SP | Sustainable Prosperity

Policy Brief January 2013

FOR A LOW CARBON ECONOMY

Carbon Exposed or Carbon Advantaged? Thinking About Competitiveness in Carbon-Constrained Markets[1]

By: Dave Sawyer, EnviroEconomics

Sustainable Prosperity
c/o University of Ottawa
555 King Edward Avenue
Ottawa, ON K1N 6N5
613-562-5800 x3342
www.sustainableprosperity.ca

Key Messages

- In the context of Ontario's membership in the Western Climate Initiative (WCI) and its ongoing commitment to climate change mitigation, the development of Ontario's carbon policy is generating a great deal of public discussion. One of the key points of debate relates to the impact of any policy regime on the province's economic competitiveness.
- This *Policy Brief* is intended to contribute to that public debate by providing a new and innovative perspective on competitiveness. It is not intended to be – and should not be read as – an analysis of current policy, or of policy options that might be considered by the provincial government.
- The broader competitiveness framework offered in this *Brief* points to some important conclusions on the potential impacts of carbon policy across the entire economy; and therefore provides some policy-relevant insights for government and other stakeholders to consider.
- Traditionally, competitiveness in the context of carbon pricing is narrowly construed as the impacts on emission-intensive and trade-exposed (EITE) sectors. With Ontario's largely service and manufacturing-sector based economy, limiting competitiveness analysis to only EITE's would miss 85% of Ontario's economy, whose competitiveness may also be affected by carbon pricing.
- Also often presumed is that carbon constraints will always lead to negative competitiveness impacts. But this assumption ignores that jurisdictions are developing differentiated carbon

1 Sustainable Prosperity would like to thank Dr. Brandon Schaufele of the University of Ottawa and Gerald Butts, Former President and CEO of WWF Canada for their thoughtful comments and contributions to this *Brief*. Responsibility for the final product and its conclusions is Sustainable Prosperity's alone, and should not be assigned to any reviewer or other external party.

policies that lead to differentiated competitiveness impacts given relative emission intensities. As a result, some of Ontario's sectors will be carbon-exposed while others will hold a carbon advantage relative to competitors.

- This *Brief* uses a four-part framework to understand the economic impacts of a carbon constraint, as imposed by an economy-wide carbon price of $40 per tonne in 2030. The results from the modelling are summarized by each factor below. Each factor is explained in greater detail in the *Brief*.
  - **Ability to Produce in Carbon-Constrained Markets: composition effects.** The indicator tracks how the composition of the economy may change with carbon costs. Ontario's average production level falls about 0.22% in 2030, though there is a high variance by sector. In terms of gross output, 90% of the economy shows an increased ability to earn, while only 10% of the economy is adversely affected.
  - **Ability to Earn in Carbon-Constrained Markets: scale effects.** A sector's "ability to earn" is measured as the change in Gross Domestic Product (GDP) of the sector before and after carbon pricing. Changes in scale indicate which sectors may be better or worse off with the policy. About 80% of the goods- and services-producing sectors (does not include the government sector) have a decreased ability to earn, while about 20% of Ontario's economy shows improved earning potential, including some sectors that would be considered EITE. The Chemicals sector is a good example, where the emission intensity of electricity used in Ontario is much lower than US competitors, thereby leading to an advantage.
  - **Low-Carbon Comparative Advantage in Ontario: revealed comparative advantage.** This indicator assesses the ability to compete in domestic markets. About 79% of the economy has an improved ability to compete, whereas 21% suffers a decreased competitive position.
  - **Low-Carbon Comparative Advantage in North America: relative trade balance.** This indicator provides a measure of overall competitiveness in carbon-constrained markets, and how the sector competes both domestically with imports and in North America through export markets. In terms of value of output, about 12% of the goods-traded sector is worse off whereas 78% is better off. Relative emission intensities between traded sectors in North America explains this difference.
- Although it was not the focus of this report, Ontario's economy may be carbon-advantaged when compared to other neighbouring jurisdictions. This is simply because its electricity sector is already largely decarbonized, as hydro, nuclear and renewables comprise most of the province's power generation capacity.

The Issue

The province of Ontario is taking steps to address climate change through a number of policy initiatives, including joining the Western Climate Initiative (WCI), which is developing a cap-and-trade system covering member states and provinces in Canada and the United States (US).[2] Economic competitiveness is one of the most important considerations when joining a multi-jurisdiction cap-and-trade system such as WCI. This *Policy Brief* presents new economic modelling of the Ontario economy to more fully explore the competitiveness issue. Two unique themes are brought forward to help policy-makers assess how Ontario might compete under carbon constraints:

1. **A broadened view of competiveness.** Competiveness impacts, both positive and negative, are assessed for Ontario's entire economy and not just the EITE industrial sectors; and,
2. **Carbon exposed or carbon advantaged?** Given differences in carbon policies, energy mixes and emission intensities relative to competitors, some of Ontario's sectors will be carbon exposed while others will hold a carbon advantage.

With a better understanding of positive and negative competitiveness impacts, and a broader view of who is affected, policy-makers can better understand carbon mitigation policy choices.

Competitiveness is a two way street, and policy needs to recognize that there are some sectors that are likely worse off with carbon policy while others may gain. With a better understanding of positive and negative competitiveness impacts, and a broader view of who is affected, policy-makers can better understand carbon mitigation policy choices. The impacts of carbon policy on competiveness are not always negative, and there are clear benefits associated with moving towards a low-carbon economy, beyond those related to climate change mitigation.

