INVEST IN HAMILTON

Manufacturing Sector Strategy

November 2022

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Hamilton's manufacturing growth strategy

An enormous growth opportunity

Manufacturing is a core foundation of Hamilton's economy. This document describes a refreshed strategic approach for keeping it that way.

The economy-wide effects of the COVID-19 pandemic still reverberate. Going forward, the manufacturing sector will increasingly prioritize resilient supply chains, talent availability, innovative technology, dependable infrastructure and flexible business models when making site selection and investment decisions. This presents numerous opportunities for the sustainable growth of manufacturing in Hamilton.

The City of Hamilton ("City") must continuously communicate a consistent value proposition to attract and retain investor interest.

This sector strategy is a call to action and provides a prioritized framework to accelerate investment.

Current sector impact

Hamilton's manufacturing sector plays a key role in Ontario's economy — generating over $21B in sales in 2021, which has grown at a compound annual growth rate (CAGR) of 7.2% since 2016.

Global growth trajectory

The global manufacturing sector continues to demonstrate growth (following a slowdown during the COVID-19 pandemic). Global manufacturing value added reached $16.3T USD in 2021, with global manufacturing production seeing a 3.1% increase in the second quarter of 2022.

Sources: KPMG, CapitalIQ, D&B, Invest in Hamilton, Research and Markets, Government of Canada, Cision, The World Bank, UNILO

Our strategy on a page

VISION

We will harness our strategic location, resilient community and proud industrial legacy to produce leading businesses in advanced manufacturing and a more prosperous, sustainable Ontario.

Strategic pillars

Building to our strengths

We will continue to support and grow our established manufacturing subsectors.

Attracting talent

We will be a magnet for human capital, focusing on both the next generation and newcomers.

Getting ahead of the curve

We will prioritize manufacturing opportunities that accelerate the transition to a low carbon economy.

Key Enablers

Industry Innovation Support (e.g., McMaster University, Mohawk College, CanmetMATERIALS MMRI)	**Port of Hamilton**	**Hamilton Immigration Partnership Council**
Federal and Provincial Initiatives	**Talent Pool and Quality of Life**	**Development Opportunities** (e.g., Bayfront Industrial Areas Strategy)
Rail and Road Network	**Hamilton International Airport**	

Spotlighted Subsectors

- **Steel and metal**
- **Industrial machinery and other equipment**
- **Water technology**
- **Food and beverage**
- **Decarbonization technologies**
- **Aerospace**

Broader Manufacturing Ecosystem

- **Automotive and EV manufacturing**
- **Fabricated and secondary metal**

Building on our strengths (1/2)

Key Items	Strategic Opportunities	Actions
Movement of goods	Seek opportunities to support building on/promote Hamilton's existing multi-modal transportation network and the presence of the required capabilities and capacity to continue to support the efficient the movement of goods across Canada and internationally.	• In partnership with Hamilton Oshawa Port Authority (HOPA), **seek to further build the Port of Hamilton's capacity / promote opportunities** to support local manufacturers including small- to mid-size enterprises (SMEs) • Seek **partnership opportunities for the Port of Hamilton**, including the expansion of current partnerships such as the one with the Port of Montreal, to further connect the City to major international shipping lines • **Continue to promote the City's strengths** as it relates to the multi-modal movement of goods to potential investors (both domestic and international) and ensure manufacturing is top of mind for the city's transport and logistics-related strategy • **Maintain a well-connected road network** to and from Hamilton's industrial zones to allow for the efficient movement of goods via trucks and to ensure manufacturing sector is a leading priority with the city's transport and logistics-related strategies • **Undertake an agricultural/food value chain analysis** to better understand industry opportunities.
Further enhancement of Hamilton as 'business friendly'	Streamline approvals process and associated timelines to further support businesses (focused on manufacturing/industrial developments) looking to enter / expand into Hamilton. Focus to be given to the development review process for greenfield and brownfield development.	• **Advocate for a review of the city's development approval process** to identify pain points and actions to further Hamilton as a leading 'business friendly' jurisdiction • **Identify leading practices** from international jurisdictions which have streamlined an efficient government approvals process for investment attraction (and decarbonization) that can be implemented in Hamilton • **Advocate for an assessment of Hamilton's energy supply** to identify/assess potential challenges identified by stakeholders and encourage the development of associated recommendations for improvement

Building on our strengths (2/2)

Key Items	Strategic Opportunities	Actions
Promote sector collaboration	Identify and promote a recognized organization/team which will serve as the 'voice for the sector' and ensure key stakeholders can unite under a clear vision and future direction.	• **Spotlight the City's Economic Development Office** as key sources of information to stakeholder groups across the city including businesses, academia, and associated organizations • **Promote partnerships and collaboration within the manufacturing sector** across stakeholder groups by hosting information sessions and opportunities for industry to provide input into implementation of the action items • **Enhance collaboration with industry other levels of government** to promote Hamilton's brand and capabilities as an advanced manufacturing hub at international industry events (e.g. Paris Air Show, Inter Solar Europe, the Cleveland Manufacturing and Technology Show)
Accelerating the growth of start-ups and scale-ups through improved access to capital	Seek opportunities to increase access to capital for companies within Hamilton's manufacturing ecosystem.	• Working with provincial and federal governments, including organizations such as Consider Canada Cities Alliance, look to **advocate on behalf of Hamilton companies for funding** that can help increase the availability of capital (with focus to be given to organizations seeking to transition to a low carbon economy) • **Explore opportunities to engage with the broader investor landscape**, including those who are not currently focused on the sector in Hamilton but may have potential interest in manufacturing/low carbon energy transition.

Getting ahead of the curve (1/2)

Key Items	Strategic Opportunities	Actions
Clean energy transition	Focus on supporting and promoting opportunities for stakeholders across the sector to transition to low carbon and clean energy sources.	• **Develop concierge services** within the City's Economic Development Office and Invest in Hamilton focused on connecting companies with accessing available resources or appropriate expertise from community groups related to decarbonization • Work with key stakeholders to **develop an industry-focused decarbonization transition roadmap** that supports local industry in achieving decarbonization targets by understanding areas of opportunity for reducing carbon emissions • Working with key stakeholders, **undertake a match-making exercise** to connect innovative start-up companies focused on decarbonization with established companies focused on clean energy transition
Future skills development	Work with academia, apprenticeship, and training programs to ensure focus is given to developing the required skillsets across the ecosystem in the near and long-term. There is potential for strong synergy supported by collaborative partnerships, research and innovation	• Partner with key stakeholders (e.g. Workforce Planning Hamilton) to **undertake detailed assessment of the future skills needs** of Hamilton's manufacturing companies, with a focus on the spotlighted subsectors • Work with academia and apprenticeship programs to **promote upskilling/reskilling opportunities** to ensure appropriate technology skillsets are present across the labour pool • **Explore opportunities to leverage Hamilton-based manufacturing skills initiatives** including upstream programs such as the Specialist High Skills Major program, Skills for Steel and the ArcelorMittal Dofasco Mohawk collaboration to bridge the structural challenges within the talent pipeline and mitigate for the local skills gaps • Work with the Ontario Ministry of Labour, industry, academia, and training programs to **develop a 10-year talent pipeline roadmap** to foster innovation within the sector and meeting future resourcing needs

Getting ahead of the curve (2/2)

Key Items	Strategic Opportunities	Actions
Technology adoption	Seek opportunities to promote accelerated technology adoption across Hamilton's manufacturing supply chain.	• Working with the provincial and federal governments, **raise awareness of incentive programs are available** for companies looking to further adopt technology as part of their business • **Identify potential areas of low technology adoption** across the city's supply chain and provide information related to incentive programs and/or upskilling/reskilling opportunities that could support the sector and related manufacturing processes. • **Strengthen collaboration and partnerships across sectors** to facilitate the crossover of technology (especially for startup companies) in this space through pilot projects and accelerate its readiness for adoption
Alignment with city initiatives	Seek alignment and opportunities to leverage existing city initiatives to further support growth of the manufacturing sector and transition towards decarbonization.	• **Expand the Economic Development Office's collaboration within the City's key working groups** focused on initiatives which have potential impact on the manufacturing sector • **Further support the city's focus on a low carbon economy** by continuing to promote decarbonization across the industry and including principles related to the transition across all manufacturing-related initiatives
Alignment with provincial and federal initiatives	Leverage provincial and federal government initiatives to support sector growth. Ensure focus is given to subsectors where Hamilton's manufacturing sector has a distinct value proposition within Canada.	• **Host a 'Queen's Park Day'** with key provincial officials to further build partnerships with provincial counterparts and raise awareness about challenges facing Hamilton's manufacturing sector, the new sector strategy, future focus and spotlighted subsectors • **Host a 'Day on the Hill'** to build awareness of Hamilton's strengths at a federal level, key challenges which can be supported by the federal government, and build awareness of the City's future focus for the manufacturing sector

Attracting talent and jobs (1/2)

Key Items	Strategic Opportunities	Sample Actions
Attracting immigrants	Successful attraction of immigrants to Hamilton is a key pillar for ensuring for a future robust manufacturing talent pool.	• Leveraging Global Hamilton and Innovation Factory's Start-up Visa Program, seek to **promote Hamilton as a first landing spot** for new immigrants entering Canada • Leveraging Hamilton Immigration Partnership Council and Global Hamilton Office, **raise awareness of employment and upskilling opportunities for immigrants** across the sector • Working with the provincial and federal governments, **increase Hamilton's participation in the Ontario Immigrant Nominee Program (OINP) and related-federal initiatives** (such as the Federal Skilled Trades Program and the Municipal Nominee Program (MNP))
Attracting new graduates	Promoting new and emerging opportunities to students (with a focus on elementary and high school students) is required to dispel myths about future employment in the sector.	• Further **leverage existing programs** and **partner with the Industry Education Council (IEC) and local high schools** to leverage existing career fairs/undertake information sessions to highlight potential future opportunities within the sector • Working with colleges and apprenticeship programs, **seek to brand manufacturing as an attractive career choice** for new graduates – especially women – with STEM knowledge
Attracting skilled workers	As the sector looks to transition towards areas which increasingly rely on technology and innovation, attracting skilled workers with experience will be a core requirement for ongoing sector growth.	• **Undertake detailed assessment of 2021 National Occupational Classification (NOC) database** (following release) to further identify the current state of Hamilton's labour pool across key sectors • **Increase collaboration** (including information sharing) with manufacturing accelerators/incubators across Canada's innovation corridor to promote flow of employment opportunities to potential talent • **Strengthen partnerships with academia and recruiters** (including employment liaison officers) to promote new opportunities to recent graduates, mid-level talent and executives within the city's subsectors • **Promote the city's quality of life and affordability** (relative to neighbouring jurisdictions across the Greater Toronto Hamilton Area)

Attracting talent and jobs (2/2)

Key Items	Strategic Opportunities	Sample Actions
Brand	Provide key stakeholders – including champions across municipal, provincial, and federal governments – with comprehensive knowledge and confidence in the long-term sustainability of Hamilton's manufacturing sector, including the focus on becoming a low carbon manufacturing hub.	• **Undertake targeted campaign** focused on highlighting the city's vision for the future, the sector's focus on decarbonization and the spotlighted subsectors to key stakeholders across Ontario and Canada • **Identify champions** within key stakeholder groups and arm them with compelling messaging and up-to-date information about wins/opportunities and awareness about the sector's journey towards a low carbon economy • **Increase buy-in from provincial and federal government leaders** by highlighting how successful decarbonization across Hamilton manufacturing can help strengthen Canada's and Ontario's manufacturing brand
Getting and keeping investor attention	Partner with the provincial and federal governments, and local manufacturing companies (as appropriate) to promote the city's competitiveness and unique standing as a leading manufacturing hub focused on transitioning to a low carbon future.	• Participate in **targeted federal and/or provincial trade missions** related to the manufacturing sector • **Develop targeted investor list and tailored pitch books** highlighting Hamilton's cost competitiveness against peer jurisdictions and the city's unique standing as an emerging low carbon manufacturing hub in North America • **Support companies with investment attraction bids** by providing resources/information (e.g. data and information on operating costs within the city; municipal, provincial, and federal supports including available grants, etc.)

