculations and Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total coal reserves of permitted coal mines</td>
<td>838</td>
<td>See Appendix 1</td>
</tr>
<tr>
<td>Total coal reserves of proposed coal mines (in EA)</td>
<td>2,963</td>
<td>See Appendix 2A</td>
</tr>
<tr>
<td>Estimated coal reserves at proposed mines (not yet in EA)</td>
<td>3,360</td>
<td>See Appendix 2B</td>
</tr>
<tr>
<td>Estimated coal reserves of proposed coal mines (in EA and not yet in EA)</td>
<td>6,323</td>
<td>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)</td>
</tr>
<tr>
<td>Total estimated coal reserves all coal mines (proposed and permitted)</td>
<td>7,161</td>
<td>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)</td>
</tr>
</tbody>
</table>
## Appendix 3b: Pollution from BC Coal and Coal Reserves (all figures in million tonnes)

<table>
<thead>
<tr>
<th>Pollution from BC Coal</th>
<th>Pollution (mT)</th>
<th>Calculations and Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated pollution from burning coal in Canada (2008)</td>
<td>3.2</td>
<td>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)) = 3.2 mT of pollution was produced by BC coal burned domestically in 2008.</td>
</tr>
<tr>
<td>Global pollution from burning BC coal (2008)</td>
<td>54.2</td>
<td>26.2 mT coal produced x 2.07 tonnes CO2 created per tonne of coal burned = 52.16</td>
</tr>
<tr>
<td>Estimated pollution from mining process</td>
<td>3.1</td>
<td>(((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.</td>
</tr>
<tr>
<td>Emissions from transport coal abroad</td>
<td>4.17</td>
<td>See Appendix 4</td>
</tr>
<tr>
<td>2008 total pollution from BC Coal (burning, mining, transport)</td>
<td>61.4</td>
<td>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</td>
</tr>
<tr>
<td>Pollution annually if all permitted coal mined &amp; burned</td>
<td>69.97</td>
<td>33.8 mT coal permitted x 2.07 T CO2 created per tonne of coal burned = 69.97</td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Comparison of pollution from BC coal</th>
<th>Value</th>
<th>Calculations and Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of BC’s total coal pollution that is included in BC’s GHG Inventory</td>
<td>4.8%</td>
<td>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</td>
</tr>
<tr>
<td>Percentage of BC’s total coal pollution that is not included in BC’s GHG Inventory</td>
<td>95%</td>
<td>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</td>
</tr>
<tr>
<td>Scientists’ estimate of total GHG that can be safely released through 2100</td>
<td>233,000 mT</td>
<td>Colin Campbell and Cliff Stainsby, Greenhouse Gas Emission Reduction Scenarios for BC: Meeting the Twin Objectives of Temperature Stabilization and Global Equity</td>
</tr>
<tr>
<td>Total potential emissions from BC permitted and proposed coal reserves as % of global 2008 - 2100 budget for carbon</td>
<td>6.36%</td>
<td>14.8 billion tonnes pollution if coal reserves (all permitted and all proposed mines) are burned / 233 billion tonnes of GHG = 6.36%</td>
</tr>
<tr>
<td>Total potential emissions from coal reserves (permitted + EA) as % global 2008–2100 budget for carbon</td>
<td>3.38%</td>
<td>7.9 billion tonnes pollution if coal reserves (all permitted and proposed mines in EA) are burned / 233 billion tonnes = 3.4%</td>
</tr>
</tbody>
</table>
### Appendix 4: Estimates of Pollution Created from Transporting BC Coal to Foreign Markets

Emission factor ocean shipping (g CO$_2$e/tonne-km): 15.84 grams of CO$_2$e per tonne of coal shipped\(^{392}\)