The Knowledge Base

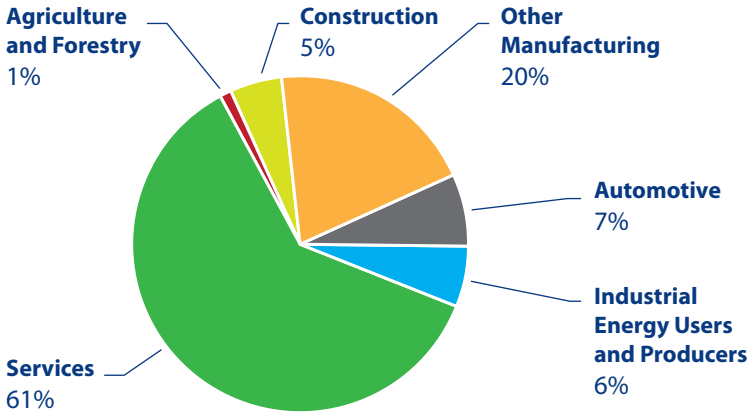
This *Policy Brief* develops a carbon mitigation competitiveness framework that follows from both the climate policy and trade liberalization literature. It uses the standard EITE approach to identify who might be carbon exposed. Economic modelling and a stylized scenario is then used to explore how trade between Ontario, the rest of Canada and the United States could be affected under carbon constraints. A competiveness framework is then applied seeking to first identify the ability of sectors in Ontario to continue to earn and produce under carbon pricing, and then the degree of carbon exposure or carbon advantage that may exist.

2 Ontario has recently stated that it will not join the cap-and-trade system until at least 2015.

Emission-Intensive and Trade-Exposed Industries or the Total Economy?

Prior to this report, the focus of competitiveness assessments related to climate policy in Canada has been on the large industrial energy users and producers, who are potentially EITE industries. For a province like Ontario, though, this focus ignores the vast majority of the economy. Notably, Ontario's automotive manufacturing sector in 2009 generated more economic output than all large industrial emitters combined, including electricity (see Figure 1). The remainder of the manufacturing sector in Ontario was another 3.5 times larger than the industrial energy users and producers. Focusing competitiveness assessments on just 6% of the total economy provides a very limited policy view.

Figure 1: Composition of Ontario's Economy, 2009



But are non-industrial sectors vulnerable to competitiveness impacts under carbon policy? The competitiveness and climate policy literature largely ignores "light" manufacturing.[3] While manufacturing industries have lower carbon costs due to lower energy needs, they are often highly competitive, trade-exposed and mobile.[4] Coupling both the importance of manufacturing to Ontario's economy and the possibility that small carbon costs could lead to large market impacts, there is a case to assess competitiveness impacts across the total economy.

Carbon Exposed or Carbon Advantaged?

A dominant theme in the carbon policy literature is a focus on the competitiveness losers. This theme culminated with the EITE tests put forward in H.R. 2454 *(American Clean Energy and Security Act* or Waxman-Markey) and showcased under the U.S. Interagency Report

3 For example see: National Round Table on the Environment and the Economy, 2011. *Parallel Paths: Canada-U.S. Climate Policy* Choices (Section 3.2), http://nrtee-trnee.ca/wp-content/uploads/2011/08/canada-us-report-eng.pdf.

4 Peters, Glen. 2008. *Do Industries with emission constraints have legitimate competitiveness concerns?* http://www.iioa.org/pdf/Intermediate-2008/Papers/6d3_Peters.pdf. Center for International Climate and Environmental Research-Oslo (CICERO). Working Paper.

on Competitiveness.[5] Typically, these tests identify the sectors likely at risk with GHG mitigation costs imposed, and who subsequently might qualify for special treatment or remediation to address adverse impacts.

But established tests for EITE presume unilateral climate policy, with carbon cost differentials leading to adverse competitiveness impacts both in domestic and foreign markets. But this is not the way carbon policy in North American is unfolding, with fragmented policies imposing differentiated carbon costs across jurisdictions and industry. Federal sector-by-sector performance regulations in the United States and Canada are under development, and existing policies, such as the Regional Greenhouse Gas Initiative, British Columbia's carbon tax and Alberta's *Specified Gas Emitter Regulation,* also impose costs. With WCI becoming operational in California and Quebec in 2013, portions of the Canadian and US economies will be under some form of carbon constraint. Regardless of the short-term carbon policy outlook in North America, it seems safe to assume that carbon costs will be differentiated by jurisdiction and province in 2020, with no movement to a uniform transparent carbon price covering all emissions.

With regions applying differentiated carbon policies, and hence costs, on industry, competitiveness impacts will not be uniform, nor will they be universally negative.

With regions applying differentiated carbon policies, and hence costs, on industry, competitiveness impacts will not be uniform, nor will they be universally negative. As with trade liberalization, there are gains from trade, with some winners and some losers. In the climate policy milieu, differential competitiveness outcomes are assured due to differing carbon policies, industry structures, energy mixes and emission profiles. Sectors and firms with lower emission intensities may be able to gain market advantage relative to their high emitting competitors.

Ontario's Emission Intensive and Trade Exposure: A Narrow Competitiveness View

The dominant assessment of competitiveness vulnerability flows from tests of EITE, which are designed with a very specific purpose in mind – to reduce the carbon cost burden of industrial and manufacturing sectors that might be at risk in domestic and foreign markets due to misaligned carbon costs. The leading EITE tests used by practitioners follow from H.R. 2454, where a sector's status as EITE under a forecast $40 carbon price (the rationale for this price is discussed in more detail in the following section) would be determined as follows:

5 Interagency. December 2, 2009. *The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries: An Interagency Report Responding to a Request from Senators Bayh, Specter, Stabenow, McCaskill, and Brown,* http://www.epa.gov/climatechange/economics/pdfs/InteragencyReport_Competitiveness-EmissionLeakage.pdf.

