



Unlocking Net-Zero Pathways for **SME Manufacturers**

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PEMBINA
institute



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About the Project Partners

Project Leads



About Green Economy Canada

Green Economy Canada is a national non-profit accelerating Canada's transition to a vibrant and inclusive net-zero future. We support businesses of all sectors and sizes in taking action on climate change and creating more sustainable operations. Through our growing network of Hubs, members and partners, we're making business better—together.



About the Pembina Institute

The Pembina Institute is a non-profit think tank that works to advance a prosperous clean energy future for Canada through credible policy solutions that support communities, the economy, and a safe climate.



Technical Partner

About the Delphi Group

Delphi is a boutique sustainability and climate change consulting firm whose mission is to transform the way leading organizations generate value to make our world better. For over three decades, Delphi has helped some of Canada's highest-profile organizations be more transparent, accountable and prosperous in an ever-changing landscape.

Project Funders

This project was made possible thanks to the generous support of:



Executive Summary

Canada has set a goal of cutting its emissions 40-45% by 2030 from 2005 levels and achieving net-zero emissions by 2050.¹

Small and medium sized enterprises (SMEs) make up more than 99% of businesses in Canada² and are the backbone of our economy in communities across the country. Although their individual carbon footprint may be small, collectively SMEs have been estimated to generate as much as 200 million tonnes of CO₂e³ — representing nearly 30% of Canada's total emissions⁴. Despite their significance to our economy and ability to hit our climate goals, how to mobilize SMEs in the low-carbon transition has been largely overlooked.

To help address this gap, Green Economy Canada and the Pembina Institute launched a pilot project focused on identifying the barriers and support needed to transition to a net-zero future for a key subset of SMEs — SME manufacturers. As larger businesses work toward their own voluntary or mandated climate goals, SME manufacturers in their supply chains will face growing pressure to demonstrate how their business models are aligned with a low-

carbon future to remain competitive. Our project recruited 10 SME manufacturing participants from Ontario and combined technical studies on greenhouse gas (GHG) reduction opportunities alongside qualitative interviews on barriers participants face in decarbonizing. We also conducted a scan of what federal and Ontario-level policies exist to help or hinder SMEs on the path to net-zero.

Small and medium sized enterprises (SMEs) make up more than 99% of businesses in Canada² and are the backbone of our economy in communities across the country.

Senior leadership values, saving money, growing their brand and engaging employees were the primary motivators for participants in our project. All businesses identified payback period as the factor they evaluate when considering capital projects, with a desired payback period as the factor averaging 4.5 years.

¹ Government of Canada, "Net Zero Emissions by 2050," <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html>

² Global Affairs Canada, Characteristics of SME exporters in Canada, <https://www.international.gc.ca/trade-commerce/economiste-economiste/analyse-analyse/sme-characteristics-exporters-pme-caracteristiques-exportatrices.aspx?lang=eng>

³ Climate Smart, Environment and Climate Change Canada, "200 Million Tonnes of Opportunity," <https://ccli.ubc.ca/wp-content/uploads/2021/06/200-Million-Tonnes-of-Opportunity.pdf>

⁴ Government of Canada, "Greenhouse gas emissions," <https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/ghg-emissions/2024/greenhouse-gas-emissions-en.pdf>



Participants identified time/capacity limitations as their most significant barrier to becoming more sustainable, with knowledge, upfront financial costs, and customers' willingness to pay higher prices for sustainable products as other key barriers. Operating in a leased vs. owned space and residing in rural locations posed additional challenges to emissions reduction efforts. However, when they were given information about what actions to take and the business case for taking them, most participants said they could make decisions to implement projects within three months, highlighting an untapped potential for accelerating climate action with SME manufacturers through education and the right support.

Our policy scan showed that while there are enabling policies and programs to incentivize businesses to transition towards energy efficient practices and switch to low-carbon fuels, the vast majority of existing programs are not targeted at SMEs and/or do not consider their unique characteristics, needs, and operating conditions in how they are designed. The number and size of funding programs targeted at SMEs at both the federal and provincial level were small relative to the amount of funding generally available for heavy industry or larger organizations. Of those that did include SMEs as a potential recipient, the project size thresholds tended to be too large to make sense for many SMEs, and participants noted that funding streams were generally complex and cumbersome to navigate. Funding also tended to be skewed towards capital projects rather than capacity-building support to help SMEs overcome their time and knowledge barriers.

Encouragingly, our technical study results showed that our diverse set of SME manufacturing participants could reduce emissions by 47% - 86% through adopting existing technology and behaviour change. Energy efficiency improvements accounted for 21% to 46% of the total GHG reductions identified. These included continuous efforts to identify and reduce all types of energy consumption in both process equipment and building heating and cooling systems. Sourcing or generating energy from renewable sources accounted for between 12% and 42% of reductions identified. These included switching to alternative energy like solar hot water or geothermal, electrifying fleet, and procuring or generating renewable electricity.

Our policy scan showed that while there are enabling policies and programs to incentivize businesses to transition towards energy efficient practices and switch to low-carbon fuels, the vast majority of existing programs are not targeted at SMEs and/or do not consider their unique characteristics, needs, and operating conditions in how they are designed.

Our study demonstrated that to unlock the net-zero potential of SME manufacturers and increase the practical feasibility of implementing emission-reducing actions, concerted investments are needed to build a supportive ecosystem, increase education and capacity-building, and overcome systemic barriers to decarbonizing.

Top Recommendations

To this end, our **top recommendations** (which are largely applicable to Canada's SMEs broadly) include:

1 Create an enabling environment for SME manufacturers to make the net-zero transition

This includes implementing mandates and setting goals around engaging SMEs in climate action, and growing green procurement and other market incentives to support SME decarbonization. It also includes continuing to increase building energy efficiency standards, expanding infrastructure and access to low-carbon fuels in rural communities, and moving towards a net-zero electricity grid.

2 Increase capacity-building for SMEs

This includes putting more effort and resources behind climate awareness-building, helping SMEs level up their internal knowledge, skills and systems for the net-zero transition, connecting SMEs with information, experts and resources to support their transition, and partnering with intermediaries to understand and aggregate SME needs.

3 Target financial and programmatic support at SMEs

This includes developing policies and programs specifically geared for SMEs, increasing the number and size of SME-friendly funding opportunities, and increasing the availability and awareness of SME-focused sustainable financing products.

By taking action today, SME manufacturers have a significant opportunity to reduce energy and operating costs while establishing themselves as a supplier of choice. SMEs with their agility, innovation, and significance to local communities across the country represent a source of untapped potential in accelerating Canada's transition to a vibrant and inclusive net-zero future. With the right support designed and delivered for SME manufacturers, we can unlock this tremendous potential to hit our climate goals, drive economic growth, increase industry competitiveness, and position Canada as a leader in green economic transformation globally.

Introduction

Small and medium sized enterprises (SMEs) make up more than 99% of businesses in Canada and collectively, have been estimated to generate as much as 200 million tonnes of CO₂e⁵ — representing nearly 30% of Canada's total emissions⁶.

These are the businesses that stitch together the fabric of our economy in local communities. Together, their success or failure will determine whether we are able to achieve robust economic growth while also addressing our growing climate crisis.

Canada has set a goal to cut its emissions 40-45% by 2030 from 2005 levels and to achieve net-zero emissions by 2050. Yet how to mobilize SMEs to reduce their emissions, and adapt and thrive in the low-carbon transition has been largely overlooked. SME manufacturers in particular are one segment that will be impacted significantly by the low-carbon transition as pressure to green supply chains grows. SME manufacturers make

up more than 50,000 businesses in Canada,⁷ employ 1 in 10 Canadians in the private sector, and contribute 4.9% of Canadian GDP⁸. Many of these manufacturers export products or are part of the supply chains of larger businesses who are increasingly working towards emissions reduction goals. Accelerating the low-carbon transition for Canadian SME manufacturers is important to ensure this sector remains competitive and resilient in the global shift to a net-zero future, and is well-positioned to capture new growth opportunities.

⁵ Environment and Climate Change Canada, "200 Million Tonnes of Opportunity," <https://ccli.ubc.ca/wp-content/uploads/2021/06/200-Million-Tonnes-of-Opportunity.pdf>

⁶ Government of Canada, "Greenhouse gas emissions," <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>

⁷ Government of Canada, "Key Small Business Statistics 2022," <https://ised-isde.canada.ca/site/sme-research-statistics/en/key-small-business-statistics/key-small-business-statistics-2022>

⁸ Calculated based on average annual GDP from 2012 to 2016 from Statistics Canada. Table 36-10-0434-03 Gross domestic product (GDP) at basic prices, by industry, annual average (x 1,000,000) for manufacturing sector and Innovation, Science and Economic Development Canada, "Key Small Business Statistics - 2020." estimate that 46.7% of manufacturing sector GDP is produced by SMEs.



50,000+

Businesses in Canada
are SME Manufacturers



1 in 10

Canadians in the
private sector are
employed by SME
Manufacturers



4.9%

Contribution to
Canada's GDP

Green Economy Canada and the Pembina Institute launched a pilot project focused on identifying the barriers and support SME manufacturers need to successfully transition to a net-zero future. Our pilot project recruited ten participants from Ontario. It combined technical studies on greenhouse gas (GHG) reduction opportunities, alongside qualitative interviews on the barriers the participants face in decarbonizing. We also conducted a scan of what federal and Ontario-level policies exist to help or hinder SMEs on the path to net-zero.

Our results show that SME manufacturers can make significant strides toward net-zero today, but require concerted investments and support tailored to their needs and characteristics.

Our results show that SME manufacturers can make significant strides to put themselves on a path to net-zero today, but require concerted investments and support tailored to the needs and characteristics of SMEs, as well as investments to address the systemic barriers they face to reducing their emissions. Since Ontario is also one of the federal backstop provinces for carbon pricing,⁹ recommendations from this project can be used to inform how its carbon pricing revenues are recycled to support the net-zero transition for SME manufacturers. The findings and recommendations could also be used to inform future provincial policies that would address climate change while strengthening overall business competitiveness.

⁹Technical Paper: Federal Carbon Pricing Backstop, <https://www.canada.ca/en/services/environment/weather/climatechange/technical-paper-federal-carbon-pricing-backstop.html>

CHAPTER 01

Methodology



Geographic Boundary

Ontario was chosen as the geographic boundary in order to focus the policy analysis and ensure a similar enough geographic context for project participants to extract useful findings.

ONTARIO

Participant Recruitment

An open call was made in 2020 to recruit ten SME manufacturers in Ontario for the project who were interested in understanding how they could reach net-zero in their own operations and contribute to Canada's broader net-zero targets. To be eligible, potential participants needed to operate a manufacturing facility located in Ontario, have less than 500 employees, and have senior leadership support to participate in the project over the course of a year. Organizations that were part of a larger parent company but operated as independent businesses with their own budgets, brand, and decision-making purview were also eligible provided they met the aforementioned criteria.



Operate a manufacturing facility located in Ontario



Have less than 500 employees



Have senior leadership support

Pilot Design

Technical Studies

A technical study was conducted for each participant by the Delphi Group to analyze their operations and emissions sources, and identify the changes necessary to move toward net-zero. Due to both cost considerations and health and safety realities with the COVID-19 pandemic, the technical studies were conducted through virtual working sessions and desktop research with participants providing information about their equipment, processes, and operations via worksheets and virtual working sessions.

GHG inventories were completed in compliance with the World Resource Institute's GHG Protocol Corporate Standard¹⁰ - an internationally recognized standard for GHG accounting. 2020 was chosen as the base year from which emission reductions to net-zero were based. This base year was selected because emissions activity data was readily available for all businesses, and because the majority of businesses in the study did not report experiencing lower production during the pandemic.



DEFINITION OF NET-ZERO

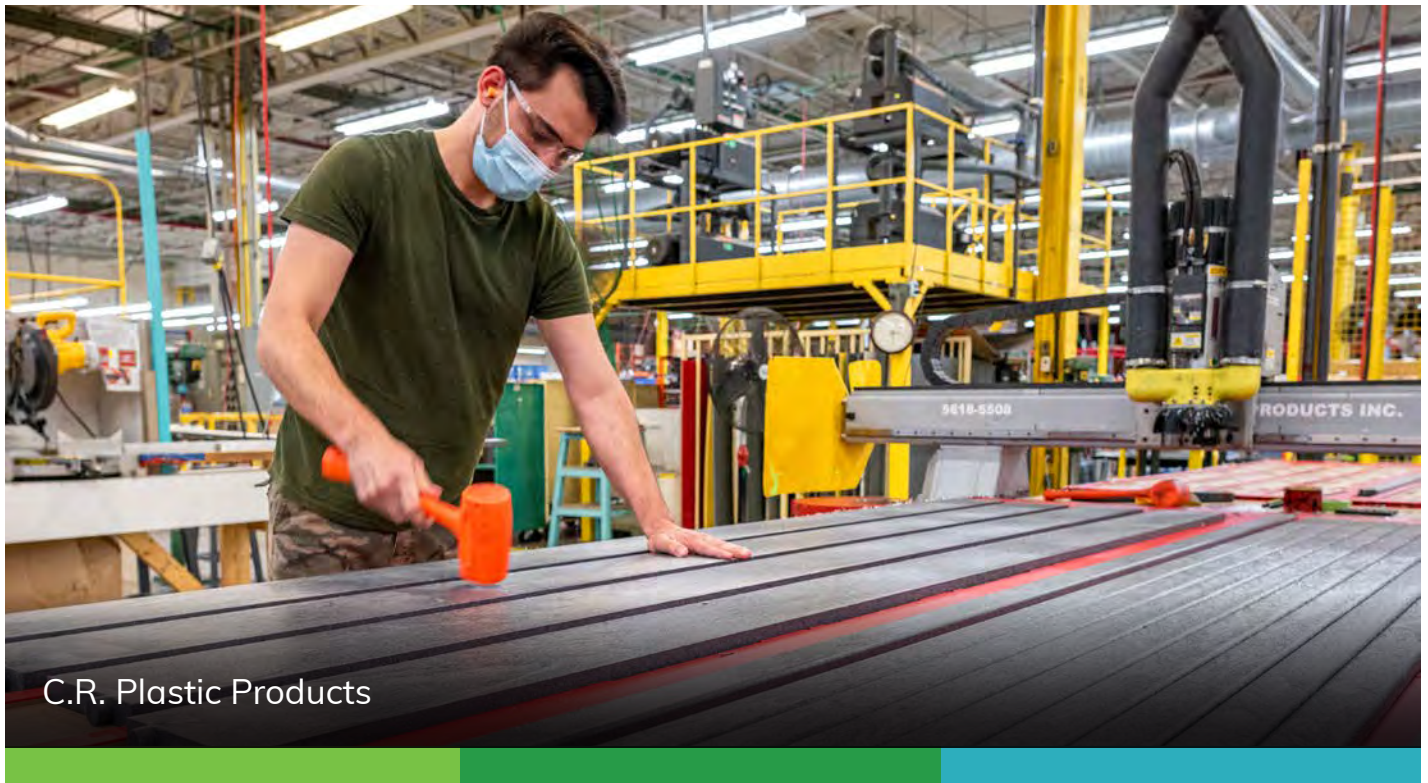
Our definition of achieving net-zero for participants focused on reducing absolute emissions from Scope 1 (their own processes) and Scope 2 (purchased electricity and heat) sources as close to zero as possible based on known and emerging technology, before the use of offsets.

Scope 3 sources (emissions generated by suppliers up-stream and end-users down-stream) were not included as part of the net-zero pathway for SMEs in this project due to project resources and participant data availability. However, understanding and quantifying material Scope 3 sources is an area we strongly recommend as a next step for participants in this project to ensure emissions reductions are aligned with a science-based approach to achieving net-zero.

This approach to focus on Scope 1 and 2 emissions is in line with the Science Based Targets Initiative's (SBTi) guidance for SMEs, which recognizes that "smaller companies often lack the resources and capabilities needed to set Scope 3 targets and monitor progress against them."¹¹ While large companies are required to measure and set science-based targets that cover Scope 1, 2, and 3, the SBTi requires SMEs to only set science-based targets covering Scope 1 and Scope 2 emissions, and make a commitment to measure and reduce their Scope 3 emissions.

¹⁰ Corporate Standard, "Greenhouse Gas Protocol", <https://ghgprotocol.org/corporate-standard>

¹¹ Science Based Targets Initiative, "Small and medium-sized enterprises (SMEs) FAQs.", <https://web.archive.org/web/20240324210132/https://sciencebasedtargets.org/resources/files/faqs-for-smes.pdf>



Policy Scan

We conducted a policy scan to identify regulations and programs to decarbonize buildings, industrial processes, and transportation between 2014 and 2023. The scan included policy interventions at provincial (Ontario) and federal levels that directly target SMEs to reduce Scope 1 and Scope 2 emission sources, as well as policies that will more broadly influence SME emissions.

Assessing Motivations, Barriers and Needed Supports

The participants completed a survey about their capital decision-making process, the barriers they face in pursuing sustainability projects, their experience with previous support programs, and their desired support for reducing emissions. As a follow up to the survey, participants engaged in interviews to provide more details about their responses.

Roundtable Discussions

In June 2021, we convened a roundtable discussion with policymakers, SME participants, business networks, technical service providers, financial institutions, and think tanks to discuss the interim project findings on the barriers SMEs face in decarbonizing and the preliminary supports they identified as being needed. This discussion enabled us to see the perspectives from different stakeholders that impact the broader low-carbon transition and what barriers they face in supporting and engaging SMEs on climate action.

CHAPTER 02

Participant Profiles



Business Participants

The ten participants in this project generally reflected the diverse make-up of Ontario manufacturers more broadly.

They ranged in size from 18 to 450 employees, and had operating budgets that ranged from <\$2M to >\$20M. They spanned diverse industries including food and beverage, electronics, plastics, and asphalt. They also had a mix of experience in sustainability, with some self-identifying as just beginning, and others having taken a variety of actions already.



Copernicus Educational Products

Arthur, ON

Designs and manufactures educational classroom teaching aids.



C.R. Plastic Products

Stratford, ON

Transforms used plastics into recycled outdoor furniture.



Reesor's Markets

Stouffville, ON

Bakery and fresh produce market selling direct to consumers through their farmers market, retail and online stores.



Riverside Natural Foods

Concord, ON

Healthy snack food producer focused on creating nutritious and eco-conscious products.



London Brewing Co-operative

London, ON

Worker-owned co-operative craft brewery establishing ties with local farmers, producers, and partners.



Almac Industrial Systems

Aurora, ON

Manufactures custom material handling systems, from engineering design through to construction and installation.



Walker Emulsions

Burlington, ON

Asphalt and wax emulsions producer for road construction, pavement preservation, wood products and other applications.



Heeman's

London, ON

Retail greenhouse and berry farm selling direct to consumers through their on-farm produce market.



Onward Manufacturing Ltd

Waterloo, ON

Manufacturer and distributor of electric, propane, natural gas and charcoal grills.



