

# **BC's Carbon Neutral Public Sector: Too Good to be True?**

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## **Executive Summary**

**The claim of carbon neutral has been challenged by research on the effectiveness of subsidy programs, such as carbon offsets. The BC government has nonetheless adopted carbon neutral as a requirement for public sector organizations. Because 25% of emissions in BC are not subject to the carbon tax, the carbon neutral requirement creates situations in which government ministries transfer taxpayer funds to profitable private companies for emissions reductions. We recommend BC abandon its goal of a carbon neutral public sector and instead extend the carbon tax to other emissions or disallow such emissions via regulation, just as it has done in the electricity sector.**

## **BC's Carbon Neutral Public Sector: Too Good to be True?**

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### **Issue**

“Carbon neutral” is an objective that some governments, organizations and individuals have adopted as a means of addressing the climate risk. It suggests that one can avoid contributing to the atmospheric build-up of greenhouse gases (GHGs) by paying someone else to reduce their emissions by an equivalent amount, called an “offset.”<sup>1</sup>

In 2008, the B.C. government decided that a carbon neutral public sector should be part of its GHG emissions reduction strategy and implemented legislative measures and policy directions to support this objective. As a first step, it adopted carbon neutral requirements for emissions directly related to civil servants and politicians travelling on public business. In 2010, the carbon neutrality requirement was extended to provincial public sector organizations (PSOs), which include core services of the provincial government as well as school districts, health authorities, post-secondary institutions, and crown corporations – in total, over 150 organizations with over 300,000 staff (B.C. MoE, 2009).

The *Greenhouse Gas Reduction Targets Act* lays out the framework and requirements for PSOs to become carbon neutral. Under the act, the *Carbon Neutral Government Regulation* requires PSOs to:

- pursue in-house actions to minimize GHG emissions each year,
- purchase, if necessary, an amount of carbon offsets equal to their remaining emissions, and
- report their progress in reducing emissions.

The B.C. government also extended its carbon neutral objective to municipal and regional governments by encouraging them to sign its Climate Action Charter. This requires local governments to commit to being carbon neutral by 2012 and in return they earn a 100% rebate of the carbon taxes they paid for municipal operations in the previous year (B.C. MCRD, 2007).

In 2008, the B.C. government created Pacific Carbon Trust (PCT), a crown corporation mandated to deliver B.C.-based GHG offsets by acting as a broker between offset providers and purchasers. While provincial PSOs are required to purchase all their offsets from PCT, local governments can buy offsets from any source (B.C. MoE, 2009; PCT, 2010). The *Emission Offsets Regulation* stipulates the steps that offset project proponents must take to be certified for sale to PCT. PCT currently sells offsets at \$25/tCO<sub>2</sub>e while it purchases them at confidential prices in a competitive bidding process.<sup>2</sup>

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<sup>1</sup> Since carbon dioxide is the most significant GHG, the term carbon neutrality is used instead of “GHG neutrality” and “carbon offset” instead of “GHG offset.” However, a stated policy goal of carbon neutrality usually includes other GHGs.

<sup>2</sup> tCO<sub>2</sub>e stands for “tonne of carbon dioxide equivalent,” a measure that enables addition of all forms of GHGs in terms of their global warming potential.

In a June 30, 2011 press release, the BC Ministry of Environment announced that the BC government had achieved carbon neutrality, noting that in addition to their own internal GHG-reducing investments, BC's PSOs spent \$18.2 million in 2010 to acquire offsets of 730,000 tCO<sub>2</sub>e (B.C. MoE, 2011).

As the B.C. government's policy thrust suggests, the carbon neutral concept is attractive for governments and indeed for many organizations, corporations, and individuals wishing to address the climate threat. However, concerns have been expressed that offsets are unlikely to reduce emissions to the extent claimed by those involved in the offset business. In this policy brief, we explain this concern and the results of independent research it has stimulated. We then discuss the implications for BC's carbon neutral policy thrust for the public sector and conclude with recommended changes.

## Analysis

Conceptually, carbon neutrality could require that emissions of GHGs into the atmosphere were offset by the extraction of GHGs from the atmosphere and their permanent sequestration. For example, extracting fossil fuels from the earth's crust and combusting them so that CO<sub>2</sub> entered the atmosphere could be offset by a device that filtered air to capture CO<sub>2</sub> (or just carbon) and then injected it permanently back into the earth's crust, perhaps in a saline aquifer or a depleted oil reservoir. This permanent extraction of carbon from the atmosphere would offset the new carbon entering the atmosphere, and thus the emitting entity would be carbon neutral.<sup>3</sup>

In current climate policy initiatives, however, the concept of carbon neutrality is defined differently. An offset need not extract emissions from the atmosphere and sequester them. Instead, all it needs do is prevent emissions that would otherwise have occurred. This definition of an offset shifts the analysis from one of strict physical measurement (carbon emitted, carbon extracted) to one of forecasting. One must forecast what emissions would have been in future and then estimate whether an offset payment reduces emissions from what they "otherwise would have been" – in other words, the emissions reduction is "additional" to reductions that would have happened naturally.

