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PRICED OUT

A lack of housing options for
working families in the Goods
Production & Distribution District
of Canada's Innovation Corridor

SEPTEMBER 2021





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LIST OF ABBREVIATION

CMA	Census Metropolitan Area
CPI	Consumer Price Index
CGE	Computable General Equilibrium
CMHC	Canadian Mortgage and Housing Corporation
CREA	Canadian Real Estate Association
DAC	Direct Air Capture
E-Commerce	Electronic Commerce
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPDD	Goods Production and Distribution District
GTA	Greater Toronto Area
LFS	Labour Force Survey
NAICS	North American Industry Classification System
NOC	National Occupational Classification
OSFI	Office of the Superintendent of Financial Institutions
RTRA	Real Time Remote Access
TRBOT	Toronto Region Board of Trade
TRREB	Toronto Region Real Estate Board



EXECUTIVE SUMMARY

The future looks bright for Toronto's Goods Production and Distribution District (GPDD) in the Innovation Corridor, as long as there are workers to fill all the jobs that could be created over the next three decades. In the aftermath of the pandemic, job growth is expected to increase in the GPDD due to several factors: the need for warehousing to support a growing e-commerce sector, a desire to onshore manufacturing and to focus on sectors where Canada can build global importance, and a return to international travel. These socioeconomic changes are likely to incentivize the creation of jobs over the next few years. What is more, over the next three decades, the race to net-zero emissions by 2050 is expected to create substantial opportunities for the manufacturing sector, with much of the economic activity likely to occur in or near the GPDD. Using modelling from Navius Research Inc., we project that an additional 55,000 to 80,000 manufacturing jobs will be created in the Toronto Census Metropolitan Area (CMA) alone by 2050, depending on how Canada reaches its net-zero targets.

However, for this economic growth to occur, firms must be able to find the workers to take those jobs. Given that these are often good, middle-class jobs, finding workers to fill these positions would not be an issue in most parts of the country. Nevertheless, exceptionally high home prices, due to a lack of housing, has made it nearly impossible for these families to find affordable housing near where they work.

The lack of housing was an issue before the pandemic struck and is likely only to get worse. While the overall

population of the Toronto Region grew substantially from 2015 due to an influx of non-permanent residents, the region also experienced a significant exodus of young families to other parts of the country. With too many young workers chasing too few homes, middle-class workers in the construction, manufacturing, warehousing, and tourism industries are going to continue to be priced out. To provide an example, a double-income household with annual income of around C\$85,000 will have to spend as much as 20% to 30% of their monthly income to rent even a 1-bedroom unit in some areas of the GPDD.

That family earning C\$85,000 would also have trouble purchasing property as well. An analysis of home sales in the GTA between January and May of 2021 finds that the same double-income household would only qualify for a mortgage for the lowest 3% of all property-sales across the region, mostly 1-bedroom units and well less than 1% of all detached, semi-detached and row housing, and only 2% of condo townhouses. This lack of affordability will make it difficult to attract and retain the types of workers needed to make the GPDD a success.

Unless the stock of housing substantially increases, the ability of the GPDD to grow will be dramatically limited, which risks losing this economic activity to other countries. It is imperative to address this housing shortage in the region and build family-friendly housing that is affordable for workers in the manufacturing, warehousing, transportation and construction sectors.

INTRODUCTION

The arguments of this report can be summarized in four simple statements:

1. The Innovation Corridor is about to embark on a 30-year period of substantial job creation in goods-related jobs, from manufacturing to warehousing.
2. Many of the jobs that will be created will be good paying, high-quality middle-class jobs.
3. Although these jobs pay well, the region will not be able to attract and retain the workers needed to take those jobs due to high housing costs stemming from a shortage of housing.
4. Failure to address the housing shortage will result in a loss of these jobs and economic opportunities to other parts of the world, making Ontario and by default the Innovation Corridor poorer as a result.

The Innovation Corridor, made up of the five Census Metropolitan Areas (CMAs) of Oshawa, Toronto, Hamilton, Guelph and Kitchener-Cambridge-Waterloo contains 60% of Ontario's manufacturing, 75% of warehousing, and 62% of transportation jobs.¹ These jobs are primarily found near major transportation hubs such as highways, airports and ports in the Corridor's Goods, Production and Distribution District (GPDD), with a large concentration of jobs in the Pearson Airport Employment Zone – areas surrounding Pearson Airport that spans across Toronto, Brampton and Mississauga.

The short and long-term outlooks for the GPDD are quite promising. The post-COVID recovery could create a large number of jobs. In the short term, three factors are expected to drive job creation. First, the structural shift to e-commerce will likely create jobs in the warehousing and transport sectors. Second, the desire to on-shore manufacturing firms and activities to improve economic resilience, and to focus on sectors where Canada has comparative advantages is also expected to create manufacturing jobs. Third, the resurgence of air travel and tourism, particularly in local and regional destinations close to airports and tourist attractions, is also expected to create new jobs in these sectors and help small local businesses in the GPDD.





In addition to the recovery, the transition to a net-zero economy has the potential to supercharge the creation of jobs in manufacturing. Results from a Computable General Equilibrium (CGE) model finds that full-time manufacturing jobs in Ontario are anticipated to increase between 114,000 to 163,000 over the next 30 years. In the Innovation Corridor, between 80,000 to 114,000 manufacturing jobs will be created across a range of sectors by 2050 relative to 2015.ⁱⁱ Toronto CMA alone will create 55,000 to 80,000 of those manufacturing jobs by 2050. This increase is driven by jobs related to the manufacturing of machinery, electronics, transportation equipment, textile, food, and furniture.

The manufacturing sector forms the backbone of the GPDD in the Corridor. The jobs in the sector mainly consist of assemblers (35%); labourers in processing, manufacturing and utilities (27%); machine operators (27%), and supervisors of processing, manufacturing, and assembly (11%).ⁱⁱⁱ These workers experience stark disparities in terms of their annual incomes. For instance, labourers earn one of the lowest incomes, with a median annual income ranging from C\$28,695 to C\$40,725. On the other hand, supervisors of processing and manufacturing earn a median annual income range of C\$67,314 to C\$102,447 across the five CMAs. All of these jobs are expected to continue growing, given the surge in demand for goods and services of manufacturing industries like machinery, electronics, transportation equipment, and food processing – all of which will subsequently demand a higher number of workers in these occupations.

IN THE INNOVATION CORRIDOR
80,000 to 114,000
 manufacturing jobs will be
 created by 2050.



35%
 Assemblers




27%
 Processing,
 manufacturing & utilities



27%
 Machine operators



11%
 Supervisors of processing,
 manufacturing, and
 assembly



The lack of housing options has caused housing prices to escalate to a point where working families cannot afford to own a home in the Toronto region, and struggle to find rental options as well.

To support these growing economic activities and the jobs they are likely to create, it is necessary for the GPDD to attract and retain the workers needed to perform those tasks. While many Canadians, with some training and skills, would be able and willing to take these jobs, they would not necessarily be able to find adequate and affordable housing. This is particularly important for young workers who are looking to start a family. An exodus of young families out of Toronto began in 2016, as home prices rose. A good indicator is the fact that, in the last four years, on net, nearly 19,000 children under the age of five have left Toronto CMA to other parts of Canada. In the prior four years that number was just over 10,000. This is only partly offset by a net gain of 5,000 in Oshawa, Hamilton, Kitchener-Cambridge-Waterloo and Guelph CMAs over the past four years. These young families are moving too far away from Pearson Airport to make daily commuting to the employment zone a realistic option. And yet, these are the workers the zone desperately needs to flourish.

