

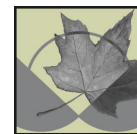


FOOT OFF THE GAS

Regulating BC's Oil and Gas Industry as if the Environment Mattered

By Ben Parfitt

SEPTEMBER 2007



CCPA
CANADIAN CENTRE
for POLICY ALTERNATIVES
BC Office

A RESOURCE ECONOMICS PROJECT REPORT

FOOT OFF THE GAS: Regulating BC's Oil and Gas Industry as if the Environment Mattered

By Ben Parfitt

September 2007

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Summary

To meet the ambitious reductions in greenhouse gas emissions that it has set for the province, British Columbia's government will have to act boldly and on a number of fronts.

One of the greatest challenges the province faces is regulating its oil and gas industry, an industry that has been a significant player in the provincial economy in recent years and that has been growing in importance relative to other resource industries.

In this regard, the province finds itself in a difficult position. On the one hand it has committed to cut overall greenhouse gas emissions by one third by 2020. On the other hand, it continues to subsidize the oil and gas industry, which is a major source of those emissions.

This paper argues that in order to make a credible effort to reduce greenhouse gas emissions, the province must stop the growth of, and gradually scale back, activities in the oil and gas sector, which is a major contributor to the climatic mess we find ourselves in. Not only must the province phase out subsidies to oil and gas companies, but it must move swiftly to put an end to industry practices such as gas flaring.

Gas flaring – the controlled burning of gas rather than putting it into a pipeline¹ – is a common industry practice that has significant social, economic and environmental consequences. It is:

- Unnecessarily wasteful;
- A major source of greenhouse gases;
- Harmful to public health; and
- Harmful to the provincial economy and resource communities alike.

On the gas flaring front, this report concludes that on average in each of the past 10 years, the deliberate burning or flaring of natural gas and the leaking or loss of gas at production facilities accounted for a staggering 13.5 per cent of BC's greenhouse gas emissions. Significantly, the BC government has announced its intention to see flaring eliminated – something that can be done, as evidenced by trends to the east in Alberta. There, the government began a concerted effort a decade ago to reduce the unnecessary flaring of natural gas. Since then, there has been a 70 per cent drop in flaring activities. BC has seen no decline during this time.

In addition to the impact on the climate from gas flaring, there are economic costs. This paper shows that, based on average royalty payments in the years 2004 and 2005, the BC government would have collected an additional \$225 million and \$303 million respectively in royalty payments, had gas that is flared gone instead to market.

On the subsidies front, this paper shows that last year and for the next three years (2006/07 to 2009/10), the cumulative effect of provincial government subsidies to the oil and gas industry are slated to be \$1.05 billion. The subsidies primarily take the form of breaks or reductions in royalty payments. Energy companies qualify for the breaks based on:

- Wells drilled in summer rather than winter months;
- Drilling deep wells;
- Drilling “marginal,” “low” or “ultramarginal” wells; and
- Some road and pipeline construction.

One of the consequences of this is that the province is encouraging even greater fragmentation of northeast British Columbia's already heavily damaged environment. This report notes that over the past 10 years the production of marketable natural gas in northeast BC has climbed by nearly 41 per cent. But because the nature of gas reserves is changing, there is now less gas on average per well than there was a decade ago. One industry estimate is that it takes four wells today to produce the equivalent amount of gas that one well produced 10 years ago. Consequently, to achieve the 41 per cent increase in gas output in northeast BC, the number of wells drilled over the same period increased by 209 per cent and well depths increased 363 per cent. This has enormous environmental consequences. First, more energy is required and more greenhouse gases are emitted because more wells are drilled. Second, more forest and important wildlife habitat is shredded or fragmented because of the expanding infrastructure of roads and pipeline corridors required to link the proliferating number of smaller wells.

Ongoing subsidies will only serve to accelerate those trends and to increase threats to some of northeast BC's most important wilderness areas. Furthermore, they will accelerate the end of a resource upon which much of northeast BC is currently dependent. At current rates of consumption, all known and believed to be available conventional natural gas resources in northeast BC will be exhausted in 33 years. That timeline would be halved if earlier provincial government projections of a doubling in oil and gas industry activities materialized. However, given the government's more recent commitments to lower the province's greenhouse gas emissions, the objective of doubling production may now be a thing of the past.

To truly stand a chance of reducing greenhouse gases, and to adequately protect the environment and economy, particularly in the energy-rich northeast region of BC, the provincial government needs to introduce substantive and far-reaching policy reforms. Failure to do so means not only increased greenhouse gas emissions, but a damaged economy because at present the province is relying too much on revenues generated from non-renewable fossil fuel resources.

The report concludes with six policy recommendations:

- Rapidly phase out all provincial government subsidies to the oil and gas industry.
- End gas flaring in BC, and impose increasingly higher fines on companies that fail to meet deadlines. In addition, immediately charge royalty fees on every unit of gas flared.
- Place annual limits on the amount of natural gas produced.
- Implement a carbon tax.
- Raise royalty rates and create a stand-alone provincial fund, similar to Alberta's Heritage Fund, which is funded by a portion of energy royalties and carbon taxes.
- Keep protected areas and special management zones protected.

These measures would have the important effect of conserving more of a non-renewable, publicly owned resource. As important, they would lay the foundation for a northeast energy industry with a far smaller ecological footprint – precisely what is needed at this time.

INTRODUCTION

Confronting Contradictions

The BC Government, the Energy Sector and Global Warming

The speech from the throne delivered in the BC legislature in February 2007 by Lieutenant Governor Iona Campagnolo made headlines across Canada for its bold promises to make BC a leader in the fight to reduce greenhouse gas emissions.

It was the first significant signal from the provincial government that it intends to end years of inactivity on a file that presents huge social, economic and ecological challenges for this provincial administration – or any other for that matter.

To underscore the point that it would take “concerted action” to combat global warming, the government set a target to cut overall emissions to the point where they were at least one third below current levels within 13 years. If that target were met, it would mean that by 2020 BC’s greenhouse gas emissions would be 10 per cent below what they were in 1990.²

Thirteen years is, however, an eternity in political terms; at least three provincial elections away. Political priorities may change. So for people who make it their business to raise awareness about the climate change-related chaos that lies ahead, details on just how the province plans to get from A to B are essential. Will the government set hard, short-term targets? Will there be tough penalties for those who fail to meet them?

In the state of California, which has served as a source of inspiration for the current provincial administration, aggressive action is being taken to reduce greenhouse gases. A stand-alone body known as the California Air Resources Board has been empowered to discipline companies or state agencies that fail to meet targets.

“We don’t have anything like that,” Ian Bruce, a climate change specialist with the Suzuki Foundation, noted not long after the government signaled its new direction. “But that’s something the province could certainly look at setting up ... an agency with real power. Right now we have a throne speech with exciting promises, but we don’t have the details of how it will work.”³

Such details are vitally important if BC is to achieve the targets because the province faces a steeper climb than other jurisdictions when it comes to lowering its emissions. For example, much of BC’s power is already relatively “clean,” coming as it does from hydroelectric generation. Conversely, a significant chunk of the provincial economy is focused on resource industries that will, in the absence of policy interventions, continue to be major emitters of greenhouse gases.

As the Business Council of British Columbia’s Jock Finlayson notes, relatively “low-carbon-emitting industries” such as high tech, software, film and entertainment and, to a lesser extent, agriculture, “play much bigger roles in California’s economy than in BC’s.” By comparison, “BC has a sizable and growing oil and gas sector, a large coal mining industry, and a thriving metal mining sector that is poised for strong future growth; California has none of these.”⁴

To which we should add that in BC, provincial governments of all political stripes tend to see natural resource industries as an important means by which to enrich provincial coffers. So there is an inherent tension between, on the one hand, new announcements such as the targets outlined in the throne speech, and on the other, the ongoing desire to maintain or increase the economic benefits derived from resource industries. Often, the push for increased revenues outstrips the desire to seriously tackle climate change because such a commitment carries obvious costs. For example, in 2006 the Ministry of Energy, Mines and Petroleum Resources employed 12 people to facilitate the opening up of offshore oil and natural gas developments. Such developments have yet to occur, in large measure because of a federal moratorium on the opening up of offshore reserves. At the same time, the Ministry of Environment’s total staff commitment for climate change was six people. Another indication of the low priority that the province has heretofore placed on climate change is indicated by the Environment Ministry’s budget for combating BC’s greenhouse gas emissions. In 2000, that budget was just shy of \$3 million (a small amount considering the depth of the challenges society faces from climate change). By 2006, the budget allocation had shrunk more than tenfold to \$250,000.

