

CONSTRUCTION AND CARBON: THE IMPACT OF CLIMATE POLICY ON BUILDING IN CANADA IN 2025

May 2019

About Smart Prosperity Institute

Smart Prosperity Institute (formerly Sustainable Prosperity) is a national research network and policy think tank based at the University of Ottawa. We deliver world-class research and work with public and private partners – all to advance practical policies and market solutions for a stronger, cleaner economy. **institute.smartprosperity.ca**

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KEY FINDINGS

- The construction industry is one of the big beneficiaries of higher carbon prices over the next few years. By 2025, higher carbon prices will spur a wave of investment in new construction, generating jobs and income.
- Income in the construction industry is over \$2.5 billion higher in 2025 with aggressive carbon pricing than with the status quo.
- An additional 19,000 jobs in construction would be created due to higher carbon prices, and another 20,500 net new jobs would be created in other sectors of the economy.
- Saskatchewan sees the highest proportion of new jobs created in construction from high carbon prices, followed by Quebec, Ontario, New Brunswick, Alberta, and British Columbia.

- Stringent carbon prices create an additional \$12.5 billion in business investment in 2025 and \$5.7 billion in increased household spending, led by consumer spending (on things such as new home construction and retrofits). This would be followed by renewable energy, carbon capture and storage, commercial construction, and building efficiency projects.
- Overall, the major economic impact of higher carbon prices is to shift economic activity, which is consistent with other studies. The construction industry is a net beneficiary of these shifts in the medium-term.



OVERVIEW

Canada's Building Trades Union (CBTU) approached Smart Prosperity Institute (SPI) with a simple question: "How will carbon taxation impact our industry and our members?" We share the CBTU's interest in the effect of environmental policy on economic performance.

It is vital that Canada creates jobs and prosperity for Canadians while also meeting our Paris Agreement commitments (at a minimum) on climate change. Governments need to smartly design environmental policies that are effective, affordable and fair, and that minimize damage to the economy. Beyond just damage control, well-designed policies create economic opportunities for Canadian workers and businesses, not just limited to the \$26 trillion global opportunity in clean growth¹.

The question of the economic impact of higher carbon prices on the construction sector is an important one, given that the sector represents 14% of Canada's GDP, using the North American Industry Classification System (NAICS) definition of construction. Furthermore, the sector employed over 1.4 million Canadians in 2018 and has a significant presence in every province and region in Canada. Given the economic importance of construction and the number of families that rely on construction for jobs and prosperity, governments must be mindful of the impacts any policy has on the sector.

In this study, we take the existing suite of federal and provincial carbon policies, including carbon pricing (cap-andtrade and carbon tax) and increase their stringency over time, allowing Canada to meet our Paris Agreement commitment of a 30% reduction in greenhouse gas (GHG) emissions by 2030 relative to 2005 levels.

¹ Elgie and Moffatt (2018). How to Grow the Economy While Also Protecting the Environment. https://institute.smartprosperity.ca/content/how-grow-economy-while-also-protecting-environment We find that while these policies do cause the Canadian economy in 2025 to be slightly smaller than it otherwise would have been (though still growing), these policies create over \$2 billion in additional economic activity for the construction sector, along with an additional 19,000 construction industry jobs.



Aggressive Carbon Prices and the Model

In order to forecast the economic impact of future carbon prices, we use an economic and energy model of the Canadian economy known as gTech². The model allows us to forecast changes in investment and the economy driven by both market factors such as changes in prices of technologies, and policy factors such as carbon prices. In this paper, we examine two scenarios:

- 1. The base case: Carbon policies (cap-and-trade, carbon tax) at both the federal and provincial levels, as they existed in 2018. This includes policies such as the B.C. carbon tax, which has existed for over a decade. No future changes to policies.
- 2. The aggressive case: We take the existing suite of carbon policies at the federal and provincial levels and increase their stringency over time, just enough that Canada hits the Paris Agreement commitment of a 30% reduction in GHG emissions by 2030 relative to 2005 levels.