Rodlin Instruments

Peterborough, ON

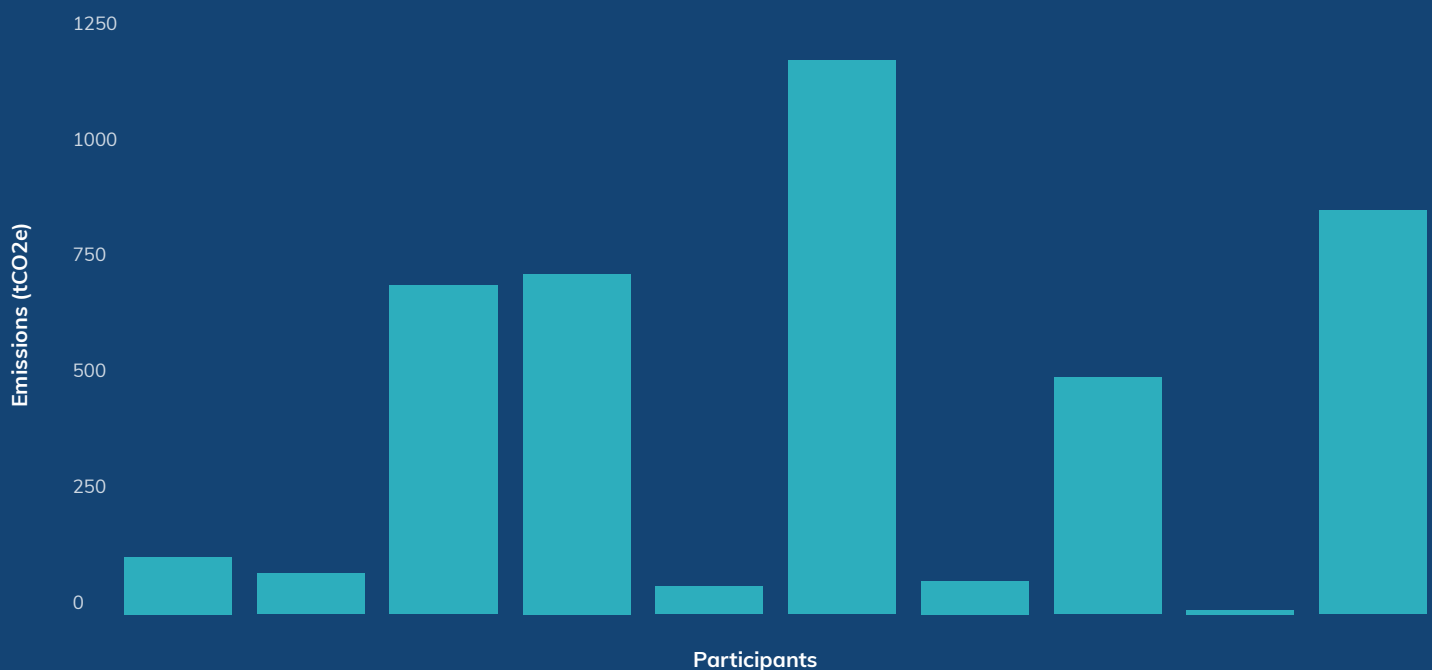
Electronic design and manufacturing subcontractor to many industries with a focus on embedded controls incorporating micro-controllers.

Emissions Breakdown

The individual carbon footprint of participants ranged from 5 tCO₂e to 1,100 tCO₂e in 2020 (**Figure 1**), with a median carbon footprint of 285 tCO₂e, and an average emissions of 410 tCO₂e. The combined Scope 1 and 2 emissions from all participants in 2020 totalled 4,105 tCO₂e, comparable to their total emissions before the pandemic in 2019.



Figure 1: Total Emissions in 2020 by Participant



The breakdown of overall emissions profiles across participants was similar, with stationary combustion (natural gas or propane used in manufacturing processes or for space heating) making up the largest source of emissions from all participants, followed by mobile combustion, and then electricity. Direct fugitive emissions, predominantly from refrigerant loss and the use of gasses related to welding or laser cutting, were a small portion of overall emissions for all participants.

Emissions Profiles of Participants

The **most common sources of emissions** for participants were:



Stationary Combustion

84%

of emissions came from using natural gas or propane for building heating/cooling or process equipment like natural gas ovens.



Mobile Combustion

8%

of emissions came from transportation sources like delivery vehicles, forklifts or corporate cars.



Direct Fugitive Emissions

2%

of emissions came from losses due to refrigerant leaks or by products of purchased gasses.



Purchased Grid Electricity

6%

of emissions came from electricity use. This number would be significantly higher if Ontario's electricity grid was more GHG intensive.

AGGREGATE TOTAL: 4,105 tCO₂e

AVERAGE TOTAL: 410 tCO₂e

Although stationary combustion is the largest source of GHG emissions (average 84%) across all participants, electricity consumption was still significant. Electricity only made up 5.8% of the average emission footprint, but it accounted for 39% of total stationary energy use when compared in common units of GJs to natural gas and propane (Table 2).

Table 2: Average Stationary Energy Use in 2020

| Average Stationary Energy | |
|-------------------------------------|--------------------------|
| Stationary Combustion - Natural Gas | 59.96% (6,640 GJ) |
| Stationary Combustion - Propane | 1.25% (138 GJ) |
| Electricity (Grid & On-Site) | 38.79% (4,295 GJ) |

This discrepancy between emissions and energy use reflects the fact that the Ontario electricity grid is currently low-emitting (34 gCO₂e/kWh)¹². However, as the grid is expected to get more GHG intensive (98 gCO₂e/kWh by 2040)¹³ from the increased use of natural gas plants to meet Ontario's energy demand, emissions related to electricity are projected to increase for participants.

¹² TAF, "A Clearer View on Ontario's Emission Factors," 17 https://taf.ca/custom/uploads/2021/11/20211116_TAF_Emissions-Factors-Guidelines.pdf

¹³ TAF, "A Clearer View on Ontario's Emission Factors," 17 https://taf.ca/custom/uploads/2021/11/20211116_TAF_Emissions-Factors-Guidelines.pdf

CHAPTER 03

Motivators & Barriers



SME Motivators and Challenges

Decision-Making Characteristics

This section discusses the motivations and barriers to net-zero action identified through participant surveys and follow-up interviews. These insights can help to better understand SME realities to support communicating the business case for taking action, and to inform the design of emissions reductions programs targeted at SMEs (see [Recommendations](#)). Through interviews and surveys, we sought to better understand the decision-making criteria, process and timelines SME manufacturers use to evaluate and undertake projects.

Financial Criteria

All businesses identified payback period as a factor they evaluate when considering capital projects, which is the length of time to recoup the cost of an investment.¹⁴ They cited a desired payback period for capital projects averaging 4.5 years. Similarly, 75% of respondents indicated that they evaluate Return on Investment (ROI), which is the profit returned on an investment compared to its cost.¹⁵ Only 12.5% of respondents indicated they evaluate Net Present Value (NPV) as part of the business case, which is the difference between the present value of cash inflows and cash outflows over a period of time.¹⁶

100%
of participants
consider
payback period



Structure of Decision-Making

The decision-making process related to capital projects and operational improvements tended to be highly centralized among participants, with approval and project idea generation resting with the business owner(s) or senior leadership. Only 20% of respondents had a dedicated sustainability role at the facility. An additional 20% had a sustainability role at their corporate site or parent company that would lend support to all facilities under their umbrella. The other 60% of participants had no dedicated sustainability staff or access to sustainability expertise at any level of the organization, which made evaluating and implementing sustainability projects more challenging.

Only 20%
of participants
have a dedicated
sustainability role



¹⁴ Payback Period Definition: <https://www.investopedia.com/terms/p/paybackperiod.asp#:~:text=The%20payback%20period%20is%20the%20length%20of%20time%20it%20takes.payback%20periods%20are%20less%20desirable>

¹⁵ Return on Investment Definition: <https://www.investopedia.com/terms/r/returnoninvestment.asp>

¹⁶ Net Present Value Definition: <https://www.investopedia.com/terms/n/npv.asp>

Timelines for Implementation & Decision-Making

75% of participants indicated a zero to three month timeframe from project conception to project approval. The remaining participants were larger and had a more formal budget approval process which lengthened their timeframe to 5 months. All participants indicated focusing on projects that could be implemented within one year, with multi-year projects only occurring in rare cases.

75%
of participants
approve projects
within 3 months



Sources of Financing

Participants indicated their most common means of financing capital projects was retained earnings (100%) followed by credit from financial institutions (50%) and government loans, grants, subsidies or non-repayable contributions (38%). Only one participant had received credit from financial institutions specifically to finance sustainability projects.

100%
cited retained
earnings as the
most common means
of financing projects



Participants indicated a lack of knowledge, time and capacity to implement sustainability projects (see [Primary Barriers to Action](#)), but that they could move fairly quickly (within three months for most participants) from project conception to approval. Given their simplified and quick decision-making processes, SMEs have an enormous potential to accelerate action towards a low-carbon future if given the right support.

Primary Motivators for Action

Project participants had strong personal and business motivations to pursue sustainability.

When asked what motivated them to reduce their environmental impact, “senior leadership preferences and values” was the consistent motivator across all participants. The next three top responses were:



75%

Saving Money
& Operating
More Efficiently



50%

Engaging Employees
& Retaining Talent



63%

Growing Reputation
& Brand

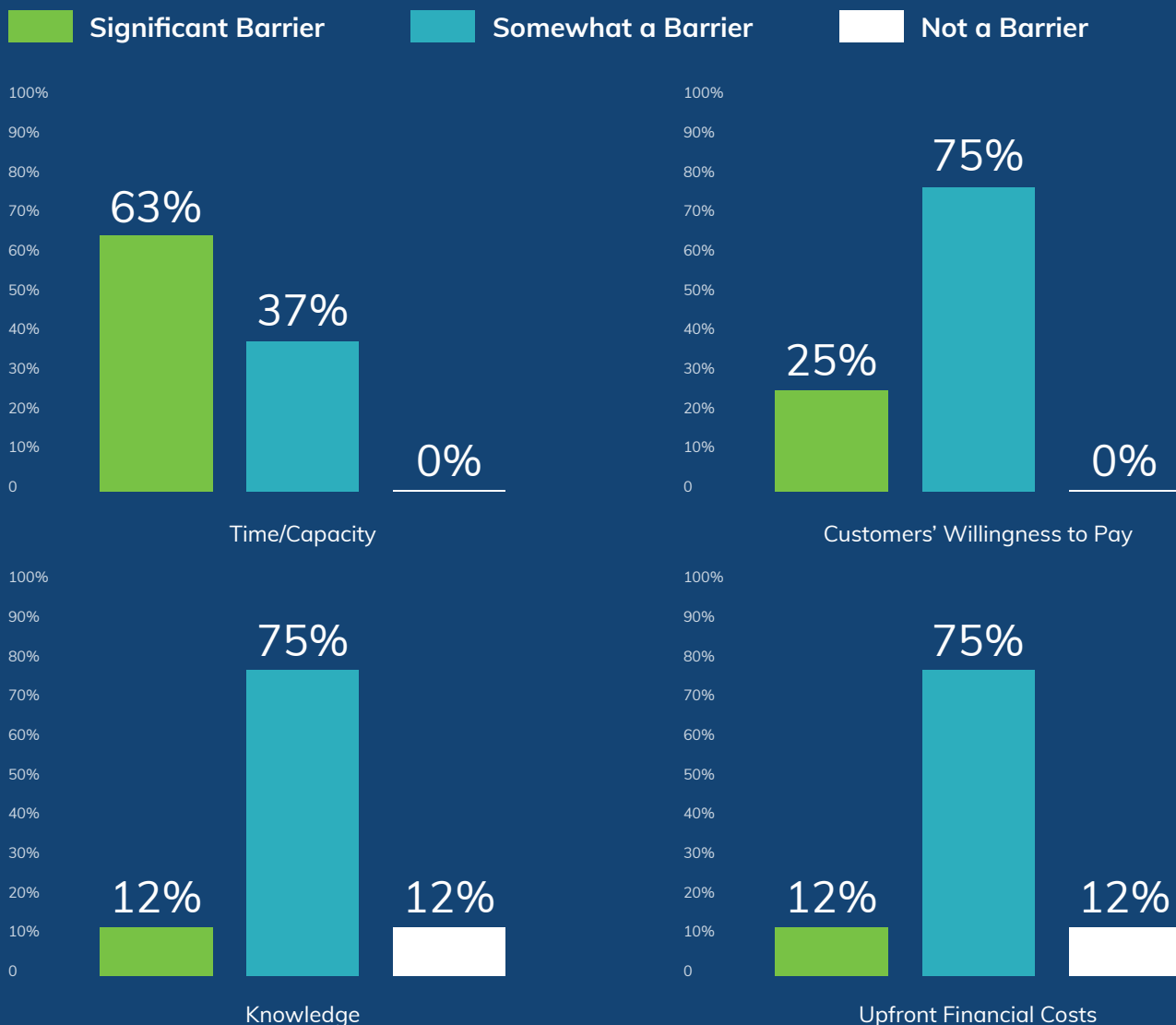
While not identified by any participant as one of their top four motivators, some organizations cited compliance, reducing risk, and growing/retaining customers as important additional considerations. These factors are becoming more significant for SME manufacturers as more customers set net-zero goals and increased environmental policies come into play within Canada and globally.

Primary Barriers to Action

Despite the strength of the motivators identified, participants noted they still face barriers in pursuing and achieving sustainability objectives which limit their overall efforts and effectiveness (Figure 3).

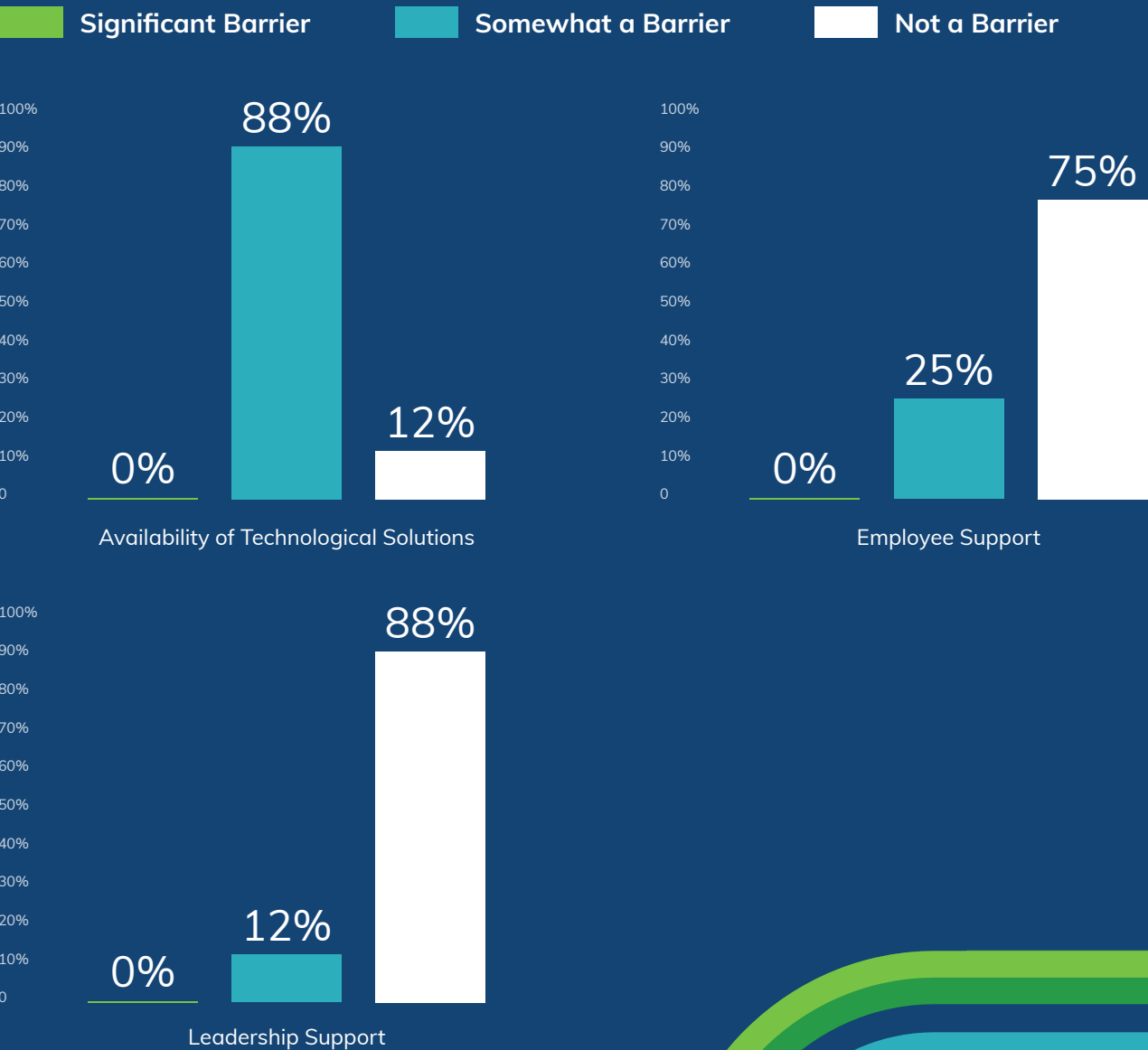
Participants identified time/capacity limitations as their most significant barrier. Other recurring barriers included customers' willingness to pay a higher price for more sustainable products, lack of internal knowledge, and high up-front financial costs. Our findings around each of these barriers are discussed in more detail below.

Figure 3: Barriers to Implementing Sustainability Efforts



Values may not total 100% due to rounding.

Figure 3: Barriers to Implementing Sustainability Efforts, cont'd



Values may not total 100% due to rounding.



Time / Capacity

As previously noted (see [Decision-Making Characteristics](#)), 60% of respondents indicated they had no dedicated sustainability staff or in-house access to sustainability expertise.

Whether participants had a dedicated sustainability role or not, all participants consistently indicated that the “realities of [other] business pressures” often stopped or delayed them in implementing sustainability projects or making decisions with sustainability in mind.

These factors meant missing out on opportunities to improve sustainability performance when making typical business decisions like purchasing or upgrading new equipment. It also meant that

many participants were unable to stay abreast of emerging technologies and funding programs that might support both their sustainability ambitions and broader business objectives.