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Hamilton’s value proposition

Hamilton’s value proposition

Hamilton offers a vibrant manufacturing cluster that combines a strategic location, innovation, and collaborative community with an industrial heritage that produces leading companies in advanced manufacturing.

In Hamilton, policymakers and business leaders are committed to supporting the manufacturing sector in meeting global sustainability objectives and providing a competitive business environment for investment. Built on a long-standing legacy of steel, metal and food manufacturing, the city is laser-focused on building on its strengths and enabling the emergence of new subsectors, advanced processes, innovation and new business models. The city is tapping into the market opportunities of emerging technology and a transition to a low carbon economy to increase jobs, prosperity and the local economy.

Hamilton’s strategic location — at the heart of Canada’s largest province and within an hour of the U.S. border — provides reliable, resilient access to world markets and trade routes. Companies located here have access to a modern, multi-modal transportation network with unparalleled ability to move their goods. This includes access to the largest port in Ontario, the busiest overnight express cargo airport in Canada, and a well-connected road and rail network.

Join us as we continue to build on our long-standing manufacturing legacy and become a leading city in North America’s journey to a low-carbon manufacturing future.

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Spotlighted subsectors

Overview of Hamilton’s manufacturing subsectors

Hamilton Manufacturing

Established Subsectors

Definition
Subsectors which have a strong presence of primary and secondary entities collectively contribute to the presence of a robust ecosystem capable of effectively and efficiently supporting the production and movement of goods. These areas offer a strong potential for both national and global growth.

Selection criteria
Subsectors were selected based on the presence of an existing robust ecosystem and competitive advantage and identified future opportunities for growth (nationally and internationally).

Subsectors
Steel and metal manufacturing, food and beverage manufacturing, industrial machinery and other equipment

Emerging Subsectors

Definition
Areas where the city has existing strengths that can be leveraged to capitalize on emerging national and global opportunities, where a robust ecosystem is not yet present.

Selection criteria
The selected subsectors were selected based on notable global growth opportunities and the presence of strengths within Hamilton that can be leveraged to establish a future competitive ecosystem.

Subsectors
Decarbonization, water technology, aerospace manufacturing

Enablers

Definition
Supporting industries and assets critical to the advancement of manufacturing operations and sector growth. These assets and initiatives act as enablers that facilitate and scale innovation.

Examples
Hamilton International Airport, Port of Hamilton, and rail and road connectivity, industry and innovation support, federal and provincial Initiatives, and talent pool.

Steel & metal manufacturing

Canadian & global trends

Innovation

Globally, the subsector is increasingly relying on high-skilled labour and innovative technologies. Such innovations are contributing to the subsector's growth, which has a forecasted CAGR of 7.3% through to 2026.

Decarbonization leader

Steel production is recognized to have large-scale carbon emissions. The subsector accounts for 11% of total global CO2 emissions. Canadian steel manufacturers have made significant progress at improving emissions, emitting the least amount of carbon per metric ton in the world, according to Global Efficiency Intelligence.

Abundance of resources

Manufacturers in Canada have access to the sixth largest reserve of iron ore in the world.

Hamilton's advantages

Global reputation

Hamilton is home to major manufacturers such as ArcelorMittal Dofasco and Max Aicher North America (MANA). These firms have engaged in innovative R&D that has led to lighter, stronger, and more sustainable products.

Research capabilities

CANMET Materials Technology Laboratory in McMaster Innovation Park is the largest metal research centre in Canada. The centre undertakes over 100 collaborative R&D projects annually with industry, academia and government. McMaster University also houses the Steel Research Centre and the McMaster Manufacturing Research Institute (MMRI).

Funding support

With NGen based in Hamilton, the federal and provincial governments are committed to supporting steel and metal manufacturing in the City. In 2021, federal and provincial investments aimed at supporting innovation and decarbonization totaled $900M CAD.

Low-carbon focus

Hamilton's Climate Change Action Strategy will have a strong focus on decarbonizing the steel subsector. ArcelorMittal Dofasco's $1.8B CAD project for converting the steel production process and phasing out coal-fired steelmaking is one of the first steps.

Reason for selection: Hamilton has a long-standing history and expertise in steel and metal manufacturing. With strong government, industry, and research centre commitment to support the transition to decarbonization, the city has an opportunity to get ahead of the curve and become a global leader in low carbon steel and metal manufacturing.

Sources: Fistco, Business Wire, Natural Resources Canada, ISED, Global News, McMaster.ca, Financial Post, NSEnergy.com, Statistics Canada, Natural Resources Canada, Newswire.ca, WorldSteel.org, Government of Canada, EinNews, McKinsey & Company, Global Efficiency Intelligence

Food & beverage manufacturing

Canadian & global trends

Subsector growth

The subsector has consistently outperformed other manufacturing subsectors with a forecasted CAGR of 8.7% through to 2026. This growth has been partially driven by strong consumer demand for higher quality and higher priced products, reflecting health trends and rising incomes in emerging markets.

Supply chain crisis

Shortages in raw materials are becoming more frequent as crop and livestock production are disrupted by climate change, the pandemic, geopolitical conflicts, and inflation/pricing impacts.

Reputable Canadian subsector

Canada is the eighth largest exporter of food in the world. The subsector exports 33% of its food and beverage production and maintains a trade surplus of approximately $4B CAD (2020).

Hamilton's advantages

Port access

The Hamilton-Oshawa Port Authority specializes in agri-food cargo shipping, enabling manufacturers to import raw materials. For example, Sucro Sourcing, a Hamilton sugar refinery, is supplied with sugar through the port.

End-to-end supply chain

That includes over 670 local farms, and over 120 food and beverage manufacturers (e.g., Maple Leaf, Mondelez, Tim Hortons roasting facility) with capabilities like automation equipment, cold and frozen storage, food grade packaging, and logistics.

Skilled talent

Trained at over 55 university and college programs from regional institutions including Mohawk College, McMaster University, Guelph University and Niagara College. Concentrations include agriculture, food science, nutritional science and culinary arts.

Ongoing growth

Has grown over 60% since 2016 to become Hamilton's second largest manufacturing subsector. Annually, the subsector generates over $4M CAD in sales. This growth has been supported by a robust supply chain that enables the efficient movement of goods.

Reason for selection: with a robust local ecosystem that enables the efficient shipping of raw inputs, and connections to populous markets, Hamilton's well established food and beverage subsector has significant opportunity to attract further growth and investment.

Sources: Invest in Hamilton, Government of Canada, Ontario Ministry of Agriculture, Agriculture Canada, Invest in Hamilton, ResearchandMarkets.com, TheBusinessResearchCompany.com, Statista.com, CRBGroup.com, BDC.ca, WorldAtlas.com, Common Thread, Dalhousie University, Hamilton-Oshawa Port Authority

Industrial machinery & equipment

Canadian & global trends

Strong global growth in demand

The market value for industrial machinery is projected to grow from $565.6B USD (2020) to approximately $794B USD by 2027 at a CAGR of 5%. China is projected to be a big source of this growth, growing its market value to $145.9B USD by 2027, at a projected CAGR of 8.2%.

Emerging innovations

‘Smart’ machines', that are increasingly automated and rely on AI, are becoming increasingly common. Over the next decade, ‘smart’ machines are expected to grow at a CAGR of 19%.

Thriving small business ecosystem

With over 4,000 small Canadian businesses that specialize in machinery manufacturing and employ between 1 to 99 employees. These small businesses are essential for supplying larger manufacturers.

Sources: Government of Canada, Globe News Wire, Trillium Network, Report Linker, Persistence Research

Hamilton’s advantages

Established industry

With local machine manufacturers such as AXYZ and Edson Packaging Machinery supplying and servicing the strong demand from the 750+ manufacturing entities in Hamilton.

Attracts firms

Firms are attracted to the cluster of established businesses and the availability of an end-to-end supply chain enabled by industrial machinery and equipment manufacturing. For example, L3Harris Technologies is manufacturing equipment for electro-optical and infrared imaging.

Innovative capabilities

As the industry looks to further combine research, technology and manufacturing, Hamilton’s research capabilities at its academic institutions will be critical to this ecosystem.

Reason for selection: strong local demand from an established manufacturing base, experienced machine and equipment manufacturers, and innovative R&D capabilities in Hamilton provide opportunities to attract additional investment and take advantage of projected subsector growth.

Decarbonization technologies

Canadian & global trends

Public sector support

Governments are investing billions of dollars into decarbonization in an attempt to address climate change, meet ambitious decarbonization targets, and steer economic growth towards sustainable industries. For example, hydrogen energy, has received $76B USD in worldwide public investment.

Canadian competitive edge

Clean technologies are forecasted to become a top export for Canada by 2025, with an annual value of $20B CAD. This growth is supported by billions of dollars in investments made by federal and provincial governments.

Hydrogen leader

Canada established a Hydrogen Strategy in 2020 that seeks to make the country a global leader in hydrogen technologies and aims for 20 MT of domestic supply of hydrogen annually by 2050.

Hamilton's advantages

Municipal commitment

The city has developed the Climate Action Strategy to reach net zero emissions by 2050. Actions include improving Electric Vehicle infrastructure, and bicycle infrastructure, among others.

The City of Hamilton is supporting the development of Hamilton Regional Decarbonization Hub that will seek to reduce/eliminate emissions across multiple sectors.