Distance Vancouver to Prince Rupert = 469 n.m. = 868.588 k

<table>
<thead>
<tr>
<th>Destination</th>
<th>%</th>
<th>km Van</th>
<th>km PR</th>
<th>tonnes CO$_2$e from Van</th>
<th>tonnes CO$_2$e from PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>0.33</td>
<td>8,134</td>
<td>10,863</td>
<td>837</td>
<td>279</td>
</tr>
<tr>
<td>South Korea</td>
<td>0.20</td>
<td>8,821</td>
<td>7,728</td>
<td>550</td>
<td>120</td>
</tr>
<tr>
<td>Taiwan</td>
<td>0.05</td>
<td>10,160</td>
<td>10,601</td>
<td>158</td>
<td>41</td>
</tr>
<tr>
<td>Germany</td>
<td>0.07</td>
<td>16,663</td>
<td>17,513</td>
<td>364</td>
<td>96</td>
</tr>
<tr>
<td>UK</td>
<td>0.05</td>
<td>16,362</td>
<td>17,212</td>
<td>255</td>
<td>67</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.04</td>
<td>16,663</td>
<td>17,513</td>
<td>208</td>
<td>55</td>
</tr>
<tr>
<td>Italy</td>
<td>0.04</td>
<td>17,954</td>
<td>18,804</td>
<td>224</td>
<td>59</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.06</td>
<td>10,580</td>
<td>11,430</td>
<td>198</td>
<td>53</td>
</tr>
<tr>
<td>Turkey</td>
<td>0.04</td>
<td>17,954</td>
<td>18,804</td>
<td>224</td>
<td>59</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>km Van</th>
<th>km PR</th>
<th>tonnes CO$_2$e from Van</th>
<th>tonnes CO$_2$e from PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>0.88</td>
<td></td>
<td>3,016.81</td>
<td></td>
<td>828.91</td>
</tr>
<tr>
<td>average</td>
<td></td>
<td>13,699</td>
<td>14,496</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rest of export</td>
<td>0.06</td>
<td>13,699</td>
<td>14,496</td>
<td>256.20</td>
<td>68</td>
</tr>
</tbody>
</table>

Total 3,273.00 896.68

Grand Total 4,169.69 (million tonnes)
Endnotes


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/cg-win/cnsmcgi.exe?Lang=E&amp;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.


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.


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/01/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/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.


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.


24. See Glossary.


27. Because their were conflicts between production numbers reported by individual companies and those reported by government, we relied on government figures for comparisons and used lowest aggregate number in estimates. 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/eng/inventory_report/2005_report/2005_report_e.pdf. See Appendix 3b.


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.


32. See Appendix 4.


34. See Appendix 3b.

35. Car and coal-fired equivalency calculations use the US EPA’s Calculator. See note 8.

36. Equivalent car pollution from mining, processing, 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.


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.

39. See Appendix 1.


41. Ibid.

42. Total cars registered in Canada (20,076,942) divided by car equivalent to Teck’s 2008 pollution (10 million cars) equals ~50 per cent more cars in Canada.


44. Total proven and probable reserves of existing BC coal mines (837.9 million tonnes) multiplied by number of cubic feet per metric tonne of coal (40) divided by distance in feet of southern border between United States and Canada (3,987 miles times 5280 feet in a mile) divided by height of CN Tower (1,815 feet) equals wall as tall as CN tower over 10 inches wide.

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


55. Western Coal, “Glossary of Coal Terms”, online: http://www.westerncoal.com/investors/glossary

56. Ibid.

57. Executive Green, “What is CO2e” (26 August, 2008), online: http://executivegreen.blogspot.com/2008/08/what-is-co2e.html


60. Ibid.

61. Ibid.

62. Ibid.

63. Ibid.

64. Mining Online Expo, online: http://www.miningonlineexpo.com/glossary.php/p.html


68. Jamie Henn (It’s Getting Hot In Here), “Bill McKibben on Democracy Now” (15 April, 2010), online: http://itsgettinghotinhere.org/2010/04/15/bill-mckibben-on-democracy-now/


70. Ibid.


73. The Canadian Encyclopedia “Coal Mining”, online: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=1


75. Ibid.

76. Total coal produced is the sum of hard and brown coal after conversion to a common energy unit (5845 million tonnes (Mt) of hard coal and 951 Mtons (Mt) of brown coal/lignite). Source: Ibid.

77. Ibid.

78. World Coal Institute, online: http://www.worldcoal.org/coal

79. The Canadian Encyclopedia, online: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0001704


81. Ibid.


83. Ibid.

84. Ibid.

85. Ibid.

86. Ibid.

87. Ibid.

89. Ibid.


93. Ibid.

94. Ibid.

95. Ibid.

96. Ibid.


98. Ibid.


100. Ibid.


107. Ibid.


114. Ibid.


116. Wikimapia, “Neptune Bulk Terminals (City of North Vancouver),” online: http://wikimapia.org/1745058/Neptune-Bulk-Terminals

117. Ibid.


119. Ibid.


...