These capacity barriers experienced by participants are consistent with findings from existing literature about the sustainability challenges SMEs face. For example, in a survey of over 45,000 SMEs located in the Greater Toronto Area and Metropolitan Vancouver conducted as part of the University of Waterloo’s “Governing and Accelerating Transformative Entrepreneurship” (GATE) project, time, financial and staff capacity constraints were the most commonly cited barriers to sustainability progress.¹⁷ Studies have noted that SMEs often face greater capacity constraints than their larger private sector counterparts, and that this lack of capacity may make it difficult to identify opportunities for emissions reductions,^{18,19} ‘synthesize or apply research, even if it is freely available’,^{20,21} and benefit from financial incentive programs that require proposal writing.²²

¹⁷ Sarah Burch, *Small Businesses and Sustainability Innovation: Confronting the Gap between Motivation and Capacity* (Centre for International Governance Innovation, 2018), 3, 6. <https://www.cigionline.org/publications/small-businesses-and-sustainability-innovation-confronting-gap-between-motivation-and>

¹⁸ F. Granak and M. Hassalani, “The Toronto Region Sustainability Program: insights on the adoption of pollution prevention practices by small to medium-sized manufacturers in the Greater Toronto Area,” *Journal of Cleaner Production* 14 (2006), 572-79, cited in. Sarah Burch, *Tapping the Potential of the Silent Majority*:

The Role of Small Businesses and Entrepreneurs in Building Resilient, Low-Carbon Communities, 3. https://www.cigionline.org/sites/default/files/pb_no_81web_0.pdf

¹⁹ E.G. Hansen and J. Klewit, “Publicly mediated inter-organisational networks: A solution for sustainability-oriented innovation in SMEs?,” *Entrepreneurship, Innovation and Sustainability* (2012), 254-78, cited in. *Tapping the Potential of the Silent Majority: The Role of Small Businesses and Entrepreneurs in Building Resilient, Low-Carbon Communities*, 3.

²⁰ Kira R. Fabrizio, “Absorptive Capacity and the Search for Innovation,” *Research Policy* 38, no. 2 (2009), 255-67, 265, cited in. *The Low Carbon Policy Ecosystem: Leaving SMEs Behind*, 10.

²¹ *The Low Carbon Policy Ecosystem: Leaving SMEs Behind*, 10.

²² Natural Resources Canada, “Financial assistance for industrial energy management projects,” <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-industry/financial-assistance-energy-efficiency-projects>

Customers' Willingness to Pay

The second most highly cited barrier to pursuing sustainability efforts was customers' willingness to pay higher prices for more sustainable products or for doing business with more sustainable companies. 70% of participants indicated that passing on a higher cost would be challenging for one of two reasons. The first is that customer purchasing decisions are highly price driven, and staying competitive requires SMEs manufacturers to keep prices low. Some of these businesses noted that the government is a key customer and felt that they had to primarily offer a low cost product to be successful in Request for Proposals (RFPs). They noted that they were not typically given an opportunity to pitch the sustainability and community benefits of choosing their product or company.

The second cited barrier to passing on a higher cost to customers was that participants felt they were already selling at a higher price point and felt that further price increases would alienate customers.

Factors for higher prices included:



lower economies of scale compared to their larger competitors;



already incorporating local or sustainable material choices in their production which had a higher cost;



having Canadian-based versus overseas manufacturing locations; and/or



a desire to pay living wage rates to their employees.



Knowledge

Participants cited a lack of knowledge as another top barrier to action. Due to time/capacity barriers, many participants indicated it was challenging enough to stay abreast of funding and support programs available, let alone make a connection between those opportunities and a particular sustainability project that would be suitable for their facility. Participants also noted that constantly emerging information about actions and technologies to pursue was hard to distil, with one participant referring to this field as the “wild west” because everything still felt new and unsettled, especially as it related to understanding and reducing Scope 3 emissions and embodied carbon in their supply chain.

During conversations with participants, it appeared that a lack of knowledge was closely related to a lack of capacity and time, rather than a lack of interest. Though the majority of participants did not have dedicated sustainability staff, they indicated a lot of self-taught expertise and an openness to continued learning.

As further discussed in the [Recommendations](#) section, participants felt that support to help them overcome the knowledge barrier would be most valuable to advance their sustainability work, including support to identify projects, stay informed of new funding programs and sustainability knowledge, and build the business case for implementing actions.



Upfront Financial Costs

The upfront financial costs of pursuing a sustainability project was also identified as a barrier. Incentives to reduce the initial capital outlay are useful to help create a more favourable business case including better payback periods and reducing the upfront cash burden on SMEs. However upfront costs were rated as less significant than the previously discussed barriers of time/capacity, customer willingness to pay and knowledge. Participants confirmed a general willingness to internally finance sustainability work as long as it met business case requirements for payback period and overall project cost. They noted that support to understand the business case for taking action and to measure the savings (financial and environmental) that they weren't typically considering in simple payback calculations could be highly beneficial to overcome any initial hesitation based solely on upfront costs. Increased availability of funding streams catered to the size and scope of SME projects would also be beneficial to help encourage them to undertake a more detailed look at potential projects.

Observed Barriers to Action



Additional barriers that were not explicitly asked about in surveys but surfaced in conversation with participants include leased space challenges and energy infrastructure limitations in rural communities.

Leased Space Challenges

It has been estimated that the majority of Ontario-based SMEs are renters as opposed to owners.²³ 40% of participants in our project operate in a leased space, and cited this as a challenge in making improvements to their facility. Several of the recommended actions in the technical studies completed for participants such as building envelope improvements, building heating/cooling system upgrades, and installation of on-site solar or geothermal systems, would require landlord support or direct investment to implement.

Traditional leasing agreements often create a “split incentive” issue between the owner and tenant where one party pays for the improvements and the other party benefits from the energy and cost savings. Tenants with a gross lease that want to invest in energy efficiency upgrades will not reap the financial benefits of those upgrades since the landlord pays the utilities. Where tenants pay the



40%
of participants
operate in a leased
space and cited this
as a challenge to
implementing projects.

utilities, getting buy-in from the property owner to invest in the upgrades can be challenging since the property manager does not see the savings. These split incentives and lack of operational control present a barrier to the uptake of low-carbon initiatives by SMEs given how many SMEs reside in leased spaces. Leveraging tools like green leases are one way to help overcome this challenge. Green leases are a type of rental agreement that can align landlords and tenants on building energy efficiency goals and encourage them to work together to save money and become more sustainable.

²³ Smart Prosperity Institute, "The Low Carbon Policy Ecosystem: Leaving SMEs Behind," 17.
<https://institute.smartprosperity.ca/sites/default/files/Policy%20Ecosystem%20Report%20-%20Final.pdf>

Energy Infrastructure in Rural Communities

Two of the project participants operate in rural communities that have limited choice of fuels to meet their energy needs, and lack electricity grid capacity for solar feed-in. This prevents them from switching from propane to a comparatively less GHG-intensive fuel source like natural gas in the short-term while they work to continue reducing energy consumption and adopt clean energy. In one case, an on-site solar panel installation had to be scaled down because the area's grid capacity could not accommodate the desired size of the install.

These anecdotes bring to light that physical location is likely to dictate the accessibility of some low-carbon energy sources such as geothermal installations and renewable power, making it harder for some rural businesses to achieve net-zero under current conditions. Given these businesses often have the physical space to make clean alternatives more feasible (biomass generation; methane capture; solar/wind installs on property, microgrids etc), clean technology adoption could be accelerated if infrastructure barriers to implementing these kinds of projects were removed.

Additional Considerations

Only a few participants in this study indicated that leadership or employee support was a barrier to action. It is possible that this barrier was not cited as more of an issue because leadership support was required for participants to take part in this study. For these SMEs where buy-in is not an issue, addressing the knowledge, capacity and financing factors discussed above can have significant benefits to accelerating their transition to net-zero.

Beyond the rural business examples noted in sections above, the availability of technology was only cited as somewhat of a barrier to decarbonization by other participants. Participant technical studies validated that most of these businesses could lower their emissions by more than 50% based on existing solutions to get on a path to net-zero. Increasing the adoption of existing technology and increasing the availability and access to low-carbon fuels will be important in putting SME manufacturers on a path to net-zero emissions while technology and regulations to support additional decarbonization are being developed.



Riverside Natural Foods

Participant technical studies showed most participants had the potential to lower their emissions by more than 50% based on existing solutions.

CHAPTER 04

Policy and Program Analysis



Policy and Program Analysis

An analysis was conducted to understand the types of federal and Ontario-based policies and programs that influence SMEs to decarbonize their operations between 2014 and 2023 (see [Appendix A](#)).

Most policies and programs focus on helping companies reduce their industrial, building, and transportation emissions. Policy interventions include:



Regulations
and Legislation



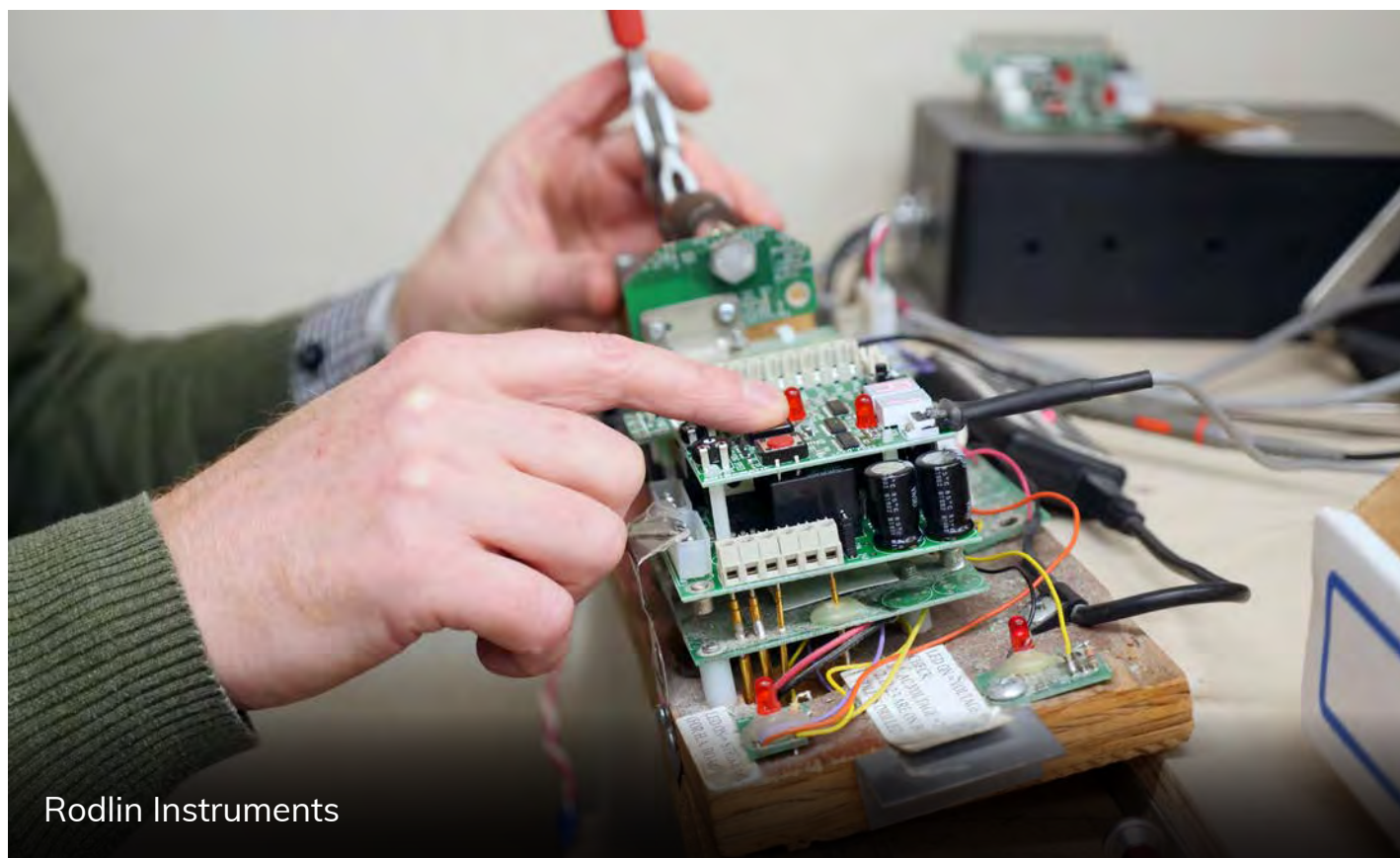
Expenditures and
Financial Incentives
for Capital and
Infrastructure Projects



Financial Incentives
to Help Businesses
Identify Energy Efficiency
Opportunities

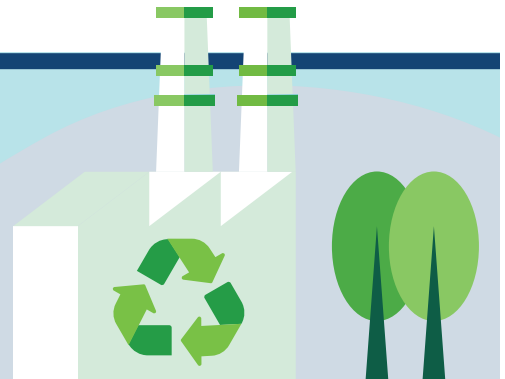


Informational Supports
and Recognition
Programs



Rodlin Instruments

While there are enabling policies and programs, we found that the vast majority do not target SMEs.



By far, Canada's federal carbon price is considered the most important emissions reduction policy, particularly given that the fuel charge portion of the federal carbon pollution pricing backstop system applies to fuels used by SME manufacturers, including natural gas, propane, diesel and gasoline.^{24,25} As the fuel charge increases with a rising carbon price, SME manufacturers will have increased incentive to reduce their use of higher-polluting fuels.²⁶

While there are enabling policies and programs to incentivize businesses to transition towards energy-efficient practices and switch to low-carbon fuels, we found that the vast majority of existing programs are not targeted at SMEs and/or do not consider their unique characteristics, capacity constraints, and operating conditions. These findings are in line with research by the Smart Prosperity Institute which finds that there is a lack of a Pan-Canadian Framework to engage SMEs on climate action and that engagement with SMEs is limited. The Institute found that only a small number of the nearly 100 federal policies and programs identified were aimed at SME emissions reduction.²⁷ While the federal government's 2021 climate plan acknowledges the role of SMEs in taking climate action, there are only vague

commitments to support SMEs, with promises to 'get their feedback on all potential ways to further support them'.²⁸

Overall, we found that most low-carbon programs are oversubscribed, not targeted at SMEs, not communicated well to SMEs, and/or not conducive or attractive enough to garner SME participation. There is a missed opportunity in capturing the environmental and economic benefits that could come from having the more than 1.3 million SMEs in Canada participating in the net-zero transition. In order for Canada to build a cleaner industrial economy, the federal and Ontario governments will need to ensure programs are inclusive and flexible enough to support SMEs in their net-zero pathway. With improved program design and a clear pan-Canadian investment strategy, SMEs can readily adopt and scale zero and low-carbon technologies and practices needed to achieve net-zero by 2050. Our policy scan findings are discussed in more detail on the next pages.

²⁴ Government of Canada, "Fuel Charge Rates," <https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/fcrates/fuel-charge-rates.html>

²⁵ Government of Canada, "Carbon Pollution Pricing – What You Need To Know., <https://www.canada.ca/en/revenue-agency/campaigns/pollution-pricing.html>

²⁶ Government of Canada, "Fuel Charge Rates," <https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/fcrates/fuel-charge-rates.html>

²⁷ Smart Prosperity Institute, "The Low Carbon Policy Ecosystem: Leaving SMEs Behind," 2.

²⁸ Healthy Environment and a Healthy Economy, 33.

Programming Targeting SMEs and SME Manufacturers is Limited

Canadian climate policies and programs could have an even greater impact by targeting SMEs as well as offering greater certainty and longevity to the life of programs.

Programs federally which clearly listed SMEs as potential recipients include the 2019-20 Climate Action Incentive Fund (CAIF) SME Project stream²⁹, the CAIF Rebate stream³⁰, the Low Carbon Economy Challenge Partnerships stream³¹ and Natural Resources Canada's Energy Manager Program.³² Three out of the four programs - the CAIF SME Project stream and Rebate stream and the Energy Manager Program - were funded by proceeds of the federal carbon pollution pricing system for backstop provinces in 2020 (Manitoba, New Brunswick Ontario, Saskatchewan).^{33,34} The CAIF closed in March 2021³⁵ and the application period for the Energy Manager Program closed in September 2019.³⁶ The Low Carbon Economy Challenge relaunched in November 2023 with the Partnerships and Champions stream consolidated, and the fund no longer explicitly lists SMEs as a target audience.³⁷

²⁹ Government of Canada, "Climate Action Incentive Fund," <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund.html>

³⁰ Government of Canada, "Climate Action Incentive Fund," <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund.html>

³¹ Government of Canada, "Low Carbon Economy Challenge," <https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund/challenge.html>

³² Government of Canada, "Energy Manager Program," <https://www.nrcan.gc.ca/energy-manager-program/21917>

³³ "Climate Action Incentive Fund".

³⁴ "Energy Manager Program".

³⁵ Environment and Climate Change Canada, "Carbon pollution pricing proceeds programming and use of proceeds," <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming.html>

³⁶ "Energy Manager Program."

³⁷ "Low Carbon Economy Challenge".



The funding that was made available even when these programs for SMEs were active is insufficient. For example, of the \$2 billion available in the 2019-2020 version of the Low Carbon Economy Fund, only \$50 million explicitly listed SMEs as potential applicants, and only \$10 million was explicitly earmarked for SMEs.^{38,39} The CAIF SME Project stream, the CAIF Rebate stream and the Energy Manager Program allocated only \$72 million, \$35 million and \$2.1 million respectively to Ontario in 2019-2020.^{40,41}

Figure 4: SME-Specific Funding Envelopes Are Small (Low Carbon Economy Fund Example)



For illustration purposes, if every registered SME in Ontario accessed the CAIF SME Project Stream, the per-business allotment would be under \$200.⁴²

This figure would be lower still for the CAIF Rebate stream and the Energy Manager Program, both of which have smaller allotments and neither of which exclusively target SMEs.⁴³ The limited funding available is also demonstrated by the fact that both the Energy Manager Program and the Climate Action Incentive Fund were oversubscribed.⁴⁴ This indicates a missed opportunity to mobilize additional GHG reductions by SMEs through increased available funding.

³⁸ "Low Carbon Economy Challenge".

³⁹ The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 15.

⁴⁰ "Climate Action Incentive Fund".

⁴¹ "Energy Manager Program".

In the Federal Budget 2023, major new tax credits were introduced to promote Canadian investment in transitioning to a clean economy, including the Clean Electricity Investment Tax Credit,⁴⁵ The Tax Credit for Carbon Capture,⁴⁶ and the Invest Tax Credit for Clean Technology Manufacturing.⁴⁷ These supports were welcomed by the Canadian Manufacturers and Exporters, citing that they would help Canadian manufacturers remain competitive against U.S. manufacturers in light of the U.S. Inflation Reduction Act of 2022.⁴⁸ While SMEs are eligible to participate in these tax credits, these programs were not specifically directed towards SME manufacturers except for those

who are specifically manufacturing zero emission technologies. These types of SME manufacturers are supported with a reduced overall 4.5% tax rate until 2035, compared to 7% for other zero-emission technology manufacturers.