Because we cannot rerun history, we can never be certain – once the offset payment has occurred – what emissions would have been in its absence. The best we can do is to estimate (forecast) what would have occurred without the offset payment.<sup>4</sup>

One approach to estimating the additionality of offsets relies on detailed financial analysis of a given project – say to convert the heat source in a commercial greenhouse from natural gas to biomass. If this investment is uneconomic at current (and perhaps forecasted) energy prices, then it is assumed that it would not have occurred, and that an offset payment that seems to cause it to occur is therefore additional. This is the method used by companies, like PCT, involved in brokering offsets. They evaluate the pre-investment economics of projects, like fuel switching, and then monitor to ensure the projects that receive an offset payment are undertaken and operated as promised.

There is, however, criticism of this approach to estimating additionality, especially from economists. In particular, economic research of subsidy policies – which is what offsets are – has revealed two problems. The first is called, "adverse selection." When a subsidy is offered, even those who do not

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<sup>3</sup> We already have technological options for doing this, even on a massive scale. Trees extract carbon from the atmosphere. Their wood can be gasified (perhaps to produce electricity) with the resulting CO<sub>2</sub> being captured and sequestered underground. Those emitting GHGs elsewhere would pay the costs of this carbon extraction process and thus receive an offset. If their total offsets equalled their total emissions, they would be carbon neutral in a true physical sense.

<sup>4</sup> Economists call this future state that never occurs the "counterfactual." Its estimation (a forecast) is a common issue in estimating the effects of economic policies because human economies cannot readily be subjected to controlled experiments.

need it will vie for it, meaning that a certain percentage of subsidy recipients may be “free-riders.” These could be firms who were intending to switch to lower-GHG fuels because, in their particular case, this fuel switch was already profitable. In the language of offsets, this would be an example of “non-additionality.”

Offset brokers claim they prevent free-riders by requiring financial details showing that the investment is uneconomic, and thus would not have occurred without the offset payment. This “verification” of the offset is assumed sufficient to guarantee that it is additional. However, this is where the second problem appears, called “asymmetric information.” The entity that is contemplating the fuel switching investment has detailed economic information, some of which it may be able to withhold from the offset broker – indicating that a subsidy is needed when in fact it is not. Thus, even though detailed analyses of offset-subsidized investments “verify” that they are additional, this may not always be the case. Past studies by economists of subsidies have shown asymmetric information to be a problem.

How can we know if there are a lot of free-riders with a subsidy program like offsets? To get at this problem, economists and policy researchers have looked for situations in which past subsidy payments occurred in some jurisdictions but not others. Situations like this are referred to as “quasi-experiments,” in which one jurisdiction acts as a crude experimental “control” for estimating the incremental effect (additionality) of the subsidy program on the recipient jurisdiction (Pattanayak et al., 2010). In quasi-experiments, economists use statistical techniques to try to detect a predicted difference between the jurisdictions that applied subsidies and those that did not. If a subsidy was intended to increase energy efficiency or cause interfuel substitution, this should be statistically detectable in comparing the two jurisdictions.

Unfortunately, the quasi-experiment approach is not perfect for estimating the effects of subsidies like offsets because past subsidy programs are never identical to current programs. Perhaps none of the past subsidy programs applied to investments that are currently eligible for carbon offsets. Perhaps contemporary offset programs have stricter eligibility criteria for subsidy (offset) recipients. Nonetheless, many economists have a greater faith in what quasi-experimental research might show – even if it requires the application of results from one type of investments to very different types of investments – simply because the past evidence for the important roles of asymmetric information and adverse selection has been so strong.