The lack of housing options has caused housing prices to escalate to a point where working families cannot afford to own a home in the Toronto region,

and struggle to find rental options as well. Four case-studies of working families with jobs in the GPDD, two single-earner and two dual-earners, illustrate this lack of affordability. Single-family workers would struggle to find affordable rental accommodations unless they have a higher-paid managerial occupation, and dual-income earners would struggle to find a place to rent that is large enough to raise a family. Purchasing a property is almost certainly out of the question. An analysis of property sales from January to May of 2021 finds that across the entire GTA, three of our four case families would not qualify for a mortgage except for the least expensive condo apartments, which are almost certainly one-bedroom units and not particularly proximate to employment opportunities in the GPDD.

This lack of housing options is not only a problem for the workers who cannot afford to live in commuting distance to job opportunities, but creates an overall labour shortage of the types of workers needed to grow the GPDD. It is imperative that communities in the Greater Toronto Area ensure an adequate supply of affordable, family-friendly housing, to ensure that workers can afford to live near the jobs being created.



WHAT IS THE GOODS PRODUCTION AND DISTRIBUTION DISTRICT (GPDD)?

The Innovation Corridor is comprised of five CMAs – Oshawa, Toronto, Hamilton, Guelph, Kitchener-Cambridge-Waterloo – and contributes to 64% of Ontario’s gross domestic product (GDP) and 25% of Canada’s GDP¹. To better understand the Innovation Corridor, the Economic Blueprint Institute (EBI) of the Toronto Region Board of Trade (TRBOT) divided this region into five Business Districts. These Business Districts are distinct from one another, based on key economic, physical, and workforce characteristics. Prior to the pandemic, more than three quarters of the close to 3.5 million jobs in the Innovation Corridor were in one of the five Business Districts.

The GPDD encompasses the largest geographical area out of the five Business Districts in the Corridor. It spreads across the five CMAs, with a significant presence around the Toronto Pearson, John C. Munro Hamilton, and Region of Waterloo airports. In addition to the geographic coverage, the GPDD has the largest number of workers across the five Business Districts, with 966,070 workers (28% of the total number of workers in the Innovation Corridor) as per the 2016 Census (Table 1).^{iv}

The GPDD accounts for a large share of production and supports movement of goods across Canada, primarily comprised of manufacturing, transportation, and warehousing, as well as retail and wholesale trade sectors, as per the North American Industry Classification System (NAICS). The manufacturing sector is the largest employer (Table 2), and includes a diverse set of industries, such as automotive, food and beverage, robotics, and pharmaceuticals. This substantial economic activity supports small local businesses (e.g., restaurants, personal services, small retailers, arts and recreation businesses) in the District.

Table 1: Number of workers in the five Business Districts of the Innovation Corridor

Business District Type	No. of Workers	%
Goods Production & Distribution District	966,065	28%
Services & Mixed-Use District	687,189	20%
Metropolitan Centre	553,350	16%
Regional Centre	293,469	8%
Knowledge Creation District	166,713	5%
Others	804,322	23%
TOTAL	3,471,109	100%

Source: TRBOT Estimates from Census 2016, Place of Work

The largest concentration of employment opportunities in the GPDD is the Pearson Airport Employment Zone – the area around the Pearson Airport that spans across Toronto, Brampton, and Mississauga. Prior to the pandemic, the Airport Employment Zone employed around 300,000 people². Frontier Economics estimates that the Airport Employment Zone will create around 542,000 jobs and contribute approximately C\$63 billion to the GDP in 2030.³ The Airport Employment Zone is expected to play an increasingly important socioeconomic role in the Corridor.

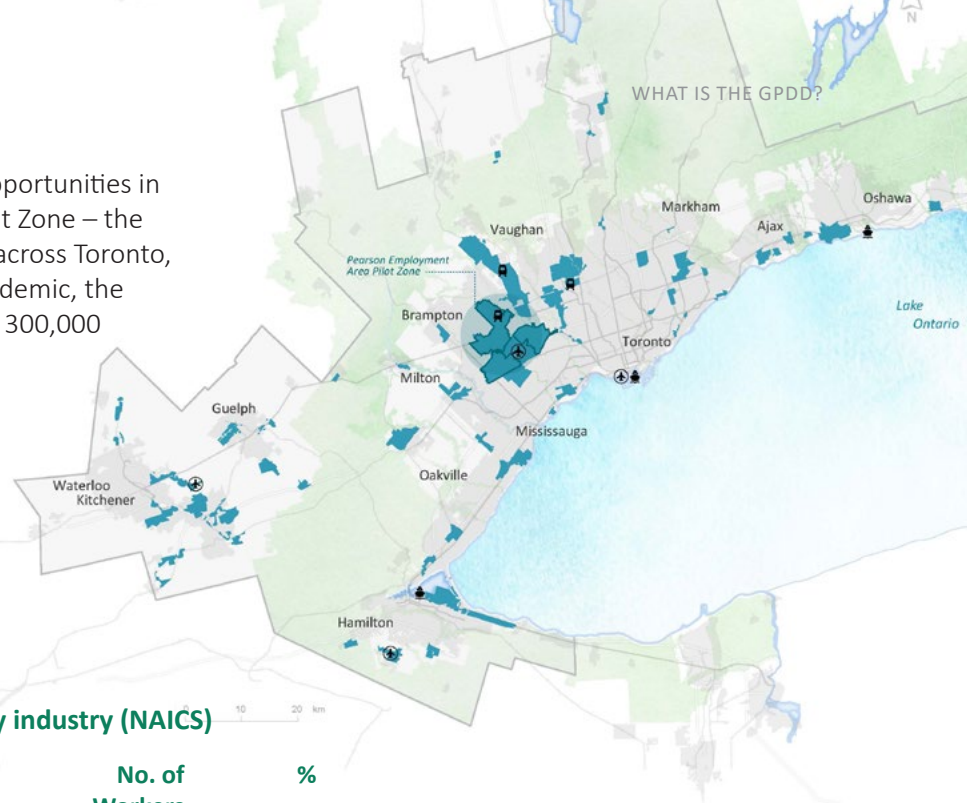


Table 2: Number of workers in the GPDD by industry (NAICS)

NAICS Description	No. of Workers	%
91 Public administration	23,146	2.4%
81 Other services (except public administration)	36,014	3.7%
72 Accommodation and food services	47,530	4.9%
71 Arts, entertainment and recreation	11,807	1.2%
62 Health care and social assistance	43,834	4.5%
61 Educational services	28,778	3.0%
56 Administrative support, waste management and remediation services	41,288	4.3%
55 Management of companies and enterprises	2,547	0.3%
54 Professional, scientific and technical services	62,456	6.5%
53 Real estate and rental and leasing	16,847	1.7%
52 Finance and insurance	27,911	2.9%
51 Information and cultural industries	20,425	2.1%
48-49 Transportation and warehousing	94,923	9.8%
44-45 Retail trade	106,135	11.0%
41 Wholesale trade	85,929	8.9%
31-33 Manufacturing	248,903	25.8%
23 Construction	54,521	5.6%
22 Utilities	8,101	0.8%
21 Mining, quarrying, and oil and gas extraction	1,136	0.1%
11 Agriculture, forestry, fishing and hunting	3,839	0.4%
TOTAL	966,070	100.0%

Source: TRBOT Estimates from Census 2016, Place of Work

**PEARSON AIRPORT
EMPLOYMENT ZONE**



300,000

people employed in the area prior to the pandemic



542,000

jobs are estimated to be created in 2030



C\$ 63 billion

approx. GDP contribution in 2030

WHY IS THE FUTURE OF THE GPDD (POTENTIALLY) SO BRIGHT?