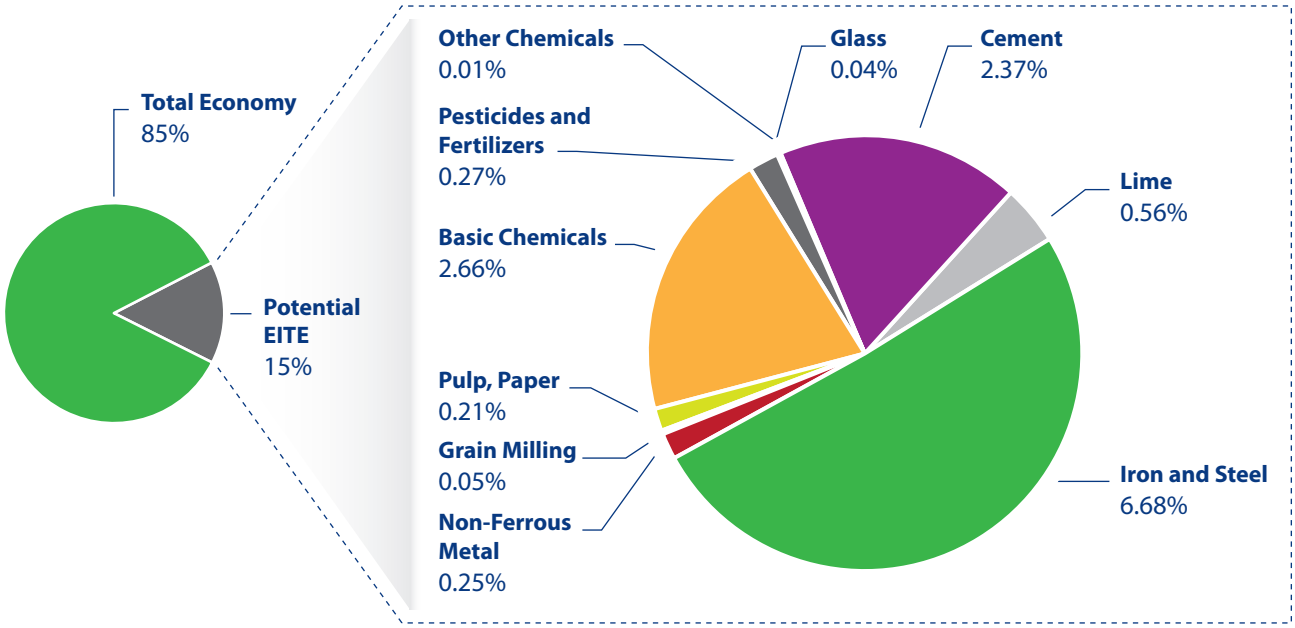
1. If the emissions intensity, defined as ($40/tonne[6] × emissions)/value of shipments, is equal to or greater than 5[7]; and,
2. If the trade intensity, defined as (total value of imports and exports)/(total value of shipments and imports), is equal to greater than 15%.

If both these tests are met, the sector is considered "EITE" and remedial treatment might be warranted. Remediation could include exemptions from the policy, free permit allocations to ease the transition, or border carbon adjustments applied against imports.

In application, the tests implicitly exclude a select few sectors that are presumed to have the ability to pass on carbon costs to consumers. As such, energy producers and energy transformers tend to be excluded, notably electricity and petroleum refining.[8] Instead the EITE tests focus on industrial energy users such as iron and steel, cement and manufacturing that are covered by the policy. In reality, most sectors are able to pass on extra costs to consumers.

Adopting the EITE eligibility criteria to Ontario (no energy producers or transformers) coupled with the emissions coverage consistent with WCI coverage rules applied to Ontario[9],

Figure 2: Ontario's Industrial Emissions, 2008



6 H.R. 2454 uses $20/tonne as a proxy for a sector's compliance cost. Since it is a fixed value, it is not useful to compare costs across sectors. Or if compliance costs are higher or lower, it would not measure the actual impact.

7 There is also an energy intensity test, but data limitations make it hard to use. Plus, work has shown that it is the emission intensity that indicates exposure and not energy intensity. See: Bramley, Matthew, Partington, P. J. and Sawyer, Dave, 2009. *Linking national cap-and-trade systems in North America: clean energy and climate action: a North American collaboration,* Pembina and IISD. http://www.iisd.org/pdf/2009/linking_nat_cap_north_america.pdf.

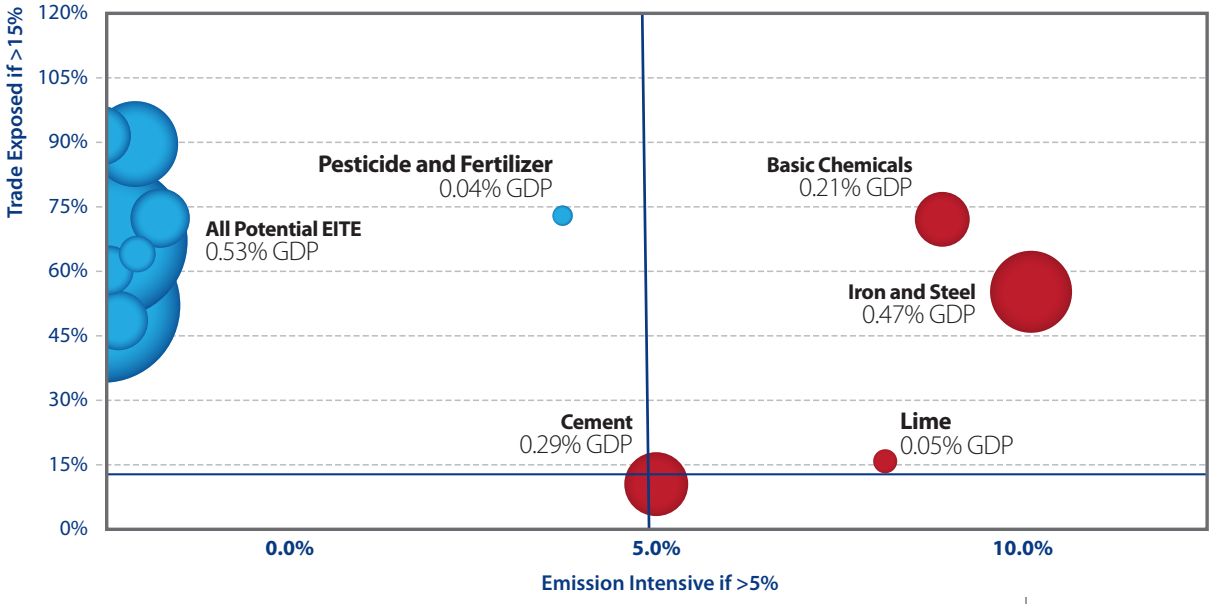
8 Ibid.

9 Facilities emitting more than the 25,000-metric-ton CO_2e threshold per year. See: Western Climate Initiative, 2010. *Design for the WCI Regional Program,* http://westernclimateinitiative.org/component/remository/func-startdown/282/.

indicates that the potential for EITE exposure was about 29 Mt in 2008, or about 15% of Ontario's 190 Mt of total emissions (Figure 2). Note that the vast majority of Ontario's manufacturing sector is excluded under the H.R. 2454 EITE tests given that the energy makes up a small fraction of total costs. This omission is addressed in the four part framework presented in the next section.