Such contradictions only naturally became the subject of debate in the provincial legislature in the weeks and months following the throne speech. For example, during the March 1 sitting of the legislative assembly, MLA Gregor Robertson, in an exchange with provincial Energy Minister Richard Neufeld, said:

Last November 23 the Premier pledged to investors in Hong Kong that he would aggressively pursue offshore oil and gas development, but all bets were off on February 13 when the Throne Speech rhapsodized about this government’s sudden commitment to tackle climate change. Then, only two weeks later, on February 27, the Energy Plan update reaffirmed the Premier’s commitment to offshore oil and gas, with less regulation and more subsidies to industry.⁵

At this time, however, offshore oil and natural gas developments remain theoretical. No commercial drilling, in fact not even any exploratory drilling, is occurring. Of more immediate concern – and the subject of much of the remainder of this paper – is what the province is doing by way of encouraging

natural gas developments in the province's northeast region, where the bulk of BC's proven oil and gas reserves are and where the vast majority of fossil fuels are currently exploited. (Gas, more than oil, is the topic of major interest in that regard, since the majority of fossil fuel reserves in the northeast are in the form of natural gas. The Canadian Association of Petroleum Producers reports that in 2005 some 30 oil wells were drilled in BC, while the number of natural gas wells drilled was 1,049.)⁶

In the Ministry of Energy, Mines and Petroleum Resources *Annual Service Plan Report 2005–2006*, Minister Neufeld boasts of how his government's "streamlined regulatory environment" and "increased investment in infrastructure" have helped to lower development costs in the province's energy-rich northeast region. This will lead to an "increase in the amount of natural gas reserves that can be produced from a well."⁷

The same report goes on to note that thanks to "high commodity prices, and an improved investment climate created by improved policies and regulatory streamlining," the provincial treasury benefited to the tune of \$3 billion in the 2005–2006 fiscal year.⁸

Nowhere in the report is the word "subsidize" used. But it is clear that subsidies are a tool the province continues to use in an effort to maximize the development of BC's oil and gas reserves. For example, the government boasts that a "permanent" fixture of its royalty regime is discounts for companies developing gas wells that are sub-par producers (companies pay royalties on each unit of marketable gas). It has also offered breaks on royalty payments to companies developing coalbed methane reserves. And it has provided financial incentives to companies developing gas wells in summer months rather than during the traditional winter season.

On the one hand we see evidence of government advocating for – and boasting of – increased gas production. On the other we see signs the province is aware it has a major greenhouse gas emission problem and that a significant amount of those emissions are tied to the very industry it subsidizes.

Adding to the "improved investment climate" are other government actions including:

- \$90 million between 2004/05 and 2006/07 in royalty road credits (a program whereby companies write off the cost of road development against the royalties paid to the province);
- \$42 million in fiscal year 2005/06 to upgrade public roads throughout northeast BC so that such roads may be used year-round by industrial traffic; and
- Up to \$36 million in further royalty credits for the building of gas pipeline infrastructure in fiscal years 2005/06 and 2006/07.⁹

These and other inducements help to explain why in its service plan report of 2006 the ministry projects close to a 7 per cent increase in natural gas production between 2005/06 and 2007/08.¹⁰

So, on the one hand we see ongoing evidence of government advocating for – and boasting of – increased gas production. And on the other, belatedly, we see signs that the province is aware that it has a major greenhouse gas emission problem on its hands and that a significant amount of those emissions are tied to the very industry whose activities it subsidizes.

Ironically, those subsidies are accelerating the depletion of a non-renewable resource, a fact that has direct economic and ecological impacts, and disproportionately so in BC's energy-rich northeast region. They also directly contribute to the unnecessary wasting of the resource and to BC's climbing greenhouse gas emissions.

So before turning to what kinds of activities are subsidized it is important to understand how much gas we actually have left. This context will later serve to inform the policy alternatives advanced at the end of this paper, policies that would end those subsidies and stretch out the life of our finite natural gas resources.

Just How Much Gas is in Northeast BC?

The BC government places great importance on oil and gas revenues. The industry, predominantly at play in the northeast quarter of the province, has in recent years eclipsed the forest industry in terms of the royalties it generates. But unlike stumpage payments (a form of royalty derived from the logging of trees on public forestlands and a revenue source which in theory is ongoing because logged trees are replanted), the total amount of royalties available from fossil fuel production is finite, and depletes over time with production. The gases or oil trapped underground took hundreds of millions of years to form. Once they are gone, they are gone forever (see *Confronting Limits: Declining Fossil Fuel Reserves* on page 12).

Longer timelines, obviously, allow for smoother transitions to new energy sources. However, in the absence of conservation measures, some jurisdictions will run out of their resources more rapidly than others. BC, which has posted Canada's most dramatic increases in natural gas production, is likely to be among them (Table 1).

But increases can't carry on forever. An authoritative report by BC's Ministry of Energy, Mines and Petroleum Resources and the National Energy Board highlights this point. In March 2006, the agencies reported that the "ultimate potential" of BC's marketable conventional gas resources was 51.9 trillion cubic feet.¹¹ Importantly, this estimate applies only to the BC portion of the Western Canada Sedimentary Basin, essentially the Peace River region of the province. Other areas of the province may yet prove to have commercially viable supplies of conventional natural gas. There is also the

Confronting Limits: Declining Fossil Fuel Reserves

No one can say with certainty when fossil fuels will run out. However, it is a truism in natural resource industries that those resources that are easiest to access are generally the first to go. As industries “mature” the likelihood of big payoffs become more remote. The mammoth trees in the lush valley bottoms, the teeming schools of inshore fish, the shallow ore deposits are long gone. The exploitation of fossil fuels follows a similar trajectory.

As author Paul Roberts explains in *The End of Oil: On the Edge of a Perilous New World*:

Worldwide, there exist approximately six hundred petroleum systems capable of producing commercial volumes of oil and gas. Of these, approximately four hundred have been explored ... This state of affairs helps explain why oil exploration has become so much more difficult in recent decades. Not only are the remaining “undiscovered” systems harder to reach, but they are likely to be smaller: historically, larger systems, being easier to find than smaller ones, have tended to be discovered first.... As exploration progresses, the average size of the fields discovered decreases, as does the amount of oil [or gas] found per unit of drilling activity.¹²

In other words, what remains to be pulled from the ground generally comes from smaller, as yet undiscovered fields, which in turn yield “ever-smaller volumes” of gas and oil. In such a scenario, maintaining, let alone increasing, production requires that more and more wells be drilled.¹³

In the BC context, this is important, particularly as it applies to residents and communities in the province’s energy-rich northeast region. Not only are more wells being drilled, but because the easiest and least controversial deposits were exported first, it now means that more wells are being drilled in proximity to residences and communities. And, if as is often the case, the wells in question produce sour gas – a gas high in toxic compounds – the health and safety risks associated with their development increase.

Returning to the issue of remaining fossil fuel resources, Mark Jaccard, an economist and professor in the School of Resource and Environmental Management at Simon Fraser University, takes a different view than does Roberts. While acknowledging the obvious – oil, natural gas and even coal supplies will eventually run out – he argues that the timelines may be far longer than what Roberts and others suggest. In *Sustainable Fossil Fuels: The Unusual Suspect in the Quest for Clean and Enduring Energy*, Jaccard notes that as the world population climbs, there will be significant increases in fossil fuel use, probably through to about 2100, and that there are abundant fossil fuels – coal, natural gas and, to a lesser extent, oil – to supply the need.¹⁴ If he is correct, such increased fossil fuel usage has tremendous implications for our climate and it will have to be counteracted by stripping the CO₂ from those fuels and sequestering the heat-trapping gas on a massive scale.

prospect for developing so-called “unconventional” gases such as coalbed methane – although here, it is important to emphasize, there is a great deal of opposition. Coalbed methane production has an even greater ecological footprint than does conventional oil and gas. Many wells are required to access the gas, and water must be pulled from the ground to free it.