189. Ibid.

190. The Canadian Encyclopedia, online: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0001704

191. Compliance Energy’s Basin coal mine was operational until 2006 but is inactive. See page 67 for more details.


193. Teck Resources Limited, “2008 Annual Report” (2008), online: http://www.teck.com. Although Teck reported 23 million tonnes of coal production from BC in 2008, we used the lower amount indicated in provincial estimates in all calculations of heat-trapping pollution to ensure our production estimates were all based upon a consistent methodology. See also note 4.

194. Ibid.

195. On our methodology for production figures for companies and mines, see note 4.

196. PollutionWatch, Ranking Facilities by Total of All Gases (2006), online: http://www.pollutionwatch.org/rank.do?change=province&year=2006&provinceSelected=GHS&provincesByList=TOTAL_ALL_TONE&facilitiesByList=TOTAL_ALL_TONE

197. Heat-trapping pollution from coal mined at Teck’s 5 BC coal mines in 2007 (51.9 million tonnes) divided by the total reported heat-trapping pollution in BC (68.7 million tonnes) equals 75.5 per cent.

198. The population of Canada is 33.9 million (see note 30).

199. The population of BC is 4,454,200 (see note 8).


201. Ibid.


203. Ibid.

204. Ibid.


206. Ibid.

207. Ibid.

208. Car and coal-fired equivalency calculations use the US EPA’s Calculator. See note 8.


213. Ibid.


219. Ibid.


221. Car and coal-fired equivalency calculations use the US EPA’s Calculator. See note 8.
223. Ibid.
225. Ibid.
231. Ibid.
232. Ibid.
233. Ibid.
237. Ibid.
238. Ibid.
240. Ibid.
241. Ibid.
242. Ibid.
243. Ibid.
245. Ibid.
246. Numerous references indicate that the Willow Creek mine operated in October and November 2008, but no accurate production figure could be found.
248. There are conflicting estimates of Wolverine’s proven and probable reserves. The estimates for all mines other than Wolverine were obtained from: Ministry of Energy, Mines and Petroleum Resources, British Columbia Mines and Mineral Exploration Overview 2009 (September, 2010), online: http://www.empr.gov.bc.ca/Mining/Geoscience/PublicationsCatalogue/MineralExplorationReview/Documents/EX-OVERVIEW_IC2010-1.pdf. However, the 2009 Overview comingles the various approved and proposed aspects of Wolverine, so we used the estimated reserves from Western Coal’s website. Western Coal Corporation, “Operation–Wolverine” online: http://www.westerncoal.com/properties/wolverine_group_perry_creek/
251. Ibid.
252. Ibid.
253. Ibid.
254. Trend’s 2008 production level reported by the mine’s owner (0.8 million tonnes) differs from MEM’s forecast 2008 production level (1.4 million). To ensure that all production levels from all operating mines were derived using a consistent methodology we used MEM’s forecast production levels to calculate heat-trapping pollution estimates. See Appendix 1. Ministry of Energy, Mines and Petroleum resources, British Columbia Mines and Mineral Exploration Overview 2009 (September, 2010), online: http://www.empr.gov.bc.ca/Mining/Geoscience/PublicationsCatalogue/MineralExplorationReview/Documents/EX-OVERVIEW_IC2010-1.pdf
255. Ibid.
257. See Appendix 1.
260. Courier Island, “Vitol Group new owner of mine” (1 January, 2010), online: http://www2.canada.com/courierslander/story.html?id=fb608ed-506b-4fe7-8c30-4c02bd3c7eeb
262. Ibid.
263. The Vitol Group owns about 20.8% of the outstanding common shares of Hillsborough Resources Ltd.
266. Global Infomine, “Quinsam Coal- Property News”, (September 30, 2008), online: http://www.infomine.com/index/properties/QUINSAM_COAL.html
267. Ibid. 
268. Ibid.
269. Ibid.
270. Watershed Sentinel, “Hotspots of Western Canada” (2010), online: http://www.sentinelhotspots.ca/hotspots/mining/coal/quinsam-mine-7-south-expansion
273. Ibid.
274. Ibid.
278. Ibid.
282. See Appendices 2a and 2b. Total estimated pollution from proposed mines in environmental assessment (6.1 billion tonnes) plus estimated pollution from proposed mines not yet in environmental assessment (6.9 billion tonnes) equals 13.1 billion tonnes of heat-trapping pollution if all the proposed mines’ reserves are burned.
283. On the number of cars and light trucks on the road worldwide, see note 15. Number of cars needed to produce equivalent amount of pollution as burning the reserves of proposed BC coal mines (2.496 billion) divided by estimated number of cars in the world (806 million cars) equals 3.10.
285. Teck Coal Limited, “Line Creek Operations Phase II Project Description Supplemental Information” (October, 2009), online: http://a100.gov.bc.ca/appsdata/epic/documents/p352/1255649294808_48ca71d1a17a3013d5fa43c6f49f4c143c0 51b724264e6a66d1513636930438f.pdf
286. See Appendix 2a.
291. See Appendix 2a.