There are strong reasons to expect that the GPDD, particularly the Pearson Airport Employment Zone, will see strong employment growth, both in the short and long-term. Some of these reasons could not have been foreseen by the 2016 forecast by Frontier Economics. The COVID-19 pandemic has enacted a devastating cost to both human lives and the economy. It has also set in motion potentially permanent changes to the economy, which are likely to create a substantial number of jobs in manufacturing, transport, and warehousing, as well as in travel and tourism sectors during the economic recovery following the pandemic. In the longer-term, Canada's recent commitment to net-zero emissions by 2050 is expected to create a high number of well-paying manufacturing jobs in the region, to produce the technologies needed to reduce global emissions.

Short-run future of the GPDD – Next 3 Years

The post-COVID recovery will bring jobs and opportunity for the GPDD

The coronavirus pandemic continues to evolve, impacting economic and social life in unprecedented ways. Ongoing public health measures impact consumer and business activities, labour market, investment decisions, as well as consumer and business confidence⁴. It is difficult to predict how this situation will play out as an economic recovery is contingent on the successful management of public health risks and on an effective vaccination rollout across the province.

The GPDD has fared relatively well during the pandemic. The essential nature of the manufacturing and logistics sectors partially explains the limited economic disruption faced by the GPDD during the pandemic compared to the other Business Districts⁵. It is impossible to forecast with any accuracy the number of jobs the economic recovery will create, at a local and industry level; there are simply too many unknowns. The world has not experienced such an economic disruption in any of our lifetimes. However, a high-level analysis suggests that the economic recovery potential of the District will be dependent on three factors that are expected to favour the economy of the region: the intensification of e-commerce, the rise of onshoring and other strategic considerations to create more resilient businesses and value chains, and the expected resurgence of post-pandemic air travel and tourism, which is likely to revitalize the local economy.



Greater convenience, cost savings, time efficiencies, and new subscription models/loyalty programs are expected to be the main demand drivers of e-commerce activities post COVID-19.



The structural shift to retail e-commerce is already creating jobs in the GPDD

Two retailing giants, Wal-Mart and Amazon, have already announced investment plans and the subsequent creation of thousands of new warehousing, fulfillment and distribution jobs in the GPDD during the recovery. As the COVID-19 crisis evolves and customer behaviours change, the global expansion of retail e-commerce accelerates. It provides customers with access to a significant variety of products from their homes. It enables firms to continue operation, despite contact restrictions and other public health measures.

Prior to the pandemic, Canada lagged behind other high-income economies in retail e-commerce adoption⁶. However, this has changed dramatically. Between February and May 2020, total retail sales in Canada fell by 17.9%, while retail e-commerce sales nearly doubled (+99.3%) to \$3.9 billion⁷.

The changes in the e-commerce landscape induced by COVID-19 will likely persist in the long run. Greater convenience, cost savings, time efficiencies, and new subscription models/loyalty programmes are expected to be the main demand drivers of e-commerce activities post COVID-19⁸. This change is likely to be consistent across demographic groups. For example, a survey conducted by Deloitte suggests that older Canadians, people aged 55 years and above who would not typically shop online, have adapted to online shopping during the pandemic and will likely continue post pandemic.⁹ On the supply side, online retailers and big box stores want to capitalize on their e-commerce infrastructure and skill investments that they made during the pandemic. As a result, businesses (even traditional brick-and-mortar ones) have accepted e-commerce as a crucial complimentary or alternative sales channel.

BETWEEN FEBRUARY AND MAY 2020



-17.9%

Total retail sales in Canada



+99.3%

Retail e-commerce sales

Canada is vertically integrated in global value chains, meaning that the manufacturing sector is highly dependent on the import and export of intermediate parts and materials to produce goods.



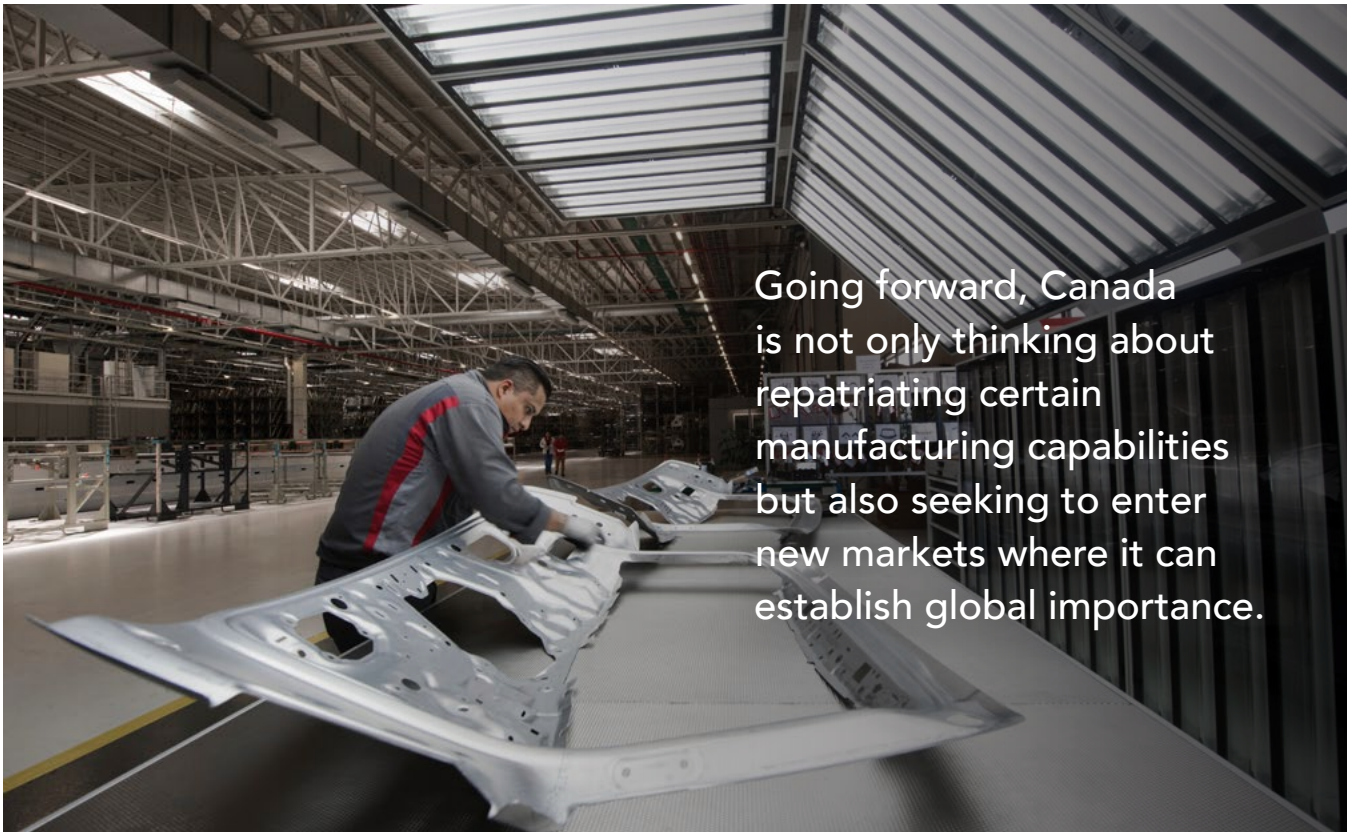
The growth of e-commerce is also expected to create demand for more warehousing and shipping. Traditionally, warehouses used to store bulk inventory and incorporated pallet shipping. The rise in online shopping has significantly changed supply, storage, and shipping management: packages are more customized, small-scale, and need to be quickly delivered to customers. Therefore, e-commerce increases demand for fulfillment and distribution centers, which usually involves larger operations and more workers than traditional warehouses.

