Cap and Trade

Reducing Pollution, Inspiring Innovation

British Columbia Global Warming Solutions Series

Matt Horne
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The Brainerd Foundation

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Executive Summary

In 2007, the British Columbia government legislated targets to reduce greenhouse gas pollution[1] to at least 33% below the 2007 level by 2020, and to 80% below the 2007 level by 2050.[2] To meet these ambitious targets, British Columbia will need to make changes across virtually all sectors — in energy production, transportation, buildings, agriculture, waste management and other industries.

The challenge now is to develop the best policy solutions and to ensure that those solutions are implemented in a way that sustainably protects our environment. In April 2007, British Columbia joined the Western Climate Initiative (WCI), a collaborative effort with the province of Manitoba and seven U.S. states to design a system that puts a cap on global warming emissions and allows trading of emissions.[3]

The stakes are significant in the design of this cap and trade system. Greenhouse gas pollution from industry and aviation account for more than 40% of British Columbia's emissions, and most of the emissions from these sources are well-suited to cap and trade. If designed effectively, the cap and trade system will help reduce pollution while keeping the economy and communities strong. If designed poorly, the system could have negative consequences on all three fronts.

For the province to succeed, British Columbians need to be well-informed. To that end, this report reviews the basics of cap and trade systems generally, and then discusses cap and trade in the specific context of British Columbia. It considers lessons learned elsewhere — in the United States, the European Union and in Canada — and then concludes with specific recommendations for the design of an effective cap and trade system for British Columbia.

Summary of Recommendations

- Set strong caps: the cap should be at least 33% below 2007 pollution levels by 2020.
- Include the right sectors: at a minimum, the system should be applied to large industry and aviation.
- Auction off permits: all of the pollution permits should be put up for auction.
- Maintain the integrity of the system: a limited use of offsets that are proven to reduce emissions should be allowed; price caps that weaken the system should not be used.

[1] In this report, greenhouse gas pollution or emissions refers to emissions of the six types of greenhouse gases covered by the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.

[2] Many climate scientists have concluded that even deeper reductions are needed in rich countries such as Canada. Studies reviewed by the Intergovernmental Panel on Climate Change show that to stabilize greenhouse gas concentrations in the atmosphere at 450 parts per million of carbon dioxide equivalent (a widely supported limit), industrialized countries' emissions must fall to 25–40% below the 1990 level by 2020 and to 80–95% below the 1990 level by 2050. See Gupta et al., "Policies, Instruments and Co-operative Arrangements," in Metz et al., eds, *Climate Change 2007: Mitigation,* Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge, UK and New York, NY: Cambridge University Press, 2007), 776. Also available online at http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html

[3] The states partnering in the WCI are California, Oregon, Washington, Arizona, New Mexico, Utah and Montana.

Negotiations are now at a critical stage. The Western Climate Initiative (WCI) partner governments, including British Columbia, are working together to design a cap and trade system by August 2008. Draft recommendations for the system are now available, and the window of opportunity to influence the design is short. Final recommendations will be released for review and comment in mid-July.

The public can send comments on the recommendations to both the WCI and the British Columbia government. Citizens are urged to contact them and provide input. Submit your comments to the WCI at www.westernclimateinitiative.org. Submit comments to the Government of British Columbia's Climate Action Secretariat at www.climateactionsecretariat.gov.bc.ca

For more information on cap and trade, visit the Pembina Institute's website at www.bc.pembina.org or contact Matt Horne, 604-874-8558, ext. 223, matth@pembina.org

Cap and Trade

Reducing Pollution, Inspiring Innovation

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1. The Basics of Cap and Trade

A cap and trade system is a tool used by governments to put an absolute limit — a hard cap — on the pollution responsible for global warming. It is designed to spur innovative and low-cost solutions to reducing pollution. This section reviews the basic elements of a cap and trade system — the cap, the allocation of permits, and the trade of permits — as well as some optional features.

1.1 The Cap

The level of the cap determines the stringency of the cap and trade policy because it establishes the extent to which emissions will be reduced. In most cases, the government will start a cap and trade system with a cap that requires a moderate effort. Over time, the government will typically decrease the cap so that polluters will continue to seek out ways to improve.

Setting the cap allows the government to focus on the problem, pollution that is responsible for global warming, and requires the polluters to focus on the solutions. There are many options available to reduce global warming emissions — improved energy efficiency, increased use of renewable energy, capture and sequestration of carbon, reducing losses from industrial systems, and changes in types or methods of production. In using a cap, the government does not choose the option that must be implemented. Each company chooses which options work best to reduce its emissions, based on individual circumstances. The combination of government regulation and resulting actions by companies will help support renewable energy, energy efficiency and other activities in British Columbia.