Applying the H.R. 2454 EITE tests to the 29 Mt of industrial emissions that have the potential to be EITE and would be covered under the WCI indicates that about 1% of Ontario's total GDP would be at risk with WCI carbon pricing, or about 5.9% of the goods producing GDP. Four sectors at the four-digit NAICS level are likely EITE, including iron and steel, basic chemicals, lime and cement, as shown in Figure 3.

Figure 3: EITE Exposure as a share of Ontario's GDP: 1% of GDP "Carbon Exposed"



Competitiveness and Succeeding in Carbon Constrained Markets

The focus on EITE ignores large parts of the total economy and how an economy might perform in carbon-constrained markets relative to its trading partners. This section first presents an overview of the GDP impact of carbon pricing on North American regions. This highlights the sensitivity of Ontario's economy to carbon costs relative to competitors. Then a number of indicators are used to assess the ability of Ontario to compete in carbon-constrained markets. Ontario's ability to produce and earn is explored, and then the presence of carbon exposure and carbon advantage is tested.

Approach and Scenarios

To highlight Ontario's ability to compete in carbon-constrained markets, this *Brief* uses a computable general equilibrium macroeconomic model of the Canadian and US economies (GEEM), calibrated to emissions and economic forecasts in 2030. In the model, Ontario, six other Canadian provinces and regions and the United States interact through trade.[10] With carbon prices applied, markets react and production adjusts.

With a forecast of emissions and economic activity in 2030, this *Brief* applies a uniform carbon price to isolate which Ontario sectors may do better or worse than the same sectors in other jurisdictions. Then to the extent carbon prices eventually vary between jurisdictions, the trends identified in this paper would be accentuated. The elements of the modelling scenario include:

- **A carbon price of $40 per tonne CO_2e in 2030 is applied in each jurisdiction to large industrial energy producers and users, including fugitive emissions.** Liquid fuels are not subject to the policy, reflecting this *Brief's* focus on competitiveness. The $40 price is estimated by increasing the WCI forecast allowance price of $33/tonne in 2020 at a rate of 2% annually. Energy prices are held constant to isolate the carbon cost effects, but if energy prices were also changing, the effects would be magnified.
- **Provincial governments collect revenue (no regional wealth transfers) with recycling of carbon payments back to labour (30%) and capital (70%).** With carbon pricing there can be large revenue flows. To isolate the redistributive impacts of the $40 per tonne carbon price, a neutral revenue recycling scenario is adopted. The scenario returns 30% of the carbon price payments back to households in the form of labour tax reductions and 70% to manufacturing and services in the form of capital tax reductions. The marginal incentive to reduce emissions still holds, with investments made to minimize the exposure to the $40 price, but additional payments on the remaining emissions are minimized.

Under this scenario a range of economic and emission data are generated by the model, which are used to populate a series of competitiveness indicators to assess carbon exposure and carbon advantage.

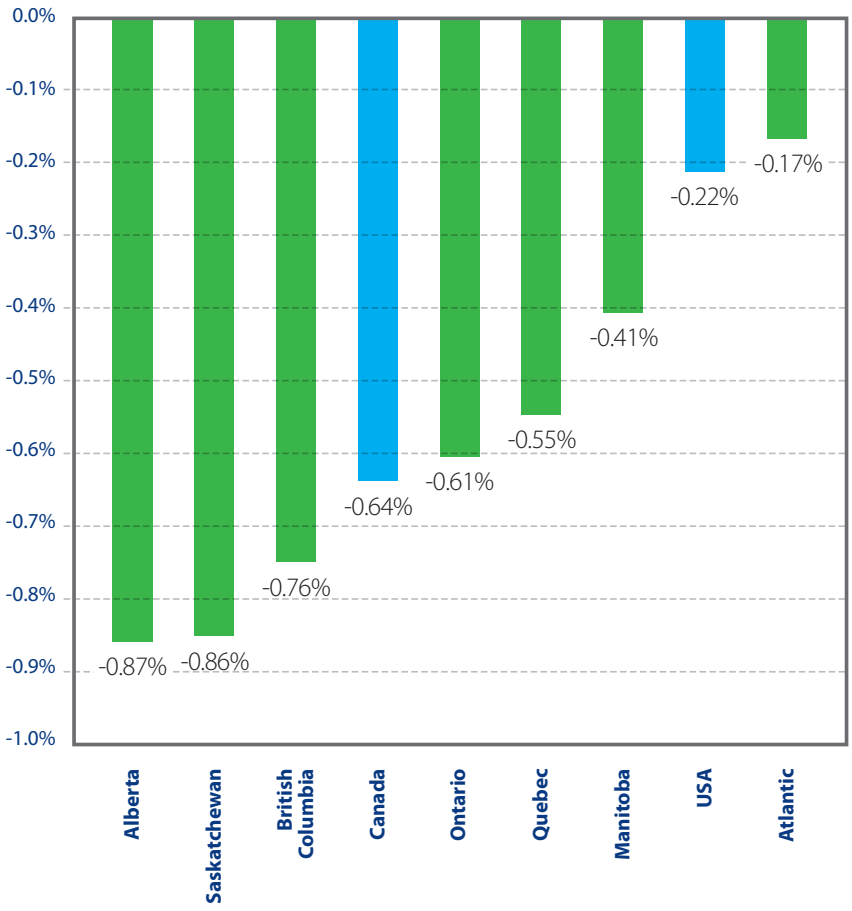
10 GEEM is maintained by researchers at Navius Consulting, notably Jotham Peters. See for an overview of GEEM: Sawyer, Dave and Fischer, Carolyn, 2010. *Better Together? The Implications of Linking Canada and U.S. Greenhouse Gas Policies,* http://www.cdhowe.org/pdf/commentary_307.pdf. C.D. Howe Commentary 307.

Impact of Carbon Costs on Economic Activity in North America

Carbon costs reduce overall economic activity as "non-productive" investments are made in abatement, for switching to higher cost fuels, and through reduced demand for goods and services. On aggregate, there is a decline in overall economic activity as measured by GDP. Countering this decline are some producers who may be able to expand production at the expense of others, indicating a net effect on GDP. Figure 4 indicates the impact of a uniform carbon price on the economies of North America as represented in the model. A reduction simply means that with the carbon price, there is a drop in the overall level of GDP, relative to business as usual, in 2030, with the maximum impact of less than 1% in all jurisdictions and an impact on Ontario that is slightly less than the national Canadian average.