However, it is clear that at this point in the development of BC’s fossil fuel reserves, the Western Canada Sedimentary Basin is the largest and most likely source of the bulk of the province’s recoverable, land-based natural gas reserves. It contains an estimated 51.9 trillion cubic feet of gas – an almost incomprehensible amount until one considers its context. First, one third of that massive amount is already gone, leaving two thirds or 34.7 trillion cubic feet.¹⁵ Second, the remaining reserves and, by extension, believed-to-be-available resources, continue to be developed at a steady pace.

If the past serves as a guide to the future, how long would it take before the 34.7 trillion feet of BC’s remaining conventional natural gas resources in the Peace River region were depleted?

If a 10-year average of 884.9 billion cubic feet of marketable gas production is used, the answer is around 39 years. If the last five years are considered and an average annual marketable gas production figure of 980.7 billion cubic feet is used, the life expectancy shrinks to 35 years. If the record year for marketable gas production in BC – 2006 – is used, the life expectancy shrinks further still to 33 years.

And finally, if the province succeeded in its stated goal of doubling natural gas production over 2002 levels,¹⁶ the life expectancy would fall sharply to just 17.5 years (Table 2).

In the absence of conservation measures, some jurisdictions will run out of their resources more rapidly than others. BC, which has posted Canada’s most dramatic increases in natural gas production, is likely to be among them.

Table 1: Marketable Natural Gas Production in BC

Year	Marketable gas	Increase (decline)
	billion cubic feet	per cent
1997	736.9	
1998	751.1	1.9
1999	766.1	2.0
2000	785.7	2.5
2001	905.7	15.2
2002	993.2	9.6
2003	925.4	(6.8)
2004	959.5	3.6
2005	987.1	2.8
2006	1,038.4	5.2
Change 1997 to 2006		40.9

Source: Canadian Association of Petroleum Producers.

There are, of course, plenty of “what ifs” in forecasting. No one can say with any certainty what effect higher production costs and lower overall returns per gas well will have on future rates of development. There’s also no way of knowing what impact market forces will have, other than to say that as global energy demand increases and supplies tighten there will be upward pressure on prices. At the same time, run-ups in production will translate into periods of oversupply, during which time prices are likely to fall and exploration and development activities decrease. Finally, it must be stressed that in any “lifespan” analysis of energy reserves, the likely scenario is one in which extraction rates peak and then begin to taper off. So, the numbers in Table 2 are best viewed as a means of roughly understanding the shelf life of a resource based on known or believed to be available resources and how intensively those resources are exploited.

Based on various comments by provincial leaders, the intent is to develop the northeast’s fossil fuel resources at a rapid rate in order to derive maximum government revenues in the short term. As

Based on various comments by provincial leaders, the intent is to develop the northeast’s fossil fuel resources at a rapid rate in order to derive maximum government revenues in the short term.

Energy Minister Neufeld commented recently, “increased oil and gas activity” provides revenues to the province on the order of \$2.8 billion a year. Those funds, in turn “support education, health and other key services,” the minister said. In other words, they go directly into general revenues. To ensure that such funds are maintained, the government has subsidized oil and gas industry activities and shows every sign of continuing to do so. Such subsidies, however, come at considerable downstream costs – costs that communities and the environment in the energy-rich northeast quarter of the province will disproportionately bear and which will interfere with the province’s goals of reducing greenhouse gas emissions.

Furthermore, BC has established no “rainy day fund” as a hedge against the day that oil and natural gas royalty revenues begin their inexorable decline. What plans are there to fund public services then?

Rate of exploitation	Lifespan of conventional natural gas resources in northeast BC
10-year average	39 years
5-year average	35 years
Rate in 1996	33 years
Government objective (double 2002 levels)	17.5 years

Source: Projections by author based on Ministry of Energy, Mines and Petroleum Resources and National Energy Board estimate of 34.7 trillion cubic feet of natural gas remaining in BC portion of Western Canada Sedimentary Basin.

Subsidizing Natural Gas Extraction: Counting the Ways

The more obvious provincial government subsidies to the oil and gas industry take six forms:

- Financial inducements to encourage companies to develop resources outside of the traditional winter operating period, winter being the chosen time because that is when the ground is more likely to be frozen and when heavy equipment is more easily moved;
- Breaks on royalty payments for the drilling of deeper wells;
- Breaks on royalty payments for the development of “marginal,” “low production” or “ultramarginal” wells;
- Offsetting costs associated with maintaining or upgrading roads;
- Offsetting some of the costs associated with maintaining pipelines; and
- Credits for future infrastructure costs involving new road and pipeline construction.

The scale of these subsidies is captured in the province's *Budget and Fiscal Plan 2007/08 – 2009/10*, which provides details on “royalty programs and infrastructure credits” both in the most recently completed financial year and as projected over the coming three fiscal years.¹⁷ Cumulatively they amount to more than \$1 billion in subsidies (Table 3).

It is important to note that these subsidies do not represent cash outlays by the government so much as foregone revenues in the form of reduced royalty payments or royalty credits. They also allow companies to make money on activities that might not be otherwise commercially viable, at least at this time. By offering breaks on what companies pay to the government for each unit of marketable gas or oil produced, the government hopes to increase overall revenues by encouraging a maximum level of development. Against the backdrop of subsidies or royalty breaks, the province’s estimated returns from the energy sector break down as shown in Table 4.

When combined, the projected subsidies or royalty credits amount to 11.5 per cent of the value of the projected revenues. It is an investment that Energy Minister Neufeld supports, saying: “It is a way of encouraging people to stay in the province.”¹⁸ The Minister goes on to say that the credits will increase in tandem with oil and gas exploration and development. More credits, more wells. More wells, more revenue.¹⁹

But are the credits or subsidies really necessary?

Table 3: Subsidies to the Oil and Gas Sector					
Subsidy area	2006/07	2007/08	2008/09	2009/10	2006 to 2010
	million				
Summer drilling	\$37	\$40	\$43	\$46	\$166
Deep drilling	\$52	\$56	\$61	\$65	\$234
Marginal/low/ultramarginal	\$100	\$113	\$124	\$133	\$470
Road infrastructure	\$39	\$31	\$10	\$4	\$84
Pipeline infrastructure	\$27	\$7	\$0	\$0	\$34
New infrastructure	\$0	\$16	\$33	\$16	\$65
TOTALS	\$255	\$263	\$271	\$264	\$1.053 billion

Source: BC Government *Budget and Fiscal Plan 2007/08 – 2009/10*.

Table 4: Oil and Gas Revenues					
Revenues	2006/07	2007/08	2008/09	2009/10	2006–2010
	million				
Natural gas royalties	\$1,390	\$1,690	\$1,770	\$1,730	\$6,580
Bonus bids,* permits, fees	\$475	\$500	\$499	\$512	\$1,986
Petroleum royalties	\$127	\$112	\$104	\$91	\$434
Oil and gas commission Fees	\$29	\$31	\$32	\$33	\$125
TOTALS	\$2.02 billion	\$2.33 billion	\$2.40 billion	\$2.36 billion	\$9.11 billion

* Bonus bids are up-front, one-time payments that energy companies make to the provincial government to secure the right to access fossil fuel reserves.

Source: BC Government *Budget and Fiscal Plan 2007/08 – 2009/10*.