While setting the level of the cap, the government must also determine which emission sources to include in the system. Many existing systems have limited their scope to single industries, such as electricity generators and/or facilities that are large-point sources of pollution, but other sources could also be included.

1.2 Allocation of Permits

Under cap and trade, the government creates "emission permits," also called allowances. Each permit allows the permit-holder to emit one tonne of greenhouse gases. For example, if the government set a cap of 1,000 tonnes, it would need to create 1,000 emission permits. A polluter responsible for 50 tonnes of greenhouse gases would need 50 emission permits.

Once the government has set the cap and created sufficient permits, it must also decide how to allocate them to the polluters covered by the system. There are two basic options (although mixed approaches are also possible):

- *Free allocation* — The government gives permits to polluters based on current or historical emissions or output. For example, a company that produces 20% of the widgets in British Columbia could receive 20% of the emission permits allocated to the province's widget-makers.

- *Auctioned allocation* — Companies buy permits from the government in an auction. In this case, the cheaper it is for a company to reduce its emissions, the less it will be willing to pay for permits.

In either case, the total number of permits allocated (the cap) is the same.

1.3 Trade of Emission Permits

The government's allocation determines only the initial distribution of permits. Once permits have been allocated, companies are free to trade with one another and take advantage of the efficiencies of a market.

Trade is the means for minimizing costs and spurring innovation. Trading occurs when companies that have more permits than they need sell them to companies that do not have enough. If a company has 50 emission permits, for example, yet expects to emit 55 tonnes of emissions in the upcoming year, it has two choices: it can try to buy 5 permits, or it can make changes to its own operations to reduce its emissions to 50 tonnes (through more energy efficiency or more renewable energy, for example).

Trading does not allow companies to simply buy their way out. Total pollution from covered sources must remain at or lower than the cap. While some individual companies will be able to trade permits, the limited number of permits means that others will have to install better equipment or find other ways to fit their overall emissions under the cap. And the reduction in greenhouse gas pollution will benefit the climate regardless of which companies reduce their emissions.

Trading minimizes costs because it ensures that emissions are reduced by the actions with the lowest cost. For example, one company can reduce its pollution by using more energy efficient trucks at a cost that is equivalent to $10 for each tonne that is reduced. Meanwhile, another company may only be able to reduce emissions by a major investment in modernizing its plant at a cost of $50 per tonne reduced. The trading system would allow the companies to buy or sell permits such that any reductions that can occur at $10 per tonne will be implemented before reductions that cost $50 per tonne. The plant modernization will proceed if the cap is tightened enough, but the lower-cost actions will be taken first.

Trading also spurs innovation because businesses can benefit from researching and developing low-cost opportunities for reductions. Any reductions they can achieve will reduce the number of permits they need to buy, or increase the number of emission permits they have to sell.

1.4 Other Features

Some cap and trade systems include additional features that help limit the costs to polluters. These features can provide useful protection for businesses, especially during the early implementation of a system. While the trading market is still maturing, permit prices can fluctuate significantly and may not accurately reflect the costs of reductions. Such features require careful consideration, however, because they can compromise the environmental objectives of the system overall.

Offsets

Offsets add flexibility to a cap and trade system by allowing companies to take credit for emission reductions that they finance outside of the sectors subject to the cap. Offset projects vary and could include funding energy savings for low-income households, solar photovoltaic

systems in remote communities, and forestry restoration efforts. Depending on the design of the cap and trade system in British Columbia, offset projects could occur only within the province or outside the province as well.

Rigorous rules governing offset creation, quantification and verification are critical to ensure that an offset credit represents a real, incremental reduction in emissions. With such rules in place in British Columbia, offsets could be an important part of the strategy for meeting the province's emission reduction targets. Without adequate legislation, however, many or most offset credits would not represent real reductions, and reliance on offsets could actually make it more difficult to meet targets.

Specifically, a credible offset project must be:

- **additional or incremental**, meaning that the emission reductions would not have occurred without the revenue from offset sales (the Clean Development Mechanism's *tool for the demonstration and assessment of additionality* is a standard test used under the Kyoto Protocol);
- **rigorously quantified** through third-party validation and verification in accordance with recognized standards;
- **claimed by a single individual/organization** and not double-counted;
- **transparent** with full information on project details and credit quantification accessible to the public;
- **re-evaluated every seven to eight years** to determine the quantity of emission reductions that can still be credibly credited;
- **evaluated based on other environmental and social impacts;** and
- **compatable with the world's major carbon trading systems**, which are currently the European Union's Emission Trading System (discussed in the next section of this report) and the Kyoto Protocol's Clean Development Mechanism.