Leading research and industry presence around EV manufacturing

Hamilton is home to leading research centres such as McMaster University's iHub that incorporates industry experts to develop electric and autonomous vehicles with a strong focus on EV motors. The organization supports more than 230 SMEs with commercializing new clean technologies and received a $10M investment from the federal government.

The city also has a presence of emerging cleantech companies, like Hydrogenics.

Funding support

The federal and provincial governments are committed to supporting Hamilton's initiatives. In 2021, federal and provincial investments into ArcelorMittal Dofasco's $1.8B CAD project for adopting cleaner manufacturing processes totaled $900M CAD. This investment will help to innovate and decarbonize the sector.

Reason for selection: with the ability to leverage federal and provincial initiatives and supported by key industry players, Hamilton is well positioned to address global calls to action to develop innovative technologies and solutions to help the manufacturing sector transition into low carbon operations.

Sources: International Energy Agency, Government of Canada, Government of Ontario, Statistics Canada, Invest in Hamilton, Invest Canada, London School of Economics, US Department of Energy, Globe News Wire, PR News Wire, Ontario's Low Carbon Hydrogen Strategy, Ontario Energy Board, ArcelorMittal, Global News, Bloomberg News, In the Hammer, Hydrogen Council

Water technologies

Canadian & global trends

Global water crisis

3 billion people worldwide currently lack an adequate supply of clean water, which is projected to double to 6 billion by 2050. Innovative water technology is needed to solve this crisis.

Wealth of freshwater

Canada has more freshwater lakes than all other countries combined and the fourth largest reserve of renewable freshwater. This resource gives Canada a competitive advantage.

Thriving ecosystem

Canada has more than 700 water technology companies, enablers, and research organizations that employ over 20,000 people.

Hamilton's advantages

Strategically located

Hamilton, is situated on Lake Ontario, which provides access to 393 cubic meters of water. This access will be important for developing Hamilton into an innovative water technology hub.

Research capabilities

Hamilton has unique research capabilities with a presence of research centres that focus on alleviating water scarcity and improving water technologies. Hamilton water research centres include Home of the UN Institute for Water, a think-tank specializing in global water crises; the National Water Research Institute, the world's largest freshwater research institute; the Wastewater Technology Centre; among others.

Innovative companies

Hamilton companies are recognized as leaders at innovating technologies such as advanced water purification, water treatment, and automated water management systems. Most notably, Fibracast, a local Hamilton firm, invented a revolutionary ultrafiltration membrane technology that has global applications.

Reason for selection: Hamilton's access to freshwater, international research centres and innovative companies provide opportunities for the city to become a global leader in developing technologies that fight water scarcity.

Sources: Invest in Hamilton, Invest Canada, Invest Ontario, waterNEXT, Fortune Business Insights, Invest Ontario, Government of Newfoundland, Water Canada, World Atlas, Live Science, Hamilton-Oshawa Port Authority, United Nations, Acciona, Fortune Business Insights, CBC News, Aqua Tech Trade

Aerospace manufacturing

Canadian & global trends

Global investment boom

The subsector is starting to rebound from the impacts of the pandemic and is benefitting from increased defence spending due to rising geopolitical tensions and investment for commercial drones, satellite technology, and space exploration. These trends will drive a projected CAGR of 7.7% through to 2025.

Established Canadian industry

The subsector contributed over $22B CAD to GDP in 2020 and employed 207,000 workers. Canada is the fifth largest aerospace exporter in the world, with over 75% of domestic production dedicated to exports.

Leader in R&D

Canada is recognized as a global leader in R&D where investments totaled $934M CAD in 2020. Canada is especially well known for work related to flight simulators and aircraft engines. Canadian R&D is highly driven by cross-collaboration across industry, academia and government.

Hamilton's advantages

R&D partnerships

Along with offering several diploma programs in aviation, Mohawk College has partnered with KF Aerospace to develop the Centre for Aviation Technology at the Hamilton International Airport. The centre is a 75,000 sq ft complex with labs, classrooms, and an aircraft hanger.

McMaster University was awarded provincial and industry funding to support innovative aerospace tech and training.

Innovative companies

Reputable and innovative local companies are driving subsector growth. This includes L3 Harris an innovative technology company with a focus on air and space.

Major defence contractors

The home of major defence contractors such as L3Harris, an innovative global aerospace and defence technology firm. The firm relocated its head office to Hamilton in 2021 at a new 330,000 sq ft facility that will focus on R&D and manufacturing and will employ 1,500 workers.

Reason for selection: aerospace is seeing rapid transformation as a result of emerging technologies, a post-pandemic rebound, increased defence spending and a growing space exploration market. Through Hamilton's research and manufacturing capabilities, the city can support Canada's broader efforts to become an aerospace innovation hub.

Sources: The Business Research Company, Government of Canada, Federal Economic Agency for Southern Ontario, Stockholm Institute for Peace, L3Harris, Statista.com

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Key enablers

Movement of goods

Hamilton is in the centre of the most densely populated corridor of economic activity in Canada, within close range of key major urban markets in Canada and the US.

The city is supported by a network of highways, international rail lines, local air connections, and the Port of Hamilton.

This multi-modal transportation network provides the city with an ability to support the effective movement of goods – a key differentiator for the manufacturing sector.

Location

- Access to a network of highways within one hour of Toronto and the US Border
- Only city in the region which has all modes of transportation within the municipal boundary (air, sea, road, and rail)
- The Hamilton Airport Employment Growth District (AEGD) business park is slated for a new development of over 8 million sq. ft. in the next 5 years

Strategic Infrastructure

- Home to two international border services available 24/7 – the Hamilton Oshawa Port Authority (HOPA), and the John C. Munro Hamilton International Airport
- Abundant connectivity to provincial highways, and Canadian National (CN) and Canadian Pacific (CP) rail lines

Free Trade Agreements

- Home to a Foreign Trade Zone (FTZ) that acts as a hub for international trade and allows for tariff and tax emptions, duty relief programs, and exclusive concierge investment services
- Access to Canada's 15 free trade agreements (FTAs) with 51 countries

Other Benefits

- Lower cost of commercialization and bringing products to market with the cost of business 50% lower than GTA
- Home to nine business parks with well-established supply chains
- Access to a resident labour force of 400,000 within a 100km radius and over 2 million people within an hour drive

Sources: Government of Canada, Invest in Hamilton

Industry and innovation support

Manufacturing-focused initiatives by institutions and industry associations such as Mohawk College, McMaster University, the Innovation Factory which includes the Centre for Integrated Transportation and Mobility, CANMAT, IDEAWORKS, Marshall School of Skilled Trades & Apprenticeship, among others are pivotal to the City's growth and prosperity. These associations act as a bridge between innovation and industry, exploring practical solutions and bringing together the expertise in Hamilton to turn ideas into reality.

Next Generation Manufacturing Canada (NGen)

- Based in Hamilton, NGen is Canada's leading advanced manufacturing supercluster that supports the transformation of the manufacturing sector through the use of innovation and technology.
- The organization aids collaboration with various businesses in specialized domains such as research, technology and manufacturing, and leads training initiatives focused on upskilling youth.
- Home to a network of network of over 2,800 manufacturers, technology companies, innovation centres, and researchers that can provide Hamilton with opportunities to develop, apply, or scale-up transformative manufacturing solutions.
- NGen's expansive supply chain capabilities for commercialization can connect manufactured goods to global markets.
- The NGen supercluster is expected to generate 35,799 new jobs across Canada in the next 10 years. To date, the organization has supported the establishment of 15 new manufacturing companies, adding to a thriving ecosystem.

Hamilton-focused Initiatives

- Located in Hamilton, McMaster Innovation Park (MIP) aims to be at the centre of research and industry, serving as a platform for young businesses to address real-world challenges and learn from meaningful insights.
  - The organization is focused on strengthening the capacity and capabilities of small and medium-sized enterprises (SMEs) to adopt new technologies and be better positioned for success in an increasingly digital and electrified economy.
- In 2021, McMaster was awarded $10M CAD in funding to support an integrated automotive, aerospace and advanced manufacturing network within MIP.
- Mohawk college has several initiatives focused on supporting the manufacturing sector, including:
  - IDEAWORKS;
  - Additive Manufacturing Innovation Centre
  - Remotely Piloted Aircraft Systes (RRAS)
  - Energy & Power Innovation Centre

Sources: DailyNews, Globalnews, mcmasterinnovationpark, NGen., Invest Hamilton

Linkages with federal and provincial priorities (1/2)

The federal and provincial governments have manufacturing-related strategies that have the potential to further accelerate the growth of Hamilton's manufacturing sector whilst also supporting the global transition to a low carbon economy. Initiatives and programs that are aligned with or can help support Hamilton's work in the sector include:

	Canada	Ontario
Net-zero Emissions	— Canada passed the Canadian Net-Zero Emissions Accountability Act in June 2021, which puts its targets to be net-zero by 2050 into law. — The 2030 Emissions Reduction Plan is a roadmap that outlines a sector-by-sector path for Canada to reach its emissions reduction target of 40 percent below 2005 levels by 2030 and net-zero emissions by 2050.	— Following Canada's commitments to become net-zero carbon by 2050, the province of Ontario is also championing this effort. Ontario has a strong economy, innovation clusters, and scale of industries, which can be leveraged to allow the province to become a leader in the transition to a net-zero economy. — The province is exploring renewable energy systems and options to achieve emissions reductions through actions such as the acceleration of hydrogen programs.
Competitive Business	— Invest in Canada is focused on increasing investment for the national advanced manufacturing, agri-food, clean technology, digital technology, health sciences and bio-sciences, and clean resources sectors.	— Ontario is committed to supporting a competitive tax environment. — As part of the Ontario 2020 budget, small businesses with payrolls under $1M CAD no longer have to pay the Employer Health Tax. — The province has set aside a $1.3B CAD budget that will be used to provide hydro bill relief for industrial businesses.

Sources: Government of Canada, Province of Ontario

Linkages with federal and provincial priorities (2/2)

	Canada	Ontario
Skilled Labour	— The Government of Canada is encouraging more Canadians to pursue careers in the skilled trades through apprenticeship grants such as the Apprenticeship Incentive Grant for Women, the Canada Apprentice Loan, as well as other financial supports and tax credits. — The federal government is working to increase awareness and uptake in science, technology, engineering and math (STEM) professions, skilled trades and technologies, with promotion and initiatives that reach over 300,000 youth annually across the country.	— The Province's Skilled Trades Strategy seeks to modernize the skilled trades and apprenticeship system. — The Achievement Incentive Program aims to encourage skilled trade employers to train apprentices. — New apprenticeship initiatives that build on existing federal supports for the skilled trades include the Skilled Trades Awareness and Readiness Program, which provides $10M CAD annually to assist young Canadians and other groups that face barriers to entering the skilled trade — The Government invests yearly to support the ongoing modernization of the Youth Employment Strategy to help youth gain the skills and experience needed to find and maintain good employment.
Immigration	— Recovering from the impacts of the pandemic, the Canadian government has raised its Immigration Levels Plan 2022-2024, with the aim to welcome 432,000 immigrants in 2022. New immigrants will include recruiting qualified people who will contribute to the Canadian economy and address the labour deficit. — The Federal Government's proposed Municipal Nominee Program (MNP) will give room for local communities, chambers of commerce, and local labour councils to directly sponsor permanent immigrants to move to their community to fill local labour needs. Local communities will recruit immigrants based on matching their skills to community job needs.	— The Ontario Immigrant Nominee Program (OINP) has focused streams related to in-demand skills, human capital priorities, and skilled trades, that can support labour shortage in the manufacturing sector. — The Ontario government is investing over $900,000 CAD to connect 900 new immigrants across the province with well-paying jobs as carpenters, electricians, plumbers, mechanics, welders, chefs and other in-demand trades. — Over the last few years, Canada has been moving towards more regionally focused immigration programs, to spread immigration throughout less populous regions of Canada, such as the Provincial Nominee Program (PNP).

