

Latest Developments in the Canadian Economic Accounts

Carbon Pricing in the Canadian System of Macroeconomic Accounts



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The following symbols are used in Statistics Canada publications:

- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- ^P preliminary
- ^r revised
- X suppressed to meet the confidentiality requirements of the *Statistics Act*
- ^E use with caution
- F too unreliable to be published
- * significantly different from reference category ($p < 0.05$)

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Carbon pricing schemes

The Pan-Canadian Framework on Clean Growth and Climate Change (the Pan-Canadian Framework) was introduced by the Government of Canada in 2016, in an effort to combat climate change (Environment and Climate Change Canada). Under the Framework, Canadian jurisdictions are required to price carbon emissions by 2018. Pricing is to be applied to a broad set of emission sources, so that Canada can meet its target for reductions in emissions of greenhouse gases (GHGs), and to support innovation and clean growth. As per the Framework, the price should start at a minimum of \$10 per tonne in 2018, and rise by \$10 per tonne each year, so that it reaches \$50 per tonne by 2022.

The purpose of carbon pricing is to reduce emissions by shifting consumption towards cleaner fuels. It is expected that carbon pricing will also stimulate investment in cleaner energy sources and help Canada meet its carbon emission reduction target. Provinces and territories can choose to price carbon by either implementing a carbon tax or adopting a cap-and-trade system.

A **carbon tax** is a fee applied to the purchase or use of fossil fuels. The chemical make-up of a particular fuel, particularly the amount of carbon in it, determines the amount of GHGs emitted when a unit of it is burned. As such, a flat tax rate charged on each tonne of carbon dioxide has to be translated to different tax rates for each type of fuel. In comparison to the cap-and-trade system, carbon taxes are relatively simple to administer, and can be tailored to cover a vast range of fossil fuel purchases. By definition, carbon taxes generate revenue and since the tax rate is set in advance, the cost imposed is easier to determine. The measurement of carbon taxes is conceptually straightforward, but can be challenging to separately identify when the carbon tax becomes imbedded in the final sale price, a practice that is occurring across a variety of jurisdictions.

A **cap-and-trade system** is a flexible market mechanism, where annual limits are placed on emissions of carbon dioxide. Emission units in the form of permits can be auctioned off, sold, or distributed free of charge by the government. Industries or agents that exceed their quota for emissions can purchase unused portions of quotas from others. An active market for tradeable permits means that they can be traded at market price. The total limits on emissions are lowered over time, to reduce overall levels of pollution. Cap-and-trade systems provide greater certainty about the level of emissions that can be achieved, due to their set limits. For example, companies that pollute at least 25,000 tonnes of GHGs per year have to have a permit equal to their emissions. The permits are issued in allowances where one allowance is equal to one tonne of carbon dioxide equivalent. Therefore if a firm emits 25,000 tonnes of carbon dioxide equivalent they would need to purchase 25,000 allowances. If they want to emit more emissions they would need to purchase them from a company or investor with unused allowances.

The ability to trade permits at market price entails efficiency. However, in comparison to carbon taxes, the system is complicated to administer. Provinces and territories that choose the cap-and-trade system must make a set number of GHG emission permits available to businesses. The number should decrease each year, to ensure that the reduction of emissions through to 2022 is at least equal to that achievable by imposing a direct price. In addition, the government must monitor emissions to ensure that companies are not exceeding their permitted levels.

Carbon pricing across provinces

Alberta, British Columbia, Manitoba and Quebec have had carbon pricing in place since before the introduction of the Framework. British Columbia and Manitoba have had carbon tax programs since 2008 and 2012, respectively; Alberta implemented its own in 2017, alongside the emissions trading system it had in place since 2007. Quebec had a carbon tax program between 2007 and 2012, after which it implemented a cap-and-trade system. Ontario implemented its cap-and-trade system in 2017.

Table 1
Carbon pricing across provinces

Province	Start Date	Carbon pricing system
Alberta	2017	Carbon tax
Alberta	2007	Cap-and-trade
British Columbia	2008	Carbon tax
Manitoba	2012	Carbon tax
Ontario	2017	Cap-and-trade
Quebec	2007 to 2012	Carbon tax
Quebec	2012	Cap-and-trade

Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from *Latest Developments in the Canadian Economic Accounts* (13-605-X).

Treatment of carbon pricing in the Canadian System of Macroeconomic Accounts

In the Canadian System of Macroeconomic Accounts, a **carbon tax** is generally treated as a surcharge on fuels, based on each tonne of CO₂ emission. As such, it represents a tax on products and will increase government revenue in the form of taxes. Comparatively, it will result in a corresponding increase in the market price of fuels consumed in final household consumption expenditure.

Cap-and-trade emissions permits are considered as taxes on production that should be recorded at the time the emissions occur (i.e., they should be recorded on an accrual basis). Since there is a timing difference between the time the payments are received by the government and the time the emissions occur, this implies the creation of a financial liability (debit) for government and a financial asset (credit) for the holder.

For example, assume that the government auctions off 25,000 allowances for \$10 per allowance. Assume that a large electricity producers purchases all 25,000 allowances. On the day of the auction there would be a financial transaction (no impact on GDP) between the government and the corporation. The government would receive cash of \$250,000 and set up an 'other liability' (prepaid permit). The firm would show a reduction in cash and an increase in 'other assets' (prepaid permit) of \$250,000.