The additionality requirement is fundamental to offset credibility. Granting offset credits to a project that does not meet this standard would effectively constitute emissions fraud. Because the emission reductions from the project would have occurred anyway, the act of creating these false credits would not reduce emissions below what they would have been otherwise. When sold to companies included in the cap and trade system, the false credits would help them meet their obligations without cutting their own emissions. The net result is that granting these false credits would *increase* total greenhouse gas pollution.

Price Caps

Cap and trade systems can also include price caps that allow companies to comply at a guaranteed price (dollars per tonne) if the permit prices exceed a maximum threshold. Price caps provide financial certainty to companies, but in doing so they can compromise environmental certainty. Money paid under a price cap will not generally result in the amount of emission reductions needed to meet the emissions cap. For systems that include price caps, the lower the guaranteed price, the weaker the signal for companies to reduce their own emissions or find acceptable offsets.

Banking and Borrowing

Offsets and price caps are not the only ways to limit the costs to companies in a cap and trade system. Other options include banking-acquired permits that are not needed in a compliance period (i.e., that can be carried forward to the next period) and borrowing permits from future years. Both options give polluters additional flexibility on the timing of when they can best reduce their emissions. Banking encourages early action and poses minimal threat to the environmental effectiveness of the cap and trade system. Borrowing more than a few years forward increases the risk that promised future reductions will not actually be achieved.

2. In British Columbia and Elsewhere

This section considers the implementation of a cap and trade system in the specific context of British Columbia. It also considers the implementation of other cap and trade systems, and explores the lessons learned from acid rain pollution in the United States, the European Union's Emission Trading System (EU ETS), the Regional Greenhouse Gas Initiative (RGGI) in the United States, and relevant federal and provincial policies in Canada.

2.1 Cap and Trade in British Columbia

The Western Climate Initiative (WCI) is the most promising opportunity currently available to the province for developing an effective cap and trade system. This section outlines the WCI and then reports on the sources of greenhouse gas pollution in British Columbia.

2.1.1 The Western Climate Initiative

WCI is a collaboration between British Columbia, Manitoba, and seven western states to develop regional strategies to address global warming. One of the first commitments of the WCI partners is to develop "a design for a regional market-based multi-sector mechanism, such as a load-based cap and trade program, to achieve the regional GHG reduction goal" by August 2008.[4] The mechanism that is currently being discussed is a cap and trade policy. Draft recommendations for the design of this policy became available in March, 2008. Final recommendations will be released for review and comment in mid-July.[5]

The WCI participants represent a significant portion of North America's greenhouse gas pollution and economic activities. The initiative is also drawing widespread interest from other jurisdictions. In addition to the nine participating provinces and states, ten other governments are actively observing the process. Some of them, including Ontario and Quebec, have indicated some consideration of similar regional strategies.[6] Figure 1 illustrates the prevalence of WCI in North America.

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[4] Initial Governor's Statement on the Western Regional Climate Change Initiative, February 27, 2007, http://www.westernclimateinitiative.org/ewebeditpro/items/O104F12775.pdf (accessed March, 2008). British Columbia joined the WCI on April 24, 2007, http://www2.news.gov.bc.ca/news_releases_2005-2009/2007OTP0053-000509.htm (accessed March, 2008).

[5] Recommendations will be posted to the Western Climate Initiative's website. Comments can submitted to the same site: http://www.westernclimateinitiative.org/

[6] Dirk Meissner, "Ontario, Quebec seek cap and trade on emissions," *Toronto Star*, January 29, 2008, http://www.thestar.com/News/Canada/article/298462.

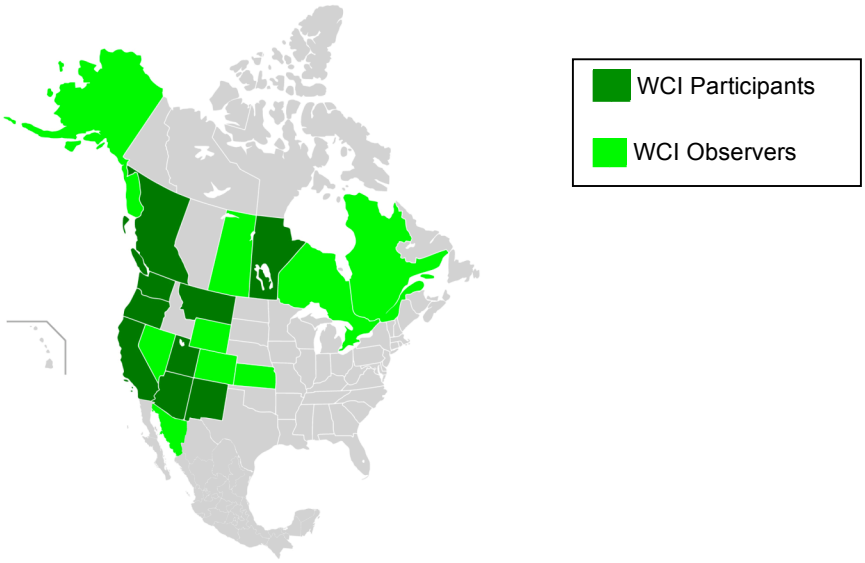

Figure 1: States and Provinces Participating in the Western Climate Initiative (WCI) or Observing the WCI Process, as of March 2008

Source: Wikipedia

Table 1 lists by population the provinces and states that are participating in WCI or observing the WCI process.