We can estimate the impact of more aggressive carbon prices on employment, output (GDP) and investment in 2025 relative to a baseline where these policies do not exist. In order to put the numbers into context, we can compare them to the levels that existed in 2015.

We chose a medium-term outlook as our examination period, specifically the year 2025. This mid-term point is close enough to today that we can be confident in our modelling results, and is a reasonable 'check-in' point for governments to adjust their carbon prices and policies as circumstances change and evidence on their effects emerges.

² gTech is a computable general equilibrium model, which is used extensively by governments to assess energy and carbon policy. More information on gTech can be found at https://www.naviusresearch.com/gtech/.



THE ECONOMY

Impact of Higher Carbon Prices on the Economy

The model allows us to forecast the economic size of six different sectors, measured in GDP, in both the case with aggressive carbon policy and our base case of existing policies. We then compare the two in absolute terms ("Gain/Loss", which measures how much the size of the sector gains or loses from each scenario) and in relative terms ("as a %"). For reference, we also include the size of each sector in 2015, along with the total size of the economy³.

Our results show that, in either scenario, GDP rises from over 2.3 trillion in 2015 to over 2.8 trillion in 2025 in 2025 dollars. However, in our world with aggressive pricing, GDP is 2.9 billion lower (in 2025 dollars) than it otherwise would be, a net loss of 0.1%. Although the net economic effect of our suite of aggressive policies is close to zero, the impact on GDP differs by sectors. The resources and transportation sectors see their output lowered thanks to aggressive policy (though they are still producing significantly more than they were in 2015). The service sector sees the highest increase in output, followed by the manufacturing and construction sectors. The effect of our higher carbon prices do little to alter overall the net size of the economy, but they do shift economic activity from sectors to others, with the construction sector being one of the larger beneficiaries.

This forecast lines up well with the experience in British Columbia, which has had carbon pricing in place for over a decade. In a recent paper, Azevedo, Wolff, and Yamazaki (2019) found that B.C.'s carbon tax had no net effect on jobs or the economy in the province, but it did shift jobs and economy activity from some industries to others. Similar to our forecast, they found that the service sector was the largest beneficiary of carbon pricing.

Interestingly, there are some differences between which industries see increased economic activity and which see increased employment.

³ All figures are presented in 2025 dollars, to account for inflation.

Impact of Higher Carbon Prices on the Economy						
Income GDP (Basic prices; billion 2025\$)	2015	2025 Base	2025 Aggressive	Gain/Loss⁴	As a %	
Services	1,585.4	1,912.4	1,923.0	10.6	0.55%	
Manufacturing	257.4	296.6	299.2	2.6	0.86%	
Construction	173.0	210.0	212.4	2.5	1.17%	
Utilities	40.0	42.4	43.1	0.7	1.53%	
Transportation	78.9	106.5	98.4	-8.1	-7.61%	
Resources	217.4	315.4	304.4	-11.0	-3.49%	
Grand Total	2,352.0	2,883.4	2,880.5	-2.9	-0.10%	

JOBS

Impact of Higher Carbon Policies on Jobs

In 2025, in a world using our existing carbon policies, there are roughly 20,347,000 people employed in Canada, an increase of just over 2 million from 2015 levels. By raising the stringency of carbon prices, the number of jobs in Canada increases by an additional 39,500. In an economy with over 20 million people working, this is a relatively modest increase in employment, but it is an increase.

Employment does not increase in all sectors, however. Resources, transportation, and manufacturing see small declines in employment relative to the world without aggressive carbon pricing (they still, however, all see increases in the number of jobs relative to 2015). The service sector experiences a significant gain in employment, at 55,000 net new jobs due to higher carbon prices, with construction gaining an additional 19,000 positions. The total income of the construction sector is \$2.5 billion higher in 2025 with aggressive carbon pricing than with the moderate policies of 2018.

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⁴ Small discrepancies may appear in the numbers due to rounding.