At the provincial level, a number of smaller incentive programs are facilitated by Ontario utility providers through agreements with Provincial energy regulators⁴⁹ and are more accessible to SMEs. For example, the Save on Energy Small Business Program in Ontario provides \$3,000 in incentives for lighting equipment, and \$2,500 for non-lighting measures like refrigeration and smart thermostat.⁵⁰

⁴⁵ Department of Finance Canada, "Budget 2023: Chapter 3 - A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy," <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html>

⁴⁶ Department of Finance Canada, "Budget 2023: Chapter 3 - A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy," <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html>

⁴⁷ Ibid.

⁴⁸ CME, "Canadian Manufacturers Welcome Budget 2023", <https://www.newswire.ca/news-releases/canadian-manufacturers-welcome-budget-2023-863134311.html>

⁴⁹ Ontario Energy Board, "OEB approves new multi-year natural gas conservation plan for Enbridge Gas Inc. and an updated natural gas conservation policy framework," <https://www.oeb.ca/sites/default/files/backgrounder-egi-dsm-EB-2021-0002-20221122-en.pdf>

⁵⁰ Save on Energy Small Business Program. <https://saveonenergy.ca/en/For-Your-Small-Business/Programs-and-Incentives/Small-Business-Program>



Enbridge, a major Ontario gas provider, provides consultations and financial incentives for natural gas conservation equipment upgrades, new construction, and retrofits to businesses including SMEs.⁵¹ These programs help to fill a gap in the overall incentive landscape for SMEs and are a good starting point to build on to enable deep decarbonization efforts for small businesses.

Programming targeting SME manufacturers specifically to green their operations is limited provincially. For example, the SMART Green Program in Ontario which had been allocated \$25 million to assist manufacturers to 'upgrade their processes and facilities to reduce GHG emissions and energy consumption'⁵² launched in October 2016 with projects needing to be completed by December 31, 2018. The program website notes that 'Funding for this program is now fully committed.'⁵³ Programs have been launched to support manufacturers to increase their competitiveness including the Advanced Manufacturing and Innovation Competitiveness (AMIC) Stream of the Regional Development Program⁵⁴, the Ontario Automotive Modernization Program⁵⁵ and the Ontario Made Manufacturing Investment Tax Credit.⁵⁶ However, these programs are not aimed specifically at helping businesses reduce their GHG emissions.

Beyond limited programming targeting SMEs and SME manufacturers to reduce their own emissions, high project cost requirements for financial incentive

programs is another shortfall of many of the funding programs. For example, the Low Carbon Economy Fund Challenge stream that launched in November 2023 supports projects that are at minimum \$4M in size, and requires the federal contribution to be no more than 25% of total eligible costs.⁵⁷ The CAIF SME Project Stream tried to address high cost floors for projects by providing a 25% rebate for projects ranging from \$80,000 - \$250,000,⁵⁸ but no such smaller scale investment programs for SMEs federally have been found since the program closed in 2021.

In general we found that the scale of incentives federally or provincially tend to be skewed towards capital projects versus capacity-building support for SMEs to learn about their emissions or to overcome internal capacity constraints and lack of sustainability expertise. There is an opportunity for greater collaboration between federal and provincial programs to develop a larger number and scale of incentive programs developed and designed with SMEs in mind.



⁵¹ Enbridge, "Program & Incentives," <https://www.enbridgegas.com/business-industrial/incentives-conservation/programs-and-incentives>

⁵² Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - First Annual Synthesis Report on the Status of Implementation - December 2017, 30. https://www.canada.ca/content/dam/themes/environment/weather/climatechange/PCF-FirstSynthesis_ENG.pdf

⁵³ Canadian Manufacturers & Exporters, "Welcome to the CME SMART Program," <https://www.cme-smart.ca/home-en>

⁵⁴ Government of Ontario, "Regional Development Program: Advanced Manufacturing and Innovation Competitiveness Stream." <https://www.ontario.ca/page/regional-development-program-advanced-manufacturing-and-innovation-competitiveness-stream> [Version: Jan 31, 2023]

⁵⁵ Government of Ontario, "Ontario Automotive Modernization Program", <https://www.ontario.ca/page/ontario-automotive-modernization-program> [Version: Feb 6, 2023]

⁵⁶ Government of Ontario, "2023 Ontario Budget: Chapter 1, Section A: Building Ontario." <https://budget.ontario.ca/2023/chapter-1a.html#s-2>

⁵⁷ of Canada, "Low Carbon Economy Challenge," <https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund/challenge.html>

⁵⁸ "Climate Action Incentive Fund: Small and Medium-sized Enterprises Project stream."

Opportunity for Greater Municipal Decarbonization Policy Efforts

Research indicates that there are fewer municipal policies, programs and resources to support decarbonization than those administered at the provincial and federal level.⁵⁹

A paper by the SPI reviewed policies relevant to climate change for Ontario municipalities including Sudbury, London, Waterloo, Ottawa, Kingston, York Region and Hamilton⁶⁰ and found that ‘municipal policies made up approximately just 18% of total decarbonization policies’ identified in their multi-jurisdictional policy dataset.⁶¹ The study concluded that there is a lack of ‘programs or initiatives to engage with the local private sector specifically’ and an emphasis on city energy efficiency and ‘demand-side mitigation policies’.⁶²

Given the importance of SMEs to local economies and reaching climate goals, municipalities can play an important role in mobilizing SMEs toward net-zero.

Over 50 have declared or recognized a ‘climate emergency’ since 2019, according to the International Climate Emergency Forum.⁶³ Given the importance



of SMEs to local economies, the close connection that municipalities have to the local realities and needs of their business community, and their local emission reduction goals, municipalities can play an important role in mobilizing SMEs toward net-zero.

Ontario municipalities have limited powers for the issuance of debt and the generation of revenues.⁶⁴ They have also had their financial capacity severely strained by the COVID-19 pandemic, which has cut revenue from areas such as cultural facilities, recreational facilities and transit and has increased outlays in areas including public health.⁶⁵ Increasing funding from provinces to municipalities to support local climate action and continuing access to pots of funding provided by organizations like the Federation of Canadian Municipalities can help municipalities increase the support available for SMEs.

⁵⁹ Additionally, it should be noted that Federal programming is more significant than programming within Ontario, and many of the programs within Ontario. Ontario's A Made-in-Ontario Environment Plan focuses on a target of emissions reductions of 30% below 2005 levels as of 2030 (aligned with the Paris Agreement). Stronger emissions programming in Ontario, including programming aimed at SMEs, could help with further progress towards net-zero by 2050. Source: Ministry of the Environment, Conservation and Parks, Preserving and Protecting our Environment for Future Generations (2018), 21. <https://www.ontario.ca/page/made-in-ontario-environment-plan>

⁶⁰ The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 18.

⁶¹ The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 18.

⁶² The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 18.

⁶³ International Climate Emergency Forum, "ICEF - Governments emergency declaration spreadsheet," <https://docs.google.com/spreadsheets/d/1tb-LklFWLujYnjmCSvCWRcLUJCCWAL27dKPzVcFq9CQ/edit#gid=0>

⁶⁴ Financial Accountability Office of Ontario, "Ontario Municipal Finances," <https://www.fao-on.org/en/Blog/Publications/municipal-finances-2020>

⁶⁵ "Ontario Municipal Finances."

SME Knowledge & Experience with Policies and Programs

To complement the policy scan, we wanted to understand how aware participants were of any existing or previous policies and programs offered that could have supported their sustainability work.

We presented them with a description and relevant link to 17 incentive/support programs and 7 informational resources that were generally available for SMEs to access between 2016 and 2021, and asked them to identify their familiarity and experience with each.



Awareness of Programs & Policies is Low

Across the participants, there was very little knowledge of most incentive and support programs with the exception of programs like the Small Business Lighting Program or Retrofit Programs provided by local electric utilities in collaboration with their conservation mandates from the IESO. 88% of participants were aware of at least

one of those two programs. The fact that SME-targeted programs have been oversubscribed while many of our climate-conscious project participants did not even participate suggests significant opportunities to improve how SMEs are engaged in available programming.

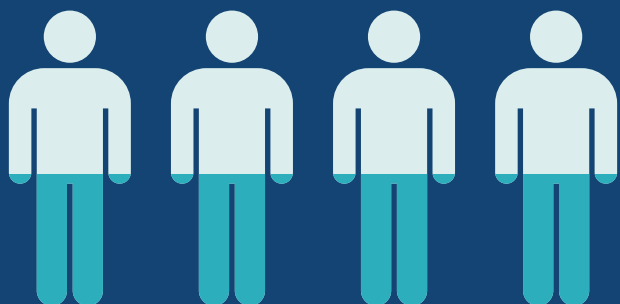
Barriers to Accessing Funding Programs

Participants were asked to identify any barriers they faced in accessing government and utility funding programs in the past.



50%

Only 50% of participants responded that they had experience applying to funding programs.



38%

An additional 38% of participants indicated they didn't have experience with funding programs because they were unaware of programs they could apply to, or were generally aware that programs existed but lacked the capacity to investigate further.

Of the 50% of participants who had experience applying to funding programs, the most commonly cited barriers to successfully accessing funding included:



Insufficient
Value Relative
to Effort



Lack of Human
Resource
Capacity

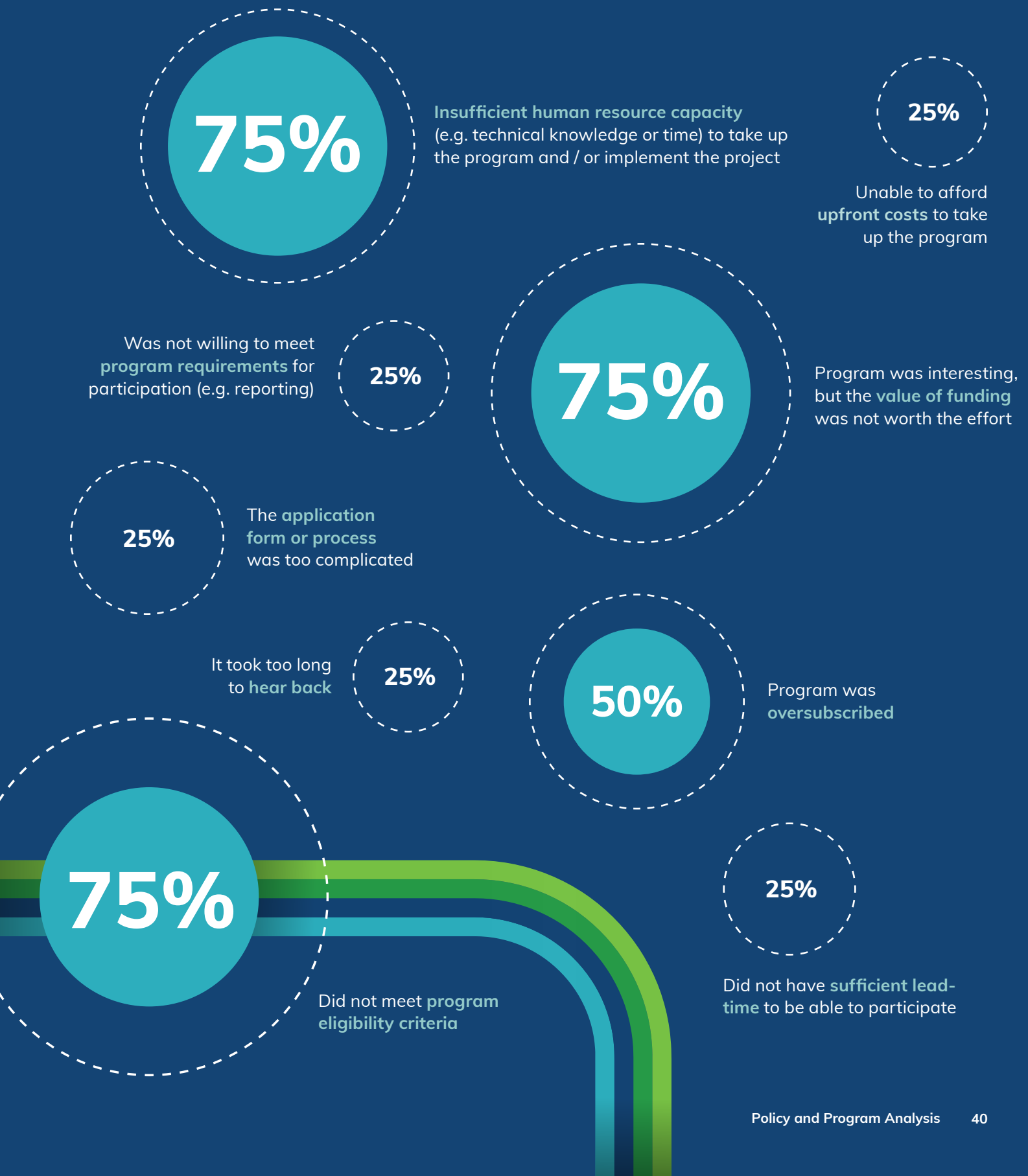


Program
Eligibility

Full details of the barriers identified are noted in **Figure 5**.



Figure 5: Barriers Cited By Participants to Successfully Access Funding Programs



CHAPTER 05

Net-Zero Technical Study Results



Energy Efficiency - Common Actions

A technical study was conducted for each participant to analyze their operations and emissions sources, and identify actions that could put them on a path to net-zero. Due to both cost considerations and health and safety realities with the COVID-19 pandemic, the technical studies were primarily conducted through virtual working sessions and desktop research with participants providing information about their equipment and processes. While this limited some of the more detailed analysis that could have been done compared to a site visit, actions resulting in potential emission reductions representing 47% - 86% of their projected 2050 emissions could be identified for nine of ten participants. One participant was limited in the analysis we could perform without a site visit based on factors like the nature of their operations, available information, and some obvious opportunities already addressed. However many qualitative learnings were obtained through discussions with them that have informed other aspects of this report.

Energy efficiency improvements accounted for 21% to 46% of the total GHG reductions by 2050 identified for participants.

These involved continuous efforts to identify and reduce all types of energy consumption in both process equipment and building heating and cooling systems. It is worth noting that the actual savings possible through energy efficiency measures for participants is likely higher as items related to aspects like building envelope improvements were more difficult to identify without a site visit, and many participants did not have detailed equipment lists. Despite the variety of operations, there were a number of common energy efficiency opportunities identified across participants (Figure 6).

A full list of common actions SME manufacturers can take is found in [Appendix B](#).



Figure 6: Energy Efficient Opportunities



HVAC SYSTEM

Avg Reduction Potential: **10.1%**

Targeting **HVAC SYSTEMS** was identified in **100% of the technical studies (9 of 9)**. Recommendations included replacing existing equipment with high efficiency equipment and adding Energy Recovery Ventilation Systems (ERVs), Desiccant-Enhanced Evaporative (DEVAP) Air Conditioners and Destratification Fans. For most participants, a suite of these opportunities were identified, averaging a reduction potential of **10.1% per applicable participant**.



BUILDING RECOMMISSIONING

Avg Reduction Potential: **4.3%**

BUILDING RECOMMISSIONING to optimize the performance of existing building systems and HVAC equipment was recommended in **100% of studies (9 of 9)**. This measure would help to identify low-cost operational improvements that were estimated to lead to an average of **4.3% emissions reduction per applicable participant**.



ENERGY MANAGEMENT SYSTEM

Avg Reduction Potential: **4.8%**

A **BUILDING ENERGY MANAGEMENT SYSTEM** to centrally control and monitor building HVAC performance was identified as an opportunity for **78% of participants (7 of 9)** and was estimated to lead to an average of **4.8% emissions reduction per applicable participant**.



WASTE HEAT RECOVERY

Avg Reduction Potential: **3.7%**

WASTE HEAT RECOVERY opportunities were identified for **67% (6 of 9)** of participants. The source and potential use of waste varied depending on the manufacturing processes and equipment on site. These measures were estimated to lead to an average of **3.7% emissions reduction per applicable participant**.



BUILDING ENVELOPE

Avg Reduction Potential: **12.3%**

At least one **BUILDING ENVELOPE** improvement, including the installation of air curtains or improving building insulation, was identified for **78% (7 of 9)** participants. Individual measures were estimated to lead to an average of **12.3% emissions reduction per applicable participant**. This was as high as 17% and 25% for two participants respectively.



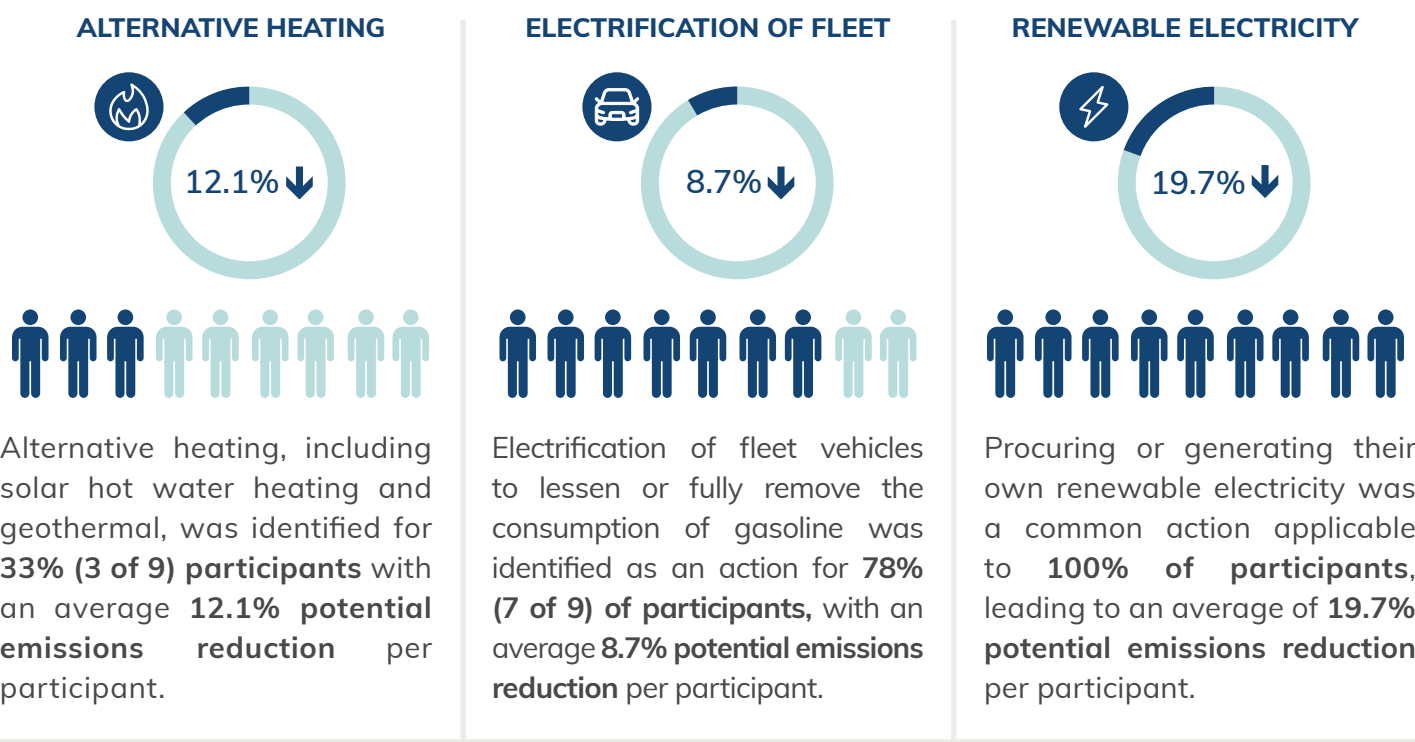
REFRIGERATION

Avg Reduction Potential: **3%**

Implementing **REFRIGERATION PREVENTIVE MAINTENANCE & CONTROLS** could reduce emissions related to energy use and fugitive emissions from refrigerant leaks for **50% (2 of 4)** of participants that have refrigeration or chiller systems. These suggestions were expected to lead to an average of **3% reduction in emissions**.