Table 1: Population of Participants and Observers of the Western Climate Initiative

Participants	Population	Observers	Population
British Columbia	4,380,300	Ontario	12,803,900
Manitoba	1,186,700	Quebec	7,700,800
Arizona	6,338,755	Saskatchewan	996,900
California	36,553,215	Alaska	683,478
Montana	957,861	Colorado	4,861,515
New Mexico	1,969,915	Idaho	1,499,402
Oregon	3,747,455	Kansas	2,775,997
Utah	2,645,330	Nevada	2,565,382
Washington	6,395,798	Wyoming	522,830
		Sonora (Mexico)	2,213,360
Total	64,175,329	Total	36,623,564

Source: Statistics Canada, United States Census Bureau, Mexico IDS Corporate

2.1.2 British Columbia's Emission Sources

To gauge the potential impact of a cap and trade system in British Columbia, it is important to understand the main sources of greenhouse gas pollution in the province. The scope of a cap and trade system is one of the first considerations when developing a system.

It is likely that, at least in the short term, the scope of cap and trade in British Columbia will be limited by the type of emission source and possibly by the size of individual facilities. The system might, for example, apply only to facilities that emit more than 1,000 tonnes of greenhouse gases each year.

Figure 2 illustrates the source of greenhouse gas emissions in British Columbia, as reported by the province. British Columbia's total emissions in 2005 were 65.9 million tonnes of CO_2 equivalent.

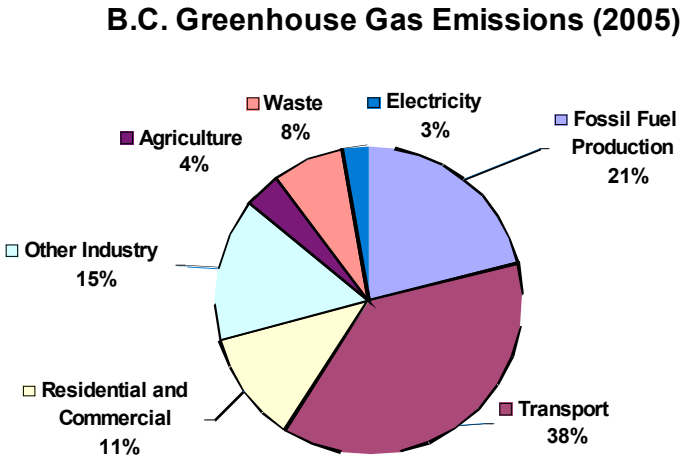

Figure 2: British Columbia's Greenhouse Gas Emissions by Sources, 2005
Source: Government of British Columbia, *Overview Document for Climate Action Team*, December 2007

The transportation sector, the largest source of emissions in British Columbia in 2005, accounted for approximately 25 million tonnes of greenhouse gas pollution. Of that total, domestic aviation generated 1.7 million tonnes (3% of the provincial total) while freight transportation emitted almost 7 million tonnes (about 10% of the provincial total). Emissions from all industry (electricity, fossil fuel production, etc.) and domestic aviation are estimated to account for more than 40% of British Columbia's emissions.

2.2 Cap and Trade Around the World

The implementation of cap and trade systems in other regions can inform us of the potential effectiveness of such a system in British Columbia. This section looks at a number of existing cap and trade systems in the United States, Europe and Canada and provides examples of how compliance options have been used.

2.2.1 Acid Rain Pollution in the United States

In the 1990s, after nearly a decade of stalemates over traditional regulation, the United States implemented one of the first cap and trade systems in an effort to address the pollution responsible for acid rain. In its first phase, that system covered the largest point sources of sulphur dioxide, comprising 263 sources at mostly coal-burning electricity plants. In subsequent phases, the system expanded to include more than 2,000 facilities. Each power plant reports its emissions on a quarterly basis to the U.S. Environmental Protection Agency, which has

developed a tracking system for the data. The cap on sulphur dioxide will eventually reduce pollution from the power plants to approximately half of the levels experienced in the 1980s.[7]

Analysis by the Massachusetts Institute of Technology (MIT) notes the system's quick implementation "without the granting of the exemptions, exceptions, or relaxations of the regulatory requirement that are typically issued."[8] The positive environmental outcomes are attributed to "the more fundamental characteristics of the program, namely, a flexible, decentralized, property rights system."[9] The researchers also estimated that the trading system led to cost savings of 33%.