Impact of Higher Carbon Prices on Jobs						
Number of Jobs (thousands)	2015	2025 Base	2025 Aggressive	Gain/Loss	As a %	
Services	14000.1	15620.3	15675.3	55.0	0.35%	
Construction	1280.6	1436.1	1455.1	19.0	1.32%	
Utilities	94.0	94.3	94.0	-0.3	-0.32%	
Manufacturing	1775.4	1925.8	1919.5	-6.3	-0.33%	
Resources	558.0	629.4	615.7	-13.7	-2.18%	
Transportation	568.0	641.4	627.3	-14.2	-2.21%	
Grand Total	18276.1	20347.4	20386.9	39.5	0.19%	

The results for manufacturing are particularly noteworthy, as the sector gains \$1.9 billion in economic activity but sees an employment decline of 6,300 jobs relative to our base case (in either scenario, the sector sees an employment increase of over 140,000 jobs relative to 2015). Aggressive carbon prices cause an increase in investment in new machinery and equipment, to make plants more efficient. This increase in investment in the latest technology also increases productivity, so fewer workers are needed than otherwise would be, due to automation.

This overall forecasting of job shifting is similar to the findings of Azevedo, Wolff, and Yamazaki (2019) on the sectoral impacts of carbon pricing in British Columbia. Unlike in our forecast, they find a small decrease in construction jobs during this period in B.C., which they attribute to the Alberta oil boom shifting construction employment from B.C. to Alberta. Such provincial shifting is likely to occur under our higher carbon price system as well, though the net effect of this on construction jobs in Canada overall is zero. Fortunately, the model allows us to forecast the impact of these policies on construction jobs by province.

Impact of Higher Carbon Policies on Construction Jobs by Province

Although our suite of accelerated carbon price increases creates new jobs in the construction industry (relative to the base case), these jobs are not spread evenly across the country. Not surprisingly, over half of the new jobs created are in the two biggest provinces, Ontario and Quebec. Although B.C. has a larger population than Alberta, Alberta sees nearly twice as many new construction jobs from our suite of policies. Surprisingly, in relative terms the best performing province for construction employment increases is Saskatchewan; without our higher carbon prices, the province would see a slight decline in construction jobs from 2015 levels, but in a scenario with more aggressive carbon policies, it instead experiences a slight gain.

The obvious question is, "Why are some provinces gaining and others are not"? We can better answer that question by examining:

- 1. Which industries are seeing increases in investment since those new investments drive construction activity?
- 2. What types of investments are companies and households making?



Impact of Higher Carbon Policies on Construction Jobs by Province

Number of Jobs (thousands)	2015	2025 Base	2025 Aggressive	Gain/Loss	As a %
Saskatchewan	50.2	48.6	50.5	1.8	3.74%
Quebec	234.7	257.8	262.4	4.7	1.81%
Ontario	456.5	503.3	511.6	8.3	1.65%
New Brunswick	27.9	31.1	31.5	0.3	0.99%
Alberta	236.9	297.3	300.1	2.8	0.94%
British Colombia	175.3	187.9	189.3	1.5	0.79%
Newfoundland	17.0	21.7	21.8	0.1	0.57%
Manitoba	42.9	44.7	44.6	-0.1	-0.23%
Territories	5.7	6.8	6.7	0.0	-0.36%
Prince Edward Island	4.8	5.2	5.2	0.0	-0.71%
Nova Scotia	28.8	31.8	31.5	-0.3	-1.09%
Grand Total	1,280.6	1,436.1	1,455.1	19.0	1.32%



INVESTMENT

Impact of Higher Carbon Policies on Investment by Sector

We can model the net effect of aggressive carbon price increases on investment in a suite of industries. We have listed the industries in terms of which gain the most from carbon price hikes, relative to the baseline. Not surprisingly, aggressive carbon pricing has a significant and positive impact on investment, as companies respond to the new environment by making investments to reduce their carbon footprint, in order to reduce their costs. Overall, business investment is \$12.2 billion higher with our higher carbon prices. Investment rises in 10 industries but falls in five others.