Sources: Government of Canada, Government of Ontario

Related City and stakeholder initiatives (1/2)

The City and relevant stakeholders run several programs and initiatives aimed at supporting the manufacturing sector and growing the economy more broadly. A key focus of these initiatives includes a focus on attracting new businesses and top talent, and becoming the city of choice for newcomers to Canada. These initiatives can be leveraged to address challenges and support accelerated growth of the manufacturing sector.

Hamilton Region Decarbonization Hub

A Hamilton Region Decarbonization Hub has been approved by Council that will engage national and international stakeholders in supporting Canada's ambitions to achieve net-zero by 2050. The hub will serve as the intersection of multiple government priorities in climate action work and will focus on exploring solutions in the steel manufacturing subsector before scaling up for adoption in other manufacturing subsectors. The initiative is to be aligned with the Hamilton Climate Change Action Strategy (under development).

Industry Education Council (IEC)

The council supports career exploration through programming, group mentoring and facilitating partnership discussions, to help local business showcase their sector to their future workforce, through practical hands-on learning opportunities. Each year, the Hamilton IEC's programs directly engage over 2,700 students and 300 employers. There is an opportunity to leverage the IEC to raise awareness about career opportunities in the manufacturing sector.

Hamilton Immigration Partnership Council (HIPC)

HIPC is a community table that seeks to create a seamless settlement experience for immigrants in Hamilton. HIPC was established in 2009 as one of Canada's first local immigration partnerships, a network that has now spread across the country and includes more than 75 similar local initiatives. The Council serves as an important broker in helping newcomers connect to local labour market opportunities in manufacturing.

Hamilton Sector Strategies

The City has developed sector strategies aimed at furthering growth and investment attraction. Most recently, the City has developed a Life Sciences Strategy which included biomanufacturing as a spotlighted subsector. Additional initiatives include a focus on clean transportation methods, and transport and logistics. The objective is to ensure that these strategies collectively support economic growth for the City. The City is also in the process of initiating a workforce strategy.

Sources: The City of Hamilton, IEC, HIPC

Related City and stakeholder initiatives (2/2)

The City and relevant stakeholders run several programs and initiatives aimed at supporting the manufacturing sector and growing the economy more broadly. A key focus of these initiatives includes a focus on attracting new businesses and top talent, and becoming the city of choice for newcomers to Canada. These initiatives can be leveraged to address challenges and support accelerated growth of the manufacturing sector.

Bayfront Industrial Area Strategy

The City of Hamilton is engaged in a revitalization project of Hamilton's Bayfront Industrial Area, which will create significant development opportunities for manufacturers. The Bayfront Industrial Area is a 1,607-hectare mixed industrial area on the shore of Hamilton Harbour and adjacent to some of the city's oldest neighbourhoods. The Strategy is a high-level, long-term vision and action plan to guide future improvements, investments and redevelopment.

Hamilton's Climate Action Strategy

Approved in August 2022, the City, along with the broader community, have committed to undertake various actions that accelerate Hamilton's transition to a prosperous, equitable, and resilient post-carbon City. Hamilton's Climate Action Strategy advances the City's response to the Climate Change Emergency Declaration and consists of two major steams: (1) climate mitigation (i.e., reduction of greenhouse gases; and (2) climate adaptation (i.e., decreasing impacts and preparing for the unavoidable impacts of a changing climate).

Sources: The City of Hamilton, IEC, HIPC

5

Labour force overview

Predicted global skills gaps and way forward

Similar to Hamilton, the sector is facing a global skills gap due to an increasingly ageing workforce and a lack of awareness and a misperception about the manufacturing industry among younger demographics.

As the manufacturing sector aligns with Industry 4.0, there will be a significant shift in the skills and competency profile required in the manufacturing workforce. There are increased demands for talent with technological skillset enabling them to handle new-age technology-driven processes such as additive manufacturing, robotics, and automation.

Global Skills Gap

- A study conducted by the Manufacturing Institute (MI) predicts that there will be 2.1 million vacant manufacturing positions by 2030
- A key issue prevalent in the labour market is finding skilled workers who have manual, operational, and highly technical skills, knowledge or expertise
- Underlying reasons for the skill gap include the introduction of advanced technologies and automation, negative perception of manufacturing jobs, retirement of baby boomers, lack of technology skills sets, lack of digital fluency, and soft skills (such as communication, adaptability, teamwork, and leadership).

Way Forward

- With increasing automation and a focus on transitioning to a low carbon economy, the manufacturing workforce will need to undergo continual learning and reskilling to stay agile
- As the manufacturing industry embraces technologies such as Artificial intelligence (AI), robotics and Internet of Things (IoT), positions relating to digital literacy, skilled production and operational managers will be on the rise
- Other skills predicted to be in demand include critical thinking, programming, and computer skills
- Sought after soft skills are anticipated to include dependability, aptitude for technology, problem solving and flexibility

Sources: Manufacturing.net, Digital Skills and Jobs Platform

Hamilton’s manufacturing labour force overview

A sizeable portion of the labour force in Hamilton is employed in the manufacturing sector. Considering the growth of the industry and corresponding demand for skilled labour, the sector will be impacted by a labour shortage if challenges remain unaddressed.

Skills and Employment Highlights

750 manufacturing companies provide 25,000 jobs (~11% of employment in the city)

Key employers: Stelco, ArcelorMittal Dofasco, National Steel Car, L3 Harris, Maple Leaf, Orlick

Required experience:
Certain jobs include both post-secondary STEM training and basic functional skills (reading, writing, math), completed apprenticeship programs, etc., while others require a more rudimentary skills base for entry-level/less specialized positions.

80% of the workforce is employed in primary metals, agrifood, machinery, automotive, and transportation equipment

Trends and Challenges

14% decline in employment
(2021 compared to 2011)

Potential factors leading to employment decline include:

- Automation and advancing technology
- Lack of required skills
- Misperception of manufacturing jobs

Current trends:

- Increased retirements
- Labour shortages in skilled trades
- Accelerated adoption in technology and automation
- 6% population growth from 2016-2021

In-demand jobs:

- Welders
- Electricians
- Computer Numerical Control (CNC) machinists
- Machine operators
- Mechatronics repair
- Millwrights

Workforce demographics:

- Shortage of new graduates with strong math skills in apprenticeships programs
- Experienced baby boomers in the industry entering retirement stage

Noted hiring obstacles:

- Low interest for positions in smaller and medium-sized businesses
- High wage expectations among select groups
- Immigration barriers (e.g. recently reduced numbers due to the pandemic)
- Affordable housing
- Lack of awareness of the manufacturing career path

Sources: Workforce Planning Hamilton, Canadian Manufacturers and Exporters

Manufacturing skills initiatives

Various projects and initiatives operate in Hamilton with the focus of creating awareness about the manufacturing industry and inculcating the required skills for manufacturing in high school students, as well as upskilling the workforce with vital skills demanded by the industry.

Further leveraging these existing initiatives / programs is a key component of helping to bridge the existing skills gap and bolster the local workforce.

Sample Programs / Initiatives	Description
Manufacturing Specialist High Skills Major (SHSM)	Offered at select schools in the Hamilton-Wentworth District School Board, the program provides students with a foundation to work in the manufacturing industry. Focus is given to service, repair, and modification of vehicles, vehicle systems and management of manufacturing services and mass-transit systems. The program offers experiential learning opportunities, connects with industry professionals and equipment vendors, organizes visits to post-secondary institutions offering manufacturing-related programs, and other services.
Career Laddering Project	Developed by the Adult Basic Education Association, Niagara Workforce Planning Board, and the Workforce Planning Board of Grand Erie, the program looks at entry-level jobs in manufacturing that have the potential for employees to progress through the company.
Skills for Steel	Run by YMCA Hamilton, the program supports the acquisition of sector-specific skills for entry-level positions focusing on steel manufacturing. This program is funded through Skills Advance Ontario (MLTSD).
Arcelor Mittal Dofasco – Mohawk College Collaboration	Arcelor Mittal Dofasco and Mohawk College together operate the province's largest apprenticeship program, with the steel company employing approximately 300 Mohawk graduates. In 2016, Arcelor Mittal invested $1M CAD towards the renewal of technology programs at Mohawk College.

Sources: Hamilton Wentworth District School Board, Manufacturing SHSM ; Workforce Planning Hamilton ; Arcelor Mittal

6

Implementation roadmap

High-level implementation roadmap – building on our strengths (1/2)

Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Movement of goods	In partnership with Hamilton Oshawa Port Authority (HOPA), **seek to further build the Port of Hamilton's capacity / promote opportunities** to support local manufacturers including small- to mid-size enterprises (SMEs)	Supporter	Infrastructure Organizations, Industry				Medium
	Seek **partnership opportunities for the Port of Hamilton**, including the expansion of current partnerships such as the one with the Port of Montreal, to further connect the City to major international shipping lines	Supporter	Infrastructure Organizations				High
	Continue to promote the City's strengths (as it relates to the multi-modal movement of goods to potential investors) and ensure manufacturing is top of mind for the city's transport and logistics-related strategy	Leader	Support Organizations				High
	Maintain a well-connected road network to and from Hamilton's industrial zones to allow for the efficient movement of goods via trucks and to ensure manufacturing sector is a leading priority with the city's transport and logistics-related strategies	Leader	Industry				Medium
	Undertake an agricultural/food value chain analysis to better understand industry opportunities	Leader	Industry				Medium
Further enhancement of Hamilton as 'business friendly'	**Advocate for a review of the city's development approval process** to identify pain points and actions to further Hamilton as a leading 'business friendly' jurisdiction	Leader	Industry				High
	Identify leading practices from international jurisdictions which have streamlined an efficient government approvals process for investment attraction (and decarbonization) that can be implemented in Hamilton	Leader	Support Organizations				Medium
	Advocate for an assessment of Hamilton's energy supply to identify/assess potential challenges identified by stakeholders and encourage the development of associated recommendations for improvement	Supporter	Industry				High