2.2.2 The European Union's Emission Trading System

The success of the acid rain system helped encourage cap and trade policies for greenhouse gas pollution in Europe and in a group of northeastern states in the U.S. EU ETS began in 2005, with 27 countries now participating and covering electric power plants and major energy-intensive industries.

In its first phase (between 2005 and 2007), this policy ran into several problems and did not generate the expected reductions in emissions. Analysts suggest that the problems with the EU ETS were due to design issues such as "setting overly generous caps for polluters and giving away most allowances [permits], resulting in huge windfall profits for power generators."[10] The EU ETS appears to be functioning more effectively in its second phase (from 2008 to 2012), and further improvements are planned for after 2012. These improvements include a move toward auctioned permits and the inclusion of aviation.

The EU ETS does not have a price cap per se, but it does impose a penalty for non-compliance that could have a similar effect. The penalty for non-compliance is 100 euros per tonne of carbon dioxide for the period from 2008 to 2012. If the trading price of permits were to exceed this penalty, companies might pay the non-compliance fee rather than purchase permits. The EU ETS does not allow companies to use this mechanism to avoid reducing emissions, however; companies that are non-compliant must pay the penalty in that year *and* submit sufficient permits to cover their shortfall in the following year.

2.2.3 The Regional Greenhouse Gas Initiative in the United States

The Regional Greenhouse Gas Initiative (RGGI), a cap and trade system based in the United States, will be implemented in ten states in the northeast and mid-Atlantic region. RGGI covers electric power plant emissions. With implementation set to start in 2009, all states are now finalizing the implementation details.

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[7] Denny Ellerman, David Harrison and Paul L. Joskow, *Emissions Trading: Experience, Lessons, and Considerations for Greenhouse Gases* (Washington, DC: Pew Center for Global Climate Change, 2003).

[8] Denny Ellerman, *Are Cap-and-Trade Programs More Environmentally Effective than Conventional Regulation?* MIT Centre for Energy and Environmental Policy Research (CEEPR) working paper 2003-015 (MIT, October 2003).

[9] Denny Ellerman, David Harrison and Paul L. Joskow, *Emissions Trading: Experience, Lessons, and Considerations for Greenhouse Gases* (Washington, DC: Pew Center for Global Climate Change, 2003).

[10] R. Cleetus, *We Need a Well Designed Cap-and-Trade Program to Fight Global Warming,* USC backgrounder (Union of Concerned Scientists, 2007), http://www.ucsusa.org (accessed February, 2008).

A review of the current status of the design for RGGI notes that:

> The RGGI model rule specifies that participating states will allocate a minimum of 25% of allowances (or permits) to support a "consumer benefit or strategic energy purpose," referred to generally as a "consumer benefit allocation." In most states, these allowances would not be allocated directly to electric generators but instead would be sold at auction, with the proceeds going to benefit consumers. Generators would be required to purchase allowances, possibly through a regional auction. The revenue from the sale of these allowances could then be used to provide programmatic support for such measures as energy efficiency or clean energy technologies, which would reduce the overall compliance costs of the program and its impact on electricity ratepayers. It was anticipated in the original memorandum of understanding (MOU) that the states would auction a minimum of 25% of their allowances, but currently all of the RGGI states expect to auction 100% of their budgeted allowances.[11]

This rule and the expected actions of the states indicates significant acceptance of the benefits of auctioning over free allocation of permits. As discussed in the next section, the requirement to use a portion of the revenue from the auction for consumer benefit could be applied to a system in British Columbia.

The RGGI system allows the use of offset credits but with limits based on market price of permits. Initially, polluters will be able to use offset purchased to cover 3.3 % of their total emissions (approximately half of their requirement for emission reductions). The offset project can be located anywhere in the United States. If permit prices exceed certain thresholds (in dollars per tonne), polluters are allowed to cover up to 10% of their emissions with offset purchases. In addition, at higher permit prices, polluters can purchase offsets from international projects, which may be less expensive than projects in the United States. These restrictions help ensure that low-cost offset credits do not flood the market. Flooding the markets would lead to companies simply purchasing the offsets and not implementing actions (such as increased energy efficiency or use of renewable energy) to reduce their own emissions.