Renewable Energy and Fuel Switching—Common Actions

Sourcing or generating energy from renewable sources accounted for between 12% and 42% of reductions by 2050 identified. These included switching to alternative energy like solar hot water or geothermal, electrifying fleet, and procuring or generating renewable electricity.



Unidentified Measures

Once the actions related to energy efficiency, fuel switching and renewable sources noted above were accounted for, approximately 14% - 53% of projected 2050 emissions were remaining. It is difficult to know exactly how much of those remaining reductions require new technology versus known behavioral, process and energy efficiency improvements that could not be recommended due to the limitations of this desktop study, which hinged heavily on participants being able to supply

data about their operations. However, based on the reductions identified for those participants who did have better access to equipment lists or institutional knowledge, reductions of at least 60% were technically possible with known technology or actions. This indicates a strong ability of many SME manufacturers to get on the path to net-zero today with the right knowledge and support to increase the practical feasibility of adopting these actions.

Feasibility of Reduction Pathways and Cost of Inaction

One of the goals of this study was to identify how feasible it was to adopt different actions from a business case perspective.

We estimated the cost to implement actions identified in four of the technical studies based on the experience of technical experts and literature reviews. This provided a very rough estimate of the scale of investment that might be required to put SME manufacturers in this project on a path to net-zero.



For the four participants, the cost to implement their **energy efficiency** actions was estimated to cost between **\$60,000 - \$420,000**. This scale of investment would help participants reduce their emissions by **32% - 44% by 2050**. For two of the participants with the largest emissions (estimated to be between 2000 tCO₂e - 8000 tCO₂e by 2050 respectively), this was equivalent to a cost of less than \$500 / tonne for the suite of measures. For the other two participants whose emissions were projected to be less than 200 tCO₂e by 2050, this was equivalent to a cost of \$2300 / tonne.



Two of these participants had **geothermal** recommendations to reduce their emissions by an additional **7% and 25% respectively by 2050**. The cost to implement this one measure was estimated to range from **\$290,000 to \$640,000**. The cost per tonne ranged from \$2,400 - \$8,000 / tonne for this measure.



The installation of **solar panels** or **purchase of renewable energy credits** was recommended to reduce any remaining emissions from electricity, which ranged from **12% - 41%** across the participants. The cost of the required amount of solar for these participants was estimated to be **between \$500,000 and millions of dollars**.



The majority of the energy efficiency measures recommended for these participants had payback periods estimated to be within 5 years, with many in the 1-3 year range. Several of these measures also had incentives available through utility programs, making the suite of reductions identified through energy efficiency reasonable to begin tackling.

The upfront cost of geothermal and solar was significantly more expensive and paybacks were estimated to be between 10-20 years. Beyond the barrier of high upfront costs to adopt these measures, one of participants with a costed study did not have operational control to install solar, nor was there enough area at their site for the required size of solar installation. Renewable energy credits provide an interim solution to support greening emissions from electricity, but are less attractive as a long-term solution because these are an ongoing cost. Given the significance of these clean technologies to the net-zero pathways of SME manufacturers, grants and financing to lower their upfront cost and hasten their payback period would go a long way to help overcome barriers to adoption where these solutions are technically feasible. For businesses without operational control, macro level changes like shifting to a net-zero electricity grid would have a sizable impact in their ability to chart a pathway to net-zero.

We sought to estimate the cost to the participants of inaction based on an escalating carbon price reaching \$170/tonne by 2030. We did not include any costs related to rising energy prices, reputational risks, loss of business due to customer demand for green products and services, or general impacts to competitiveness from maintaining the status quo amid an accelerating global transition to a low-carbon economy.



Copernicus Educational Products

Our projections indicate that if the participants in our study took no action to reduce their emissions, they will be paying on average \$149,000 in carbon costs by 2030, and will have cumulatively paid on average \$745,000 by 2030.

By taking steps to reduce their emissions and get on a path to net-zero, SME manufacturers can not only avoid these costs but become stronger and more resilient for the future.

CHAPTER 06

Discussion & Recommendations



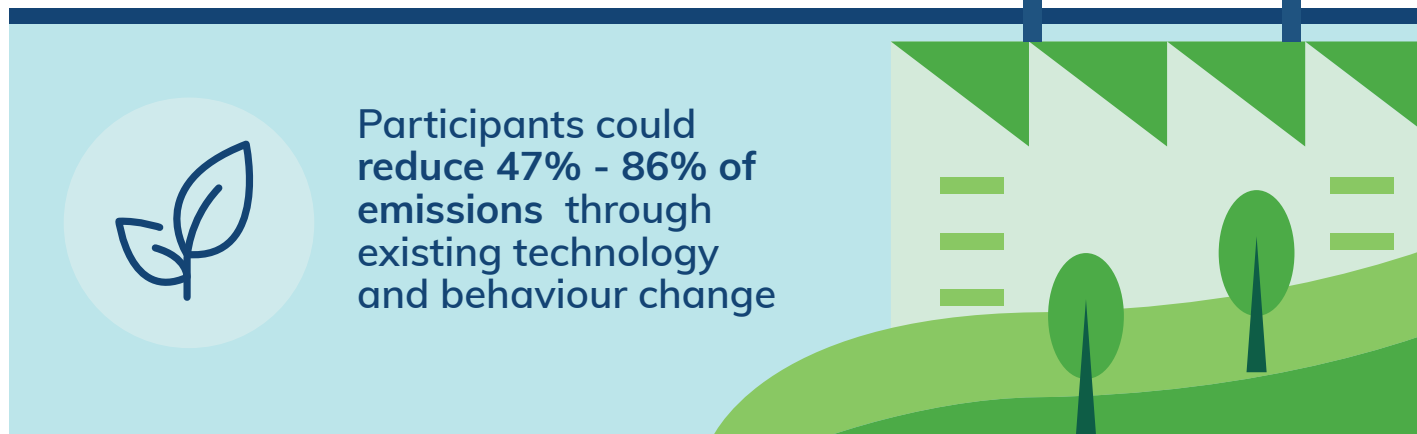
Discussion & Recommendations

As the backbone of our economy, SMEs possess enormous potential to accelerate our transition to a prosperous net-zero future. Often lauded for their agility and innovation, SMEs have simplified decision making processes compared to their larger private sector counterparts, and when given the appropriate knowledge and support, can quickly respond to opportunities. These characteristics of SMEs combined with their sheer number means that we can make big strides in reaching our environmental and economic goals by mobilizing them. Engaging Canada's more than 1.3M SMEs in implementing actions toward net-zero will drive demand for green products and services in local communities and spur the growth of new industries. It will create a boom in demand for good green jobs, and an economic multiplier effect as local investment and spending in the green economy grows.

The benefits of climate action are particularly strong for SME manufacturers, who not only have a significant opportunity to reduce energy and operating costs due to the nature of their operations, but can establish themselves as the supplier of choice in proactively moving towards net-zero.

As government customers, publicly regulated sectors, and larger businesses all work toward their own net-zero goals, supply chain pressure will only increase on SME manufacturers to demonstrate how their business models are aligned. The cost of inaction will also grow as key regulations like carbon pricing in Canada continue to escalate. Tackling climate change is no longer just a moral imperative - it is rapidly becoming a must for businesses to demonstrate that they are fit for the future.

Encouragingly, our project results showed that our diverse set of **SME manufacturing participants could reduce emissions by 47% - 86% through adopting existing technology and behaviour change**. However, to achieve these reductions at the pace and scale needed will require concerted investments focused on building a supportive ecosystem to mobilize action and increase the practical feasibility of decarbonization efforts. Below are some recommendations based on our findings to support the transition of SME manufacturers towards a net-zero future.



1

Create an Enabling Environment for SMEs to Make the Net-Zero Transition

a. Implement Mandates and Set Goals Around Engaging SMEs in Climate Action

In speaking with policymakers individually and through roundtable discussions, we heard that one of the major barriers to engaging SMEs broadly on emission reduction efforts is a lack of climate mandates explicitly focused on SMEs. Without this, government departments are limited in their capacity to support and engage SMEs. Incorporating mandates and goals around decarbonizing SMEs - whether at the government or utility levels, or within entities that serve SMEs - is a foundational step to ensuring Canada's SMEs get the attention they need to fully participate and remain resilient in the low-carbon transition.



London Brewing Co-operative

b. Grow Green Procurement & Create Market Incentives to Support SME Decarbonization

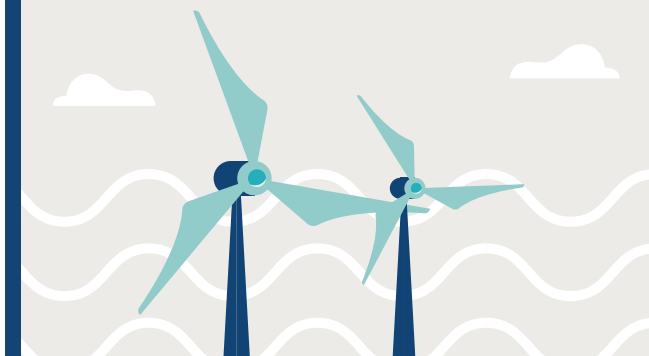
Participants in our study cited customers' willingness to pay as one of the top barriers to further investing in sustainability efforts as they felt their customers were highly price-sensitive. Passing costs to the customer wasn't seen as feasible as they felt that remaining competitive required them to keep prices as low as possible. Having all levels of government and the private sector incorporate green procurement policies would help to create additional criteria on which SMEs could compete. It would also reward SMEs for accelerating investments to green their products and services. These criteria should be designed in a way to recognize the smaller scale operations and resources of SMEs compared to their larger counterparts so expensive certifications or niche requirements don't disadvantage SME suppliers but still encourage meaningful progress towards net-zero. Mechanisms to potentially pool the resource needs of SME manufacturers and bulk buy sustainable raw materials or commonly applicable technologies like solar panels could also help to lower prices through increased economies of scale.

Policy levers like an escalating carbon price are also powerful tools to help harness market forces for SME manufacturers to invest in climate-friendly choices. However, the vast majority of SMEs and SME

manufacturers have not measured their emissions and are not prepared for the impacts of carbon pricing on their operations. Our projections indicate that if the participants in our study took no action to reduce their emissions, they will be paying on average \$149,000 in carbon costs by 2030, and will have cumulatively paid on average \$745,000 by 2030.

By taking steps to reduce their emissions and get on a path to net-zero, SME manufacturers can not only avoid these costs but leverage this significant economic incentive to make changes to their operations that will help them adapt and thrive in a changing world. However, without targeted support, policies like carbon pricing will pose significant financial challenges for SMEs and create a strong backlash against these kinds of policies.

We urgently need to ramp up the education, funding, and support programs available to give SMEs the tools to transition and remain competitive in the shift to a low-carbon future.





c. Continue to Implement Building Energy Efficiency Standards

Many SMEs reside in leased space⁶⁶ and face challenges in making direct improvements to their facility that could put them on a path to net-zero. Several of the recommended actions in our technical studies such as building envelope improvements, building heating/cooling system upgrades, and installation of on-site solar or geothermal systems, require landlord support for some participants. These findings suggest that regulations and support programs that target building owners to make sustainability-related improvements to their building would also benefit many SMEs in greening their own operations. As such, continuing to increase building energy performance standards and available support programs to make sustainability-related improvements is a key part of ensuring that SMEs can reach net-zero emissions. Educating SME tenants on how to work with landlords to modify lease agreements with sustainability considerations could be one way SMEs can influence landlords to proactively green their buildings.

d. Expand Energy Infrastructure and Access to Low-carbon Fuels in Rural Communities

One factor that limited the ability of participants to achieve greater GHG reductions in our study was their location—specifically that SMEs in rural locations did not have access to the same low-carbon fuels or energy infrastructure to be able to implement certain kinds of changes. Expanding the grid capacity and access to low-carbon fuels will be an important part of enabling an equitable energy transition, and will have an impact on how quickly certain businesses will be able to decarbonize to achieve net-zero emissions. Achieving net-zero under current conditions for rurally based SME manufacturers will not be possible. Given these businesses often have the physical space to make clean alternatives more feasible (biomass generation; methane capture; solar/wind installs on property, microgrids etc), clean technology adoption could be especially accelerated if infrastructure barriers to implementing these kinds of projects were removed.

⁶⁶The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 17.

e. Green the Electricity Grid to Enable SME Manufacturers to Move Towards Net-zero

Once the energy efficiency improvements were implemented, participants in our study were projected to have on average 19% of their emissions remaining from electricity in 2050. In 2020, participant emissions from electricity represented on average just 5.8% of their overall business as usual emissions. This large jump in emissions, even after action is taken, is due to expectations that Ontario's grid will become more GHG intensive (98 gCO₂e/kWh by 2040)⁶⁷ from the retirement of nuclear plants and increased use of natural gas plants to maintain Ontario's energy supply. A significant portion of the path to net-zero for SME manufacturers could be achieved by investing in greening Ontario's electricity grid and achieving the federal goal of a net-zero electricity grid by 2035. Given that many SMEs reside in leased space with limited operational control, and may not have the funds or available space to accommodate the full size of solar installation required to meet their electricity needs, making investments to green the electricity grid is one of the best ways to support SME manufacturers in moving towards net-zero.

A significant portion of the path to net-zero for SME manufacturers could be achieved by investing in greening Ontario's electricity grid and achieving the federal goal of a net-zero electricity grid by 2035.



⁶⁷ TAF. "A Clearer View on Ontario's Emission Factors," 17 https://taf.ca/custom/uploads/2021/11/20211116_TAF_Emissions-Factors-Guidelines.pdf

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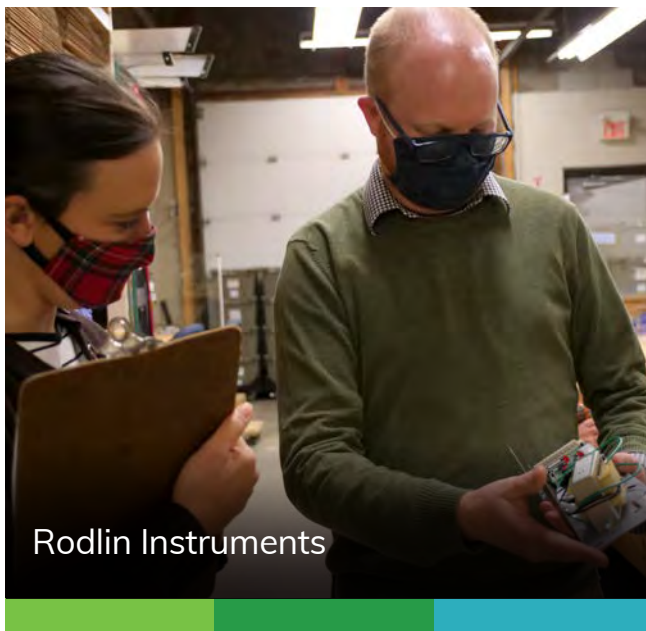
Increase Capacity-Building for SMEs

a. Put the Net-Zero Transition on the Radar of SME Manufacturers

In Green Economy Canada's experience of engaging SMEs in climate action for more than a decade, the vast majority are still at an early stage of awareness on climate action and are largely unprepared for the net-zero transition. Public policy, funding programs and discourse have historically focused on big businesses, heavy emitters, and more recently, those manufacturers who can produce clean technologies, sending a signal to the majority of SMEs that climate change is something that is less relevant to them. A greater focus needs to be put broadly on raising awareness with SMEs about how the global transition to net-zero is impacting them and the business case benefits of making the transition sooner than later. Given how critical leadership support is to unlocking

the potential of SMEs to contribute to and benefit from the net-zero transition, initiatives aimed at building the awareness and buy-in of senior leadership to prioritize sustainability are especially important.

As a starting point, we recommend local, provincial, and federal policymakers begin publicly talking about why it is important for SMEs to take steps to reduce their emissions and back that up with policies and programs in annual budgets that reflect this importance.



Entities that regularly engage with SMEs to support business operations and competitiveness also have an important role in putting climate action on the radar of SMEs. The more financial institutions, economic development officers, business networks and industry associations can actively talk to SME manufacturers about the importance of taking steps to measure and address their climate impacts, the more it will reinforce that this is a key issue that SME manufacturers should be paying attention to so that they can be prepared.

b. Invest in Leveling up Internal Knowledge, Skills, and Systems for Net-Zero

Canada's approach to engaging businesses in the low-carbon transition has been focused on adopting energy efficiency measures and clean technologies that can help us lower emissions. However, the shift to a low carbon economy will require SMEs to have business models and make decisions on a regular basis that are consistent with a low carbon future—not just implement one-off projects where incentives exist.

Most of the participants in our study had no dedicated or specialized sustainability staff in-house, and indicated that time, capacity and knowledge were their top barriers to making decisions with sustainability in mind.

Greater investments are needed to help SME manufacturers and SMEs broadly level up their internal knowledge and skills for the low-carbon transition. Everyone from front line operators, to senior leadership needs to understand the business case for sustainability, where company emissions come from, and how their individual and collective decisions drive or lower those emissions and associated operating costs.

What gets measured gets managed, and developing a GHG inventory provides a

foundational step for SME manufacturers to establish their baseline emissions, set reduction targets, and measure reduction progress. Funding programs should encourage SMEs to create GHG inventories as a first step in moving towards net-zero, and support SMEs with getting the support they need to build the internal knowledge, skills, and systems to manage their climate impacts on the way. Managing building and process-related energy use is a key part of the decarbonization pathway for SME manufacturers. Larger industrial businesses are becoming more accustomed to implementing energy management programs, but SME manufacturers need support to train their operators and learn how to adopt energy management principles into their operations without having dedicated in-house energy managers by training.



c. Connect SMEs with Information, Experts and Resources.

The results of our project highlighted that time and capacity were the main barriers cited by SME participants to advancing sustainability projects. It was difficult to keep track of external developments and funding programs, and know what steps to take to get on the path to net-zero. Beyond funding programs to help acquire external expertise or build internal knowledge and systems, participants cited the following additional supports would be valuable to help address the knowledge and time/capacity barriers identified:



Knowledge of what peers are doing. Access to a network of peers within and outside of their industry to learn, share and collaborate with on climate action.