With the Greater Toronto and Hamilton Area expected to grow by 3.5 million people over the next two decades, fulfillment and delivery centers need to be located closer to their customer base to ensure prompt delivery¹⁰. This has already started to happen. Amazon has announced plans to open two new fulfillment centers in Hamilton and Ajax by 2021, which is expected to create more than 2,500 full-time jobs. Moreover, Amazon is also planning to open five new delivery centers in Stoney Creek, Kitchener, Vaughan, Etobicoke, and Scarborough by 2022, which will add more jobs in the GPDD¹¹. Wal-Mart has announced that it will open its fifth distribution center in the Greater Toronto Area (GTA) as part of a \$3.5-billion commitment to invest in its Canadian operations during the next five years, which will also create more jobs in the warehousing and distribution sectors¹².

Onshoring manufacturing firms and other strategic considerations will create manufacturing jobs

In this highly globalized world, it is hard to find an economy not relying on international trade, with the Bank of Canada calling international trade a “lifeblood of the Canadian economy”¹³. Both the export and import side of trade are vital in the production of goods. Canada is vertically integrated in global value chains, meaning that the manufacturing sector is highly dependent on the import and export of intermediate parts and materials to produce goods¹⁴.

The pandemic has disrupted international trade, global supply chains, and manufacturing operations across the world. In the face of uncertain access to essential materials due to the pandemic, calls to increase economic resiliency through on-shoring manufacturing are mounting. It is important to note that there was a case for onshoring prior to the pandemic. A combination of rising wages in key offshore manufacturing areas, competitive exchange rates, better intellectual property rights, increased transport and energy costs, and greater need for supply-chain resilience has contributed to domestic firms thinking about onshoring manufacturing¹⁵.




Going forward, Canada is not only thinking about repatriating certain manufacturing capabilities but also seeking to enter new markets where it can establish global importance.

During the early phases of the pandemic, with the implementation of public health measures, Canadian manufacturing saw roughly a 30 percent decline in output, with automotive, aerospace, and machinery experiencing especially negative shocks¹⁶. While there have been signs of a partial economic recovery, the pandemic-induced recession has reinforced the importance of a strong domestic manufacturing footprint. This is especially true for industries that support national health, safety, and security¹⁷. This situation has prompted some manufacturers to bring some of their production back home, particularly medical equipment and pharmaceutical productions¹⁸.

Going forward, Canada is not only thinking about repatriating certain manufacturing capabilities but also seeking to enter new markets where it can establish global importance¹⁹. Canada's newly formed Industry Strategy Council has advocated that the main manufacturing sectors that should be supported in the next 3 years include health/biosciences, value-added resources, and high value manufacturing. These industries were selected by the Industry Strategy Council based on their current size, successful utilization of innovation, and ability to provide upstream and downstream support

to other domestic companies in the supply chain²⁰. Furthermore, the U.S. government's desire to onshore manufacturing will benefit Canadian manufacturers that are highly integrated into U.S. supply chains²¹.

Onshoring efforts and strategic support for certain manufacturing sectors are likely to be beneficial for the Corridor's GPDD. High-value manufacturing serves as an illustrative example. For example, Canada is one of the world's top 10 producers of light vehicles²². With over 100 years of capabilities in auto manufacturing, Canada is well positioned with the infrastructure and research and development expertise to make the country a global leader in emerging automotive technologies, such as electric vehicles and fuel cells. The Toronto region is traditionally recognized as an important location in the automobile manufacturing with a highly diverse labour force²³. With recently announced investments from Ford and General Motors, automobile plants in Oakville and Oshawa, which were about to close, have been revamped to manufacture electric vehicles²⁴. This will open job opportunities for motor vehicle assemblers, inspectors and testers – occupations that make up a significant portion of jobs in the District²⁵.



Over the next three years, one can reasonably expect that air travel and tourism activities in local and regional destinations will rebound.

Resurgence of air transport and tourism post COVID-19 will create jobs in the GPDD

With travel restrictions, border closings, and limits on mass gathering due to the pandemic, air transport and tourism sectors have been disproportionately affected. Global passenger travel was down 90% in April 2020 and still down 75% in August 2020, compared to the same periods in the prior year²⁶. The global tourism industry declined by 48% compared to 2019, in terms of tourism expenditures lost. This translates to losses of \$1.4 trillion to \$1.9 trillion in tourism spending in one year²⁷. In Canada, airline revenues fell by 43%, or C\$14.6 billion, in 2020, placing nearly a quarter of a million jobs at risk²⁸. Moreover, general tourism spending in Canada fell from C\$20.7 billion to C\$11.1 billion in 2020, incurring a C\$25.4 billion dent in the GDP that is generated by aviation and aviation-related tourism^{29,30}.

The federal government 2021 Budget has earmarked close to C\$1.5 billion to support airline and tourism sectors³¹. Nonetheless, the economic recovery of these sectors is expected to be slow due to lingering health anxieties caused by the uncertainty about exposure risks, travel restrictions, lower business confidence, and inconsistencies in global vaccination timelines³². Over the next three years, one can reasonably expect that air travel and tourism activities in local and regional destinations will rebound³³. A suppressed appetite for travel, household savings, and the eventual easing of travel restrictions will facilitate this demand³⁴.

The recovery of air travel and tourism brings great potential for jobs generation in the Corridor's GPDD. The GPDD has more than 85% of air transportation sector jobs in the Innovation Corridor³⁵. A recovery in this sector will restore some of these jobs which were



lost and create new ones. Moreover, the recovery of tourism and hospitality sectors in the GPDD will benefit small local businesses, contributing to the economic, cultural, and social well-being of these districts.

The lifting of health restrictions and mass vaccination will lead to a steady recovery of the jobs that were lost³⁶. However, a return to the “old normal” is unlikely, as the acceleration of e-commerce, the onshoring of manufacturing, and the recovery of travel and tourism sectors is expected to create net new jobs in the manufacturing, transport, and warehousing, as well as in the travel and tourism sectors, which are concentrated in the Corridor’s GPDD. What is promising is that this job creation will likely outlive recovery efforts because of the continued growth in the manufacturing sector expected in Canada, along with the rest of the world, as countries move forward to achieve net-zero emissions by 2050.

Long-run future of the GPDD – Next 30 Years **Decarbonization can create good manufacturing jobs for the GPDD**

The manufacturing sector is one of the core sectors expected to be directly impacted by a transition to a zero-carbon economy. Jobs in manufacturing are central to developing and delivering the products and technologies needed in a zero-greenhouse gas emissions future, including solutions in e-mobility, energy storage, fuel cells, bio-products, smart grid, and renewable energy. For many companies producing these technologies in Canada, the GPDD is the natural place to be due to the existing infrastructure and dense supplier networks.

The potential for manufacturing job creation in the GPDD is substantial. It is possible to forecast how many of these manufacturing jobs will be created, on net, for Ontario, using a Computable General Equilibrium (CGE) model by Navius Research Inc. called gTech. This allows an estimate of how manufacturing jobs in the Innovation Corridor will be affected as Canada moves to a net-zero future by 2050, which provides a better understanding of the challenges these future workers and their families may face in finding affordable housing.