The construction industry experiences an extra \$1.1 billion in investment from accelerated carbon pricing, on top of the \$6 billion increase in investment it can expect to experience from 2015 to 2025, for reasons unrelated to carbon policy. In percentage terms, the 4.84% increase in investment in construction ranks only behind "non-metallic minerals", "paper" and "utilities". There are two factors driving the increases in investment in these sectors. The first is the increase in demand for the services that these industries provide, which is driving much of the increase in the construction and utilities sector. The second factor is investments that drive down the carbon footprint of that sector, which is what appears to be driving the increase in the paper industry.

The construction industry experiences an extra \$1.1 billion in investment from accelerated carbon pricing.

Impact of Higher Carbon Policies on Investment by Sector

Investment (billion 2025\$)	2015	2025 Base	2025 Aggressive	Gain/Loss	As a %
Utilities	11.7	14.0	22.2	8.2	58.31%
Service	218.4	257.9	264.2	6.3	2.44%
Oil sands	19.0	42.1	43.7	1.6	3.80%
Other manufacturing	38.4	39.5	40.8	1.3	3.31%
Construction	17.6	23.6	24.7	1.1	4.84%
Non-metallic minerals	1.8	2.1	3.1	1.0	47.52%
Paper	2.1	2.0	2.4	0.5	23.13%
Metal	3.2	3.6	3.7	0.1	2.84%
Refining	3.6	2.1	2.2	0.1	2.99%
Resource	5.1	5.3	5.3	0.0	0.57%
Mining	19.4	19.5	19.3	-0.3	-1.41%
Support activities for mining and oil and gas extraction	5.6	9.0	8.6	-0.4	-4.02%
Chemical industries	9.9	8.4	7.8	-0.5	-6.39%
Transportation	20.4	27.6	25.5	-2.1	-7.61%
Oil and gas	49.7	56.8	52.1	-4.7	-8.22%
Grand Total	425.9	513.5	525.7	12.2	2.38%

These changes in investment help explain job creation by province. In absolute terms, excluding the construction industry, the biggest investments relative to baseline are made by the utilities, service, oil sands, manufacturing, and non-metallic minerals (including potash) industries. Provinces with significant footprints in these industries will tend to create high levels of construction jobs.

Not surprisingly, two of the sectors that see declines are transportation and oil and gas, which are driven by reduced demand for their services thanks to carbon pricing. More surprisingly is the increase in investment in the oil sands. Although under higher carbon prices we can expect reduced demand for oil, this is more than offset by the increased investments the sector will make in reducing their carbon footprint. We can see this in greater detail by examining the types of investments that businesses will be making.



Impact of Higher Carbon Policies on Business Investment by Type

Businesses invest \$12.5 billion more than they otherwise would have thanks to the aggressive carbon pricing. Not surprisingly, the biggest absolute increase is in the construction of renewable energy projects like wind and solar. In percentage terms, the biggest percentage increase in investment is in carbon capture and storage projects. Well over half of the dollar investment in these projects would be in Alberta, which helps explain the province's relatively strong performance in creating construction jobs.

Renewable energy projects and carbon capture and storage projects are not, however, the only construction investments that would be made in a scenario with an aggressive carbon policy. In our table, "investment unrelated to energy" is dominated by the construction of new buildings and other infrastructure, along with retrofits. The model sees a 1% increase in expenditure on these items, relative to baseline, due to the increased demand for energy efficient buildings. This also explains the doubling of investment, relative to baseline, in "building efficiency and electrification", which includes installation of new HVAC systems and other investments to make both existing and new buildings more energy and heat efficient.

Higher carbon prices also impact the investment decisions that households make.

Businesses invest \$12.5 billion more than they otherwise would have thanks to the aggressive carbon pricing.