Around the world, the following activities have been eligible for offsets:

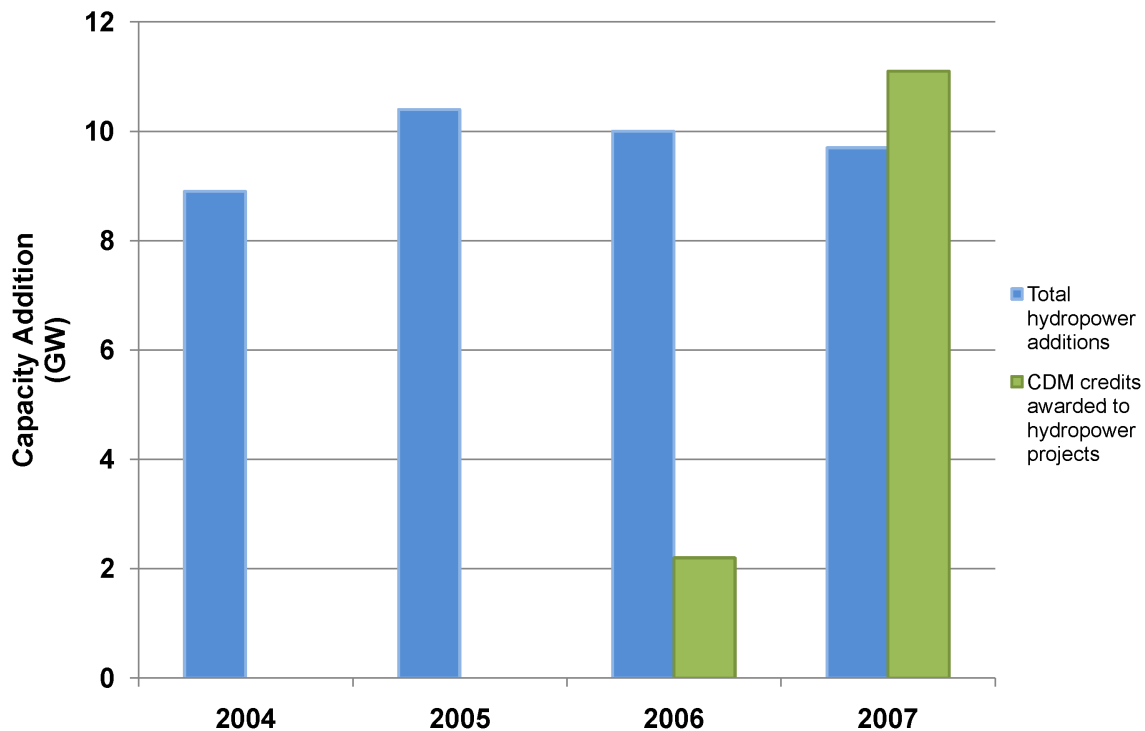
- increasing energy efficiency to reduce fossil fuel combustion,
- fuel switching from fossil fuels to renewable energy,
- changing agricultural practices to sequester carbon in soils or reduce animal-related emissions (tillage techniques, manure management, livestock feed),
- afforestation and forest-land conservation to sequester carbon in biomass,
- industrial-scale CO<sub>2</sub> capture and geological storage, and
- preventing or capturing various GHG emissions from landfills, natural gas pipelines, cement and aluminium plants, and other industrial and urban sources.

According to B.C.’s PCT, fuel switching has been the most important type of offset thus far, although there have also been subsidies for energy efficiency, afforestation, and emissions capture or prevention.

In the past, energy utilities in North America have run subsidy programs to foster fuel switching. However, we are not aware of a quasi-experiment focused on such programs. We are, however, aware of

research on the role of the Clean Development Mechanism<sup>5</sup> in funding “verified” renewables offsets in developing countries. A great number of renewable energy investments in China have recently been financed via this offset mechanism. In a time-series analysis, Victor and Wara (2008) recorded historical investments in hydropower in China in order to estimate the effect of offset funding from the Clean Development Mechanism, which increased dramatically in 2006 and 2007. Figure 1, covering 2004 to 2007, suggests that offset payments had little effect on the general trend of investment in hydropower in China – new hydropower supply has remained steady at nine to ten gigawatts per year. This suggests that little if any of the offsets were additional and that carbon neutrality was not achieved by those who may have claimed otherwise.

**Figure 1: Offset-funded hydropower in China**



Source: M. Wara, personal communication, 2008

Energy utilities in North America, especially electric utilities have also run subsidy programs for energy efficiency. In the period 1985 to 2005, US utilities spent over \$20 billion to subsidize energy efficiency by firms and households, while Canada spent over \$3 billion. As noted earlier, these subsidies are the same as offset payments in that their intent was to induce an entity to invest differently than it would have otherwise. Data from jurisdictions that had little or no subsidies for energy efficiency provide a comparison for estimating the actual effect of the efficiency subsidies. Quasi-experimental research tends to indicate that while efficiency subsidies do have an effect, this is usually substantially less than presumed by the pre-investment forecasts made by the utilities that run such efficiency programs (Arimura et al., 2009, Kaufman and Palmer, 2010; Rivers and Jaccard, 2011). Generally, this is because the utilities tend to under-estimate the percentage of subsidy recipients who receive funds for efficiency investments they would have made anyway – the adverse selection (free-rider) problem. Indeed,

<sup>5</sup> The Clean Development Mechanism was created under the Kyoto Protocol for GHG reduction in 1997.

hindsight quasi-experimental research on various types of subsidies has consistently estimated significant free ridership rates, as indicated by the survey of studies in Table 1.