Ongoing support to scope, prioritize, and understand the business case of sustainability projects as well as support to identify short and long-term actions, and the costs of inaction. This support would help SME manufacturers to prioritize sustainability projects alongside other business investments and integrate sustainability into their business planning. It would also help them identify when to implement those changes in light of the business case, resource considerations, and changing technology.



Support to stay abreast of relevant funding opportunities and policy changes was the most highly rated support cited by participants. They wanted to see an increased focus on how programs are communicated so that relevant information reaches SMEs in a way that is actionable and reduces the burden to self-identify funding opportunities amid competing business priorities.

d. Partner with Intermediaries to Understand and Aggregate SME Needs

While many of the stakeholders consulted in our project voiced a desire to more actively support SMEs, some of the key barriers that folks identified involved not understanding SME needs, and higher administrative costs to engage SMEs relative to the size of their projects. According to the Smart Prosperity Institute, the number and variety of SMEs can make them difficult for governments to engage with, and a significant amount of backend investment is required for programs and policies that need adjudication between proposed projects.⁶⁸ Existing business networks like chambers of commerce, Business Improvement Associations, industry associations, and NGO business networks all represent important conduits to the SME community. Partnering and investing in networks connected to SMEs is one way to overcome many of these barriers. These intermediaries can aggregate SME needs and voices to provide intelligence back to entities looking to serve SMEs in the green transition, and can act as trusted voices to help get information

out to SMEs about the resources available to help them. Intermediaries can also aggregate data about SMEs and help to bundle projects to reduce the administration needs for policymakers, energy efficiency programs, consultants, and contractors, and leverage these economies of scale to bring technical support to SMEs at a more affordable price point. These networks are not currently geared towards helping businesses understand and work towards the low-carbon transition.

Supporting networks like these to develop deeper partnerships with those that do have sustainability expertise could have a significant impact in reaching SMEs and spurring action in communities across Canada.

⁶⁸ The Low Carbon Policy Ecosystem: Leaving SMEs Behind, 4.



3

Target Financial and Programmatic Support at SMEs

a. Design Policies and Programs for SMEs

Our policy scan showed that while there are enabling policies and programs to incentivize businesses to transition towards energy efficient practices and switch to low-carbon fuels, the vast majority of existing programs are not targeted at SMEs and/or do not consider their unique characteristics, needs, and operating conditions. While SMEs may be eligible for programs open to all types of businesses, they are at a disadvantage in accessing and navigating these programs, and in competing on project size relative to their larger business counterparts. The successful transformation of our economy requires that we successfully support the transition of the 99% of businesses that SMEs represent. To do so, we need to invest in building policies and programs specifically designed for and targeted towards SMEs.

b. Increase the Number and Size of SME-Friendly Funding Opportunities

Our policy and program analysis showed that the number and size of funding programs targeted at SMEs at both the federal and provincial level was small relative to the amount of funding available generally for heavy industry or larger organizations. Of those that did include SMEs as a potential recipient, the project size thresholds tended to be too large to make sense for many SMEs. Expanding the amount of available funding for SMEs, reducing the minimum cost size of projects, and having several funding streams

to help cover a range of project sizes would help a greater number of SMEs to implement projects. There is an opportunity for greater collaboration between federal and provincial programs to develop a larger number and scale of incentive programs developed and designed with SMEs in mind. Participants indicated that additional funding support would allow them to undertake a higher volume of projects or implement projects more quickly than they would on their own.



We sought to use the rough costing that was done for four of the participants to understand the scale of investment that might be required to meaningfully engage SME manufacturers in Ontario on the path to net-zero.

Based on estimates, costs range from \$60,000 - \$420,000 to implement energy efficiency measures that could reduce participant emissions by 32% - 44% by 2050. We would need between \$300M - \$2.1B of available funding to provide a 50% incentive for half of Ontario's 20,000 SME manufacturers to adopt these actions.

This does not include financial support to make procuring technical support more feasible, funds to support the adoption of clean technologies, or funds to support internal capacity-building for the low-carbon transition. Even targeting a smaller percentage of the manufacturers in Ontario, it is clear that the scale of investment in mobilizing these SMEs needs to drastically increase if we're serious about keeping our manufacturing sector competitive in the low-carbon transition. Funding for these financial supports could come from a combination of federal carbon pricing revenues, provincial investment, utility incentives, and private sector financing.



In designing SME-friendly funding opportunities, the following recommendations should be considered:

PROVIDE PRESCRIPTIVE SUPPORT FOR ESTABLISHED TECHNOLOGY

Where there is well-established technology, providing a standardized/prescriptive list of climate action recommendations for SMEs with the business case could reduce some of the knowledge hurdles to exploring next steps. This list could allow SME manufacturers to implement some obvious or simpler actions before contracting consultants for more specialized needs. An initial list of GHG reduction projects was generated from our technical studies and can be found in [Appendix B](#). Further tailoring could be done to help different types of SME manufacturers understand which projects might be more applicable, as well as which service providers in their community can support them to explore this further.

PROVIDE FLEXIBILITY FOR UNIQUE PROJECTS

Providing opportunities for SME manufacturers to access flexible funding envelopes could enable them to take on GHG reduction projects that are unique to their specific process, equipment or broader operation.

FUND CLEAN-TECH ADOPTION

Increasing the funding options available specifically to SME manufacturers to lower the high upfront costs and improve the long payback periods of adopting clean technologies, including new and emerging technologies, would be highly beneficial. Given that renewables and other clean technologies accounted for roughly a third to half of the identified reductions for our participants, this is an important part of enabling net-zero for SME manufacturers.

IMPROVE THE EASE OF APPLICATION

An easy, quick and straightforward application with clear timelines would help SMEs better access funding. A staged/gated application process would be useful such that the first stage application could evaluate the proposed project for eligibility/fit before SMEs invested significant time into a more detailed application.

CONSIDER FUNDING RELEVANT TO BUSINESS SIZE

Having SMEs compete with larger organizations for funding puts them at a disadvantage when \$/tonne is a key metric in evaluating successful proposals as SMEs are smaller and tend to also have a smaller individual carbon footprint. Having funding programs that take into account the business size is important so that projects put forward by SME manufacturers are competing with similarly sized or resourced organizations. Even within the category of SMEs, that might mean offering programs at different funding sizes to allow both small and medium organizations an opportunity to access funding.



ENABLE PROJECT BUNDLING

Enabling SMEs to bundle their own projects or pool projects with other SMEs with the help of an administrator could help get more projects completed and increase the overall size of projects to make applications more competitive against larger organizations.

NET-ZERO ACCELERATOR FUND

Lastly, we recommend creating a **Net-Zero Accelerator Fund for SMEs** to encourage and provide financial support for SME manufacturers and other small businesses to move toward net-zero emissions. The Net Zero Accelerator Initiative exists for large industrial businesses, providing \$8B to support large-scale investments to move towards net-zero.⁶⁹ Having a similar fund designed for and accessible to SME manufacturers would motivate them in taking a holistic and accelerated approach to aligning their business models with net-zero. As we have done with this project, funding could support moving SME manufacturers through the process of developing a GHG inventory, creating a net-zero action plan, and providing funding to implement a suite of deep decarbonization projects over a period of time to move towards net-zero. Additional incentives could be provided to help SME manufacturers set and integrate net-zero goals, and train staff to have the required knowledge and skills to help their organization make the low-carbon transition.

⁶⁹Net Zero Accelerator Initiative: <https://ISED-ISDE.CANADA.CA/site/strategic-innovation-fund/en/net-zero-accelerator-initiative>

c. Increase Availability/Awareness of SME-focused Sustainable Financing Products

While our policy and program scan looked at publicly available financing and support for the low-carbon transition, financial institutions can play a key role in helping SMEs transition to a low-carbon future. 50% of our participants said that they used general credit from financial institutions as a means to finance sustainability projects, but only one had received credit specifically to finance sustainability projects. Sustainable financing products which provide a lower interest rate for projects aligned with the net-zero transition could help SMEs reduce the upfront costs to take on these projects more quickly. As many SMEs are concerned with increasing debt loads, pairing these loans with grants, subsidies, non-repayable contributions and tax credits from the government could create an attractive financing package to help SMEs implement actions towards net-zero.



Sustainable financing products that provide a lower interest rate for projects aligned with the net-zero transition could help SMEs reduce the upfront costs to take on these projects more quickly





Copernicus Educational Products

Conclusion

Our project shows that SME manufacturers can take many steps today to put them on the path to net-zero while becoming stronger and more competitive in the global shift to a low-carbon future.

These businesses, with their agility, quick decision-making processes, and connection to their communities, represent a source of untapped potential in accelerating Canada's transition to a vibrant and inclusive net-zero future. To mobilize SME manufacturers on the path to net-zero and adequately prepare them for changing regulatory and customer requirements, it is clear we must increase awareness of the need to act and

design policies and programs with their unique characteristics in mind. We must also rapidly ramp up the scale of financial incentives and capacity-building support available to help them adopt low-carbon practices, while continuing to invest in macro levers like greening Canada's electricity grid. These changes will benefit not just SME manufacturers, but all SMEs broadly across the country. With the right support designed and delivered for SMEs manufacturers, we can unlock their tremendous potential to help us hit our climate goals, drive economic growth, and position Canada as a leader in green economic transformation globally.

APPENDIX A

Summary of Policy Scan



Appendix A - Summary of Policy Scan

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | The fuel charge portion of the federal carbon pollution pricing backstop system , while not specific to SMEs, applies to a number of fuels used by SME manufacturers - including natural gas, propane, diesel and gasoline. ^{70,71} | No | Regulations & Legislation |
| | Climate Action Incentive Fund (CAIF) Small- and Medium-sized Enterprises project stream supported over 700 proposals for SMEs wishing to undertake retrofit projects, targeting emissions from areas including industry, buildings and transportation. ^{72,73} This program was active until March 31, 2021 and is now closed. ⁷⁴ | Yes | Financial Incentives - Capital and Infrastructure |
| | Natural Resources Canada's Energy Manager Program provided 'financial assistance for industrial, commercial and institutional facilities, and fleets to identify and adopt energy efficiency solutions...' SMEs were listed prominently among potential eligible recipients. ⁷⁵ | Yes | Financial Incentives - Capacity Building |
| | The Low Carbon Economy Challenge portion of the \$2 billion Low Carbon Economy Fund, launched in 2017, provided funding to innovative GHG emission reduction projects ⁷⁶ , with SMEs listed prominently as potential eligible recipients for the Partnerships stream. ⁷⁷ | Yes | Financial Incentives - Capital and Infrastructure |
| | The Canada Growth Fund is a public investment vehicle with \$15 billion dedicated to supporting the development of Canada's clean economy. It provides funding for projects across low-carbon or climate tech value chains, including low-carbon natural resource development to help reduce emissions. SMEs are listed as eligible recipients. ⁷⁸ | No | Financial Incentives - Capital & Infrastructure |

⁷⁰ Government of Canada, "Fuel Charge Rates," <https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/fcrates/fuel-charge-rates.html>

⁷¹ Government of Canada, "Carbon Pollution Pricing – What You Need To Know," <https://www.canada.ca/en/revenue-agency/campaigns/pollution-pricing.html>

⁷² Government of Canada, "Climate Action Incentive Fund: Small and Medium-sized Enterprises Project stream," <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund/small-medium-enterprises-project-stream.html>

⁷³ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 105.

⁷⁴ Environment and Climate Change Canada, "Carbon pollution pricing proceeds programming and use of proceeds," <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming.html>

⁷⁵ Natural Resources Canada, "Energy Manager Program," <https://www.nrcan.gc.ca/energy-manager-program/21917>

⁷⁶ Government of Canada, "What is the Low Carbon Economy Fund," <https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund/what-is-lcef.html>

⁷⁷ Government of Canada, "Low Carbon Economy Challenge," <https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund/challenge.html>

⁷⁸ Department of Finance Canada, "Canada Growth Fund," <https://www.budget.canada.ca/fes-eea/2022/doc/gf-fc-en.pdf>

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | The Clean Electricity Investment Tax Credit is a tax credit that provides a 15% refund for eligible clean electricity investments to support SME manufacturer's transition to net-zero production. This tax credit includes non-emitting electricity generation systems and stationary electricity storage systems like batteries, pumped hydroelectric storage, and compressed air storage. ⁷⁹ | No | Financial Incentives - Capital & Infrastructure |
| | The Canada Infrastructure Bank allocates \$10 billion towards its Clean Power priority area and an additional \$10 billion towards its Green Infrastructure priority area. As a result, the Bank will have the capacity to invest a minimum of \$20 billion in the year 2023, which will support the development of significant clean growth and clean electricity infrastructure projects for SME manufacturers. ⁸⁰ | No | Financial Incentives - Capital & Infrastructure |
| | The Investment Tax Credit for Clean Technology Manufacturing is a proposed measure that would offer a refundable tax credit of 30% to companies investing in new machinery and equipment used in the manufacturing or processing of clean technologies and critical minerals. This would also include certain industrial vehicles and related control systems used in manufacturing. ⁸¹ | No | Financial Incentives - Capital & Infrastructure |
| | Reduced Tax Rates for Zero-Emission Technology Manufacturers are enhanced to extend the reduced tax rate of 4.5% for small businesses and 7.5% for other businesses up to 2035. ⁸² | Yes | Regulations & Legislation |
| | Strategic Innovation Fund provides \$500 million over ten years from 2023 to support the development and application of clean technologies across sectors, including manufacturers. The fund will also allocate \$1.5 billion of its existing resources to projects in clean technology, critical minerals and industrial transformation. ⁸³ | No | Financial Incentives - Capital & Infrastructure |

⁷⁹ Department of Finance Canada, "Budget 2023: Chapter 3 - A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy," <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html>

⁸⁰ Department of Finance Canada, "Budget 2023: Chapter 3 - A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy," <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html>

^{81,82,83} Ibid

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | The Energy Innovation Program's Clean Fuels and Industrial Fuel Switching initiative will allocate up to \$50 million for industrial fuel switching for manufacturers in chemicals and fertilizers, iron and steel, smelting and refining, and cement. The program aims to address hard-to-abate sectors by focusing on this technology area, as well as clean fuels production and hydrogen codes and standards. ⁸⁴ | No | Financial Incentives - Capital & Infrastructure |
| | The Canadian Innovation and Investment Agency has pledged \$1 billion over a period of five years from 2022-23 to support the initial operations of Canadian companies and facilitate innovation, commercialization of research, and the creation of fresh economic prospects for businesses. SMEs are named as being an important recipient stakeholder from this agency. ⁸⁵ | No | Financial Incentives - Capital & Infrastructure |
| | The Green Button is an Ontario data standard that businesses, particularly SMEs, can use to access their utility data. By using Green Button applications to analyze this data, SMEs can find personalized ways to increase energy efficiency, leading to cost savings on monthly bills and a reduction in demand on the energy system. ^{86,87} | Yes | Informational Supports & Recognition Programs |
| | Through the Canada Infrastructure Program (ICIP) , \$33 billion funding is delivered through bilateral agreements with each of the provinces and territories. SMEs can access this fund through their province's Green Infrastructure stream to support projects that create more energy efficient buildings or improve capacity to manage more renewable energy. ^{88,89} | No | Financial Incentives - Capital & Infrastructure |

⁸⁴ Natural Resources Canada, "Energy Innovation Program - Clean Fuels and Industrial Fuel Switching," <https://natural-resources.canada.ca/science-and-data/funding-partnerships/funding-opportunities/funding-grants-incentives/energy-innovation-program/energy-innovation-program-clean-fuels-and-industrial-fuel-switching/23956>

⁸⁵ Department of Finance Canada, "Budget 2022: Chapter 2 - Jobs, Growth, and an Economy That Works for Everyone," <https://www.budget.canada.ca/fes-eeq/2022/report-rapport/chap2-en.html#wb-cont>

⁸⁶ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation* (2022), 111.

⁸⁷ Province of Ontario, "Lower your energy bills with Green Button," <https://www.ontario.ca/page/lower-your-energy-bills-green-button#section-2>

⁸⁸ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation* (2022), 40.

⁸⁹ Government of Canada, "Investing in Canada Infrastructure Program," <https://www.infrastructure.gc.ca/plan/icp-pic-INFC-eng.html>

| Policy Interventions Summary | | | |
|------------------------------|---|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | Net Metering regulation is amended to allow a significantly broader pool of industrial electricity customers to enable third-party ownership of net metered renewable energy generation in Ontario. SMEs who are not in a position to own or operate their own behind-the-meter renewable energy generating equipment can benefit from this. ⁹⁰ | No | Regulations & Legislation |
| | The Grid Innovation Fund in Ontario, previously known as the Conservation Fund, supports innovative initiatives to lower electricity bills. The fund is open to various types of applicants, including SMEs, to better manage their energy consumption. ^{91,92} | No | Financial Incentives - Capital & Infrastructure |
| | The Ontario Made Manufacturing Investment Tax Credit offers a 10% refundable Corporate Income Tax credit to qualifying investments in buildings, machinery, and equipment for use in manufacturing or processing within the province. Businesses can receive up to \$2 million in tax credits annually. Although the incentive is not specifically linked to emission reduction upgrades, it could support SMEs in upgrading their operations to newer, cleaner standards. ⁹³ | No | Financial Incentives - Capital & Infrastructure |
| | The Ontario Automotive Modernization Program is a partnership with SME automotive parts suppliers in Ontario providing up to \$150,000 to help cover up to 50% of eligible project costs. ⁹⁴ It supports projects including process technology adoption, tools and technologies to support new product development, and lean manufacturing. Although this incentive is not tied to emission reduction upgrades, this may support updating overall operations to newer, cleaner standards. | Yes | Financial Incentives - Capital & Infrastructure |

⁹⁰ Jacob A. Sadikman et al., Ontario amends net metering regulation for third-party ownership (2022), <https://www.osler.com/en/blogs/energy/may-2022/ontario-amends-net-metering-regulation-for-third-party-ownership>

⁹¹ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 46.