Carbon costs reduce overall economic activity as "non-productive" investments are made in abatement, for switching to higher cost fuels, and through reduced demand for goods and services.

Figure 4: GDP Impact of a C$40 Carbon Price on North American Regions, 2030



The popular view is that losses in the EITE sectors explain the GDP reductions, but this is not the whole story. Some sectors may have a relative advantage if they have a lower

emission profile than competitors. Some Ontario sectors that use decarbonized electricity might gain market share under climate policy relative to US competitors who rely primarily on thermal electricity from coal. The next section tests the assertion that some sectors may be carbon exposed while others are carbon advantaged.

Ontario's Carbon Exposure and Carbon Advantage

This *Brief* uses four factors to explore how Ontario's sectors might respond to carbon costs. While the focus is on Ontario, these four indicators are broadly applicable to understanding the competiveness impacts of carbon policy:

- **Ability to Produce in Carbon-Constrained Markets: composition effects.** The indicator of "ability to produce" is simply measured as the change in the value of production with the carbon price relative to without. The indicator tracks how the composition of the economy may change with carbon pricing.
- **Ability to Earn in Carbon-Constrained Markets: scale effects.** A sector's "ability to earn" is measured as the change in GDP of the sector before and after carbon pricing. Changes in scale indicate which sectors may be better or worse off with the policy.
- **Low-Carbon Comparative Advantage in Ontario: revealed comparative advantage.** This indicator compares the export and import ratio of a sector to that of the province to adjust for trade balance effects.[11] This indicator assesses the ability to compete in domestic markets.
- **Low-Carbon Comparative Advantage in North America: relative trade balance.** This indicator highlights the response of the trade balance in a sector relative to total trade for the commodity sold in North America.[12] It provides a measure of overall competitiveness in carbon-constrained markets, and how the firm competes both domestically with imports and in North America through export markets.

This *Brief* uses original modelling in 2030 of a uniform carbon price applied in Canada and the US to populate the above indicators (at $40 per tonne with recycling revenue at 30% labour and 70% capital). The following section presents the results.

11 Alexeeva-Talebi, Victoria, Böhringer, Christoph and Moslener, Ulf, 2008. *Climate Policy and Competitiveness: An Economic Impact Assessment of EU Leadership in Emission Regulations,* http://www.cer.ethz.ch/resec/research/workshops/Nachwuchsworkshop/Alexeeva-Talebi_Paper.pdf. Centre for European Economic Research (ZEW).

12 Ibid.

Ability to Produce in Carbon Constrained Markets: Composition Effects

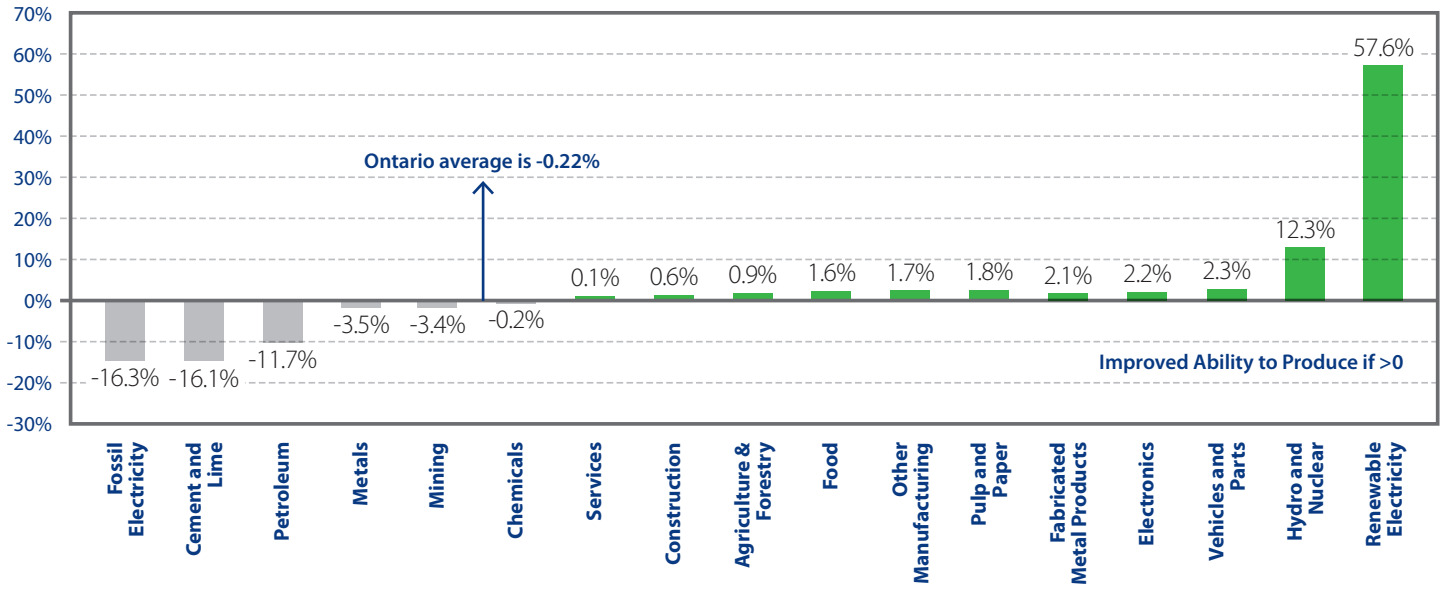
A jurisdiction's ability to transition to a low-carbon economy has as much to do with avoiding economic losses as making economic gains. Producers that can expand under carbon pricing can, to some extent, offset other production losses attributable to carbon costs.

The ability of a sector to transition to a low-carbon economy can be determined through changes in the composition of the economy.[13] The composition of an economy will change after carbon pricing, tilting towards production of less carbon-intensive goods and services. The indicator of "ability to produce" is simply measured as the change in the value of production with the carbon price relative to without. A positive value indicates that the sector can expand output under carbon pricing, while a decrease points to a contraction in the sector's size, as measured by output.