High-level implementation roadmap – building on our strengths (2/2)

Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Promote sector collaboration	**Spotlight the City's Economic Development Office** as key sources of information to stakeholder groups across the city including businesses, academia, and associated organizations	Connector	Support Organizations, Industry, Academia				High
	Promote partnerships and collaboration within the manufacturing sector across stakeholder groups by hosting information sessions and opportunities for industry to provide input into implementation of the action items	Leader	Industry, Support Organizations				High
	Enhance collaboration with industry and other levels of government to promote Hamilton's brand and capabilities as an advanced manufacturing hub at international industry events (e.g. Paris Air Show, Inter Solar Europe, the Cleveland Manufacturing and Technology Show)	Leader	Government, Industry				Medium
Capital	Working with provincial and federal governments, look to **advocate on behalf of Hamilton companies for funding** that can help increase the availability of capital (with focus to be given to organizations seeking to transition to a low carbon economy)	Connector	Government, Industry, Investors				Medium
	Explore opportunities to engage with the broader investor landscape, including those who are not currently focused on the sector in Hamilton but may have potential interest in manufacturing/low carbon energy transition	Connector	Industry, Investors				Medium

High-level implementation roadmap – getting ahead of the curve (1/2)

Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Clean energy transition	**Develop concierge services** within the City's Economic Development Office and Invest in Hamilton focused on connecting companies with accessing available resources or appropriate expertise from community groups related to decarbonization	Leader	Support Organizations, Industry				Medium
	Work with key stakeholders to **Develop an industry-focused decarbonization transition roadmap** that supports local industry in achieving decarbonization targets by understanding areas of opportunity for reducing carbon emissions	Leader	Industry				Medium
	Working with key stakeholders, **Undertake a match-making exercise** to connect innovative start-up companies focused on decarbonization with established companies focused on clean energy transition	Connector	Industry, Investors				High
Skills	Partner with key stakeholders (e.g. Workforce Planning Hamilton) to **undertake detailed assessment of the future skills needs** of Hamilton's manufacturing companies, focused on the spotlighted subsectors	Supporter	Support Organizations				High
	Work with academia and apprenticeship programs to **promote upskilling/reskilling opportunities** to ensure appropriate technology skillsets are present across the labour pool	Supporter	Academia				Medium
	Leverage Hamilton-based Manufacturing Skills Initiatives such as the Specialist High Skills Major program, Skills for Steel and the ArcelorMittal Dofasco Mohawk collaboration to bridge the existing skills gap and bolster the local workforce	Supporter	Industry, Academia				High
	Work with industry, academia, and training programs to **develop a 10-year talent pipeline roadmap** to foster innovation within the sector and meeting future resourcing needs	Supporter	Industry, Academia				High

High-level implementation roadmap – getting ahead of the curve (2/2)

Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Technology adoption	Working with the provincial and federal governments, **raise awareness of incentive programs are available** for companies looking to further adopt technology as part of their business	Supporter	Government, Industry				Medium
	Identify areas of low technology adoption across the city's supply chain and provide information related to incentive programs and/or upskilling/reskilling opportunities that could support the sector and related manufacturing processes	Connector	Industry, Infrastructure Organizations				Medium
	Strengthen collaboration and partnerships across sectors to facilitate the crossover of technology especially for startup companies in this space through pilot projects and accelerate its readiness for adoption	Connector	Industry				Medium
Alignment with city initiatives	**Expand the Economic Development Office's collaboration within the City's key working groups** focused on initiatives which have potential impact on the manufacturing sector	Leader	Support Organizations				Medium
	Further support the city's focus on a low carbon economy by continuing to promote decarbonization across the industry and including principles related to the transition across all manufacturing-related initiatives	Leader	Industry				High
Alignment with provincial and federal initiatives	**Host a 'Queen's Park'** day with key provincial officials to further build partnerships with provincial counterparts and raise awareness about challenges facing Hamilton's manufacturing sector, the new sector strategy, future focus and spotlighted subsectors	Leader	Government				High
	Host a 'Day on the Hill' to build awareness of Hamilton's strengths at a federal level, key challenges which can be supported by the federal government, and build awareness of the City's future focus for the manufacturing sector	Leader	Government				High

High-level implementation roadmap – attracting talent and jobs (1/2)

Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Attracting immigrants	Leveraging Hamilton Immigration Partnership Council, seek to **promote Hamilton as a first landing spot** for new immigrants entering Canada	Leader	Support Organizations				Medium
	Leveraging Hamilton Immigration Partnership Council and Global Hamilton Office, **raise awareness of employment and upskilling opportunities for immigrants**	Leader	Support Organizations				Medium
	Working with the provincial and federal governments, **increase Hamilton's participation in the Ontario Immigrant Nominee Program (OINP) and related-federal initiatives** (such as the Federal Skilled Trades Program and the MNP	Leader	Government, Support Organizations				High
Attracting new graduates	Further **leverage existing programs** and **partner with local high schools** to leverage existing career fairs/undertake information sessions to highlight potential future opportunities within the sector	Leader	Academia				High
	Working with colleges and apprenticeship programs, **seek to brand manufacturing as an attractive career choice** for new graduates – especially women – within STEM	Supporter	Academia				High
Attracting skilled workers	**Undertake detailed assessment of 2021 National Occupational Classification (NOC) database** (following release) to determine further identify current state of Hamilton's labour pool across key sectors	Leader	Government				Medium
	Increase collaboration (including information sharing sessions) with accelerators/incubators focused on manufacturing across Canada's innovation corridor to promote employment opportunities to potential talent	Supporter	Industry				Medium
	Strengthen partnerships with academia and recruiters (including employment liaison officers) to promote new opportunities to recent graduates, mid-level talent and executives withing the city's subsectors	Connector	Industry, Academia				Medium
	Promote the city's quality of life and affordability (relative to neighbouring jurisdictions across the Greater Toronto Hamilton Area)	Leader	Support Organizations				Medium

High-level implementation roadmap – attracting talent and jobs (2/2)

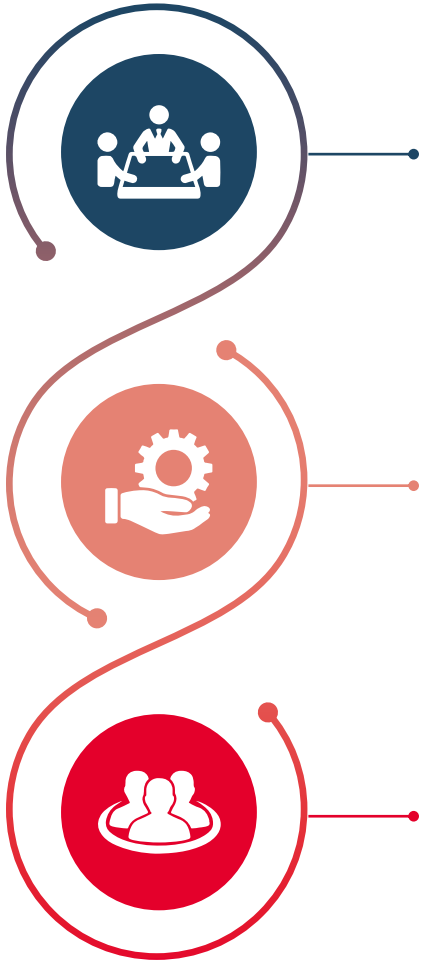
Key Items	Action	City of Hamilton Role	Groups Involved	<6months	6-24 months	>24 months	Priority
Brand	**Undertake a targeted campaign** focused on highlighting the city's vision for the future, the sector's focus on decarbonization and the spotlighted subsectors to key stakeholders across Ontario and Canada	Leader	Industry, Government				Medium
	Identify champions within key stakeholder groups and arm them with compelling messaging and up-to-date information about wins/opportunities and awareness on the sector's journey towards a low carbon economy	Leader	Industry				High
	Increase buy-in from provincial and federal government leaders by highlighting how successful decarbonization across Hamilton manufacturing can help strengthen Ontario's and Canada's manufacturing brand	Leader	Government				High
Getting and keeping investor attention	Participate in **targeted federal and/or provincial trade missions** related to the manufacturing sector	Supporter	Government				High
	Develop targeted investor lists and tailored pitch books highlighting Hamilton's cost competitiveness against peer jurisdictions and the city's unique standing as an emerging low carbon manufacturing hub	Leader	Support Organizations				High
	Support companies with investment attraction by providing resources (e.g. data and information on operating costs within the city; municipal, provincial, and federal supports including available grants, etc.)	Supporter	Industry				Medium

Appendices

Appendix A

Additional background and context

The need for a manufacturing sector strategy



A sector strategy is a call to action — a framework to outline the direction and priorities to achieve accelerated growth. Hamilton's Manufacturing Strategy can help provide a framework for the sector's participants to link public investments with private sector expertise and innovation. Done right, it will inspire further collaboration and alignment to attract domestic and international investment.

The manufacturing strategy can enable the sector to leverage key strengths and address roadblocks. This includes supporting and promoting subsectors with a competitive advantage that present current and future opportunities for growth.

Hamilton needs to further develop its manufacturing sector value propositions to gain and retain investor attention. This needs to be done to effectively convey what makes the specific sector and Hamilton unique.

Key strengths

Growing Hamilton's advanced manufacturing sector and attracting investment will require drawing on the strengths of the sector to unlock broader advantages. Hamilton's sector strengths include the long-standing expertise in the manufacturing of metals and food and beverage, among other subsectors. This is supported by broader city advantages such as the high quality of life and strategic location that Hamilton provides to attract talent and support a competitive business environment.

Academic Institutions

Hamilton has direct access to a diverse talent pool due to its proximity to renowned academic institutions and critical innovation networks.

Strategic Location

Located near the US and Canada border, local manufactures have access to an expansive market and major trade corridors. This is supported by multi-modal transportation options – including the Hamilton International Airport and the Port of Hamilton.

Existing Manufacturing Presence

Hamilton has a robust industrial base from which to draw from. The existing cluster of manufacturing companies serves as an attractive factor for the location selection of companies entering the market.

Collaborative Environment

Strong collaboration and support across Hamilton's manufacturing ecosystem were raised by stakeholders as a key differentiator and a unique strength. Stakeholders noted the invaluable support they received from peers willing to provide guidance and support. This collaboration can further be leveraged to support decarbonization efforts.

High Quality of Life

Situated on Lake Ontario and along the Niagara Escarpment, Hamilton offers residents a high quality of life, including access to outdoor activities with vast hiking trails, relative affordability, world-class academic and research hospitals, and a thriving art scene.