294. Ibid.

295. Ibid.

296. See Appendix 2b.


298. B.C. Environmental Assessment Office, “Project Information Centre (e-PIC) - Roman Coal Mine,” (September, 2010) online: http://a100.gov.bc.ca/appsdata/epic/html/deploy/epic_project_home_308.html

299. Ibid.

300. B.C. Environmental Assessment Office, “Order Under Section 11”, (October 2, 2008), online: http://a100.gov.bc.ca/appsdata/epic/documents/p308/1195829663655_85a4678b86059651804797626ce42908.pdf

301. Car and coal-fired equivalency calculations use the US EPA's Calculator. See note 8.


304. Ibid.


306. Ibid.


313. Recsan Environmental Services Limited (Canadian Dehua International), “Gething Coal Project Description” (October, 2006), online: http://a100.gov.bc.ca/appsdata/epic/documents/p287/1163714443519_c7325af71774591a7fb6561861184c.pdf


315. Ibid.

316. Ibid.


319. Recsan Environmental Services Limited (Canadian Dehua International), “Gething Coal Project Description” (October, 2006), online: http://a100.gov.bc.ca/appsdata/epic/documents/p287/1163714443519_c7325af71774591a7fb6561861184c.pdf

320. Ibid.


322. Ibid.


325. Ibid.

326. Ibid.

327. Ibid.

334. See Appendix 2a.
335. On the number of cars and light trucks on the road worldwide, see note 15.
337. Coalwatch Comox Valley Society, “Home”, online: http://www.coalwatch.ca/
339. Ibid.
340. Ibid.
342. Watershed Sentinel, “Raven Underground Coal Project” (October, 2009), online: http://sentinelhotspots.ca/hotspots/mining/coal/raven-underground-coal-project
343. See Appendix 2a.
345. Ibid.
347. Ibid.
348. See Appendix 2b.
350. Ibid.
351. Cline Mining Corporation, “Coal resources”, online: http://www.clinemining.com/projects/coal/resources.html
352. See Appendix 2b.
356. Ibid.
357. First Coal Corporation, “Central South”, online: http://www.firstcoal.com/s/CentralSouth.asp
358. Ibid.
359. Ibid.
360. First Coal Corporation, “About Us”, online: http://www.firstcoal.com/s/AboutUs.asp
361. See Appendix 2b.
364. West Coast Environmental Law, “West Moberly Protect Caribou Herd from Mining” (March 19, 2010), online: http://wcel.org/resources/environmental-law-alert/west-moberly-protect-caribou-mining
368. See Appendix 2b.


370. Ibid.


375. See Appendix 2b.


379. Ibid.

380. See Appendix 2b.

381. Unicorn International Mines Group, Projects, "Projects", online: http://www.theunicorn.ca/projects.html


386. To ensure company and mine coal production figures were derived from a consistent methodology we used mine-by-mine forecasts provided by the BC government in British Columbia Mines and Mineral Exploration Overview 2008.

387. We underestimated the amount of coal produced as zero, although we know there was coal production in 2008. Coal mining became operational at Willow Creek on October 16, 2008, and continued for approximately six weeks. But since we found no reliable figures for the volume of coal produced, we had to put zero in this table. The mine stopped production due to significant market collapse and uncertainty surrounding the demand for metallurgical coal. It did not operate again in 2008.

388. To ensure consistent and current proven and probable reserve figures for companies and mines, we used the figures provided by the BC government in British Columbia Mines and Mineral Exploration Overview 2009.


390. Ibid.

391. A company’s pollution as a percentage of BC’s annual reported GHG Inventory was calculated by dividing the estimated pollution forecast for 2008 by the total reported GHG pollution in the BC GHG Inventory (88.7 million tonnes). See note 4.