Modelling Job Creation in a Net-Zero Economy

The number of jobs created in the transition to net-zero will depend, in part, on the pathway Canada follows to get there. To confront the uncertainty involved in job projections when the full range of policy options are yet to be decided, three distinct yet credible pathways to decarbonization were selected and modelled. The results were compared and used to evaluate common outcomes for Ontario's manufacturing sector across a range of decarbonization pathways. While all three scenarios assume a net-zero emissions future by 2050, two of them presuppose that decarbonization is reached directly through a mix of technologies, including carbon capture and storage. The other scenario assumes that technology will be largely responsible for approximately 75% of emissions reductions, with the rest to be offset elsewhere.

The first scenario, named *Electrons*, is a lower carbon intensity pathway characterized by high rates of fuel switching in favor of end-use electrification. The second, *Resources*, is a higher carbon intensity one, characterized by less fuel switching, and more by carbon capture or direct air capture (DAC) technologies. The third scenario, *Blended*, is a middle ground between the other two scenarios, and has higher reliance on carbon offsets. While all three pathways take Ontario to a net-zero emissions goal by 2050, the key features varying across these scenarios are the stringency of greenhouse gas (GHG) emissions reduction policies, market conditions, and technology parameters, such as costs over time and innovation rates (Table 3).

While all three scenarios assume a net-zero emissions future by 2050, two of them presuppose that decarbonization is reached directly through a mix of technologies, including carbon capture and storage.

Table 3: Summary of national decarbonization scenarios

Scenario	Policy Assumptions	Impacts of assumptions
Electrons	Carbon price rising to C\$170/t in 2030, adjusted for inflation thereafter. Additionally, a GHG emissions cap that requires a 30% reduction by 2030 (from 2005 levels), a 60% reduction by 2040, and a 100% reduction by 2050 (but roughly 40 MtCO ₂ offsets from land/agriculture/forestry not in the model).	More fuel switching and renewable energy consumption. Lower oil price and less activity in fossil fuel sectors.
Resources	Same as the <i>Electrons</i> scenario	Less fuel switching and renewable energy consumption. Moderate oil price and activity in fossil fuel sectors.
Blended	Same as <i>Electrons</i> scenario, but with a GHG emissions cap that requires a 30% reduction by 2030, a 50% reduction by 2040, and a 75% reduction by 2050.	Moderate fuel switching and renewable energy consumption. Moderate oil price and activity in the fossil fuel sectors.

Source: Navius Research Inc.

Jobs and Economic Growth for the GPDD in Decarbonization

Across all three scenarios, Ontario's economy is expected to continue growing from 2015 to 2050. The GDP in Ontario is projected to grow from C\$712 billion in 2015 to C\$1,242 billion in 2050 in the Electrons or lower carbon intensity scenario, C\$1,226 billion in Resources or higher carbon intensity scenario, and C\$1,237 billion in the Blended scenario.^v Manufacturing jobs make up almost 12% of all jobs in Ontario in the model and are anticipated to increase between 114,000 to 163,000 over the next 30 years.^{vi} This increase is driven by jobs related to the manufacturing of machinery, electronics, transportation equipment, textile, food, and furniture.

As the gTech model can yield results on job creation in a net-zero future at only the national and provincial levels, the numbers for Ontario were distributed, or pro-rated, at the level of Toronto CMA and the remaining four CMAs forming the Innovation Corridor (i.e., Guelph, Hamilton, Kitchener-Cambridge-Waterloo, Oshawa). This was done by calculating the average employment (2016 – 2020) in these industries in the five CMAs as a share of average manufacturing employment in the province.^{vii} These shares were used to pro-rate the provincial job creation numbers across scenarios in 2050 at the CMA level. This calculation

assumed that manufacturing jobs in the Innovation Corridor continue to form the stable 70% of total manufacturing jobs in Ontario in the future.^{viii}

Out of this 70%, the largest increase (also 70%) is expected to be in the CMA of Toronto, ranging from 55,000 to 80,000 net jobs across several manufacturing industries in 2050 relative to 2015, depending on the carbon intensity of the decarbonization pathway (see Table 4). The remaining 30% of manufacturing jobs expected by 2050 (between 24,000 and 35,000) are concentrated in the rest of the four CMAs forming the Innovation Corridor (Table 5). However, the creation of jobs across sectors is unlikely to be uniform, as manufacturing jobs will grow unevenly by subsector. Jobs in plastics, for instance, are likely to peak in 2030, falling thereafter, with only the Resources scenario showing the potential for job growth. Similarly, job growth in machinery manufacturing will probably be sluggish before taking off in 2045 and beyond (Figure 1). Other manufacturing sectors, including medical equipment, and furniture, promise the greatest job increases to 2050, especially in the Electrons or lower-carbon intensity scenario. In short, while total manufacturing employment increases in all scenarios, this does hold true for every subsector of manufacturing.

Several insights emerge from this modelling around manufacturing jobs in the Innovation Corridor:

- 1. The net increase in manufacturing jobs in the Innovation Corridor in 2050, relative to 2015, across all modelled scenarios is driven by subsectors like machinery, electronics, transport equipment, food, furniture, and miscellaneous manufacturing (including medical equipment).**
- 2. Across these scenarios, job creation figures are highest in potential futures where transportation equipment and chemicals manufacturing are set to grow, with the Resources and Electrons futures each resulting in the creation of 114,000 net jobs by 2050. This is driven by growth in subsectors like machinery, electronics, furniture, and miscellaneous manufacturing.**
- 3. The trajectory for job creation is not uniform across sectors, nor do any subsectors experience uniform increases over time. There is greater job creation up to 2030 for all sectors except machinery which bounces back only in 2050. On the flip side, manufacturing and transport equipment dips in 2040 before recovering in 2050.**














In short, a decarbonizing world is one that is good for Ontario's manufacturing sector, but the way in which the province decarbonizes will, in part, determine the number of manufacturing jobs created and in which subsectors.

Figure 1: Cumulative net increase in jobs in the Innovation Corridor relative to 2015, in thousands of full-time jobs



Source: Authors' calculation from modeling results by Navius Research Inc. And Labour Force Survey, Statistics Canada (extracted using the Real Time Remote Access).

Table 4: Net increase in manufacturing jobs in 2050 in the Toronto CMA (relative to 2015, in 000s FTEs)














INDUSTRY	MANUFACTURING JOBS IN TORONTO CMA AS % OF INNOVATION CORRIDOR*	ELECTRONS	RESOURCES	BLENDED
 Food, beverage, tobacco	12%	8.2	8.9	8.2
 Textile	2%	1.5	1.4	1.1
 Wood product	2%	0.4	0.4	0.3
 Renewable gasoline/diesel	1%	0.1	0.0	0.1
 Other chemicals	5%	0.9	1.7	1.1
 Plastics	4%	-0.1	1.9	0.6
 Direct-reduced-iron steel	0%	0.3	0.3	0.2
 Fabricated metal product	4%	2.7	2.5	1.9
 Machinery	4%	4.7	3.3	2.5
 Computer & electronics	6%	6.5	5.0	4.3
 Transport equipment	11%	8.4	11.8	0.5
 Other	19%	37.4	32.5	29.9
 Total Manufacturing	70%	79.5	79.7	55.5

Source: Calculated from modeling results from Navius Research Inc. And Labour Force Survey, Statistics Canada (extracted using the Real Time Remote Access).

Note: FTEs is full-time equivalent jobs. These numbers cover jobs for the CMA of Toronto.

*This represents current shares (from the LFS) i.e., jobs in each industry in the CMA, as a share of total manufacturing jobs in the Innovation Corridor (average 2016- 2020).