2.2.4 Canadian Federal and Provincial Policies

In Canada, the federal government has proposed a highly weakened form of cap and trade policy for heavy industry sectors. The Alberta government has already implemented a similar policy. Neither of these polices sets a true cap on emissions; instead, they set limits on "emissions intensity" (emissions per unit of industrial production), which can allow actual emissions to grow.

These systems also contain major loopholes that give polluters cheap alternatives to making real reductions in their emissions. For example, the Alberta Specified Gas Emitters Regulation includes provisions for offsets,[12] but it does not require offset projects to be additional. Both the

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[11] New Hampshire Department of Environmental Services, with the assistance of the University of New Hampshire, *Regional Greenhouse Gas Initiative (RGGI) Frequently Asked Questions on the Economic Analysis* (January 2008), https://www.airquality.nh.gov/ard/climatechange/pdf/economic_FAQs.pdf (accessed March 2008).

[12] Specified Gas Emitters Regulation, Alberta, Reg. 139/2007, section 7, http://www.canlii.ca/ab/laws/regu/2007r.139/20070717/whole.html (accessed March 2008).

federal and Alberta systems allow companies to pay money into a fund with no clear assurance as to the emission reductions that will be secured by the fund.

3. Recommendations for British Columbia

A cap and trade system could play a significant role in reducing British Columbia's greenhouse gas pollution, but a positive outcome is not inevitable. For British Columbia and the WCI to create a robust and effective cap and trade system, they need to ensure that four key elements are in place: a sufficient cap, a comprehensive scope, fair allocation of pollution permits, and limits on costs that do not compromise the environment. This section explains these four essential components in some detail.

3.1 Set Strong Caps

> ***What should the cap be and how quickly should it decline?***
>
> The cap should be at least 33% below 2007 pollution levels by 2020. Annual reduction targets should be designed to set an appropriate course towards this target.

A cap based on a 33% reduction takes a "fair share" approach, where the polluters covered by the cap achieve reductions in line with the overall targets British Columbia has put into law.[13] It also acknowledges that all sectors will need to make significant reductions in order for British Columbia to meet its targets, especially in the medium to long term.

There should also be provisions to make the cap stronger if needed. Scientific evidence may indicate that we need to accelerate efforts against global warming, or economic analysis may show that cap and trade is more effective than other policies. Based on current scientific evidence, the Pembina Institute and the David Suzuki Foundation concluded that Canada's net greenhouse gas pollution need to be reduced to 25% below the 1990 level by 2020, and 80% below the 1990 level by 2050.[14] The target of 25% below the 1990 level target equates to 46% below the 2007 level by 2020.[15]

Our recommendation uses 2007 as a reference year, and although British Columbia's legislated targets are referenced to this year, there are also strong rationales for the cap to be referenced to 1990. 1990 is the base year used internationally, including in the Kyoto Protocol under which Canada faces a legally binding target. The choice of base year is important because the emissions from each sector grow at different rates. If the emissions from sectors regulated by the cap and

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[13] Bill 44 requires British Columbia's total emissions to fall to 33% below the 2007 levels by 2020 and to 80% below 2007 levels by 2050. Targets for 2012 and 2016 are also to be legislated during 2008.

[14] Matthew Bramley, *The Case for Deep Reductions: Canada's Role in Preventing Dangerous Climate Change* (Vancouver, BC and Drayton Valley, AB: The Pembina Institute and David Suzuki Foundation, 2005), 17–18. Also available online at http://climate.pembina.org/pub/536.

[15] Calculated based on estimated 2007 greenhouse gas emissions for British Columbia that are 38% higher than 1990 levels.

trade system grew faster between 1990 and 2007 than sectors outside of the cap and trade, referencing reductions to 2007 would ignore the past growth in regulated sectors and give them an easier target than if the earlier base year were used.

If the British Columbia government sets a weaker cap, other parts of the provincial economy will have to reduce emissions even more. In this case, the government would need to explain how the remainder of the economy will make up for the shortfall.

3.2 Include the Right Sectors

Most existing cap and trade systems have focused on large industrial facilities (including electric power plants), but broader coverage is certainly possible. The WCI has shown that it would be practical to include the emissions from most sectors.[16] The sources that could be included in the cap and trade system without significant further work are the electricity sector, large stationary combustion sources, liquid transportation fuel combustion, residential and commercial heating fuel combustion, and industrial process and wastes.

> ***Which polluters should the cap and trade system regulate?***
>
> The cap and trade system should, at a minimum, apply to pollution from large industry and aviation.