High impact

Moderate impact

Key challenges

Growth and continued evolution of the manufacturing sector requires the mitigation of challenges and foreseeable roadblocks noted below. A key challenge facing the City includes facilitating the shift of Hamilton's brand from that of a 'steel town' to that of an advanced manufacturing hub that supports the global transition to a net-zero carbon economy.

Ease of Doing Business

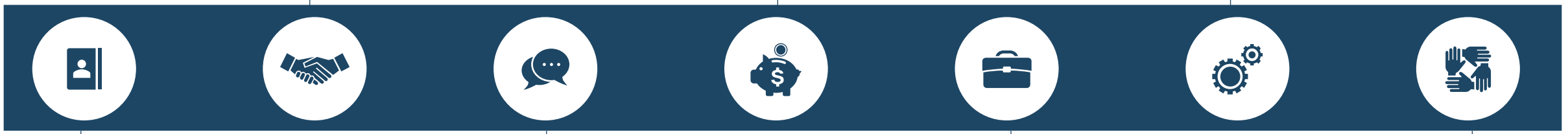
Including barriers ('red tape', cost factors, etc.) for companies looking to enter or expand in Hamilton

Funding

Including high competition for funding, often seen as not being focused on the manufacturing sector

Technology Adoption

The adoption of new technologies in the sector is comparatively slower in Hamilton certain parts of Ontario's supply chain than in other jurisdictions but is crucial to enable greater productivity



Labour

Ongoing and predicted labour shortages caused in part by difficulties in attracting local skilled and foreign workers

Branding

Lack of awareness of manufacturing-related employment opportunities and the City's shift towards emerging growth areas

Investment Barriers

Including a low availability of greenfield sites suitable for development and cost barriers related to decarbonization.

Collaboration

Lack of a clear strategy for sector growth, support for navigating the industry, and facilitating partnerships between organizations

High impact

Moderate impact

Key opportunities

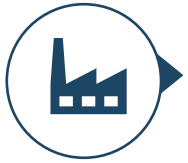
Hamilton has a strong and long-standing manufacturing base to build from and expand. Accelerating sector growth will depend on the city's ability to leverage existing strengths (advantages / differentiators) and capitalize on emerging opportunities (areas of potential growth / advantage) within key subsectors of focus.

Clean Energy Transition

The City of Hamilton's climate action strategy (ReCharge Hamilton) aligns with federal and provincial ambitions, and will be focused on accelerating clean energy use in the manufacturing sector, spearheaded by companies like ArcelorMittal Dofasco. If green hydrogen can be manufactured and commercialized in Hamilton, then there is an opportunity for Hamilton to become a leader in this new emerging space and serve as a blueprint for manufacturing hubs around the world.

Labour Attraction

Hamilton's manufacturing sector requires skilled workers and individuals with STEM skillsets that can drive innovation and technological adoption. The sector can fill its labour needs by attracting post-secondary graduates and immigrants, as well as promoting careers in manufacturing to high school students. Hamilton can also work with the province to support more graduates in the skilled trades. Additionally, Hamilton especially has opportunities for new immigrants as its diverse economy enables workers with a diversity of skillsets to obtain additional Canadian experience in their preferred field. The City also has opportunity to work with the province to support increasing the number of skilled trade graduates that can help meet Hamilton's labour needs.



Leveraging Existing Assets

Hamilton is the home to an advanced manufacturing supercluster, together with NGen, CANMET, MIP, the Hamilton Immgration Partnership Council and the nearby universities and colleges, there is potential for strong synergy supported by collaborative partnerships, research and innovation. Companies have the opportunity to partner with McMaster University and Mohawk College to explore and test new technologies in facilities that they would otherwise not have access to. It is critical to ensure that the existing base of firms in the City's manufacturing sector remains as competitive as possible.

Enhance End-to-End Ecosystem

Integration of the value chain with access to Hamilton's port and airport can be an added benefit to Hamilton's strategic location, to develop an end-to-end ecosystem that will have less reliance on imports and suppliers, this would include the manufacturing of machinery and equipment used by other subsectors. Overall, the sector plays a key role in wealth creation and has the ability to drive economic prosperity and productivity growth in the city and the wider Canadian economy.

Hamilton International Airport (HIA)

Ranked #1
Busiest overnight express cargo airport in Canada

16%
Year-over-year increase in cargo activity in 2021

$83.3M
Investment by Tradeport and its partners in 2021

$1.5B
industrial activity in 2021

Key facts and recent developments

- HIA is a no curfew airport with a 24/7 operation
- Strategically located & well connected to 2 major highways that link to Toronto, Ohio, Kentucky, Tennessee, Georgia, and Florida
- HIA benefits from Hamilton's designation as a Foreign Trade Zone Point, which offers a combination of tax and duty relief programs, tariff exemptions, and exclusive concierge investment services by a dedicated group of sector experts
- Offers numerous air cargo logistics and handling services in collaboration with key partners (including DHL, Express, CargoJet, Purolator, and UPS)
- Largest domestic overnight express cargo airport in Canada with a total billable aircraft weight of 766 million kilograms
- Lower aeronautical fees in comparison to Toronto Pearson Airport
- Key land developments (as of 2021) include:
  - Mohawk College's 75,000 sq. ft. learning complex in partnership with KF Aerospace
  - DHL's $110M CAD gateway facility (the largest in Canada), with the ability to process 15,000 packages per hour
  - Amazon's center adjacent to the airport

Hamilton has an opportunity to further capitalize on its unique location and multi-modal transportation hub.

The city's airport has a key role to play by providing investors with an efficient and well-connected transport option that can help mitigate detrimental supply chain blockages.

Sources: Hamilton International Airport, Invest in Hamilton, HOPA, Dry Cargo International

Port of Hamilton

Largest
Port in Ontario

$2B
Cargo value handled per year

10.8 MMT
Cargo handled in 2021

0.2 MMT
Planned additional capacity per year

$300M
Investment by port users in the last decade

Key facts and recent developments

- The port includes a multimodal facility with access to marine, rail and truck transportation and a presence of ~7000 rail cars
- Served by CN and CP rail and multiple trucking partners that enable direct connection to 400-series highways
- Offers a dedicated warehouse space of 1 million+ sq.ft with direct marine access for loading/unloading and 60 acres of open storage
- Home to essential infrastructure for handling raw material (iron ore/coal) imports from the US for steelmaking
- Gateway for domestic and US shipments, facilitates movement of goods to Europe, Asia, Africa, and South America
- Recent agreement with GIO railways that will enable the use of capital CN Railway Infrastructure
- Planned expansion into Niagara Region
- Canada's leading marine service providers (such as McKeil Marine and Federal Marine Terminals) offer services within the port
- Recent initiative with the Port of Montreal to further expand the movement of goods in the region

Based on stakeholder discussions, opportunities exist to further assess how the port can increasingly support local manufacturing companies.

The focus should be on identifying areas of the city's manufacturing ecosystem (e.g. SMEs) that are underutilizing the port and would benefit from increased access/awareness.

Sources: Hamilton International Airport, Invest in Hamilton, HOPA, Dry Cargo International,

Road connectivity

Hamilton has access to an extensive highway and road network that connects the city to major destinations and markets across North America.

This form of transport ensures that the shipment of manufactured goods can be made effectively.

Image source: Invest in Hamilton

Rail connectivity

Hamilton is well connected to regional, national and international rail lines, through Canadian National and Canadian Pacific railroads.

Many major hubs in Canada and the USA can be reached in under five hours, providing manufacturers with efficient rail routes through which to move their goods.

Image source: Invest in Hamilton

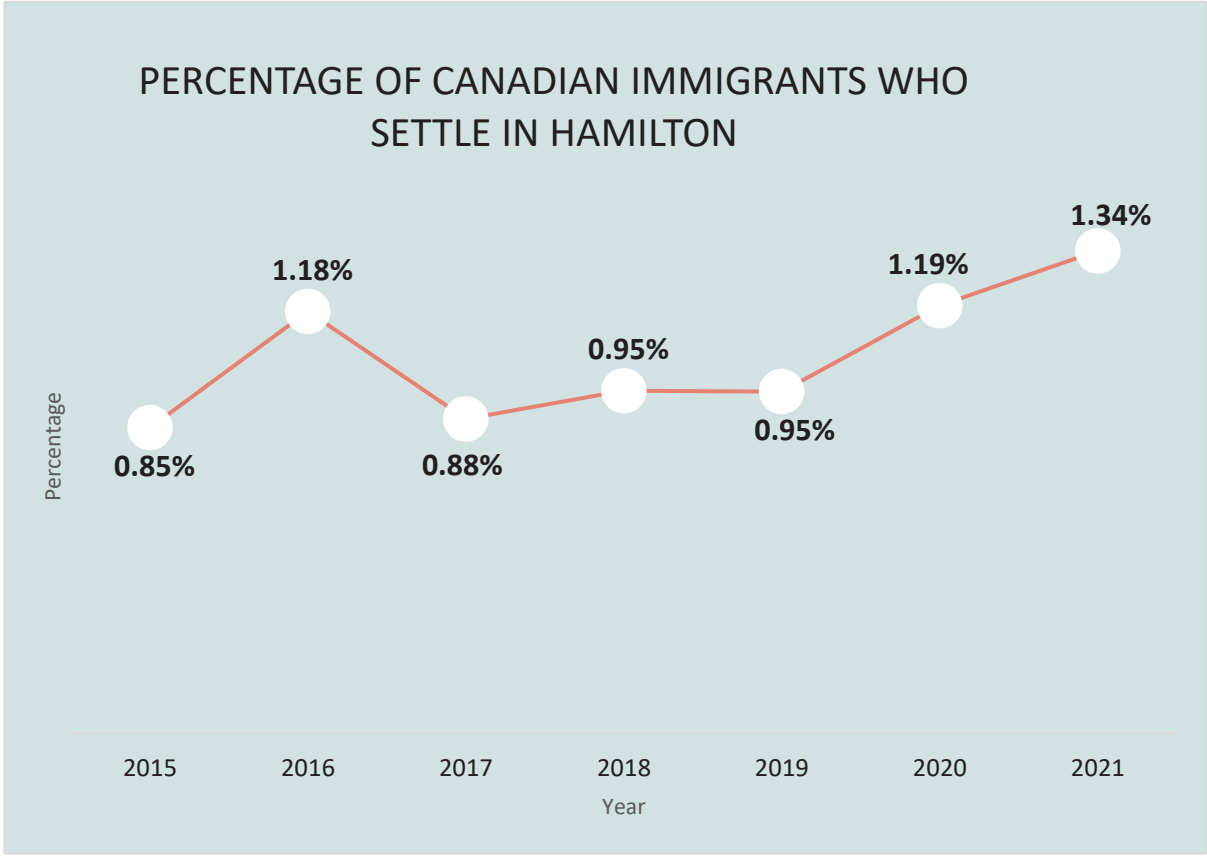
Immigration in Hamilton

Population growth in Hamilton over the last decade has been largely driven by immigration. Based on data from 2015 to 2022, Hamilton receives an average of 1% of the new immigrants who settle in Canada. The city has seen continued growth over the last 7 years, with a peak in 2016 following large-scale government assisted refugee initiatives.