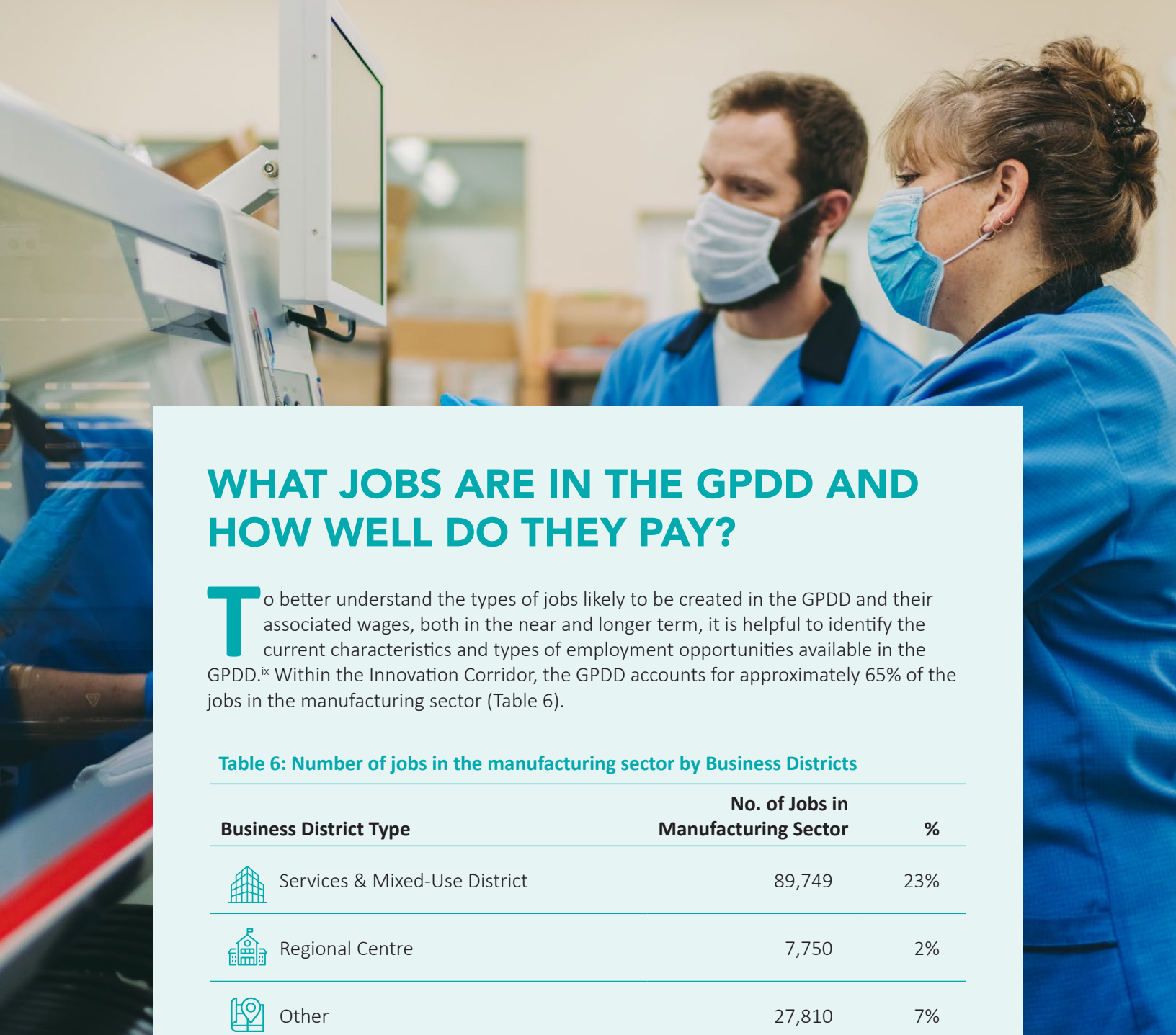
Table 5: Net increase in manufacturing jobs in 2050 in other four CMAs (relative to 2015, in 000s FTEs)

INDUSTRY	MANUFACTURING JOBS IN TORONTO CMA AS % OF INNOVATION CORRIDOR*	ELECTRONS	RESOURCES	BLENDED
 Food, beverage, tobacco	4%	0.3	0.3	0.3
 Textile	0.4%	0.1	0.0	0.1
 Wood product	1%	0.0	0.0	0.0
 Renewable gasoline/diesel	0.2%	6.5	5.0	4.3
 Other chemicals	1%	0.4	0.7	0.5
 Plastics	1%	0.0	0.7	0.2
 Direct-reduced-iron steel	1%	0.9	1.0	0.7
 Fabricated metal product	3%	1.8	1.7	1.3
 Machinery	3%	3.1	2.2	1.7
 Computer & electronics	2%	2.5	1.9	1.7
 Transport equipment	8%	6.2	8.8	0.4
 Other	5%	9.2	8.0	7.3
 Total Manufacturing	30%	34.4	34.5	24.0

Source: Calculated from modeling results from Navius Research Inc. And Labour Force Survey, Statistics Canada (extracted using the Real Time Remote Access).

Note: FTEs is full-time equivalent jobs. These numbers cover jobs for the CMAs of Oshawa, Guelph, Kitchener-Cambridge-Waterloo, Hamilton.







* This represents current shares (from the LFS) i.e., jobs in each industry in the CMAs, as a share of total manufacturing jobs in the Innovation Corridor (average 2016- 2020).



WHAT JOBS ARE IN THE GPDD AND HOW WELL DO THEY PAY?

To better understand the types of jobs likely to be created in the GPDD and their associated wages, both in the near and longer term, it is helpful to identify the current characteristics and types of employment opportunities available in the GPDD.^{ix} Within the Innovation Corridor, the GPDD accounts for approximately 65% of the jobs in the manufacturing sector (Table 6).

Table 6: Number of jobs in the manufacturing sector by Business Districts

Business District Type	No. of Jobs in Manufacturing Sector	%
 Services & Mixed-Use District	89,749	23%
 Regional Centre	7,750	2%
 Other	27,810	7%
 Metropolitan Centre	6,240	2%
 Knowledge Creation District	3,174	1%
 Goods Production & Distribution District	248,903	65%
TOTAL	383,625	100%

Source: TRBOT Estimates from Census 2016, Place of Work

Note: The number of jobs is based on the NAICS 31-33 Manufacturing classification.

Out of total manufacturing workers in the GPDD, around 35% or 45,492 consist of assemblers, followed by labourers in processing, manufacturing and utilities (27% or 34,283), and machine operators (27% or 34,169) (Table 7).

While the compensation for manufacturing work varies widely across industries, overall, these have pay-levels above the Canadian average. Across age-groups, full-time workers in Hamilton and Oshawa can expect to earn the highest median annual incomes in the Corridor (Figure 2). Compensation is also the highest for workers between the ages of 35 to 44 years, and 45 to 54 years in the Corridor. Younger workers who are between the ages of 25 to 34, as well as oldest workers (ages 65 years and over) all earn under C\$60,000 per year (Figure 2). These trends are similar for full-time warehousing jobs across the Corridor, with workers in the age groups of 35 to 44 years and 45 to 54 years earning the highest incomes (Figure 3).