With the $40 carbon price applied across all competitors in Canada and the US, Ontario's average production level falls about 0.22% from the Reference Case in 2030. Figure 5 shows more sector detail, with a large number of Ontario sectors outperforming the average loss in production for the province, starting with chemicals, while some are left better off, starting with services. While sectors like renewable electricity would be expected to outperform in carbon-constrained markets, it is other sectors such as chemicals, food, pulp and paper and vehicles that show promise in their ability to compete in carbon-constrained North American markets.

In terms of gross output, or roughly the value of production, 90% of the economy shows an increased ability to earn, while only 10% of the economy is adversely affected.

Figure 5: Ability to Produce in Carbon-Constrained Markets: Change in Sector Output with Carbon Pricing



13 Ibid.

Ability to Earn in a Carbon Constrained Markets: Scale Effects

Carbon pricing most likely shrinks the overall size of an economy, as measured by GDP. Figure 4 shows that a $40 carbon price reduces Ontario's GDP by 0.6% in 2030. This focus on overall GDP of course masks sector impacts where economic theory would predict structural shifts between sectors as labour and capital are redeployed due to market dynamics that emerge under carbon policy.

A sector's "ability to earn" is measured as the change in the sector's GDP before and after carbon pricing. The trade literature refers to this as scale effects, which are measured as a change in the sector's GDP under the policy.[14] With carbon costs imposed, the expectation is that the combination of increased carbon costs and decreased demand will erode the value-added of the sector. But this ignores that some may do better relative to foreign competitors as well as other domestic producers, and so increase economic value despite carbon constraints. A positive "ability to earn" index implies GDP growth in the sector, whereas a negative index implies a decline in ability to earn.

With carbon pricing, some sectors do better than expected as baseline emission intensities, coupled with their ability to decarbonize relative to competitors, drives a positive "earning" potential. Figure 6 indicates the sectors that have decreased ability or increased ability to earn. Figure 7 indicates that about 80% of the goods and services producing sectors (does not include the government sector) have a decreased ability to earn, but of these, only 0.4% of the GDP is trade-related (mining and cement). About 20% of Ontario's economy shows improved earning potential, including some sectors that would be considered EITE, or vulnerable to competitiveness impacts. Chemicals is a good example, where the emission intensity of electricity used in Ontario is much lower than US competitors, thereby leading to an advantage.

With carbon pricing, some sectors do better than expected as baseline emission intensities, coupled with their ability to decarbonize relative to competitors, drives a positive "earning" potential.

14 See: Bruvolle, Annegrete, and Larsen, Bodil Merethe, 2004. "Greenhouse Gas Emissions in Norway: Do Carbon Taxes Work?" *Energy Policy,* 32(4): 493–505. http://weber.ucsd.edu/~carsonvs/papers/632.pdf.

Figure 6: Ability to Earn: Change in Sector GDP with Carbon Pricing

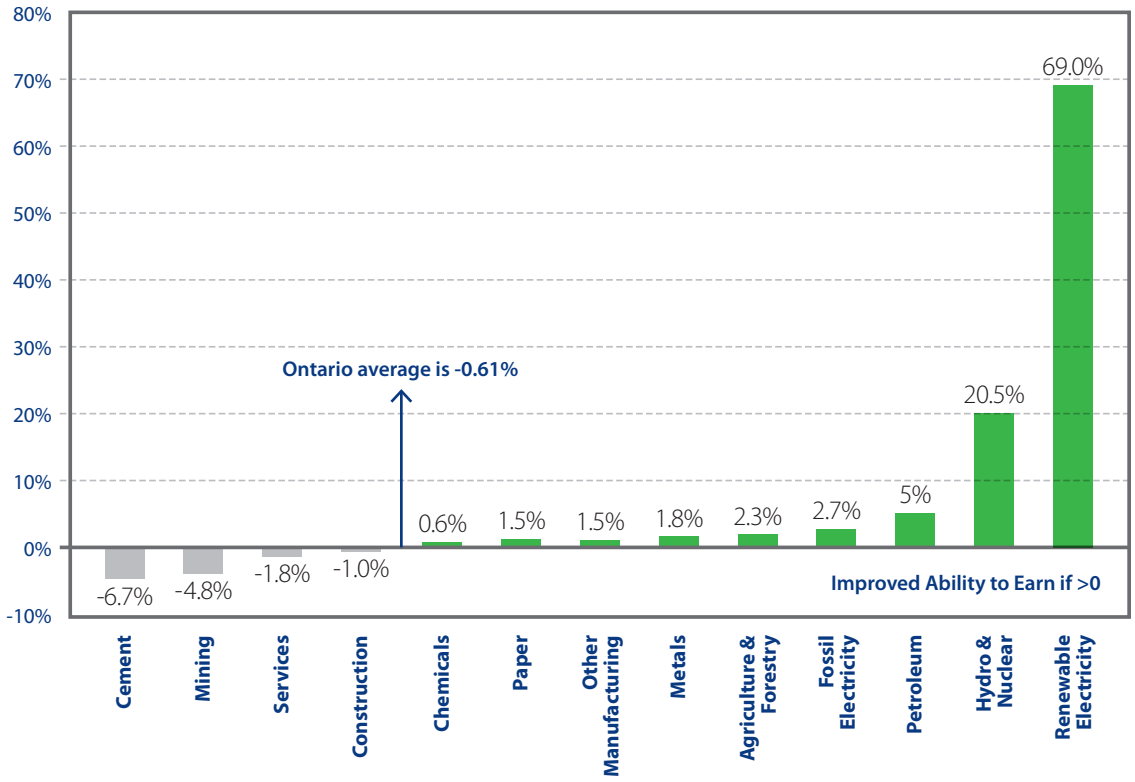
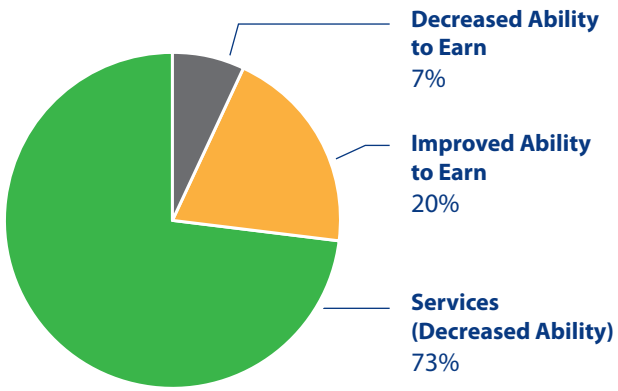


Figure 7: Ability to Earn: Share of GDP Impacted with Carbon Pricing



Low-Carbon Comparative Advantage: Doing Better in Ontario Markets

The ability of a sector to perform better or worse with carbon pricing has much to do with the emission intensity of the sector relative to its competitors, as well as the size of any carbon cost differential. If competing firms face similar carbon costs but have differing emission intensities, all else being equal, the most emission-intensive will face deteriorated competitiveness. As trading partners converge on similar carbon costs, there will be both winners and losers in trade.