In 2004, a report by the Pembina Institute strongly suggested no. It noted that Canadian provinces in the business of producing fossil fuels lagged well behind other jurisdictions when it came to collecting revenues from oil and gas companies. The report concluded that on a “per barrel of oil equivalent” basis (a calculation that rolls natural gas and oil revenues into one) jurisdictions such as Norway and Alaska collected far more revenues from companies exploiting their fossil fuel reserves (Table 5). Significantly, jurisdictions such as Norway are also far ahead of Canadian provinces in introducing taxes that have resulted in dramatic improvements in the lowering of greenhouse gas emissions, something discussed in more detail when the subject of a carbon tax is raised later in this report. In Norway the per barrel oil equivalent in revenues collected was \$14.10, while in Alaska it was \$11.60. But in BC, the corresponding figure was just \$5.40. In Alberta it was \$4.30. And in Saskatchewan (the smallest of the three provinces in terms of production) it was \$4.70.²⁰

Importantly, those comparisons were based on revenues collected by the various jurisdictions between 1995 and 2002. Since then, many of the subsidies noted above were unveiled in BC. And what of those subsidies? What, for example, are we to make of the summer drilling incentives?

It is not as though wells drilled in summer cannot be drilled in the winter. In fact, it is actually easier to drill in winter when the ground is frozen and heavy equipment is more easily moved. The only reason for the subsidy is to encourage development throughout the year rather than in a more concentrated period of time. A year-round development regime does, of course, have its benefits. There is a more stable environment for workers in the industry who may also live in the region. And there is something to be said for having fewer peaks and valleys in terms of employment. But from a strict resource conservation perspective, does it make sense to subsidize activities that have the effect of speeding up developments and depleting resources faster than they otherwise might be? In the absence of summer drilling subsidies, the industry would either absorb the added costs associated with summer drilling and drill in summer, or they would drill more wells in the winter months when

Canadian provinces in the business of producing fossil fuels lagged well behind other jurisdictions when it came to collecting revenues from oil and gas companies. On a “per barrel of oil equivalent” basis, jurisdictions such as Norway and Alaska collected far more revenues from companies exploiting their fossil fuel reserves.

Jurisdiction	Revenues to government
	per barrel of oil equivalent
Norway	\$14.10
Alaska	\$11.60
British Columbia	\$5.40
Saskatchewan	\$4.70
Alberta	\$4.30

Source: Pembina Institute.

they tend to drill anyway, or they would phase-in their drilling programs over longer periods of time, which would be a good thing given the finite nature of the resource in question. “Credits” for wells drilled in summer are thus of questionable public benefit.

According to the Ministry of Energy, Mines and Petroleum Resources, the costs of bringing new wells on line during the summer season are such that every single well drilled qualifies for the maximum credit of \$100,000. Thus, over the first four years of the summer drilling program alone, the cumulative provincial subsidy amounted to nearly \$74 million (Table 6). However, since the summer drilling subsidy was introduced, the price of natural gas has risen every year, and in some years significantly so. In the year the subsidies began, natural gas prices averaged \$221.96 for every 1,000 cubic metres of gas at the wellhead. The next year prices were marginally higher at \$226.64, an increase of 2.1 per cent. In 2005, however, prices skyrocketed to \$298.56 – a 31 per cent increase from 2003. And in 2006, while the prices had tapered off to \$237.34, they were still 7 per cent above prices in the first year of the program.²¹

When such price increases are considered in light of the large volumes of gas produced, subsidies of \$100,000 per well drilled in summer months must be questioned. Prices will undoubtedly decline again, an argument perhaps for keeping subsidies in place. But it is reasonable to counter such arguments by saying that if high development costs prohibit moving ahead unless subsidies are provided, then perhaps development should be delayed until such time as companies feel economic conditions are in their favour once again. After all, the gas isn’t going anywhere if it’s in the ground.

Also of questionable public value are provincial subsidies to companies drilling deeper for gas or tapping into more marginal gas deposits. The industry knows as it moves into new areas in the Western Canada Sedimentary Basin that more wells must be drilled to produce an equivalent amount of gas to that produced just a decade ago. As noted recently in the energy industry publication *Daily Oil Bulletin*, it now takes on average four natural gas wells to generate the same amount of gas that one well produced 10 years ago.²² The same article quoted an energy industry expert, Bill Gwozd of the Ziff Energy Group, as saying that the productivity of new gas wells in Western Canada has declined at a rate of 7 per cent per year since 1996. As a result, the cost of producing marketable gas is climbing.²³

This has not, however, prevented energy companies from continuing to make sizeable bonus bid payments to the province for rights to access new pools of natural gas, nor has it had a serious dampening effect on profitability. For example, Canadian energy giant Encana Corporation, Canada’s largest and most profitable company, reported net earnings in 2006 of US\$5.65 billion.²⁴ Such profits, the company told its shareholders, came despite “a tough operating environment.” Not tough enough,

Year	Number of summer wells	Subsidy (millions)
2003	133	\$13.3
2004	146	\$14.6
2005	226	\$22.6
2006	233	\$23.3
TOTALS	738	\$73.8

Source: BC Ministry of Energy, Mines and Petroleum Resources.

apparently, to prevent the company from dramatically increasing its proven oil and gas reserves in 2006. According to the company's most recent annual report filing, Encana managed to boost its proven oil and gas reserves in North America by 9 per cent to 19.2 trillion cubic feet as of the end of 2006.²⁵ It also had robust profits in 2005 (US\$3.42 billion), 2004 (US\$3.51 billion) and 2003 (US\$2.36 billion).²⁶ In the absence of the subsidies noted earlier, such profits would have been lower, but not significantly so. Remember, in 2006–2007 provincial subsidies, while totalling a hefty \$255 million, were spread among all energy companies operating in the northeast BC energy patch, not just Encana.

Nevertheless, Encana and others will take what they can get. As the company noted in a 2003 press release announcing its payment of \$369 million to the BC government for the rights to drill between 100 and 200 new natural gas wells per year in the Cutbank Ridge area near Dawson Creek, “We applaud the government for improving the investment climate through targeted royalties, upgrading roads, the adoption of summer drilling incentives, enhanced tax competitiveness and streamlined regulatory processes.”²⁷

The same press release went on to note that the fossil fuels trapped beneath Cutbank Ridge would “yield steady, profitable, long-life production growth” for Encana in the years ahead. Small wonder the applause.

Encana and other energy companies will undoubtedly respond to criticisms about subsidies by contending that, in the absence of government assistance, some drilling operations are less profitable and therefore unlikely to proceed at this time. They may also contend that existing subsidies actually ensure more efficient resource extraction by encouraging such things as the drilling of deeper wells and the maximum recovery of gas; gas that might otherwise not be pulled from the ground. However, this ignores the fact that as resources decline prices generally rise. If ending subsidies has the effect of slowing development, the likely outcome is that prices would rise. Rising prices would serve to make less marginal oil and gas deposits worth developing. Companies would then be more inclined to develop such reserves, recouping the higher development costs from higher selling prices. And they would do so without government (taxpayer) support.

Energy companies will undoubtedly contend that, in the absence of government assistance, some drilling operations are less profitable and therefore unlikely to proceed. But surely that is a good thing. Oil and gas resources are non-renewable. Over time, prices will rise, making less marginal oil and gas deposits worth developing. Companies can recoup the higher development costs because of the increased revenues associated with higher prices, and they can do so without taxpayer support.

The Hidden Subsidy: Treating the Atmosphere as a Free Waste Receptacle

Direct financial inducements are not the only form of subsidy. When companies pollute with impunity, when governments allow them to do so, another and quite pernicious form of subsidy exists. The environment is in essence treated as a free waste receptacle, and future generations are left to deal with the costs.

The most glaring and unnecessary source of pollution in the natural gas industry is the so-called “flaring” of gas. Deliberately igniting or flaring gas, rather than capturing it for use, is a global phenomenon and a major source of greenhouse gas emissions. Every year, according to a news account in the Boston Globe, the natural gas industry worldwide flares enough gas to add 400 million tons of CO₂ to the earth’s atmosphere, an amount equal to about half of Canada’s total greenhouse gas emissions. If no infrastructure is in place to handle the gas, if there are not enough gas consumers nearby, or if oil and gas producers simply cannot be bothered to deal with it, the gas ends up getting burned. The result is that all the greenhouse gases associated with flaring, primarily CO₂, enter the atmosphere to wreak further havoc with our climate. Smaller amounts of even more potent greenhouse gases such as methane – a gas that traps 23 times more heat in the atmosphere than does CO₂ – are also released during flaring. Thankfully, however, much of the methane content in natural gas ends up being converted to CO₂ during flaring.