Figure 2: Median full time manufacturing income across age-groups

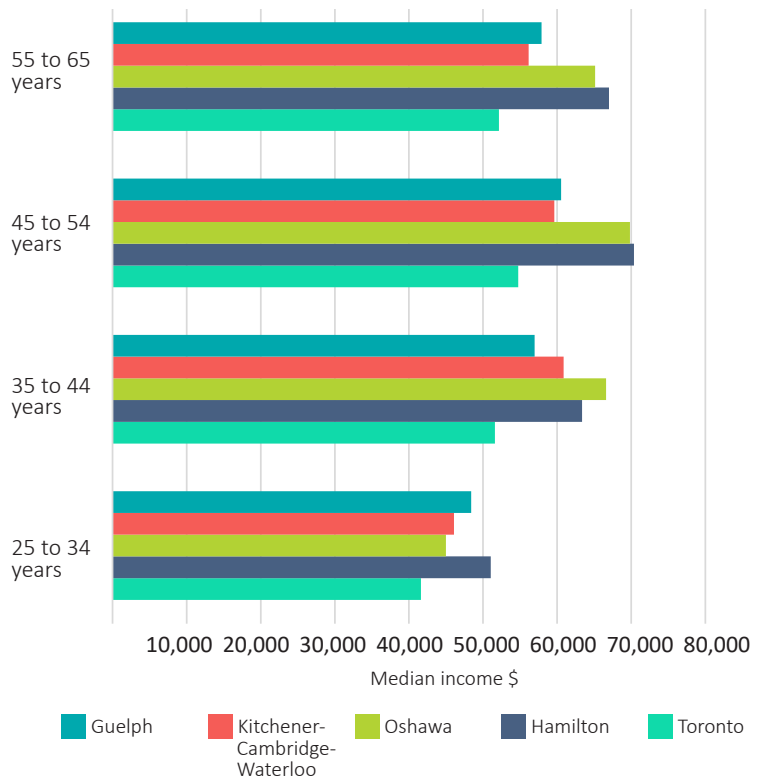
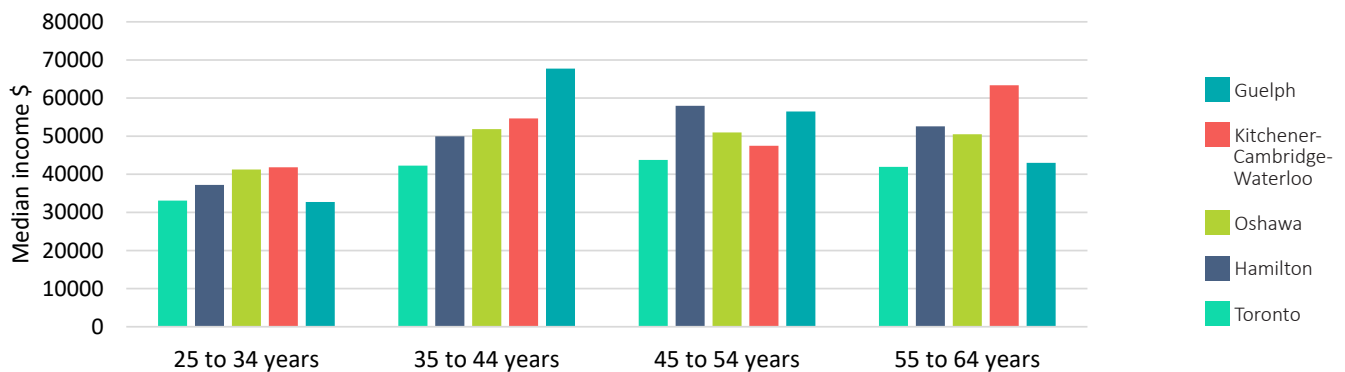


Figure 3: Median full-time warehousing income across age-groups



Source: Drawn from Statistics Canada- 2016 Census. Catalogue Number 98-400-X2016364.

Note: These income numbers are for full-time, full-year workers and are adjusted for inflation at a rate of increase of 6.7% from 2016 to 2020



Table 7: Number of manufacturing jobs in the GPDD

Manufacturing occupations (2 digit NOC)	Toronto	Oshawa	Hamilton	Kitchener- Cambridge- Waterloo	Guelph	TOTAL	%
92- Processing, manufacturing and utilities supervisors and central control operators	9,856	530	1,546	1,777	1,086	14,794	11%
94- Processing and manufacturing machine operators and related production workers	24,358	655	3,050	3,577	2,528	34,169	27%
95- Assemblers in manufacturing	29,670	1,635	1,767	6,899	5,521	45,492	35%
96- Labourers in processing, manufacturing and utilities	25,954	535	2,680	3,117	1,998	34,283	27%
TOTAL	89,837	3,355	9,043	15,370	11,133	128,738	100%

Source: TRBOT Estimates from Census 2016, Place of Work

Note: The number of manufacturing workers are based on estimates for the GPDD at the 2-digit National Occupation Classification (NOC) level from the 2016 Census. This does not include managerial level jobs in the manufacturing sector, which are under NOC-09.