This third indicator identifies the relative low-carbon competitiveness of different industries within Ontario. A sector has a revealed "low-carbon" comparative advantage relative to other Ontario industries if it is able to export more under carbon policy relative to all other Ontario sectors while adding domestic market share.

Following the trade literature, this *Brief* uses a variant of the revealed comparative advantage to explore Ontario's carbon comparative advantage. Revealed comparative advantage compares the export and import ratio of a sector to that of the province to account for trade balance effects.[15] This indicator is then adjusted to identify sectors that are carbon advantaged by comparing an index of revealed comparative advantage before and after the imposition of carbon costs. An index that is positive indicates that the sector would likely benefit in the presence of carbon costs through trade, beating the overall trade impact on Ontario. A sector has a low-carbon comparative advantage if it can maintain exports while fending off imports relative to all trade in Ontario. Figure 8 presents the results by sector. Figure 9 indicates that in the scenario about 79% of the economy has an improved ability to compete, whereas 21% suffers a decreased competitive position.

The ability of a sector to perform better or worse with carbon pricing has much to do with the emission intensity of the sector relative to its competitors, as well as the size of any carbon cost differential.

15 Ibid.

Figure 8: Low-Carbon Comparative Advantage – Ability to Compete in Ontario

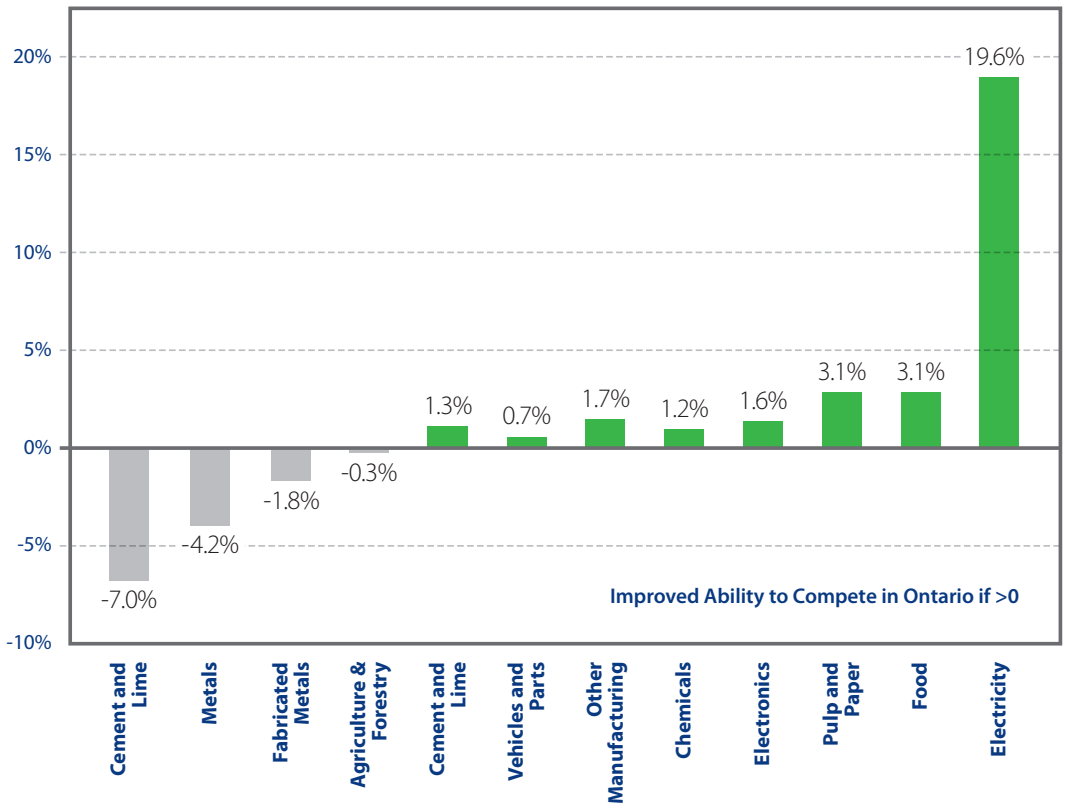
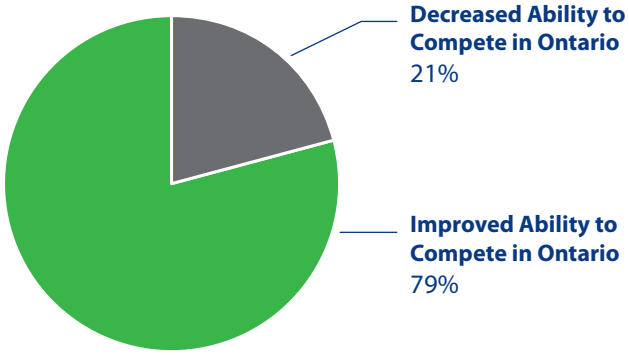


Figure 9: Low-Carbon Comparative Advantage – Ability to Compete in Ontario: Share of Economic Activity in Goods Sector



Low-Carbon Comparative Advantage: Trading in North American Markets

A low-carbon comparative advantage is present if a sector or firm can outperform its competitors. This indicator measures leakage risk, and how producers compete in carbon-constrained markets at home and abroad. A sector's low-carbon comparative advantage is revealed using the relative trade balance indicator, which compares Ontario's trade balance (exports minus imports) for a commodity to the total Canada and US trade (exports plus imports) of that commodity.[16] A value exceeding zero indicates a low-carbon advantage in relation to Canadian and US competitors.