The Globe cites further a recent report to the World Bank by Chris Elvidge, a physical scientist with the US National Oceanic & Atmospheric Administration.²⁸ The report by Elvidge and other scientists notes that it would take the greenhouse gas emissions associated with all of the vehicles currently on the road in Great Britain, France and Germany combined to equal the emissions associated with today's global flaring of natural gas. Not only is this an environmental insult of the first order, but an economic one as well. All of that wasted natural gas has a value of US\$69 billion. If captured, and burned efficiently, it would be enough gas to meet one quarter of the United States' current annual demand for natural gas.

In recent years there has been a growing outcry about the wanton waste of, and the health risks associated with, flared gas. Sour gas, which is increasingly drawn from wells in northeast BC, is high in hydrogen sulfide (H₂S), a potent neurotoxin. If improperly combusted, and at even low concentrations, it has been associated with spontaneous abortions.²⁹ The health risks associated with gas flaring have led to conflicts between local residents and oil and gas companies around the world, including Nigeria³⁰ and, closer to home, Alberta. Since 1999, Alberta's Energy and Utilities Board has placed tighter guidelines around the flaring and unnecessary venting of natural gas. The result has been a dramatic decrease in the amount of gas wasted.³¹

According to the Board, gas flaring in Alberta fell 72 per cent between 1996 and 2004. Voluntary reduction targets by the energy industry were partly responsible as were practical arrangements. Such arrangements included tying gas production at four or five wells together through shared pipelines. This in turn made it more cost-effective to transport the gas rather than to flare it.³²

Gas flaring and unnecessary gas venting or escapes during processing are a major source of greenhouse gas emissions in northeast BC.

According to data maintained by the province³³ and analyzed for this paper, the total amount of flared and wasted gas in BC and its associated CO₂ emissions are as presented in Table 7.

Year	Gas flared	Associated CO ₂
	billion cubic metres	metric tons
1996	4.0	7,524,869
1997	4.1	7,712,991
1998	4.4	8,277,356
1999	4.6	8,653,600
2000	4.5	8,465,478
2001	4.8	9,029,843
2002	4.7	8,841,722
2003	5.0	9,406,087
2004	4.4	8,277,356
2005	4.6	8,653,600
Totals	45.1	84,842,902

Source: Author's analysis of Ministry of Energy, Mines and Petroleum Resources data (*Oil and Gas Production and Activity in British Columbia: Statistics and Resource Potential 1995–2005*). The data provides information on gas flared but not on its associated CO₂. For every 100 cubic feet of gas burned the energy produced is 100,000 BTUs or one therm. Each therm produces 11.7 pounds of CO₂.

As can be seen, unlike in Alberta, the trend in BC is in the wrong direction and it is far from encouraging from a greenhouse gas emissions perspective. According to preliminary data from Environment Canada, the total greenhouse gas emissions from BC were 65.7 million tonnes in 2005.³⁴ That same year, the CO₂ released by the energy industry in the northeast of the province as a result of ignited or wasted gas was 8.65 million tonnes, or 13.1 per cent of the total. If 2003 – the year of highest CO₂ emissions associated with flared and otherwise wasted natural gas is used – the percentage rises to 14.9 per cent, based on total BC greenhouse gas emissions that year of 63.2 million tonnes. Finally, if a 10-year average is used, the greenhouse gas emissions associated with flared and otherwise wasted natural gas is 13.5 per cent of BC's total emissions.

In light of the significant contributions the natural gas industry makes to BC's overall greenhouse gas emissions, it is no surprise that environmental organizations have zeroed in on this sector for special attention. The David Suzuki Foundation, for example, singles out BC's oil and gas production and transportation sectors as two areas of the provincial economy most in need of addressing from a greenhouse gas emissions perspective.

It would take the greenhouse gas emissions associated with all of the vehicles currently on the road in Great Britain, France and Germany combined to equal the emissions associated with today's global flaring of natural gas.

"Emissions from the oil and gas sector have grown by 67 per cent since 1990 due to increased production and massive growth in fugitive emissions," the Foundation's Dale Marshall wrote in 2006, citing Environment Canada data.³⁵

What may come as a surprise to some, however, is that the BC government appears to have embraced the idea that emissions of greenhouse gases in the province's oil and gas sector could be dramatically reduced if widespread flaring and related wasting of natural gas could be brought under control.

In the earlier mentioned speech from the throne, the government said:

Under the new energy plan, British Columbia will reduce greenhouse gas emissions from the oil and gas industry to 2000 levels by 2016.

That will include a requirement for zero flaring at producing wells and production facilities.

Again, however, important details remain absent from the throne speech, details that will have an important bearing on whether the province truly can bring the energy sector's overall emissions under control. One important detail, later to be fleshed out, was whether there would be interim targets set to reduce gas flaring. The answer seems to be yes. In its BC Energy Plan released two weeks after the throne speech, the province committed to an interim goal of a halving of gas flaring by 2011.³⁶ However, neither the throne speech nor the government's subsequent Energy Plan spells out whether there will be financial penalties in the event that those targets fail to be met. Furthermore, what does the government intend to do about other aspects of the oil and gas sector's activities that are ramping up rather than lowering greenhouse gas emissions? And what if the government's current actions (oil and gas industry subsidies) actually encourage that outcome?

As stated earlier, the government's approach to climate change often appears contradictory, and nowhere more so than in the oil and gas sector. On the one hand, the government rightly zeroes in on gas flaring as an unacceptable practice that should be eliminated. But on the other it subsidizes

and otherwise encourages maximum development of the resource. Worse yet, because the nature of the resource is changing (less gas per unit of area exploited, less gas nearer the surface, etc.), more energy must be expended to get new gas reserves into production.

Two sets of statistics highlight this point. The first itemizes the number of gas wells drilled (Table 8). The marked increases year by year far outstrip the pace at which marketable gas is being brought on line. Significantly, as more wells are drilled, the risk to public health and safety increases because more and more of the gas pulled from the ground in BC is sour. Second, the damage to the environment increases as well. More wells mean more infrastructure such as roads and pipelines, which in turn leads to more fragmentation of the northeast's already dramatically fragmented forests.

Much the same pattern is noted in statistics on the depth of wells drilled (Table 9). Not only do individual wells produce less gas, but the wells must in many cases be drilled far deeper to access the gas.

Table 8: Number of Gas Wells Drilled in BC		
Year	Wells drilled	% increase/decrease
1996	461	
1997	583	+ 26.4
1998	652	+11.8
1999	620	- 4.9
2000	770	+24.1
2001	875	+13.6
2002	643	-26.5
2003	1041	+61.8
2004	1270	+22.0
2005	1426	+12.2
Change 1996 to 2005		+209.3

Source: Analysis of Ministry of Energy, Mines and Petroleum Resources data (*Oil and Gas Production and Activity in British Columbia: Statistics and Resource Potential 1995–2005*).

Table 9: Depth of Wells Drilled in BC		
Year	Depth of wells (thousands of metres)	% Increase/decrease
1996	377	
1997	505	+33.9
1998	578	+14.4
1999	539	-6.7
2000	706	+40.0
2001	823	+16.5
2002	702	-14.7
2003	1162	+65.5
2004	1396	+20.1
2005	1747	+25.1
Change 1996 to 2005		+363.3

Source: Analysis of Ministry of Energy, Mines and Petroleum Resources data (*Oil and Gas Production and Activity in British Columbia: Statistics and Resource Potential 1995–2005*).

The more wells, the deeper the wells, the more energy expended. Which means, inevitably, more CO₂ and other heat-trapping gases entering the earth's atmosphere.

All of this further complicates the BC government's goal of dramatically reducing the province's greenhouse gas emissions, and suggests strongly that a new, bold course of action is required. What might some of the planks of such a plan be?

RECOMMENDATIONS

Regulating Oil and Gas as if the Environment Mattered

To reduce greenhouse gas emissions BC must act decisively on a number of fronts. That includes the oil and gas industry, whose activities generate significant volumes of CO₂ and other heat-trapping gases.