Table 2
Permit auction

	Company		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars			
Cash	...	250,000	250,000	...
Other payable (Emissions permit)	...	...	...	250,000
Other receivable (Emissions permit)	250,000	...	...	...

... not applicable
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from *Latest Developments in the Canadian Economic Accounts* (13-605-X).

As the firm produces electricity (and emits carbon) they would gradually reduce the prepaid receivable. At the same time, the government would record a tax revenue and reduce the other payable (emissions permit). Assume the corporation emitted 20,000 tonnes of carbon in the first year. Within the macroeconomic accounts we would record \$200,000 in taxes on production payable by the corporation to the government. Consequently, the prepaid asset and liability will be reduced by the same amount.

Table 3
Accrual payment of taxes on production (Year one)

	Company		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars			
Other payable (Emissions permit)	...	...	...	50,000
Other receivable (Emissions permit)	50,000	...	...	...
Tax on production	...	200,000	200,000	...
... not applicable				
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from <i>Latest Developments in the Canadian Economic Accounts</i> (13-605-X).				

Assume that during the year there is a shortage of permits and the market price of the permit increases from \$10 per allowance to \$15. This increase in market price creates an unrealized gain, which will be shown as a non-produced non-financial asset (tradable emissions permit) on the balance sheet of the company that holds the permit, shown in the table below. Continuing with the example, if the company only used 20,000 of their 25,000 allowances, they have 5,000 remaining at a value of \$75,000 (5,000 × \$15 per allowance).

Table 4
Tradable emissions permit

	Company		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars			
Other payable (emissions permit)	...	...	...	50,000
Other receivable (emission permit)	50,000	...	...	...
Non-produced non-financial asset (tradable emissions permit)	25,000	...	...	...
... not applicable				
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from <i>Latest Developments in the Canadian Economic Accounts</i> (13-605-X).				

The company can then do one of two things; either they will continue to pollute and use the permit or they can sell their permit. If they choose to keep the permit and continue to pollute, the company cannot surpass the emissions quota of 5,000 allowances, even though the market value is greater than the original issue price, as this would be counterproductive to the objective of reducing (or capping) emissions. Once the emissions allowances have been reached, the company would need to write down the non-produced non-financial asset (tradable emissions permit) and remove from the balance sheet of the company.

Table 5
Accrual payment of taxes on production (Year 2)

	Company		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars			
Other payable (emissions permit)	...	...	...	0
Other receivable (emission permit)	0	...	...	...
Tax on production	...	50,000	50,000	...
Write down of the non-produced non-financial asset (tradable emissions permit)	...	25,000	...	...
... not applicable				
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from <i>Latest Developments in the Canadian Economic Accounts</i> (13-605-X).				

Alternatively, the company can decide to sell the remaining permits to another company, which will result in a sequence of transactions described in the table below. The sale of the remaining emissions allowances will trigger a cash transaction between company 1 and company 2 (current market value: 5,000 allowances × \$15 per allowance = \$75,000) shown in

line 1, followed by the sale of an existing asset, valued at \$50,000 shown in line 3. The value of the sale of the existing asset is equal to the emissions allowances remaining (5,000), valued at the original price of \$10 because the purchasing company still cannot surpass 5,000 emissions allowances even though the price has increased.

Table 6
Tradable emission permits between companies

	Company 1		Company 2		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars					
Cash	75,000	...	...	75,000	...	...
Other payable (emissions permit)	...	...	...	...	...	50,000
Other receivable (emission permit)	...	50,000	50,000	...	...	...
Non-produced non-financial asset	...	25,000	25,000	...	...	...
... not applicable						
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from <i>Latest Developments in the Canadian Economic Accounts</i> (13-605-X).						

Assuming company 2 uses the remaining allowances, they will be subject to the taxes on production submitted to the government shown in line 3. If company 2 does not immediately use the emissions allowances, they would show a non-produced non-financial asset on their balance sheet as shown in line 4.

Assume company 2 uses the remaining allowances. The Canadian System of Macroeconomic Accounts would record this as taxes on production submitted to the government equal to the issue price of the permit (\$50,000). In addition, the company would record an additional capital loss equivalent to the value of the non-produced non-financial asset (\$25,000). They would then remove the non-produced non-financial asset from their balance sheet.

Table 7
Accrual payment of taxes on production

	Company 1		Company 2		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars					
Other payable (emissions permit)	50,000
Other receivable (emission permit)	50,000	...	...
Taxes on production	50,000	50,000	...
Write down of the non-produced non-financial asset (tradable emissions permit)	25,000	...	...
... not applicable						
Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from <i>Latest Developments in the Canadian Economic Accounts</i> (13-605-X).						

In the releases of the Canadian System of Macroeconomic Accounts, Statistics Canada has decided to make the following simplifying assumption:

- The carbon emissions will occur in the same period that the permits were purchased from the government.

Using our example, this simplifying assumption would result in the following treatment.

Table 8
Simplified treatment in the CSMA

	Company		Government	
	Plus (+)	Minus (-)	Plus (+)	Minus (-)
	dollars			
Cash	...	250,000	250,000	...
Taxes on production	...	250,000	250,000	...

... not applicable

Source: Statistics Canada, "Carbon Pricing in the Canadian System of Macroeconomic Accounts" from *Latest Developments in the Canadian Economic Accounts* (13-605-X).

The simplifying assumption made above will be re-visited as the cap-and-trade market develops.