⁹² IESO, "Grid Innovation Fund," <https://www.ieso.ca/en/Get-Involved/Innovation/Grid-Innovation-Fund/Overview>

⁹³ Government of Ontario, "2023 Ontario Budget: Chapter 1, Section A: Building Ontario," <https://budget.ontario.ca/2023/chapter-1a.html#s-2>

⁹⁴ Government of Ontario, "Ontario Automotive Modernization Program", <https://www.ontario.ca/page/ontario-automotive-modernization-program> [Version: Feb 6, 2023]

| Policy Interventions Summary | | | |
|------------------------------|---|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | The Ontario Vehicle Innovation Network (OVIN) launched with a \$56.4 million investment in 2021. The OVIN aims to promote innovation and collaboration in the development of EV and battery-related technologies through partnerships between SMEs, academia, the auto industry, and the battery sector. ⁹⁵ | Yes | Financial Incentives - Capacity Building |
| | The voluntary Clean Energy Credit (CEC) registry will enable SME manufacturers to prove that their electricity has been sourced from clean resources like hydroelectric, solar, wind, bioenergy, and nuclear power. The purchases of CECs can generate funds that could be returned to ratepayers, helping to lower electricity costs and support the generation of future clean energy. ⁹⁶ | No | Financial Incentives - Capital & Infrastructure |
| | Regional Development Program: Advanced Manufacturing and Innovation Competitiveness (AMIC) Stream offers financial assistance to SME manufacturers in Ontario. It invests in capital equipment, technology adoption, and skills development to boost innovation and competitiveness. ⁹⁷ While this initiative is not specifically aimed at emission reduction, it could facilitate upgrades to cleaner and more modern operations. | Yes | Financial Incentives - Capital & Infrastructure |
| | The Government of Canada provides Tax Savings for Industry – business income tax incentives for clean energy projects. ⁹⁸ This includes an accelerated capital cost allowance for eligible equipment under Classes 43.1 and 43.2 of Income Tax Regulations Schedule II and deductions for certain expenses considered to fall under the category of ‘Canadian renewable and conservation expense’. ⁹⁹ These would include ‘certain expenses incurred during the development and start-up of renewable energy and energy conservation projects’. ¹⁰⁰ | No | Financial Incentives - Capital and Infrastructure |

⁹⁵ Government of Ontario, “2023 Ontario Budget: Chapter 1, Section A: Building Ontario,” <https://budget.ontario.ca/2023/chapter-1a.html#s-2>

⁹⁶ Government of Ontario, “2023 Ontario Budget: Chapter 1, Section A: Building Ontario,” <https://budget.ontario.ca/2023/chapter-1a.html#s-2>

⁹⁷ Government of Ontario, “Regional Development Program: Advanced Manufacturing and Innovation Competitiveness Stream,” <https://www.ontario.ca/page/regional-development-program-advanced-manufacturing-and-innovation-competitiveness-stream> [Version: Jan 31, 2023]

⁹⁸ Natural Resources Canada, “Tax Savings for Industry,” <https://www.nrcan.gc.ca/science-data/funding-partnerships/funding-opportunities/funding-grants-incentives/tax-savings-industry/5147>

^{99,100} “Tax Savings for Industry.”

| Policy Interventions Summary | | | |
|---|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Cross- Cutting | In its 2019 budget, the Ontario government proposed the Ontario Job Creation Investment Incentive , 'a tax credit that allows businesses to write-off investments made in specified clean energy equipment.' ^{101,102} | No | Financial Incentives - Capital and Infrastructure |
| Building and Industrial Emissions DEFINITION "Building emissions" will refer to non-process emissions, including those associated with the heating or cooling of buildings and water ^{103,104} "Industrial emissions" will refer to emissions associated with industrial processes. | The federal output-based pricing system (OBPS) for larger industrial facilities , applies only to industrial facilities ^{105,106} emitting at or in excess of 50,000 tonnes of CO ₂ e annually ¹⁰⁷ , limiting applicability to SME study participants, who together emitted less than 5,000 tCO ₂ e in 2020. On January 1, 2022, the Ontario Emissions Performance Standards (EPS) program took effect to regulate greenhouse gas emissions from large industrial facilities, replacing the federal OBPS in Ontario. ¹⁰⁸ | No | Regulations & Legislation |
| | The Canadian Industry Partnership for Energy Conservation (CIPEC) is a coalition that provides benefits including recognition and networking opportunities to its members and does not have onerous membership requirements. ^{109,110} | No | Informational Supports & Recognition Programs |

¹⁰¹ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change: Third Annual Synthesis Report on the Status of Implementation* (2020), 43. http://publications.gc.ca/collections/collection_2020/eccc/En1-77-2019-eng.pdf

¹⁰² Carolyn Kim and Cedric Smith, Building a zero-emission goods-movement system: Technical appendix (2020), 21. <https://www.pembina.org/pub/building-zero-emission-goods-movement-system>

¹⁰³ Government of Canada, *Pan-Canadian Framework on Clean Growth and Climate Change* (2016), 15. <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>

¹⁰⁴ Natural Resources Canada, "A market transformation roadmap for windows, space heating and water heating technologies," <https://www.nrcan.gc.ca/energy/regulations/21290>

¹⁰⁵ "Carbon Pollution Pricing - What You Need To Know."

¹⁰⁶ Government of Canada, "Ontario and pollution pricing," <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/ontario.html>

¹⁰⁷ Government of Canada, "Review of the federal Output-Based Pricing System Regulations," <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/review.html>

¹⁰⁸ Government of Ontario, "2023 Ontario Budget: Chapter 1, Section A: Building Ontario," <https://budget.ontario.ca/2023/chapter-1a.html#s-2>

¹⁰⁹ Government of Canada, "Become a CIPEC Leader," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-industry/canadian-industry-program-energy/become-cipec-leader/20382>

¹¹⁰ Membership for industrial companies is free and requires submission of a letter of intent. Source: Natural Resources Canada, "Become a CIPEC Leader." <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-industry/canadian-industry-program-energy/become-cipec-leader/20382>

| Policy Interventions Summary | | | |
|-----------------------------------|---|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | The ENERGY STAR for Industry and ENERGY STAR Challenge for Industry programs provide recognition for efficient facilities and those that achieve significant energy reductions. ^{111,112} | No | Informational Supports & Recognition Programs |
| | Natural Resources Canada's Industrial Energy Management program has been renamed to the Green Industrial Facilities and Manufacturing Program (GIFMP) to offer cost-shared financial support to industrial facilities and manufacturing to maximize their energy efficiency and reduce emissions in their operations. The GIFMP will provide \$194 million over five years ¹¹³ , starting in 2022-23 to support various energy-efficient practices such as ISO 50001 certification, training for energy managers, audits, and capital investments for retrofits and upgrades to facilities. ¹¹⁴ Federal and provincial tax incentives for clean energy projects and equipment are also examples of financial incentive programs intended to reduce the cost of emissions reduction projects. ^{115,116,117} | No | Financial Incentives - Capital and Infrastructure |
| | The federal government's Regulations amending the Ozone-depleting Substances and Halocarbon Alternatives Regulations , seek to reduce the release of hydrofluorocarbons (HFCs) through reducing both their supply in Canada and demand therefore in manufactured products. | No | Regulations & Legislation |
| | The federal Energy Efficiency Act and Energy Efficiency Regulations and the Ontario Energy and Water Efficiency Regulations set efficiency standards for products including water heaters, heating equipment and air conditioning equipment. ^{118,119} | No | Regulations & Legislation |

¹¹¹ Natural Resources Canada, "ENERGY STAR for Industry certification," <https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/about-energy-star-canada/energy-star-announcements/energy-star-industry/19858#wb-auto-4>

¹¹² "ENERGY STAR Challenge for Industry."

¹¹³ Natural Resources Canada, "Minister Wilkinson Announces New Program to Support Decarbonization of Industrial Facilities and Manufacturing to Maximize Energy Performance and Industry Competitiveness," <https://www.canada.ca/en/natural-resources-canada/news/2023/02/minister-wilkinson-announces-new-program-to-support-decarbonization-of-industrial-facilities-and-manufacturing-to-maximize-energy-performance-and-i.html>

¹¹⁴ Natural Resources Canada, "Green Industrial Facilities and Manufacturing Program," <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-for-industry/green-industrial-facilities-and-manufacturing-program/20413>

¹¹⁵ Natural Resources Canada, "Tax Savings for Industry," <https://www.nrcan.gc.ca/science-data/funding-partnerships/funding-opportunities/funding-grants-incentives/tax-savings-industry/5147>

¹¹⁶ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change: Third Annual Synthesis Report on the Status of Implementation* (2020), 43. http://publications.gc.ca/collections/collection_2020/eccc/En1-77-2019-eng.pdf

¹¹⁷ Carolyn Kim and Cedric Smith, *Building a zero-emission goods-movement system: Technical appendix* (2020), 21. <https://www.pembina.org/pub/building-zero-emission-goods-movement-system>

¹¹⁸ Government of Canada, "Introduction to the Regulations: Canada's Energy Efficiency Act (Act) and Energy Efficiency Regulations (the Regulations)," <https://www.nrcan.gc.ca/energy/regulations-codes-standards/6859>

¹¹⁹ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change: Third Annual Synthesis Report on the Status of Implementation* (2020), 60. http://publications.gc.ca/collections/collection_2020/eccc/En1-77-2019-eng.pdf

| Policy Interventions Summary | | | |
|-----------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | EnerGuide labels ¹²⁰ and ENERGY STAR certified products ^{121,122} can be used to ensure businesses are purchasing energy efficient products. | No | Informational Supports & Recognition Programs |
| | The Energy Efficiency database is an online one-stop shop for energy efficiency resources ¹²³ . | No | Informational Supports & Recognition Programs |
| | The Independent Electricity System Operator (IESO) has developed a Conservation and Demand Management Framework for 2021-2024, which focuses on 'cost-effectively meeting the needs of Ontario's electricity system'. ¹²⁴ | No | Regulations & Legislation |
| | The IESO's Retrofit program offers incentives for energy efficient upgrades in areas including lighting, HVAC and manufacturing. ¹²⁵ IESO energy-efficiency programs for families and businesses were increased by \$342 million in Ontario Budget 2023. | No | Financial Incentives - Capital and Infrastructure |
| | The IESO's Energy Manager program provides approved companies with up to \$20,000 upfront to hire an energy manager and up to \$150,000 per year based on performance. ¹²⁶ | No | Financial Incentives - Capacity Building |
| | The Energy Performance program provides financial incentives based on electricity savings and peak demand savings. ¹²⁷ | No | Financial Incentives - Capital and Infrastructure |
| | The Small Business Lighting program provides businesses with 50 employees or fewer incentives of up to \$2,000 for new energy efficient lighting. ¹²⁸ | Yes | Financial Incentives - Capital and Infrastructure |

¹²⁰ Government of Canada, "EnerGuide in Canada." <https://www.nrcan.gc.ca/energy-efficiency/energuide/12523>

¹²¹ Government of Canada, "ENERGY STAR for Products." <https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-products/12519>

¹²² Government of Canada, "List of ENERGY STAR certified products." <https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-products/list-energy-star-certified-products/13631>

¹²³ Government of Canada, "Energy Efficiency." <https://www.nrcan.gc.ca/energy-efficiency/10832>

¹²⁴ Independent Electricity System Operator, "2021-2024 Conservation and Demand Management Framework," Save on Energy, November 4, 2020. <https://saveonenergy.ca/Overview/CDM-Framework-Nov-4-update>

¹²⁵ Independent Electricity System Operator, "About the Retrofit program," Save on Energy, <https://saveonenergy.ca/For-Business-and-Industry/Programs-and-Incentives/Retrofit-Program/About>

¹²⁶ Independent Electricity System Operator, "Energy Manager Program," Save on Energy, <https://saveonenergy.ca/en/For-Business-and-Industry/Programs-and-Incentives/Energy-Manager-Program>

¹²⁷ Independent Electricity System Operator, "Energy Performance Program," Save on Energy, <https://saveonenergy.ca/en/For-Business-and-Industry/Programs-and-Incentives/Energy-Performance-Program>

¹²⁸ Independent Electricity System Operator, "Small Business Lighting Program," Save on Energy, <https://saveonenergy.ca/en/For-Your-Small-Business/Programs-and-Incentives/Lighting>

| Policy Interventions Summary | | | |
|-----------------------------------|---|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | IESO will be offering a new program in 2022 which will 'focus on supporting participants to get larger, more complex projects off the ground', 'reduce the administrative burden for participants' and 'help address the unique and specialized needs of industrial consumers'. ¹²⁹ | No | Financial Incentives - Capital and Infrastructure |
| | ENERGY STAR Portfolio Manager allows comparison of buildings to the national average and others of the same type. ¹³⁰ | No | Informational Supports & Recognition Programs |
| | Major energy retrofit guidelines can provide guidance on how to assess, plan, implement and maintain energy-saving building retrofits. ¹³¹ | No | Informational Supports & Recognition Programs |
| | Starting in 2023-24, Investment Tax Credit for Carbon Capture, Utilization and Storage (CCUS) will be available for high-emitting sectors to invest in CCUS for projects. ¹³² Specific labour requirements will be attached to this tax credit. | No | Financial Incentives - Capital & Infrastructure |
| | To support clean energy projects in northern and Indigenous communities, the Wah-ila-toos initiative , which includes Northern REACHE , provides \$300 million in funding. The types of projects funded include renewable energy technologies, capacity building for energy literacy and planning, as well as energy efficiency improvement for building upgrades and retrofits. ^{133,134,135} | No | Financial Incentives - Capital & Infrastructure |
| | The National Building Code 2020 and National Energy Code for Buildings 2020 support the development and adoption of net-zero-energy-ready building codes and technologies through \$48.3 million in investment. SMEs can access this funding from the Green Infrastructure Energy Efficient Buildings Research, Development and Demonstration program. ¹³⁶ | No | Regulations & Legislation |

¹²⁹ IESO, "Save on Energy New Program Information: Process and Systems Upgrade program." <https://saveonenergy.ca/en/Overview/CDM-Framework-Program-Details>

¹³⁰ Government of Canada, "ENERGY STAR Portfolio Manager Access Page," <https://www.nrcan.gc.ca/energy/efficiency/buildings/energy-benchmarking/3693>

¹³¹ Natural Resources Canada, *Major Energy Retrofit Guidelines for Commercial and Institutional Buildings* (2016), <https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oe/buildings/pdf/RetrofitGuidelines-e.pdf>

¹³² Department of Finance Canada, "Budget 2023: Chapter 3 - A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy," <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html>

¹³³ Government of Canada, "Clean energy in Indigenous, rural and remote communities," <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reduce-emissions/reducing-reliance-diesel.html>

¹³⁴ Government of Canada, "Northern REACHE Program." <https://www.rcaanc-cimac.gc.ca/eng/1481305379258/1594737453888#h2-4>

¹³⁵ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation* (2022), 105.

¹³⁶ Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation* (2022), 49.

| Policy Interventions Summary | | | |
|-----------------------------------|---|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | The Decarbonization Incentive Program (DIP) is a merit-based program part of the Output-Based Pricing System Proceeds Fund. DIP incentivizes long-term decarbonization of Canada's industrial sectors to accelerate or deploy commercially available low-carbon technology to reduce GHG emissions. ¹³⁷ SMEs can only access the fund through their province. | No | Financial Incentives - Capital & Infrastructure |
| | Enbridge Gas Inc. offers incentives for efficient natural gas equipment upgrades, new construction and retrofits to businesses including SMEs. ¹³⁸ Their programs include providing financial incentives and design expertise to upgrade to more efficient equipment that align with Ontario Building Code. They also cover up to 50% of project costs for energy-efficiency projects not covered by fixed equipment incentives. ¹³⁹ This is a part of the Natural Gas Conservation Framework to increase process efficiencies and is approved by the Ontario Energy Board. ¹⁴⁰ | Yes | Financial Incentives - Capital & Infrastructure |
| | Enbridge Gas Inc. covers the cost of identifying and measuring energy-saving opportunities in the building or facility of businesses in Ontario, including SMEs. ¹⁴¹ This is a part of the Natural Gas Conservation Framework to increase process efficiencies and is approved by the Ontario Energy Board. ¹⁴² | Yes | Financial Incentives - Capacity Building |
| | The Forest Biomass Action Plan for manufacturers of forest biomass-based products is still undergoing the planning stage, however it aims to encourage sustainability in Ontario's forest sector in its five-year action plan. ¹⁴³ | No | Regulations & Legislation |

¹³⁷ Environment and Climate Change Canada, "Output-Based Pricing System Proceeds Fund: Decarbonization Incentive Program." <https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/output-based-pricing-system-proceeds-fund/decarbonization-incentive-program.html#toc3>

¹³⁸ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 66.

¹³⁹ Enbridge, "Programs & Incentives." <https://www.enbridgegas.com/business-industrial/incentives-conservation/programs-and-incentives>

¹⁴⁰ Ontario Energy Board, "OEB approves new multi-year natural gas conservation plan for Enbridge Gas Inc. and an updated natural gas conservation policy framework," <https://www.oeb.ca/sites/default/files/backgrounder-egi-dsm-EB-2021-0002-20221122-en.pdf>

¹⁴¹ Enbridge, "Program & Incentives." <https://www.enbridgegas.com/business-industrial/incentives-conservation/programs-and-incentives>

¹⁴² Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 66.

¹⁴³ Province of Ontario, "Forest Biomass Action Plan," <https://www.ontario.ca/page/forest-biomass-action-plan>

| Policy Interventions Summary | | | |
|-----------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | Canada introduced changes to the Off-Road Compression-Ignition and Large Spark-Ignition Engine Emission Regulations to reduce harmful air pollutants emitted by new equipment such as stationary diesel engines, generators, and forklifts. This sets a new emission standard to establish one consistent regulatory framework. ^{144,145} | No | Regulations & Legislation |
| | The IESO's Save on Energy Industrial Energy Efficiency Program (IEEP) supports industrial manufacturers across Ontario in improving their industrial processes and implementing system optimization projects. The program offers organizations up to \$5 million in financial incentives for each large, complex industrial energy-efficiency project accepted into the program. ¹⁴⁶ | No | Financial Incentives - Capacity Building |
| | Though no longer active, the Green Ontario Fund , established in 2017, was a popular program that provided homeowners and businesses with rebates to install energy efficient windows, thermostats, insulation and heat pumps that would help reduce the energy consumption and GHG emissions from buildings. ¹⁴⁷ | No | Financial Incentives - Capital and Infrastructure |
| | The Government of Canada has developed a series of tools to support the recommissioning of commercial and institutional buildings . Recommissioning re-optimizes buildings by improving energy-efficiency and comfort levels for building occupants. The process is expected to lead to energy savings typically ranging from five to 15 percent, but can result in savings as high as 30 percent. A recommissioning guide, an advanced training course and case studies have been developed to support those involved in the recommissioning process. ¹⁴⁸ | No | Informational Supports & Recognition Programs |

¹⁴⁴ Department of Justice, "Off-road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations (SOR/2020-258)," <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2020-258/page-2.html#h-1277264>

¹⁴⁵ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 55.