As this paper shows, the greenhouse gases associated with the unnecessary flaring of natural gas alone constitute, on average, 13.5 per cent of the province's overall emissions. Beyond that there are all of the greenhouse gases produced by the machines required to drill new wells and build pipelines, the equipment required to pump and process gas, and the trucks and other transportation that move industry materials about. Not to mention when the gas is eventually burned either domestically or internationally.

RECOMMENDATION 1: Rapidly phase out all provincial government subsidies to the oil and gas industry.

As a first step to reversing the trend toward more, not fewer, greenhouse gas emissions in BC's oil patch, the province must square its actions with that objective. Clearly, it is incompatible with the objective of reducing greenhouse gas emissions to provide financial incentives to companies to:

- drill more wells;
- drill deeper wells; and
- tap into more marginal gas supplies.

Curtailing subsidies will begin to make a dent in greenhouse gas emissions by slowing down the rate at which resources are developed. However, in and of itself this recommendation won't do the job.

RECOMMENDATION 2: End gas flaring in BC, and impose increasingly higher fines on companies that fail to meet deadlines. In addition, immediately charge royalty fees on every unit of gas flared.

Where there will be far greater gains in reducing greenhouse gas emissions is in eliminating gas flaring. The province acknowledges this, which is why it has taken the commendable first step of saying it wants gas flaring halved by 2011 and stopped by 2016. But targets in the absence of financial penalties levied against those who waste a publicly owned resource make little sense. As already noted, wasting gas by unnecessarily burning it has obvious greenhouse gas implications. It also has implications for the provincial economy and for resource communities. When a finite resource is wasted, revenues that would otherwise go to the Crown to pay for a host of social services are foregone. So too are opportunities to generate more jobs by channeling gas that would otherwise be flared into pipelines and from pipelines into gas plants for processing.

Oil and gas companies do not deserve a free ride when it comes to polluting and squandering an irreplaceable publicly owned resource. Such practices must end.

The throne speech pledge to phase out gas flaring is commendable. Companies should not be allowed to endanger public health and further exacerbate climate change woes by using the atmosphere as a free waste receptacle.

A credible phase-out plan, however, must have defined and enforceable deadlines beyond which companies are financially penalized for non-compliance.

In the interim, all companies flaring gas should be required to make royalty payments on that wasted gas. This regime, in addition to a carbon tax (see Recommendation 4), will help to ensure that energy companies do not waste non-renewable, publicly owned resources. Imposition of royalty fees on flared gas is good for many reasons:

- First, while companies may bear higher costs, the costs borne by the public through increased environmental degradation and greenhouse gas emissions are reduced. Ultimately, however, the companies benefit because gas that was previously wasted is captured and sold instead.
- Second, the provincial government collects more revenues over time, revenues that can be invested in public programs.

Year	Marketable gas (billion m ³)	Royalties	Flared/wasted gas (billion m ³)	Projected royalty increases
2004	27.17	\$1.39 billion	4.42	\$225.1 million
2005	27.95	\$1.84 billion	4.62	\$303.6 million

Source: Author's analysis of Canadian Association of Petroleum Producers and Ministry of Energy, Mines and Petroleum Resources data. The projected royalty increases are based on taking the average royalty price paid on marketable gas in 2004 and 2005 and applying the same rate in each year to the volume of flared or otherwise wasted gas.

- Third, workers and communities in resource-dependent areas such as the Peace River region benefit because there is ultimately more gas to work with. The wasted gas is, instead, used.
- Fourth, public health and the environment benefit because there are fewer toxins in the air, although not necessarily fewer greenhouse gas emissions, as gas not flared will ultimately be burned somewhere to create heat or energy (although, if successful, the capture and use of all wellhead gases should offset the need to produce more natural gas elsewhere, thereby reducing overall emissions).

If all the gas that were flared or lost in production processes was instead channeled into pipelines as a marketable product and royalties paid on it, a considerable increase in provincial revenues would occur (Table 10).

Clearly, the amount of gas that is flared and otherwise wasted is significant. There is also a realistic prospect that further volumes of gas are wasted through leaks at “suspended” wells. Wells no longer in production are generally sealed at the wellhead. BC’s Oil and Gas Commission, regulator of the province’s oil and gas industry, requires companies to submit an “Inspection of Suspended Well Report” to the Commission’s compliance and enforcement branch. The report checklist highlights that gas leaks may occur from the wellheads and surface casings of abandoned or suspended wells.³⁷ Upon receipt of the reports, the Commission may then elect to conduct on-the-ground inspections at well sites to ensure that gas is not leaking. Gas leaks are a human health and environmental hazard and where leaks occur, companies should be required to pay royalties based on the volume of gas that escapes.

Oil and gas companies do not deserve a free ride when it comes to polluting while squandering an irreplaceable publicly owned resource.

RECOMMENDATION 3: Place annual limits on the amount of natural gas produced.

If penalties in the form of increased royalty payments result in more gas being captured for processing rather than wasted, intriguing opportunities present themselves. One is to limit the rate at which natural gas reserves are exploited so as to stretch out the life of a precious and finite natural resource.

BC has a long history of enforcing just how much of one of its most important natural resources may be exploited at any one time. That resource is trees. Significantly, trees are a renewable resource. Fossil fuels are not. Given the ultimately unsustainable nature of fossil fuels – particularly in areas such as BC’s Peace Region where the relative abundance of natural gas in remaining reserves and resources is well understood – why not stretch out the benefits of those resources over time?

Returning to the forestry example for a moment, the Chief Forester of the province is required to set limits on logging activities on an area-by-area basis. The setting of these rates, known as Allowable Annual Cuts or AACs, follows a lengthy review process, during which members of the public usually have access to a number of technical and less technical documents. Ultimately, a “rationale”

document is produced wherein the Chief Forester outlines the reasons for setting the new logging rate. An example of this is the 1996 AAC rationale for the 100 Mile House area. That publication notes no less than 21 different documents that were considered by then Chief Forester Larry Pedersen in reaching his decision.³⁸ Other determinations offer similar detail in publicly available background documents.

The setting of new AACs is almost always met with criticism and almost always considered controversial. Is the resource being liquidated, or is the timeline between logging today's forests and tomorrow's forests reasonable enough to ensure that we have forests for tomorrow? Similarly, in fisheries, a hallmark of management decisions is the limits placed around the exploitation of various fish stocks. These limits are often expressed in terms of Total Allowable Catches or TACs. Like AACs, TACs are also the subject of heated debate, especially over which parties are entitled to what share of the total resource. But at least when it comes to forest and fisheries resources there is debate, public debate, about just how sustainable or unsustainable harvest rates are. There is no such equivalent

when it comes to fossil fuels and their exploitation in BC, which is a curious thing given the extremely high value of the resource and its limited availability.

Ultimately, capping natural gas production will also be what is necessary to truly reduce greenhouse gas emissions – at least until such time as the industry demonstrates that it can operate in a CO₂-neutral way.

Given what geologists predict with some confidence is left by way of natural gas reserves and resources in northeast BC, there is not a long period of time remaining before that resource is exhausted. As stated earlier, based on current rates of extraction, about 33 years remain. A doubling of exploitation rates – something advocated a few short years ago by the provincial government – would deplete the resource in just 17 years. This does not bode well for resource-dependent communities in northeast BC including Fort Nelson, Fort St. John, Dawson Creek and Chetwynd.

Extending the life of the resource by placing limits on extraction rates is a reasonable proposition for a host of reasons – social, economic and environmental. And it is worth noting that, from a strictly economic perspective, members of OPEC (the Organization of the Petroleum Exporting Countries) have periodically upped or lowered production rates in successful attempts to influence such things as crude oil prices.

Moreover, in BC if the government stays true to its stated goal of ending gas flaring and other unnecessary waste in the oil and gas sector, there is an easy tool at its disposal to lengthen the life of the northeast's natural gas reserves. Simply reduce the amount of gas pulled from the ground by the amount of gas saved through an end to flaring. Doing so does not deny natural gas to companies that have made bonus bid payments to the province for the right to exploit gas reserves. It simply says that companies must do so in a phased-in manner, one that maximizes public benefits.