**Table 1: Estimates of free-ridership associated with energy efficiency subsidies**

Technology	Source	Free-ridership
Furnace	Malm (1996)	89%
Refrigerator	Train and Atherton (1995)	36%
Air conditioner	Train and Atherton (1995)	66%
Building shell retrofit	Grosche and Vance (2009)	50%
Electric utility DSM programs – various	Loughran and Kulick (2004)	50-90%
Hybrid vehicles	Chandra et al. (2009)	74%

Source: Authors’ compilation

These examples – from subsidies for fuel switching to renewable energy and investments in energy efficiency – illustrate the major problem facing carbon neutrality and offsets as a policy tool for effecting change.<sup>6</sup> Because we cannot be sure how a given firm or household would have acted in the absence of an offset payment, we equally cannot be sure that paying for offsets will result in carbon neutrality. Indeed, research on past subsidy programs, by independent researchers who do not have a financial stake in any particular outcome, indicates that free-ridership rates may be very high, which in turn means that offset programs will likely fall far short of achieving carbon neutrality.

From a policy perspective, this evidence creates a major challenge. For governments, businesses and individuals seeking to shift society to a low-GHG emissions path, the carbon neutral concept is attractive. Even though they still produce emissions, offsets allow entities to present themselves as no longer contributing to the problem. It is a wonderful marketing tool for businesses too. But, because the independent analysis of free-ridership suggests that these emissions reductions could be substantially less than claimed, aggregate emissions will not fall as predicted and emissions reduction targets will not be achieved. At the same time, claims of carbon neutrality will most likely be false, while being impossible to prove on an individual basis. Such an eventuality will be knowable only over time as emission reduction targets are not met.

Finally, in addition to the adverse selection and asymmetric information problems that face the concept of carbon neutral, the requirement that only BC’s public sector must be carbon neutral creates an additional problem in terms of both economic efficiency and equity. First, BC’s PSOs must pay the carbon tax on all their emissions, at \$25/tCO<sub>2</sub>e in 2011. Second, they must also purchase offsets from PCT for all of these emissions at an additional cost of \$25/tCO<sub>2</sub>e. This means they face an effective emissions price of \$50/tCO<sub>2</sub>e while everyone else paying the carbon tax in BC pays \$25/tCO<sub>2</sub>e, or a \$0 for the 25% of emissions that are still exempt from the carbon tax. It is economically inefficient to have

<sup>6</sup> Other research, showing similar problems, in subsidies to change agricultural tilling practices and to conserve forest land, are available from the authors.

emitters of GHGs face different costs for their emissions, something the BC carbon tax was designed to avoid – by levelling the same charge for all GHG emissions in the province.

At the same time, because the BC carbon tax currently only applies to about 75% of GHG emissions in the province, some emissions from profitable private firms are not yet subject to the carbon tax, even though they easily could be. These emissions are thus potentially eligible for offset subsidies. This would mean that money from BC taxpayers that is normally intended for schools, hospitals, social programs and other public services would be directed to paying not only the carbon tax (like other BC firms and households), but also this same amount again to the PCT so that it might transfer these funds to private companies whose investments in GHG reduction may or may not be additional.

This scenario was recently confirmed with the release of information by the PCT that it had purchased offsets from EnCana, a profitable corporation that develops oil and gas, for GHG reductions that could have been achieved by regulating the company to make these reductions.<sup>7</sup>

### **Policy Recommendations**

Given these problems, in general, with the concept of carbon neutral and, specifically, with the goal of a carbon neutral public sector, we recommend the following.

1. Eliminate the requirement for a carbon neutral public sector and the policies that incentivize carbon neutral commitments by municipal and regional governments.
2. Develop policies that over the next five years either extend the carbon tax (or cap-and-trade system if adopted) to all provincial GHG emissions or, where this is not feasible, apply graduated regulations to emission sources that are not covered by emissions pricing.
3. Return all carbon tax revenues collected from public sector organizations to these same entities. The design of this recycling mechanism should, however, sustain the incentive for each individual entity to reduce emissions. This means that the recycling mechanism would not ensure “revenue neutrality” for each entity, but rather, like the recycling mechanism for carbon tax revenues collected from private firms and households (income tax cuts), would be distributed on some other basis, such as “per staff member” or “per dollar of total budget.”

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<sup>7</sup> See B. Simpson, “Taxing the public for a private good is a bad idea,” Vancouver Sun, July 4, 2011.

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