Access to skilled workers has become an important and growing challenge for businesses across Canada. In recent studies, almost 50% of surveyed companies reported that their skilled trades workers will be retiring in the next 15 years. Moreover, 40% of surveyed organizations expect to face a skilled trade shortage in less than five years.

With the worsening labour shortage, these forecasts make for an ideal situation for people who want to immigrate to Hamilton, Canada, especially through Skilled Worker Applications, such as the Federal Skilled Trades Program (FSTC), or the MNP when it is made available. The rising trend of new Canadian immigrants choosing to settle in Hamilton will be helpful in addressing existing and predicted labour shortages.

As an issue acknowledged by the provincial government, Ontario is looking to negotiate an increase in immigration and a boost in the number of workers Ontario takes in, as well as more say in the types of job skills they possess.



Sources: The City of Hamilton, Statistics Canada

Hamilton’s focus on decarbonization

The City of Hamilton is on a mission to achieve net zero GHG emissions by 2050. In lieu of this target, the City has formulated a Climate Action Strategy which includes several actions the City and the broader community can take to accelerate the transition to a sustainable, equitable and resilient low-carbon city. Leveraging and aligning with these initiatives will be key to supporting decarbonization efforts across Hamilton’s manufacturing sector.

Initiatives by the City

The City has implemented various initiatives to encourage climate positive actions including:

- Investments in bicycle infrastructure
- Parks and tree planting
- Electrification of vehicles and equipment
- Improved stormwater infrastructure
- Approval of a budget for the implementation of Hamilton’s Green Fleet Strategy
- Conversion of 89 internal combustion city vehicles to battery all-electric
- Establishing a Climate Change Reserve and policy for funding innovative climate actions

Corporate Action

Canada’s carbon-intensive steel industry accounts for 5% of the country’s total greenhouse emissions. Hamilton houses two steel giants, Arcelor Mittal Dofasco and StelCo, which cumulatively represent more than 50% of Canada’s steel industry emissions. The need for decarbonization is imperative to ensure for a sustainable future.

- **Ontario’s first carbon-negative bus:** Hamilton Street Railway (HSR) has collaborated with Enbridge Gas for the first renewable natural gas-fuelled bus in Ontario, Ontario’s first-ever carbon-negative bus
- **ArcelorMittal Dofasco’s transition to Electric Arc Furnace:** ArcelorMittal’s transitioning its traditional high-carbon emitting blast furnace-basic oxygen furnace steelmaking production model to the Direct Reduced Iron (DRI) – Electric Arc Furnace (EAF) production model
- The CSPA in association with the Canadian Carbonization Research Association (CCRA) has developed a decarbonization framework following a stepwise transition approach to primarily focus on lower-cost near-term options using existing facilities and higher-cost long-term strategies leveraging innovative technologies
- NGen has supported McGuire Aero Propulsion Solutions Inc. (“MAPS”) collaboration with Burloak Technologies through funding to develop a sustainable, transformative, net-zero power generation technology for commercial and industrial businesses: the micro-power-plant (MPP)

Derived from MG analysis based on sources from: City of Hamilton, Canadian Steel, GlobeNewsWire

Key stakeholder groups required to support the strategy

The groups listed in Hamilton's manufacturing implementation roadmap include the key stakeholders mentioned in the throughout strategy. To support successful execution, the City will need to be responsible for leading or supporting each action in coordination with all stakeholders involved.

Academia and Research Centres

Including universities, colleges, training programs, and research organizations that are focused on STEM and manufacturing. In Hamilton, these include McMaster University and Mohawk College, as well as research centres (such as CANMET Materials Technology Laboratory), etc.

Industry

Includes both established organizations such as major steel producers like Stelco, ArcelorMittal Dofasco, and CFF Stainless Steels, as well as start-up/scale-up companies.

Government

Including all three levels of government (Government of Ontario, Government of Canada, and the City of Hamilton).

Potential Investors

Including angel investors, private equity funds, and venture capitalists that provide companies with initial and ongoing financial means to invest in research, development, capital, marketing, and commercialization.

Support Organizations

Including NGen, MIP, Hamilton Immigration Partnership Council, accelerators (Innovation Factory Hamilton Technology Centre, etc.), economic development agencies (Invest Ontario, Invest in Hamilton), and other organizations (e.g., Hamilton Chamber of Commerce) that support Hamilton's manufacturing sector.

Infrastructure Organizations

Includes public organizations that facilitate the movement of goods such as Hamilton International Airport and the Hamilton-Oshawa Port Authority.

Related implementation roles and responsibilities

A sector strategy needs to be led by a single entity to ensure clarity and accountability. In this case, the lead is the City of Hamilton and associated entities such as Hamilton Economic Development. While the City will need to rely on key stakeholders to help grow the sector and attract investment, the City is ultimately responsible for leading most initiatives, taking action, and measuring results. Overall, it is important that all stakeholder groups work together to attain a common goal for sector growth. Fragmentation or a lack of collaboration among key stakeholders can result in efficiency loss and lost investment opportunities as potential investors seek to invest in a market where a comprehensive suite of services or supports is easily accessible.

Leader

Responsible for spearheading efforts by the network and helping to ensure success of key initiatives. Leads the coordination of all of the different groups that are involved and ensure there is alignment among them in reaching a common goal.

Supporter(s)

Responsible for supporting key initiatives, but is not considered a decision maker, and does not holds the same level of accountability as a lead.

Connector

Focused on bringing together different entities, assets, and information to drive innovation and the success of key initiatives

Champion

Responsible for promoting the vision, value proposition, and/or key initiatives of the network across the ecosystem and/or abroad

Appendix B

Subsector overviews

Steel & metal manufacturing

Subsector Overview

Definition: the smelting and refining of metals from ore or scrap in blast or electronic furnaces.

- Critical to the global economy, serving as a backbone for manufacturing and construction.
- Requires highly skilled engineering to process inputs and remove impurities like nitrogen, silicon and excess carbon.

Global Trends

- Global market value: $3.02T USD (2021).
    - Forecasted to grow to over $4.5T by 2026 with a CAGR of 7.3%.
- subsector demand is being driven by infrastructure development in emerging markets, as well as the rising adoption of steel in automotive, electrical, construction and other end-use industries.
- China is the largest market for manufactured steel, consuming about 34% of global output and produces more steel than the rest of the world combined.
- The subsector is a major emitter, with production accounting for 11% of global CO2 emissions.
- The subsector is becoming more efficient by adopting innovations such as industrial robotics that perform functions like material handling, welding, cutting, and pressing.

Canadian Trends

- Total domestic net revenues: $49.3B CAD (2019).
- Annually contributes over $11B CAD (2019) to domestic GDP.
- Employer of over 25,000 workers and contributed $3.4B CAD to Canada's GDP in 2019.
- Canada has the sixth largest reserve of iron ore.
- According to studies conducted by Global Efficiency Intelligence, Canadian steel manufacturers emit the lowest amount of CO2 per metric ton of steel produced in the world
- Innovations, a highly skilled workforce and increasing demand are expected to help the subsector rebound in the coming years.

Hamilton's Advantage

Key Differentiators

- Historically known as a global metal manufacturing hub (i.e., "steel town") Hamilton is home to major steel producers such as Stelco, ArcelorMittal Dofasco, and CFF Stainless Steels.
- ArcelorMittal Dofasco is Canada's leading flat steel producer and has helped to innovate the subsector by developing lighter, stronger, and more sustainable products through partnerships with top automotive, energy, packing and construction firms.
- The Government of Canada has demonstrated a commitment to supporting innovation and decarbonization across the subsector.
- In 2021, the federal government committed $400M CAD towards AMD's $1.8B CAD project for converting the steel production process and phasing out coal-fired steelmaking. The project is anticipated to improve productivity, product quality and energy efficiency.
- The subsector has evolved in complexity over previous decades to increasingly encompass capabilities such as engineering, product design, fabricated metal products, and final product commercialization.
- This transformation was supported by the city's strong research capabilities such as CANMET Materials Technology Laboratory (CANMET-MTL) at McMaster Innovation Park.
- CANMET-MTL is the largest research centre in Canada dedicated to fabricating, processing, and evaluating metals, alloys and materials. Facilities at CANMET-MTL enable staff and researchers to undertake over 100 collaborative R&D projects annually with industry, academia and other government departments.

Sources: Fistco, Business Wire, Natural Resources Canada, ISED, Global News, McMaster.ca, Financial Post, NSEnergy.com, Statistics Canada, Natural Resources Canada, Newswire.ca, WorldSteel.org, Government of Canada, EinNews, McKinsey & Company, Global Efficiency Intelligence

Food and beverage manufacturing

Subsector Overview

Definition: the processing of raw materials into market-ready products for consumption.

- Food segments include: bread and cereals, rice, oil crops, sugar, meat, fish and seafood, dairy and eggs, confectionary, and vegetables.
- Beverage segments include: alcoholic drinks, carbonated soft drinks, bottled water, and non-carbonated drinks.

Global Trends

- Global market value: $5.82T USD (2022).
    - Forecasted to grow to $8.9T USD by 2026 at a CAGR of 8.7%.
- Stronger performance than the majority of manufacturing subsectors due to:
    - Growth in demand from population expansion and rising incomes in emerging markets.
    - Investments into R&D that have innovated processes, products, and packaging. Between 2016 and 2021, capital investments grew by 85%, triple the rate for the overall manufacturing sector.
- The subsector faces significant challenges, as climate change, the pandemic and geopolitical conflicts have caused major supply chain disruptions and unstable raw material prices.

Canadian Trends

- Domestic market value: $117.8B (2019).
- The largest domestic manufacturing subsector by employment with 290,000 jobs and second largest by revenue, representing 17% of manufacturing sales.
- Major export subsector, where Canada is the eighth largest food and beverage exporter in the world. Between 2014 and 2019, Canadian exports had a CAGR of 4%, growing to 33% of total production value or $38.9B CAD (2019).
    - 72% of exports go to the US.
- Labour shortages are an issue for the subsector, where job vacancies reached 20% in 2021.

Hamilton's Advantage

Key Differentiators

- A robust supply chain that has made the city into a major hub for the movement of goods. This feature has enabled Hamilton's food and beverage subsector to rapidly expand, growing by 35% over the past 10 years, and annually contributing $1B CAD to the local economy.
- The subsector is supported by a port that specializes in agri-food cargo and the largest overnight express cargo airport in Canada.
- A thriving ecosystem with over 120 food and beverage manufacturers and 9,500 skilled workers.
- World-class companies located in Hamilton include Mondelez International, Maple Leaf, Tim Hortons, Gay Lea, among others.
- The city is situated in the most populous region of Canada and located within 45 minutes of Toronto, and US boarder crossings.
- The city is home to North America's largest vertical farm, Infarm (currently undergoing construction).
- A pipeline of skilled talent from over 55 post-secondary education programs in agriculture, food science, nutritional science and culinary arts at Mohawk College and McMaster University.