In choosing the appropriate scope of activities to include in the WCI cap and trade policy, we considered four key questions:

1. Are the emissions from the activities adequately covered by other policies in British Columbia?
2. Are there specific advantages to joining a regional approach; in particular, are these activities vulnerable to direct competition from companies in other WCI jurisdictions that could be avoided if all WCI jurisdictions act in tandem? If the jurisdictions do not act in tandem, businesses could move to jurisdictions with less stringent environmental policies.
3. Do polluters respond efficiently to a price signal? For some emissions sources, the price signal provided by the purchase and trade of pollution permits is not a strong motivator to reduce emissions, even when it makes financial sense to do so.
4. Are challenges in quantifying emissions levels likely to reduce the robustness of the cap and trade policy?

Table 2 lists the types of sources that could be regulated by the cap and trade system. For each type of emission source, we indicate how it fares with the four questions above. The more checkmarks in a given row, the better suited an emissions source is to cap and trade in British Columbia. In some places, we have given mixed ratings ("✓ / ?" for example) to indicate that some of the emissions within a given source are well-suited to cap and trade, although there are questions about other portions.

[16] Scope Subcommittee, Western Climate Initiative, *Summary of Major Design Options Under Consideration*, January 2, 2008, http://www.westernclimateinitiative.org/ewebeditpro/items/O104F14641.pdf (accessed January 2008).

Table 2: Suitability of British Columbia Emissions Sources to Cap and Trade

Source/Type of Emissions	Minimal coverage by other BC climate policies?*		Benefit to regional approach?	Strong response to price signal?	Easy to measure with accuracy?
	Carbon Tax	Other Policy			
Large industry: electricity	×	×	✓	✓	✓
Large industry: other					
Energy emissions	×	✓	✓	✓	✓
Process emissions	✓	✓	✓	✓	✓ / ?
Small and medium industry					
Energy emissions	×	✓	?	✓ / ?	✓
Process emissions	✓	✓	?	✓ / ?	✓ / ?
Transportation					
Aviation	×**	✓	✓	✓	✓
Freight (road, rail, marine)	×**	✓	✓	✓	× / ?
Personal (road, rail, marine)	×	×	×	×	✓
Residential and commercial	×	×	×	×	✓
Waste management	✓	×	×	✓	✓ / ?
Agriculture	✓	✓	?	✓ / ?	× / ?

* An *x* indicates that a significant policy has been implemented or is under development, but not necessarily that the source of emissions is adequately covered. Although British Columbia has implemented a number of policies to reduce greenhouse gas pollution, the Pembina Institute does not consider any sector adequately addressed to date.[17]

** Although British Columbia's carbon tax applies to domestic aviation and freight, it does not apply to international aviation or international marine emissions.

Selecting the sources best suited to a cap and trade system is not straightforward, but this analysis concludes that large industry and aviation are the right sources to target for a number of reasons:

- Pollution from these industries is not adequately addressed by current policy in British Columbia. For these sources, this is particularly relevant for the process emissions and emissions from international travel that are not covered by British Columbia's carbon tax.
- They will benefit from a regional approach to reducing emissions because they compete with companies from neighboring jurisdictions (like the states on the west coast).
- They are motivated to increase profits and therefore will reduce their emissions if it makes them more profitable.
- Their emissions can be accurately measured with a minimum of effort, facilitating permit calculation and trading. The WCI has raised concerns about the ability to precisely measure or calculate emissions from some non-combustion emissions sources. Although

[17] A. Bailie et al, *Mind The Gap: A Blueprint for Climate Action in British Columbia, Summary and Full Reports* (Drayton, AB: The Pembina Institute, 2007), http://www.pembina.org/pub/1550

some data challenges do now exist, we believe that robust measurement protocols can be developed to overcome them in time for the launch of cap and trade.

Emissions from these sources are estimated to cover close to 40% of British Columbia's emissions. The exact percentage will depend on three factors: 1) the threshold used to separate large and small industry, 2) any specific emission sources that cannot be measured with sufficient accuracy, and 3) the international aviation emissions that are attributable to British Columbia. Any threshold used to determine which industrial sources are too small for inclusion in the cap and trade system should strive to capture at least 90% of emissions from a given type of source. The specific thresholds set will likely have to vary between different industry sectors. If any sources are excluded due to imprecise emissions data, it will also be important to work to resolve those data issues as quickly as possible.

Focusing on large industry and aviation results in the exclusion of a number of sectors from the cap and trade system. While the remaining sources of pollution could be covered by cap and trade, they are not as well-suited to the system based on the above criteria. British Columbia has already started to implement strong policies to address these other sources, the most notable of which is the carbon tax announced in the 2008 budget. If strengthened over time, British Columbia's carbon tax can play the same role in these sectors as a broader cap and trade system would have served.

There are still several sources of pollution, however, that would fall outside the scope of either the carbon tax or cap and trade:

- Process emissions from the small and medium industry that fall below an eventual cap and trade threshold.
- Emissions from international marine travel and freight (cruise ships and freighters).
- Emissions from agricultural sources.