The results in Figure 10 show that some sectors traditionally viewed as vulnerable under carbon pricing are indeed likely to experience a reduced ability to compete. What is notable about this finding using the relative trade balanced indicator is that cement will experience competitiveness challenges relative to its direct competitors, even with similar carbon prices. The sector is likely carbon exposed relative to its competitors. But, there is also a range of other sectors that may hold a carbon advantage, including fabricated metals, food manufacturing, mining, electronic, chemicals and pulp and paper. These sectors have the ability to perhaps outperform their competitors due to some structural advantages linked to emission intensity and options to decarbonize.

There is also a range of other sectors that may hold a carbon advantage, including fabricated metals, food manufacturing, mining, electronic, chemicals and pulp and paper.

Figure 11 indicates that, in terms of value of output, 78% of the goods traded sector is better off, whereas about 12% is worse off. Relative emission intensities between traded sectors in North America explains this difference.

16 Alexeeva-Talebi, Victoria, Böhringer, Christoph and Moslener, Ulf, 2008. *Climate Policy and Competitiveness: An Economic Impact Assessment of EU Leadership in Emission Regulations,* http://www.cer.ethz.ch/resec/research/workshops/Nachwuchsworkshop/Alexeeva-Talebi_Paper.pdf. Centre for European Economic Research (ZEW).

Figure 10: Low-Carbon Comparative Advantage – Ability to Compete in North American Markets

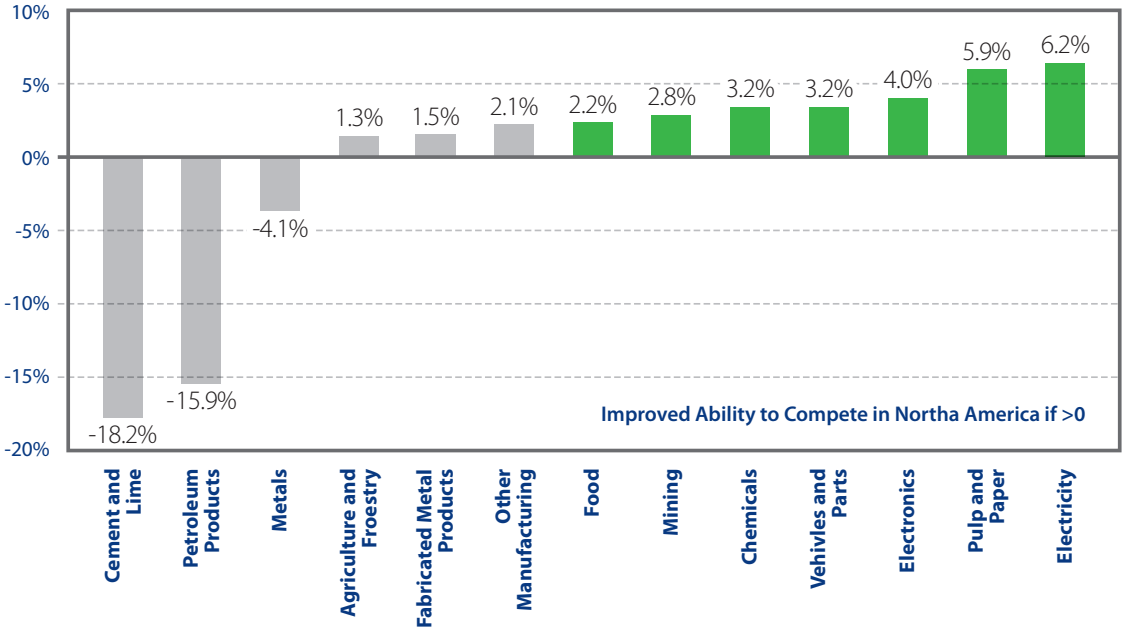
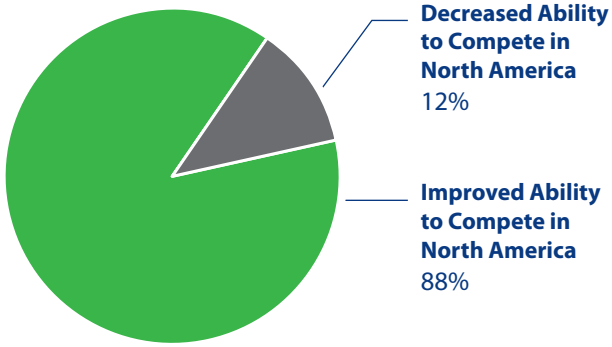


Figure 11: Low-Carbon Comparative Advantage – Ability to Compete in North American Markets: Share of Economic Activity in Goods Sector



Implications for Policy-Makers

This *Brief* is intended to provide a new, and alternative, framework for assessing the competitiveness impacts of climate policy. It uses an illustrative policy scenario for Ontario with a view to furthering the information for public debate on the subject in the province. Sustainable Prosperity believes that the following conclusions are of direct relevance to policy-makers engaged in the development of carbon pricing policies in Canada:

1. The standard view of competiveness impact is overly narrow and, as such, fails to consider the full competitiveness impacts of climate policy.

2. While a narrow focus on EITE sectors is appropriate for designing policy to ensure significant adverse competitiveness impacts are identified and perhaps mitigated for EITE industries, it has nevertheless limited the policy view on competitiveness. A broader view looks at competitiveness as within the lenses of adverse impact on large industrial emitters but also on the relative competitiveness of the entire economy relative to major trading partners.

3. Largely ignored in the traditional approach to competitiveness assessment is the good news story. While some adverse impacts are undeniable, there will also be opportunities. Those sectors using lower emission intensity fuel could gain an advantage relative to competitors as markets introduce carbon constraints. The assessment found in this *Policy Brief* indicates that some sectors traditionally viewed as vulnerable could in fact have a carbon advantage relative to competitors in North American markets. While these results are not conclusive, they do indicate a need to adopt a broader view of the competitive impact of carbon policy.

4. Many in the manufacturing sectors are highly mobile and subject to stiff product competition at home and abroad. Identifying impacts on these sectors through direct policy impacts or indirect effects like energy price increases should be a priority for policy-makers.