Significantly, placing limits on development ultimately benefits energy companies too. As the provincial government is well aware, its zealous promotion of northeast BC's massive Ladyfern gas deposit actually resulted in the over-exploitation of that deposit to the point where it was drawn down too quickly, making significant portions of the deposit inaccessible. Likening the deposit to a giant milkshake with too many straws sticking into it, Calgary-based writer and energy expert

Andrew Nikiforuk broke the story on how the race to get to Ladyfern's riches ensured its premature demise. The end result: a trillion cubic foot gas play downgraded to 400 billion cubic feet.³⁹

Ultimately, capping natural gas production will slow greenhouse gas emissions. However, while the province's greenhouse gas emissions reduction targets are predicated in part on ending gas flaring, stopping flaring will not in and of itself reduce greenhouse gas emissions. If the flared gas is captured and subsequently burned to produce heat and energy there will still be CO₂ releases. Thus, reducing gas production by the amount of gas saved through an end to flaring represents a true greenhouse gas emissions savings and a significant one in the overall scheme of things.

RECOMMENDATION 4: Implement a carbon tax.

Further tools will be needed to reduce the energy industry's ecological footprint, however. One such tool is a carbon or emissions tax.

In a recent working paper released by the C.D. Howe Institute, Mark Jaccard estimated the effect of the Canadian government's policies on reducing greenhouse gas emissions.

The most important of the new federal policies focuses on Canada's large industrial greenhouse gas emitters – the big electrical utilities, oil and gas companies, manufacturers, mines and the like responsible for half of the country's emissions – and requires reductions in the "intensity" of greenhouse gas emissions. What this means, essentially, is that for each unit of production the amount of greenhouse gases required must fall. However, because *overall* production may rise, per unit savings in greenhouse gas emissions will be partly and likely wholly wiped out.

The federal government's proposed reductions in "emissions intensity" are 18 per cent by 2010 and a further 2 per cent per year through 2015, with the baseline year being 2006.

Jaccard's conclusion is that this approach will not have the desired effect of reducing Canada's greenhouse gas emissions to 20 per cent below today's levels by 2020. Nor will it result in the even more ambitious long-term goal of a 65 per cent reduction in greenhouse gas emissions by 2050.

"By 2020, emissions would be 120 megatonnes below projected levels and by 2050 the reduction would be almost 400 megatonnes below the business-as-usual projection. However, the results also indicate that overall emissions in Canada are unlikely to fall below current levels. The government is likely to miss its target by almost 200 megatonnes. Moreover, because of this gap between target and reality, it is unlikely that a future government would be able to achieve the ambitious 2050 target."⁴⁰

Jaccard's view – and that of many others – is that a carbon tax is required to make a serious dent in greenhouse gas (GHG) emissions.

"Setting a value on the atmosphere is essential since fossil fuels, the dominant source of human GHG emissions, will remain competitive with other energy sources for at least several decades and perhaps centuries," Jaccard concludes. "Such value-setting can only occur (1) directly via a GHG tax, the most economically efficient approach, or (2) indirectly by regulators that set a cap on emissions (perhaps

with tradeable permits), or control the carbon content of energy supplies, or control the emission characteristics of the technologies available in the market (vehicles, buildings, equipment).⁴¹

In Canada, it is unlikely that the imposition of a carbon tax would prove crippling to the economy. In fact, Jaccard himself said as much to the federal Conservative government earlier this year in a report the government commissioned. Federal Green Party leader Elizabeth May subsequently obtained a copy of the report through an access to information request and provided it to the media. The report concluded that a carbon tax of \$50 per tonne of greenhouse gas emissions would cut about \$4.8 billion from Canada's gross domestic product in 2010, a relatively minor hit equivalent to 0.09 per cent of GDP. By 2020, however, the tax would actually have been around long enough to stimulate the economy, boosting Canadian GDP by a nominal .004 per cent.⁴²

The federal government also heard other reasons in support of a carbon tax when elected Members of Parliament met early in 2007 to discuss the government's proposed Clean Air Act. David Boyd, a respected environmental lawyer, author and adjunct professor at Simon Fraser University's School

In Canada, it is unlikely that the imposition of a carbon tax would prove crippling to the economy.

of Resource and Environmental Management, noted that a Canadian tax on the sale of all fossil fuels – coal, petroleum products and natural gas – could be imposed “with minimal disruption to the economy,” and that it offered an opportunity to “shift taxation away from activities that are good for society (e.g., labour and investment) onto activities that pose huge risks to society (i.e., carbon dioxide emissions).”⁴³

Boyd also noted that while there are equity issues that must be addressed with such taxes (lower-income households, for example, spend a larger portion of their income on energy than do higher-income households), there is a very broad basis of support for a carbon tax. This includes a majority of Canadians as identified in a 2006 Ipsos-Reid poll, and more than 2,500 economists (including eight Nobel Laureates) who signed a statement in 1997 urging the adoption of “mandatory, broad-based market instruments” including carbon taxes to address global warming.⁴⁴ Boyd also stressed that the taxes can be introduced at modest levels to begin with and increased over time, and that where they have been introduced they have already proven effective.

Barring the federal government taking leadership and imposing a carbon tax, could BC go it alone? Events in Europe suggest the answer is yes. For example, Norway, a member of the European Economic Union, has had a \$55 per tonne of CO₂ tax in place since the 1990s. The country not only imposed the tax with little negative impact on its competitive position in the EU, but the tax stimulated important developments in greenhouse-gas-emitting industries such as Norway's oil and gas sector. For example, the Sleipner project in the North Sea sees the energy industry stripping CO₂ from natural gas and pumping the greenhouse gas into a saline aquifer 1,000 metres below the sea floor. While other energy companies have pumped CO₂ below ground as a means of increasing output at oil wells where production is falling, the Sleipner CO₂ sequestration project was done specifically to avoid the carbon tax.⁴⁵

BC could impose a similar tax without waiting for the federal government to do so. Moreover, the revenues generated from such a tax would stay in the province, which would not necessarily be the case with a federal tax. And those dollars could, if the province so wished, be used to stimulate activities in other areas that would be of net benefit to our climate. New tax dollars could, for example,

be invested in public transit in an effort to reduce car traffic and the associated CO₂ emissions. Or they could be used to build wind, solar or tidal power facilities, or as rebates to consumers purchasing a range of energy saving devices.

This report recommends that BC implement a carbon tax, and that the tax be on top of the additional royalties charged energy companies that choose to continue flaring natural gas. The tax would provide further incentive for companies to halt flaring – a preventable industry practice. Furthermore, a tax would stimulate the move toward a more carbon-neutral industry. As in Norway, energy companies in North America are already stripping CO₂ from some fossil fuels and injecting it underground. Jaccard estimates there are now about 3,000 kilometres of pipelines in Canada and the US that carry CO₂. The gas is then injected into the ground at several points to enhance oil recovery. But the gas could also be pumped – as in Norway’s case – to points deeper underground, below saline aquifers and rock formations that would trap the gas.

Carbon sequestration, it must be emphasized, has its critics. The greatest concern rests with leaks. Leaks could, in the worst case, burst from the ground and suffocate people.⁴⁶ In other cases, trapped gas might migrate into groundwater where the gas could acidify the water and potentially leach toxins from the surrounding rock, including lead. But according to the International Panel on Climate Change, which has estimated that worldwide there is the potential to store somewhere between 2 trillion and 10 trillion tons of carbon dioxide, such risks are unlikely if geologically stable storage sites are selected. The IPCC has reported that, stored correctly, 99 per cent of carbon dioxide would “very likely” remain underground over 100 years and “likely” remain there over 1,000 years.⁴⁷

The oil and gas industry now has 30 years’ experience pumping CO₂ underground to increase oil production. In the case of deep underground carbon sequestration not in the service of oil extraction but tax avoidance, Norwegian energy company Statoil has to date pumped more than 6 million tonnes of CO₂ far below the bottom of the North Sea. No leaks have yet been detected and geologists continue to monitor the site.⁴⁸

RECOMMENDATION 5: Raise royalty rates and create a stand-alone provincial fund, similar to Alberta’s Heritage Fund, which is funded by a portion of energy royalties and carbon taxes.