Sources: Invest in Hamilton, Government of Canada, Ontario Ministry of Agriculture, Agriculture Canada, Invest in Hamilton, ResearchandMarkets.com, TheBusinessResearchCompany.com, Statista.com, CRBGroup.com, BDC.ca, WorldAtlas.com, Common Thread, Dalhousie University, Hamilton-Oshawa Port Authority

Industrial machinery and equipment

Subsector Overview

Definition: machinery and equipment that is used in various sectors such as mining, manufacturing, energy, construction, domestic appliances etc.

Global Trends

- Global market value for machine tools: $565.6B USD (2020).
    - Forecasted to grow to approximately $794B USD by 2027 at a CAGR of 5%.
- The US is currently the world's largest industrial machinery market, valued at $162.9B USD (2020) which represents a 28.8% global market share.
- Strong growth is anticipated in China, with a market value forecasted to grow to $145.9B USD by 2027, at a CAGR of 8.2%.
- The subsector is rapidly innovating through 'smart' machines which are more automated and increasingly rely on AI. Over the next decade, 'smart machines' are expected to grow at a CAGR of 19%.
- Although production and sales were impacted during the pandemic with the subsector facing significant disruption to its supply chain, the subsector is expected to quickly rebound.

Canadian Trends

- Total domestic revenues of $39.6B USD (2019), which have grown by 6.7% since 2016.
- Industry 4.0 is a growing focal point for Canadian manufacturers. 89% of Canadian manufacturing business leaders believe industry 4.0 is a serious growth opportunity.
- Machinery manufacturing has experienced rapid gains in productivity over the last 10 years, outpacing the average of 2% for all industries by double the rate at 4%.

Hamilton's Advantage

Key Differentiators

- Local machine manufacturers, such as All Tool Manufacturing Inc. and Hamilton Machine, that supply and service Hamilton manufacturers.
- Hamilton's commitment to and growth of advanced manufacturing has increased demand for industrial machinery and equipment. This demand will help attract companies into Hamilton.
    - For example, in 2021 L3Harris Technologies opened a state of the art Canadian HQ in Waterdown, Hamilton. The firm will support local manufacturing and will be manufacturing electro-optical and infrared imaging.
- As the industry looks to further combine research, technology and manufacturing capabilities, Hamilton's research organizations will be critical to this ecosystem.
- Hamilton's industrial activity ensures demand for machinery and related supports, with over 750 listed manufacturing entities operating in the city. The scale of industrial activity in the city requires a machinery sector that can support these systems with expansions and maintenance work.

Sources: Government of Canada, Globe News Wire, Trillium Network, Report Linker, Persistence Research

Decarbonization technologies

Subsector Overview

Definition: encompasses a wide range of sectors that specialize in 'clean technology' with an aim to reduce carbon emissions through innovative approaches. Relevant segments include:

- Renewable energy – comprising of solar, wind, hydroelectricity, and bioenergy.
- Hydrogen/fuel cells – that convert hydrogen into electricity with minimal impact.
- Carbon capture (CCUS) – that captures and removes atmospheric CO2.

Global Trends

- The renewable energy global market value of $881.7B USD (2020) is forecasted to grow to $2T by 2030 at a CAGR of 8.4%.
- The hydrogen and fuel cell global market value of $2.5B USD (2020) that forecasted to grow to $18B by 2027 at a CAGR of 33.1%.
- The CCUS global market value of $1.6B USD (2021) and forecasted to grow to $3.6B by 2026 at a CAGR of 17.4%.
- Growth is heavily driven by public investment – with government investment into R&D for low carbon energy technologies was $24B USD in 2019, with China investing more than any other country.
- Private invests billions, where In 2021, US clean-energy received a record $105B USD in investment.

Canadian Trends

- Domestic market value of $67.5B CAD (2020) or about 3.3% of GDP.
- Employs about 323,000 workers and forecasted to become one of Canada's top exports by 2025, reaching an annual exports value of $20B CAD.
- Receives generous government support, where since 2017, the federal government has invested $2.3B CAD into clean technology R&D.
- A federal Hydrogen Strategy that seeks to make Canada a global leader in hydrogen technologies and aims for 20 MT of domestic supply of hydrogen annually by 2050.

Hamilton's Advantage

Key Differentiators

- Hamilton has a history of clean technology expertise, with an electrical grid that has over 90% its power come from renewable sources.
- Hamilton manufacturing firms have made significant progress towards decarbonization.
  - For example, ArcelorMittal Dofasco has become an international green leader in steel manufacturing. Other manufacturers in Hamilton also share a desire to pursue decarbonization, making efforts to transition to hydrogen as fuel.
- Leading research capabilities that will advance the subsector and provide companies opportunities to conduct complex R&D.
  - For example iHub, a clean automotive and aerospace research hub at McMaster University, will support more than 230 SMEs with commercializing new clean technologies. This project was supported by the federal government through a $10M investment in 2021 and is expected to enhance Hamilton's position as a global destination to develop, test, and commercialize cleantech vehicles.
- Commitment from the municipal government that has established a Climate Action Strategy to reach net zero emissions by 2050. Actions include improving EV infrastructure, improving bicycle infrastructure, among others.

Sources: International Energy Agency, Government of Canada, Government of Ontario, Statistics Canada, Invest in Hamilton, Invest Canada, London School of Economics, US Department of Energy, Globe News Wire, PR News Wire, Ontario's Low Carbon Hydrogen Strategy, Ontario Energy Board, ArcelorMittal, Global News, Bloomberg News, In the Hammer, Hydrogen Council

Water technology

Subsector Overview

Definition: technologies that support water extraction and purification for drinking and industrial uses while minimizing disruption to ecosystems.

— Areas of focus include water scarcity, water infrastructure, and wastewater treatment.

Global Trends

- Global market value for water treatment: $301.8B USD (2022).
    - Forecasted to grow to approximately $490B USD by 2029 at a CAGR of 7.1%.
- The US is the largest market valued at $109.5B USD (2021). Substantial demand stems from beverage and pharmaceutical manufacturers.
- The subsector will increasingly play a role in alleviating worsening water scarcity from population growth and climate change.
    - Currently, 3 billion people worldwide lack an adequate supply of clean water, which is projected to double to 6 billion by 2050.
- Innovative technologies are revolutionizing the industry like AI, advanced metering infrastructure digital twins, intelligent asset management, geographical information systems (GIS), and 5G.

Canadian Trends

- Domestic water treatment market value: $2.5B CAD (2017).
- 22,000 total water industry employees.
- Canada has a competitive advantage in the subsector, with more freshwater lakes than all other countries combined and the fourth largest reserve of renewable freshwater.
- Over 700 water technology companies, enablers, and research organizations that employ 22,000 workers.
- Canada is a major exporter with nearly 80% of water technology companies exporting and earning annual revenues of over $7B CAD (2019).

Sources: waterNEXT, Fortune Business Insights, Invest Ontario

Hamilton's Advantage

Key Differentiators for Hamilton

- Part of a regional hub around Lake Ontario for innovative water technology, with access to freshwater, industry leading research initiatives, and innovative companies.
- Located within a thriving ecosystem in Ontario which has more than 900 water related companies, 300 early-stage water technology developers, 100 technology incubators, and 42 Canadian Research Chairs dedicated to water. This ecosystem, along with support from government, spends over $14B CAD annually on R&D.
- Home of the UN Institute for Water, Environment and Health at McMaster University, a think-tank for responding to global water crises like floods, droughts and salinity intrusion.
- Has the largest freshwater research institute in the world, the National Water Research Institute, as well as Wastewater Technology Centre, Canadian Water Network and Great Lakes Institute for Environmental Research.
- Home to local water technology companies providing innovative technologies for advanced water purification (e.g. micro-filtration, ultra-filtration and reverse osmosis), wastewater treatment, and automated water resource management systems.
- Location of companies like Fibracast, a global leader in R&D, and manufacturing of advanced membrane technologies for wastewater treatment. The company's revolutionary, patented hybrid immersed ultrafiltration membrane technology, FIBREPlate®, is sold and serviced throughout the globe.

Aerospace manufacturing

Subsector Overview

Definition: the designing, testing and manufacturing of flight vehicles and parts for flight vehicles with civil and military applications.

- Includes research, development and manufacturing of flight vehicles.
- Firms may specialize in aerospace, defense, space and security technologies. The industry is intertwined with technology, as the process behind the components require advanced materials and processes.

Global Trends

- Global market value: $298B USD (2020).
    - Forecasted to grow to $430B USD by 2025 at a CAGR of 7.6%.
- The industry was heavily impacted by the pandemic due to the grounding of most civilian travel. However, the industry is expected to rebound strongly, with strong future growth estimates.
- Major avenues for growth in the subsector include increased defence spending due to rising geopolitical tensions, commercial drones, satellite technology, and space exploration.

Canadian Trends

- Canada is recognized as a global leader in aerospace, where the subsector contributed over $22B CAD to the country's GDP in 2020 and employed 207,000 Canadians.
- Canada ranks in the top five for R&D across flight simulator, engine, and aircraft sub-segments.
- Canada is the fifth biggest exporter of aerospace products in the world, with exports valued at $9.6B USD. Overall, 75% of Canadian aerospace production is exported to 186 different countries.
- A global leader in R&D, where investments totaled $934M CAD in 2020.
- The subsector is heavily supported by cross-collaboration across industry, academia and government.

Hamilton's Advantage

Key Differentiators

- Mohawk College and KF Aerospace have partnered to develop the Centre for Aviation Technology based at Hamilton International Airport. The collaboration includes a 75,000 square foot complex with labs, classrooms, and a hanger containing 16 aircraft. The partnership will facilitate hands on training for young professionals in the industry.
- Strong research capabilities through McMaster University and Mohawk College.
- Hamilton's partnership with McMaster University has led to a $10M CAD investment to integrate the aerospace and advanced manufacturing network.
- Reputable and innovative local companies that are driving sector growth. For example, Skygauge Robotics is a company focused on industrial drones that assist with building inspections.
- The home of major defence contractors such as L3Harris. In 2021, L3Harris, an innovative global aerospace and defence technology firm, relocated its Canadian head office in Hamilton at a new $110M CAD, 330,000 sqr. ft. facility. The facility will focus on R&D and manufacturing. It currently employs 1,250 workers which will grow to 1,500 by 2023.

Sources: The Business Research Company, Government of Canada, Federal Economic Agency for Southern Ontario, Stockholm Institute for Peace, L3Harris, Statista.com

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