All of these sources will need to be addressed by climate policy in British Columbia.

The land use sector and forestry sectors, which are not included in Table 2, must also be noted since they can be either a source or a sink for emissions. Currently, the WCI is not planning to incorporate either of these sectors, citing concerns about leakage, the inability to measure emissions, and administrative complexity. However, some activities such as deforestation and afforestation need to be further considered for inclusion within Canadian cap and trade systems where large public land ownership could mitigate administrative complexity.

3.3 Auction Off Permits

How should the government issue pollution permits to companies?

All of the pollution permits should be put up for auction.

Pollution permits can be distributed to companies at no cost, or they can be auctioned. Auctioning has many advantages:

- Auctioning is a simple, market-based system, consistent with the *polluter pays* principle. This principle is already being used in British Columbia with the province's new carbon tax.
- Companies that have already reduced emissions benefit because they need to buy fewer pollution permits.

- Auctions provide a source of revenue for the province. This revenue can be used to fund other projects to reduce emissions, and to help vulnerable sectors, workers and citizens.
- Consumers are protected from unfair price increases. In Europe, some companies that received permits at no cost raised prices anyway — a "windfall" profit for doing nothing.

If auctioning is initially deemed to be unfeasible for some emission sources, the government and affected companies will need to make changes so that they can move to full auctioning as soon as possible. In this scenario, the British Columbia government would have to demonstrate clearly that the free allocation is tailored to each sector and set at a level justified by each sector's vulnerability to international competition outside the WCI region. Vulnerability to competition with a less-polluting sector that provides the same service within British Columbia is not an acceptable justification for free allocation. It is also important to note that the cost of purchasing emission permits will not necessarily do significant harm to a sector's competitiveness, even when it is competing internationally.

3.4 Maintain the Integrity of the System

What about offsets and other ways to limit costs for companies?

The cap and trade system should allow a limited use of offsets that are proven to reduce emissions. Price caps that weaken the system should not be used.

Some cap and trade systems include measures that limit the costs companies are required to pay. As discussed in section 1, two key options are offsets and price caps.

Offsets allow companies to buy pollution reductions from outside the cap and trade system. We recommend the limited use of offsets in British Columbia, and only under certain conditions:

- Offsets need to meet the requirements outlined in the first section of this report. Most importantly, offsets require a strict additionality requirement, which means that offset projects would not take place without funding from the offset purchase.
- Use of offsets should be limited so that competition for permits is not watered down.
- Forest offsets should only be included if their unique challenges are addressed. These challenges include the temporary nature of the credits due to the impermanent storage of carbon in forests, the potential impacts on biodiversity, and leakage to forestry activities in other jurisdictions.

A **price cap** is a guarantee that the cost of compliance does not exceed a certain amount per tonne of emissions. British Columbia's cap and trade system should not include a price cap that would weaken the incentive for companies in the province to reduce their pollution. If price caps are used, then:

- The price should be set at a level that is expected to be reached only in exceptional circumstances, so that companies in British Columbia focus on reducing their own pollution.
- The British Columbia government should commit to acquire credible offsets to replace 100% of the emission reductions foregone by use of the price cap. Alternatively, polluters could be required to submit permits to cover foregone reductions in subsequent years.

Any provision for offsets or price caps begs the question: how high does the price of pollution permits need to rise before either mechanism could be used? Our current analysis suggests that

price levels need to be *at least* $30 per tonne carbon dioxide equivalent by 2008 to 2010, *at least* $50 per tonne by 2015 and *at least* $75 per tonne by 2020.[18] These price levels would be sufficient to ensure that the deep pollution reductions that are needed in British Columbia (and elsewhere in Canada) would occur. As new information becomes available, the Pembina Institute will update these recommended price levels to align them with the evolving understanding of what is needed to achieve deep reductions. Of particular note are the economic modelling studies currently being done by British Columbia and the WCI to better understand these issues.

Banking-acquired permits that are not needed in a compliance period and borrowing permits from future years are additional ways to limit the costs to companies in a cap and trade system. Because banking encourages early action and poses minimal threat to the environmental effectiveness of the cap and trade system, banking provisions can be effective. Due to the risk that the promised future reductions will not actually be achieved with borrowing mechanisms, we recommend borrowing in the cap and trade system only within three-year compliance periods.

[18] C. Demerse, "Carbon Pricing: Efficiently Stimulating Greenhouse Gas Emission Reductions," an excerpt from *Big Steps Forward: Recommendations for Budget 2008* (Drayton, AB: Pembina Institute, 2007), http://pubs.pembina.org/reports/GBC-CarbonPricing.pdf