Spending 2025 2025 2015 Gain/Loss As a % (billion 2025\$) Base Aggressive Renewable electricity 5.2 5.7 11.7 6.0 104.89% Carbon capture and storage 0.0 0.5 4.7 4.3 918.48% 323.2 376.1 379.8 0.99% Investment unrelated to energy 3.7 0.8 1.0 2.3 1.3 128.98% Building efficiency and electrification 0.5 41.07% Low GHG vehicles 0.0 1.2 1.6 Oil and gas fugitive controls 0.1 0.3 0.6 0.3 106.49% 0.9 0.3 51.41% Industrial electrification 0.4 0.6 283.41% Waste (landfills and manure) 0.0 0.0 0.2 0.1 0.1 0.1 0.2 0.1 88.72% Industrial biomass 0.1 0.2 0.0 29.13% **Biofuels manufacturing** 0.6 Public transit 0.5 0.5 0.5 0.0 -8.96% 104.2 Rest of energy investment 137.7 133.6 -4.1 -2.98% **Spending by Business Total** 435.2 523.8 536.3 12.5 2.39%

Impact of Higher Carbon Policies on Business Investment by Type

Impact of Higher Carbon Policies on Household Investment by Type

Here "investment unrelated to energy" relates to *all* consumer spending which is not "building efficiency and electrification", "low GHG vehicles" and "rest of energy investment". Our aggressive carbon prices cause consumer spending to grow by \$7.1 billion relative to baseline. The bulk of this is likely to come from new spending that households will make on new home construction and retrofits, in response to carbon pricing. As well, households will spend an additional \$700 million, relative to baseline, on energy efficiency such as the installation of new water heaters, in both new and existing homes.

Surprisingly, households spend less on low greenhouse gas (GHG) vehicles in 2025 with our carbon suite than they do without. There are a number of factors causing this, including increased use of transit and carpooling, along with lower prices for efficient vehicles through a shift in demand for these vehicles. (That is to say, although consumers are spending less in dollar terms that does not mean they are necessarily buying fewer vehicles). All of this is to show that carbon policies can impact the economy in surprising and often counterintuitive ways.

Our aggressive carbon prices cause consumer spending to grow by \$7.1 billion relative to baseline.

Impact of Higher Carbon Policies on Household Investment by Type						
Spending (billion 2025\$)	2015	2025 Base	2025 Aggressive	Gain/Loss	As a %	
Investment unrelated to energy	1,468.7	1,767.4	1,774.5	7.1	0.40%	
Building efficiency and electrification	2.1	2.5	3.2	0.7	29.39%	
Low GHG vehicles	0.0	2.3	1.8	-0.5	-21.28%	
Rest of energy investment	47.0	48.5	46.9	-1.6	-3.31%	
Spending by Households Total	1,517.8	1,820.7	1,826.4	5.7	0.31%	

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CONCLUSION

Continually increasing carbon prices will change the way we work, live and invest. Higher carbon prices both "price an externality" by putting a price on emissions and create incentives for households and businesses to reduce their carbon footprint. They also create markets for companies to create new, more efficient products. Although the net economic effect of carbon pricing is minimal, it does advantage some industries over others. Over the next few years, the construction sector is one of the "winners" of carbon pricing, as escalating carbon prices unleash a wave of business and household investment in construction. Higher carbon prices, if enacted, will create an additional 19,000 jobs and \$2.5 billion in economic activity for the construction sector. Higher carbon prices, if enacted, will create an additional 19,000 jobs and \$2.5 billion in economic activity for the construction sector.

ACKNOWLEDGEMENTS

The author would like to thank Dave Sawyer for modelling work and insightful comments. Smart Prosperity Institute (SPI) would like to thank Canada's Building Trades Unions (CBTU) for funding this project.

Research and writing were conducted by Mike P. Moffatt. Responsibility for the final product and its conclusions is Smart Prosperity Institute's alone, and should not be assigned to the reviewers or any external party. Review of the report does not necessarily mean endorsement, and any errors remain the author's responsibility.



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