The importance the provincial government attaches to revenues from the oil and gas sector is obvious, but carries with it risks. The most obvious is that fossil fuel reserves are finite. As the reserves are exploited, the revenues associated with them pay for a host of programs including health and education. But as oil and gas reserves run out, so too will the revenue stream from things such as energy royalties.

Jurisdictions including Norway, Alaska and Alberta have all created stand-alone accounts as a hedge against the future depletion of the energy revenue stream. Significantly, Norway in particular has done so while collecting far more in revenues on a per-barrel-of-oil equivalency than has BC. And there are indications that Alberta may soon follow Norway’s lead, following the release of a recent government-commissioned study that suggested the province was not collecting enough in royalty fees.⁴⁹ This strongly suggests that BC should be able to raise its overall royalty rates and channel a portion of the increased royalties into a separate account that could provide revenues down the road when the oil and gas sector has tapped out much of the province’s fossil fuel reserves.

An interest bearing account would, in future years, provide an important source of revenues to pay for important public services. It could also be used as a tool in the province's efforts to lower greenhouse gas emissions by providing a fund for renewable energy projects including wind, solar and tidal, or for public transit projects that not only make our cities more liveable, but that lower vehicular greenhouse gas emissions.

RECOMMENDATION 6: Keep protected areas and special management zones protected.

Finally, while much attention focuses these days on the impact that the oil and gas industry has on our climate, it is important to remember the large ecological footprint the industry has on the land and water in northeast BC. These impacts become even more of a concern in light of global warming and the increased uncertainty about what impact it will have on protected areas.

A recommitment on the province's part to ensuring that what is declared "protected" remains so, is vital. Northeast BC's wildlife areas and wildlife populations are already under stress thanks to decades of development by the oil and gas sector. Hence the need to adequately conserve what remains by restricting where wells, roads and pipelines may be built.

Northern British Columbia is home to some of the largest continuous areas of undeveloped land in the province, and indeed the country. World renowned wilderness areas such as the Northern Rockies are home to some of the most important and relatively intact ecosystems on the continent, ecosystems that are large enough in size to support predators and prey alike in numbers sufficient to perpetuate their populations.

But there are ongoing signs that the conservation gains of the past decade in and around the Northern Rockies are at increased risk. In recent years, energy companies have pressed for a road to be built through Graham-Laurier Provincial Park to facilitate increased drilling activities. The road has yet to be built but has received

provincial government approval. The park is home to moose, elk, Stones sheep, black bear and grizzly bear. Bull trout, a fish species considered threatened or endangered in many parts of BC, also inhabit streams in the park.

Similarly, a road and pipeline right-of-way has been increased in size on the periphery of Pine Le Moray Provincial Park. The park is home to woodland caribou, a wildlife species that has been shown to decline in all forested areas where roads or transportation corridors are built.

Finally, the energy industry has proposed putting an all-weather bridge across the Prophet River, a designated heritage river in northern BC. The move would bring increased truck traffic and development into the region's biggest and arguably most important special management area, the Muskwa-Kechika, an area rich in wildlife.

At this time, these are the three most prominent examples of energy industry threats to northeast BC's already seriously fragmented environment. Others may be in the offing as the density of gas wells and pipelines increase in response to declining fossil fuel supplies.

A recommitment on the province's part to ensuring that what is declared "protected" remains so, is vital. Northeast BC's wildlife areas and wildlife populations are already under stress thanks to decades of development by the oil and gas sector. Those threats will increase as climate change manifests itself in periods of hotter weather and as local precipitation patterns change. Hence the need to adequately conserve what remains by restricting where wells, roads and pipelines may be built.

IN CONCLUSION, THE IMPLEMENTATION OF THE SIX POLICIES OUTLINED IN THIS PAPER would go a considerable way to securing a better future for a region where, without a great deal of care, a valuable resource will run out far faster than we imagine and with potentially devastating consequences. With foresight, that resource can be conserved, its benefits stretched out to maximum benefit, and our shared climate better protected.

Notes

- 1 Gas flaring commonly occurs for four reasons. First, gas is flared to determine a well's capability. Flaring also occurs when wells are serviced and gas is burned off from inside depressurizing equipment. A more common reason for flaring is when oil wells produce gas. If the amount of gas is deemed "insufficient" to warrant construction of pipelines and gas-gathering equipment, it is burned or flared instead. Flaring may also occur during periods of uncontrolled or emergency releases of gas in order to avoid larger problems such as uncontrolled leaks or explosions (www.cantoxenvironmental.com/sectors/oilgas/naturalgas).
- 2 British Columbia 2007a.
- 3 Cernetig 2007.
- 4 Ibid.
- 5 British Columbia 2007b.
- 6 Canadian Association of Petroleum Producers (www.capp.ca/default.asp?V_DOC_ID=674).
- 7 British Columbia Ministry of Energy, Mines and Petroleum Resources 2006a.
- 8 Ibid.
- 9 Ibid.
- 10 British Columbia Ministry of Energy, Mines and Petroleum Resources 2006b.
- 11 British Columbia Ministry of Energy, Mines and Petroleum Resources and National Energy Board 2006.
- 12 Roberts 2004.
- 13 Ibid.
- 14 Jaccard 2005.
- 15 British Columbia Ministry of Energy, Mines and Petroleum Resources and National Energy Board 2006.
- 16 British Columbia Ministry of Energy, Mines and Petroleum Resources 2003.
- 17 British Columbia 2007c.
- 18 Clarke 2007.
- 19 Ibid.
- 20 Taylor 2004.
- 21 Canadian Association of Petroleum Producers (www.capp.ca/SHB/Sheet.asp?SectionID=5&SheetID=259).
- 22 Ross 2007.
- 23 Ibid.
- 24 Encana 2007.

- 25 Ibid.
- 26 To access Encana’s annual financial reports visit the company’s web site at www.encana.com.
- 27 Encana 2003.
- 28 Elvidge 2007.
- 29 Argo 2002.
- 30 Federal High Court of Nigeria 2005. Nigeria’s experience with sour gas flaring is an interesting case study because of a recent and potentially precedent-setting court ruling in that country. The African nation’s oil-rich Niger Delta has been the setting of often violent disputes as oil and gas reserves are developed, in good part because the economic benefits of those resources never seem to trickle down to the people. Yet it is local residents who disproportionately bear the human health and environmental costs. In 2005, the Federal High Court of Nigeria ruled in favour of residents in the Delta State of Nigeria, who had asked the court to rule that gas flaring by the Shell Petroleum Development Company Nigeria Ltd. and the Nigerian National Petroleum Corporation posed clear health and environmental risks. The court decided in their favor, saying that the defendants, including Nigeria’s Attorney General, must ensure that people living in the oil-and-gas-rich delta region lived in a “clean poison-free, pollution-free and healthy environment.”
- 31 Alberta Energy and Utilities Board 1999.
- 32 For a discussion of some of the achievements in Alberta see www.methanetomarkets.org/resources/oil-gas/docs/canada_flaring2.pdf.
- 33 British Columbia Ministry of Energy, Mines and Petroleum Resources 2006c.
- 34 Environment Canada 2007.
- 35 Marshall 2006.
- 36 British Columbia Ministry of Energy, Mines and Petroleum Resources 2007.
- 37 British Columbia Oil and Gas Commission 2003.
- 38 British Columbia Ministry of Forests 1996.
- 39 Nikiforuk 2003.
- 40 Jaccard 2007.
- 41 Ibid.
- 42 Curry 2007
- 43 Boyd 2007.
- 44 Ibid.
- 45 Jaccard 2005.
- 46 Freese 2003. Freese writes of a natural carbon dioxide release from a lake in a volcanic crater in Camaroon in 1986 that killed as many as 1,800 people.
- 47 Jia 2007.
- 48 Adam 2005.
- 49 Ebner 2007.

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The Resource Economics Project offers research and policy solutions that promote economic stability and environmental sustainability in BC's resource-dependent communities. The project aims to bridge the "jobs versus environment" divide.

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