¹⁴⁶ IESO, Save on Energy, "Industrial Energy Efficiency Program," <https://www.saveonenergy.ca/For-Business-and-Industry/Programs-and-incentives/Industrial-Energy-Efficiency-Program>

¹⁴⁷ Tess Kalinowski, "Green Ontario cancellation leaves homeowners, industry scrambling," The Star, June 20, 2018. <https://www.thestar.com/business/real-estate/2018/06/20/green-ontario-cancellation-leaves-homeowners-industry-scrambling.html>

¹⁴⁸ Government of Canada, "Recommissioning for existing buildings," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-buildings/energy-efficiency-existing-build/recommissioning-existing-buildings/20705>

| Policy Interventions Summary | | | |
|-----------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Building and Industrial Emissions | The ' Reporting of Energy Consumption and Water Use regulation ' requires that owners of large buildings report water and energy use annually to the Ministry of Energy, Northern Development and Mines. ¹⁴⁹ | No | Regulations & Legislation |
| | The SMART Green program had been allocated \$25 million to assist small-and medium- sized manufacturers in Ontario to 'upgrade their processes and facilities to reduce GHG emissions and energy consumption...' ¹⁵⁰ The program website notes that 'funding for this program is now fully committed.' ¹⁵¹ | Yes | Financial Incentives - Capital and Infrastructure |
| | This TargetGHG program by the Ontario Centre of Innovation seeks to encourage 'industrial plants to adopt leading-edge technology' in collaboration with Ontario entrepreneurs. All three streams of the program are currently closed. The program's targeting of 'large industrial plants' would also limit applicability to SME manufacturers. ¹⁵² | No | Financial Incentives - Capital and Infrastructure |
| Transportation Emissions | Canada's Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations set standards for new, on-road light-duty vehicles ¹⁵³ while the second phase of Canada's Heavy-Duty Vehicle and Engine Greenhouse Gas Emission Regulations will put in place new performance-based standards for the reduction of GHG emissions from on-road heavy-duty vehicles, engines and potentially trailers, too. ^{154,155} Canada's 2020 <i>A Healthy Environment and a Healthy Economy</i> plan proposed to further strengthen these standards. ¹⁵⁶ | No | Regulations & Legislation |

DEFINITION
 "Transportation emissions" will refer to emissions associated with vehicles.

¹⁴⁹ "Report energy and water use in large buildings".

¹⁵⁰ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - First Annual Synthesis Report on the Status of Implementation - December 2017, 30. https://www.canada.ca/content/dam/themes/environment/weather/climatechange/PCF-FirstSynthesis_ENG.pdf

¹⁵¹ Canadian Manufacturers & Exporters, "Welcome to the CME SMART Program," <https://www.cme-smart.ca/home-en>

¹⁵² Ontario Centre of Innovation, "TargetGHG," <https://oce-ontario.org/programs/archived-programs/target-ghg>

¹⁵³ Environment and Climate Change Canada, 2018 Discussion paper on the mid-term evaluation of the Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations (2017), 1-2. <https://www.canada.ca/content/dam/eccc/documents/pdf/cepa/DiscussionPaperAutomobilesLightTrucksGHG2018-eng.pdf>

¹⁵⁴ Government of Canada, Heavy-Duty Vehicle and Engine Greenhouse Gas Emission Regulations SOR/2013-24. <https://laws-lois.justice.gc.ca/PDF/SOR-2013-24.pdf>

¹⁵⁵ An interim order to delay the implementation of the trailer standards is in effect until May 18, 2021.

¹⁵⁶ Environment and Climate Change Canada, *A Healthy Environment and a Healthy Economy: Background* (2020), 2-3. <https://www.canada.ca/en/environment-climate-change/news/2020/12/a-healthy-environment-and-a-healthy-economy.html>

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Transportation Emissions | \$199.6 million over five years is allocated to expand the Green Freight Assessment Program, now renamed to Green Freight Program starting in 2022-23, and \$0.4 million ongoing from Natural Resources Canada. This program helps companies to reduce fuel consumption and greenhouse gas emissions of fleets through various methods such as energy assessments, retrofits, repowers, logistical best practices and low carbon vehicle purchases, thereby helping to decarbonize vehicles already on the road. ^{157,158} | No | Financial Incentives - Capital and Infrastructure Projects |
| | The SmartDriver training series provides training to commercial and institutional fleets in Canada and aims to help drivers improve their fuel consumption in order to reduce operating costs and vehicle emissions. ¹⁵⁹ | No | Informational Supports & Recognition Programs |
| | The SmartWay Transport Partnership , meanwhile, is a voluntary program to encourage 'best practices in freight supply chains' and supports participants in areas including benchmarking, fuel consumption tracking and performance improvement. ¹⁶⁰ | No | Informational Supports & Recognition Programs |
| | The Government of Canada has committed to a mandatory zero-emission vehicle sales target of 100% as of 2035. ¹⁶¹ This will apply to all new light-duty cars and passenger trucks. ¹⁶² | No | Regulations & Legislation |
| | Canada's Incentives for Zero-Emission Vehicles (iZEV) program provides point-of-sale incentives for the purchase or lease of eligible ZEVs. ¹⁶³ The program was extended in the federal 2022 budget with a proposal to provide \$1.7 billion over five years, starting in 2022-23 to extend the iZEV program until March 2025. ¹⁶⁴ | No | Financial Incentives - Capital and Infrastructure |

¹⁵⁷ "Natural Resources Canada, "Green Freight Program," <https://natural-resources.canada.ca/energy-efficiency/transportation-alternative-fuels/greening-freight-programs/green-freight-program/20893> [Version: Feb 22, 2023]

¹⁵⁸ Department of Finance Canada, "Budget 2022: Chapter 2 - Jobs, Growth, and an Economy That Works for Everyone," <https://www.budget.canada.ca/fes-eea/2022/report-rapport/chap2-en.html#wb-cont>

¹⁵⁹ Government of Canada, "SmartDriver Training Series," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/greening-freight-programs/smartdriver-training-series/21048>

¹⁶⁰ Government of Canada, "Join SmartWay," <https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-transportation-and-alternative-fuels/fuel-efficiency-commercial-transportation/smartway-fuel-efficient-freight-transportation/smartway-partners/join-smartway/21056>

¹⁶¹ Transport Canada, "Canada's Zero-Emission Vehicle (ZEV) sales targets," <https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles/canada-s-zero-emission-vehicle-zev-sales-targets>

¹⁶² Transport Canada, media release, *Building a green economy: Government of Canada to require 100% of car and passenger truck sales be zero-emission by 2035 in Canada*, June 29, 2021. <https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html>

¹⁶³ "Zero-emission vehicles."

¹⁶⁴ Department of Finance Canada, "Budget 2022: Chapter 2 - Jobs, Growth, and an Economy That Works for Everyone," <https://www.budget.canada.ca/fes-eea/2022/report-rapport/chap2-en.html#wb-cont>

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Transportation Emissions | The federal government offers a 100% tax write-off for zero-emission light-, medium- and heavy-duty vehicles that have been bought by businesses. ¹⁶⁵ The federal government expanded the tax credit eligibility to include a wider array of eligible automotive equipment and vehicles in 2020. ¹⁶⁶ | No | Financial Incentives - Capital and Infrastructure |
| | Ontario's Green Vehicle License Plate Program provides organizations including businesses with benefits that include enhanced access to certain high occupancy toll lanes and high occupancy vehicle lanes. ¹⁶⁷ | No | Financial Incentives - Capital and Infrastructure |
| | To increase the availability of ZEV charging and refueling infrastructure, the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative (EVAFIDI) has a goal of establishing a 'coast-to-coast' infrastructure network. ¹⁶⁸ | No | Financial Incentives - Capital and Infrastructure |
| | The Zero-Emission Vehicle Infrastructure Program (ZEVIP) is focused on investing in infrastructure in 'more localized areas where Canadians live, work and play'. ¹⁶⁹ | No | Financial Incentives - Capital and Infrastructure |
| | The Electric Charging and Alternative Fueling Stations Locator provided by Natural Resources Canada helps businesses and individuals to locate public stations. ¹⁷⁰ | No | Informational Supports & Recognition Programs |
| | The National Trade Corridors Fund (NTCF) invests into Canadian infrastructure projects, with a focus on projects that can 'improve the flow of goods and people in Canada', among other priorities. ¹⁷¹ | No | Financial Incentives - Capital and Infrastructure |

¹⁶⁵ "Zero-emission vehicles."

¹⁶⁶ Government of Canada, "Expanding Tax Support for Business Investment in Zero-Emission Vehicles," <https://www.canada.ca/en/department-finance/news/2020/12/expanding-tax-support-for-business-investment-in-zero-emission-vehicles.html> [Version: Dec 15, 2020]

¹⁶⁷ Ontario Ministry of Transportation, "Ontario's Green Vehicle License Plate Program," <http://www.mto.gov.on.ca/english/vehicles/electric/green-licenceplate.shtml>

¹⁶⁸ Natural Resources Canada, "Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-alternative-fuels/electric-and-alternative-fuel-infrastructure/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352>
¹⁶⁹ Natural Resources Canada, "Zero Emission Vehicle Infrastructure Program," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-alternative-fuels/zero-emission-vehicle-infrastructure-program/21876>

¹⁷⁰ Natural Resources Canada, "Electric Charging and Alternative Fueling Stations Locator," <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-and-alternative-fuels/electric-charging-alternative-fuelling-stationslocator-map/20487#/find/nearest>

¹⁷¹ Natural Resources Canada, "National Trade Corridors Fund," <https://tc.canada.ca/en/programs/funding-programs/national-trade-corridors-fund>

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|---|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Transportation Emissions | The Clean Fuel Standard (CFS) , which is expected to come into effect in 2022, will require a reduction of carbon content in domestically used liquid fuels, such as gasoline and diesel, on average, by 12 to 14% between 2022 and 2030. ¹⁷² In Ontario, there is a requirement that fuel suppliers 'increase the amount of renewable content in regular-grade gasoline to 15 per cent' as of 2030. ¹⁷³ | No | Regulations & Legislation |
| | Incentives for Medium-Heavy-duty Zero-Emission Vehicles (iMHZEV) Program provides \$547.5 million over four years starting from 2022-23 from Transport Canada. The iMHZEV Program will provide point-of-sale incentives for eligible Canadian businesses that buy or lease medium and heavy-duty zero-emission vehicles, subject to funding availability. ^{174,175} | No | Financial Incentives - Capital and Infrastructure |
| | Ontario's enhanced emissions testing program aims to target high-polluting vehicles such as commercial trucks and buses. The program includes a vehicle emissions testing program for heavy diesel commercial motor vehicles which will be integrated with the annual safety Motor Vehicle Inspection Station program. The integration of emission requirements is expected to begin on July 1, 2023, and align the inspection with annual plate renewals. ^{176,177} | No | Regulations & Legislation |
| | As a part of the A Healthy Environment and a Healthy Economy plan, the Government of Canada has announced it will be investing \$1.5 billion to increase the production and use of low-carbon fuels, such as ethanol, renewable diesel, low-carbon hydrogen and renewable natural gas through the Low-Carbon and Zero-Emissions Fuels Fund . ¹⁷⁸ | No | Financial Incentives - Capital and Infrastructure |

¹⁷² Canada's Clean Fuel Standard: Setting the Record Straight (Pembina Institute, 2021), <https://www.pembina.org/reports/clean-fuel-standard-setting-the-record-straight-21-02.pdf>

¹⁷³ Province of Ontario, "Ontario to be National Leader and Require Cleaner and Greener Gasoline," media release, November 26, 2020. <https://news.ontario.ca/en/release/59352/ontario-to-be-national-leader-and-require-cleaner-and-greener-gasoline-1>

¹⁷⁴ Department of Finance Canada, "Budget 2022: Chapter 2 - Jobs, Growth, and an Economy That Works for Everyone," <https://www.budget.canada.ca/fes-eea/2022/report-rapport/chap2-en.html#wb-cont>

¹⁷⁵ Transport Canada, "Incentives for medium and heavy-duty zero-emission vehicles," <https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles/medium-heavy-duty-zero-emission-vehicles/incentives-medium-heavy-duty-zero-emission-vehicles> [Version: Jul 13, 2022]

¹⁷⁶ Government of Ontario, "DriveON: Emissions and safety inspection program," <https://www.ontario.ca/page/driveon-emissions-and-safety-inspection-program> [Version: Dec 14, 2022]

¹⁷⁷ Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change - Fourth Annual Synthesis Report on the Status of Implementation (2022), 52.

¹⁷⁸ Environment and Climate Change Canada, "A Health Environment and a Healthy Economy," <https://www.canada.ca/en/environment-climate-change/news/2020/12/a-healthy-environment-and-a-healthy-economy.html>

| Policy Interventions Summary | | | |
|------------------------------|--|-----------|-----------------------------|
| Emission Source | Policy Intervention | SME Focus | Type of Policy Intervention |
| Transportation Emissions | Greener Gasoline requires that fuel suppliers 'increase the amount of renewable content in regular-grade gasoline to 15 per cent.' The requirements will be phased in – from 10 per cent to 11 per cent in 2025 and 15 per cent in 2030. ¹⁷⁹ | No | Regulations & Legislation |
| | Off-Peak Delivery Program (Ontario) Ontario's Bill 215 Main Street Recovery Act introduces legislation that allows for the delivery of goods 24/7 across the province. ¹⁸⁰ Off-peak deliveries are faster and more efficient than deliveries made during peak times, and as a result, can help businesses reduce their transportation related GHG emissions by approximately 11%. ¹⁸¹ | No | Regulations & Legislation |

¹⁷⁹ Province of Ontario, "Ontario to be National Leader and Require Cleaner and Greener Gasoline," media release, November 26, 2020.

¹⁸⁰ Legislative Assembly of Ontario, "Bill 215, Main Street Recovery Act, 2020." <https://www.ola.org/en/legislative-business/bills/parliament-42/session-1/bill-215#:~:text=Bill%20215%20has%20been%20enacted,the%20Statutes%20of%20Ontario%2C%202020.&text=The%20Schedule%20amends%20the%20Ontario,the%20Lieutenant%20Governor%20in%20Council>

¹⁸¹ Kianoush Mousavi, Sabrina Khan, Glareh Amirjamshidi and Matthew Roorda, Pilot Off-Peak Delivery Program in the Region of Peel (2020), 8. http://smartfreightcentre.ca/wp-content/uploads/2020/02/SFC-OPDPeelPilot-FinalReport-January30_2020.pdf

APPENDIX B

Energy Savings Tips for Small and Medium Manufacturers



Appendix B - Energy Savings Tips for Small and Medium Manufacturers

The following table lists some of the energy efficiency and conservation measures that small and medium manufacturing companies could implement to reduce GHG emissions.¹⁸² To quantify the impacts of these measures, companies can conduct an ASHRAE energy audit (level 2 or higher).¹⁸³

| Focus Area | Efficiency Measure | Approximate Payback Period ¹⁸⁴ |
|-------------------|---|---|
| Energy Management | Energy management systems | Short |
| | Energy assessments | Short |
| Lighting | Turn off lighting in unoccupied areas | Short |
| | Establish lighting level standards | Short |
| | Make use of daylight whenever possible | Short |
| | Use efficient light sources | Short |
| | Build an operation and maintenance plan | Short |
| HVAC | Adjust non-production hours temperatures | Short |
| | Repair leaking ducts | Medium |
| | Variable air volume and adjustable speed drives | Medium |
| | Modify fans | Medium |
| | Use ventilation fans | Medium |
| | Efficient exhaust fans | Medium |
| | Add heat reflective foil behind radiators | Short |
| | Solar air heating | Long |
| | Roof gardens | Long |

¹⁸² [1] Sources: https://www.energystar.gov/sites/default/files/buildings/tools/Baking_Guide.pdf; <https://www.wisoven.com/blog/5-ways-minimize-energy-costs-your-industrial-oven>; https://www.energystar.gov/buildings/save_energy_commercial_buildings/ways_save/building_upgrades; <https://www.carbontrust.com/resources/building-fabric-guide>

¹⁸³ Note that the energy savings for these measures are difficult to approximate without a detailed understanding of the facility and/or equipment.

¹⁸⁴ The payback period assessment was made by reviewing publicly available literature and based on Delphi's experience.

| Focus Area | Efficiency Measure | Approximate Payback Period ¹⁸⁴ |
|-------------------|--|---|
| Building Envelope | Add insulation to walls, ceilings, roofs | Medium |
| | Reflective roof coatings | Medium |
| | Ensure windows are properly fitted and have double/triple glazing | Medium |
| | Use high performance glass with insulation properties | Medium |
| | Add external shading using trees, vegetation, external blinds, etc. | Short |
| | Seal any cracks and gaps | Short |
| | Block any chimneys | Short |
| | Install trickle ventilator | Medium |
| | Ensure all external doors remain closed | Short |
| | Fit brush strips to doors | Short |
| | Replace seals and door closers | Short |
| | Seal any unused doors | Short |
| | Fit draught lobbies or a revolving door to main entrances | Medium |
| | Install Interlocking control for doors and heating systems | Medium |
| | Add a vehicle entrance lobby, PVC/plastic strip curtains or high-speed motorized doors with automatic sensor controls to vehicular access doors. | Medium |
| | Add airtight door seals to vehicular access doors | Short |
| | Add insulation to suspended timber floors | Long |
| Motor Systems | Develop a motor management plan | Short |
| | Select motors strategically | Short |
| | Maintain motors | Short |
| | Ensure motors are properly sized | Short |

| Focus Area | Efficiency Measure | Approximate Payback Period ¹⁸⁴ |
|----------------|---|---|
| Motor Systems | Minimize voltage unbalances | Short |
| | Motor automation | Medium |
| | Adjustable speed drives | Medium |
| | Power factor correction | Medium |
| Refrigeration | Refrigeration maintenance program (to maximize efficiency) | Short |
| | Check for leaks | Short |
| | Ensure pipe insulation is in good condition | Short |
| | Plan loads - Refrigeration units are most efficient at max load. It is more efficient to have one unit at full load rather than two units at half load. | Short |
| | Prevent overstocking of cold rooms | Short |
| | Install electronic communicated (EC) low power fans | Medium |
| Pump Systems | Pump system maintenance program | Short |
| | Monitor pump systems | Short |
| | Properly size pumps | Short |
| | Avoid throttling valves | Short |
| | Properly size pipes | Short |
| | Reduce pump demand | Medium |
| | Controls | Medium |
| | High efficiency pumps | Medium |
| | Multiple pumps for variable loads | Medium |
| | Trimming impellers | Medium |
| | Adjustable speed drives | Medium |
| Compressed Air | Maintain compressed air systems | Short |
| | Reduce leaks | Short |

| Focus Area | Efficiency Measure | Approximate Payback Period ¹⁸⁴ |
|------------------|---|---|
| Compressed Air | Turn off unnecessary compressed air | Short |
| | Use lowest possible pressure | Short |
| | Properly size regulators | Short |
| | Properly size pipes | Short |
| | Monitor compressed air use | Medium |
| | Modify system instead of increasing pressure | Medium |
| | Load management | Medium |
| | Controls | Medium |
| | Lower inlet air temperature | Medium |
| | Recover heat for preheating water | Medium |
| | Install alternative equipment to eliminate compressed air | Long |
| Boilers | Visual inspection | Short |
| | Install piping insulation | Short |
| | Properly size boilers | Short |
| | Control boiler process | Medium |
| | Reduce excess air | Medium |
| | Improve boiler insulation | Medium |
| | Condensate return | Medium |
| | Recover blowdown stream | Medium |
| | Upgrade old boilers | Long |
| Office Equipment | Purchase Energy Star certified equipment | Medium |