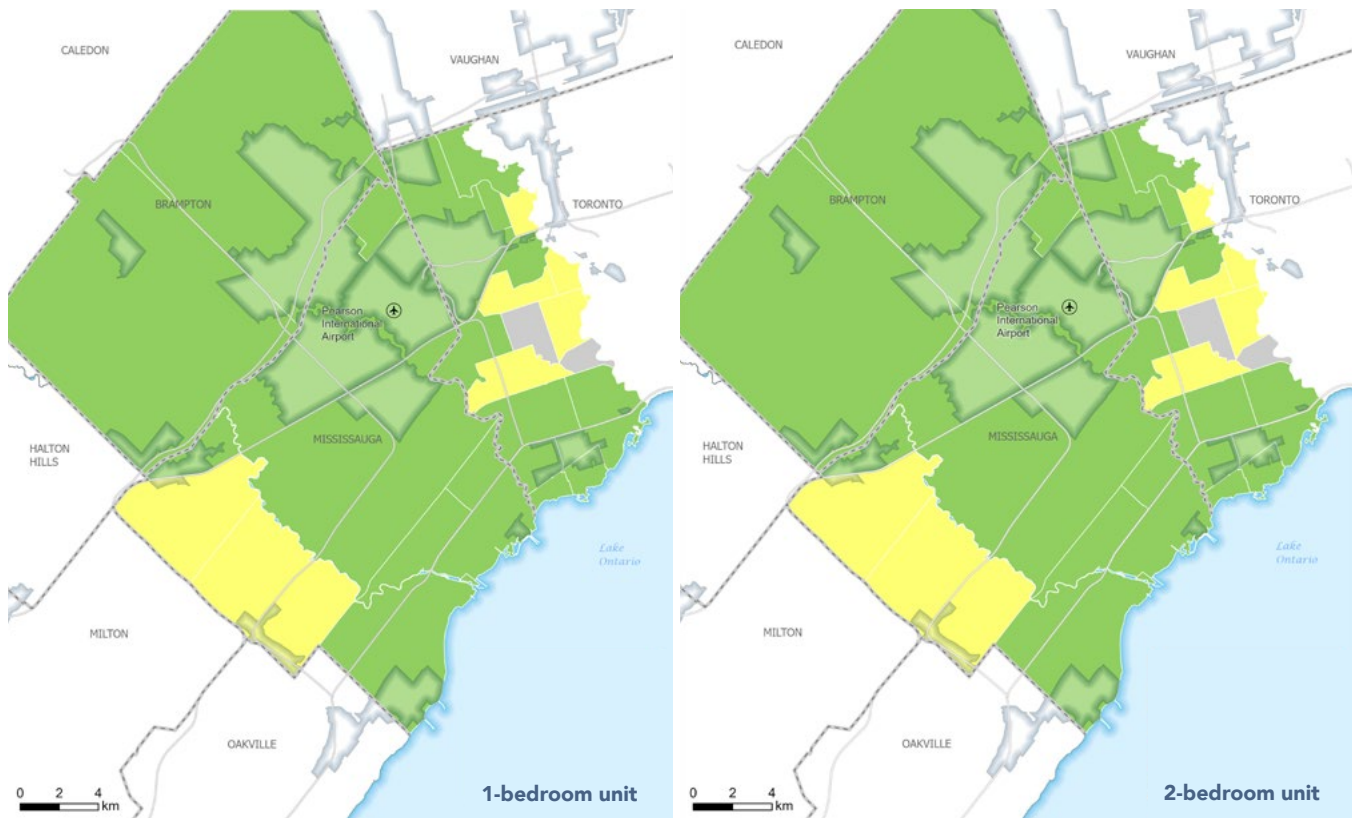
MAPPING THE RENTAL AFFORDABILITY CHALLENGE

FOUR CASE STUDIES

To illustrate the magnitude of the housing affordability challenge, it is useful to consider a handful of case studies of different manufacturing workers in the GPDD, especially near the Pearson Airport Employment Zone where job concentration is likely to be high. These case studies use the median and after-tax annual and monthly incomes of four households – two of them being single-person, and the other two being double-income households – to determine the percentage of income required to rent 1-bedroom and 2-bedroom units in the GPDD, or to purchase a home anywhere in the Toronto area. The manufacturing workers were selected across a range of skill-levels that drive manufacturing employment. These include supervisors who tend to have the highest salaries, assemblers who tend to have salaries on the lower end, and machine operators, whose earnings are somewhere in the middle. This helps to show how housing affordability varies across different income levels for workers in the GPDD.

Single income households with high income jobs can afford to live near Pearson Airport in the GPDD, while the rest of the households are most likely to be priced out.

Figure 4: CASE STUDY 1: Percent of Income Required for a Supervisor to Rent a 1 Bedroom or 2 Bedroom Unit



Source: TRBOT analysis based on CMHC Rental Market Survey (October 2020) and Statistics Canada- 2016 Census.

Note: Apartments Rental Prices by Bedroom Type at the Neighborhood level for Brampton, Mississauga, and Etobicoke.



SUPERVISOR

20-30%

of monthly after-tax income to rent a 1 or 2-bedroom unit in the GPDD

PERCENT OF INCOME REQUIRED

- <20%
- 21% - 30%
- 31% - 40%
- 41% - 50%
- 51% - 60%
- 61% and over
- No Data
- Goods Production & Distribution District

Single income households with high income jobs can afford to live near Pearson Airport in the GPDD, while the rest of the households are most likely to be priced out. For example, a single income household of a supervisor will have to pay out around 20% to 30% of their monthly after-tax income (C\$4,196) to rent 1- or 2-bedroom units around the Pearson Airport Employment Zone (Figure 4). Considering the affordability criteria set by the Canadian Mortgage and Housing Corporation (CMHC) i.e., housing costs to be 30% of pre-tax income, managers can afford to live in the GPDD³⁷.

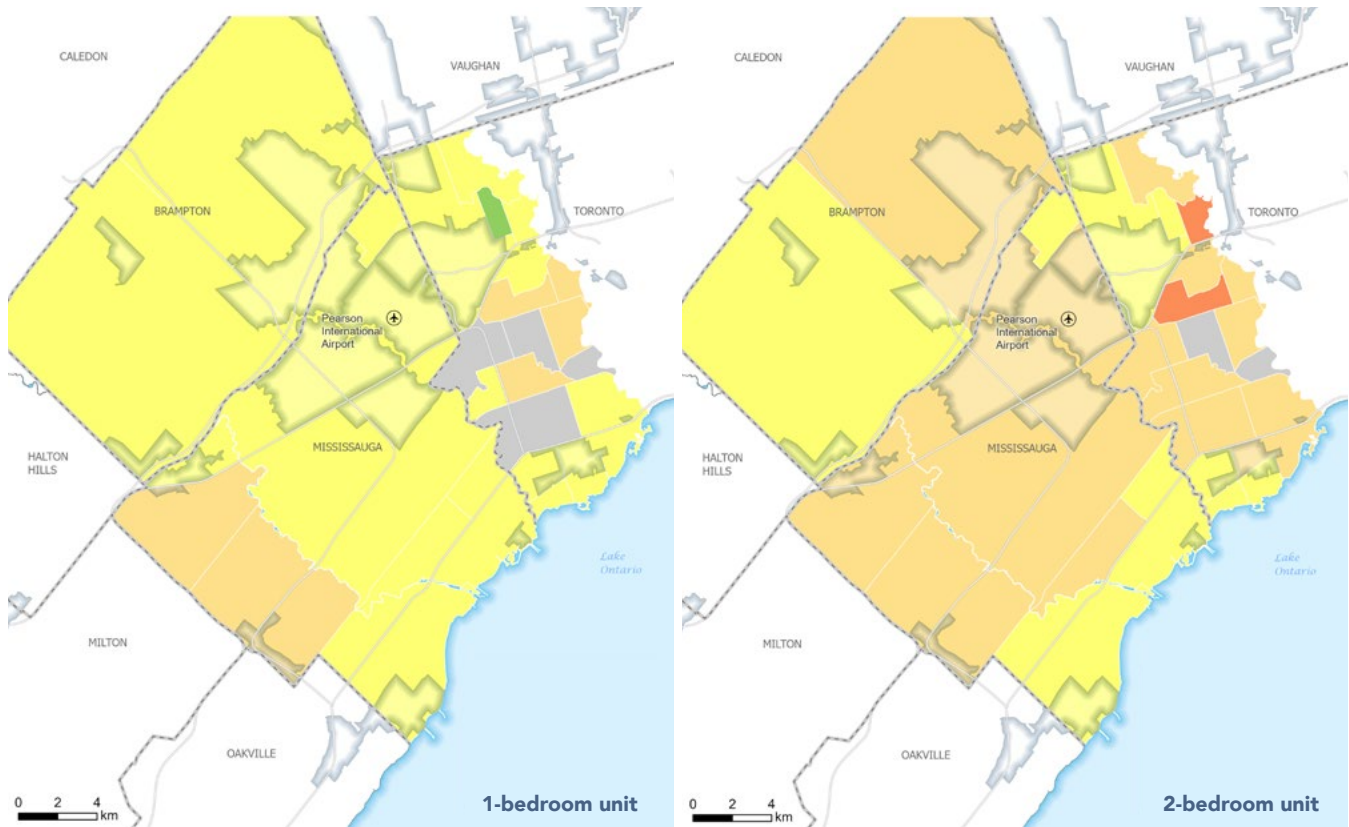
CASE STUDY 1

Supervisor – motor vehicle assembly

Median annual salary ^x	66,413
After tax income	50,356
Monthly after-tax income	4,196

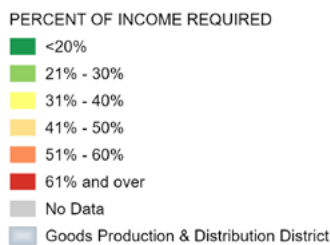
Source: Median annual salary data drawn from Statistics Canada- 2016 Census. Catalogue Number 98-400-X2016304.

Figure 5: CASE STUDY 2: Percent of Income Required for an Assembler to Rent a 1-Bedroom Unit or 2-Bedroom Unit



Source: TRBOT analysis based on CMHC Rental Market Survey (October 2020) and Statistics Canada- 2016 Census.

Note: Apartments Rental Prices by Bedroom Type at the Neighborhood level for Brampton, Mississauga, and Etobicoke.



However, other single income households may be priced out. For example, an assembler will have to pay 30% to 40% of monthly after-tax income (C\$2,949) as rent to afford a 1-bedroom unit in the GPDD and almost 50% of their income to rent a 2-bedroom unit (Figure 5).



30-40%

of monthly after-tax income to rent a 1-bedroom unit in the GPDD

or

50%

of their income to rent a 2-bedroom unit

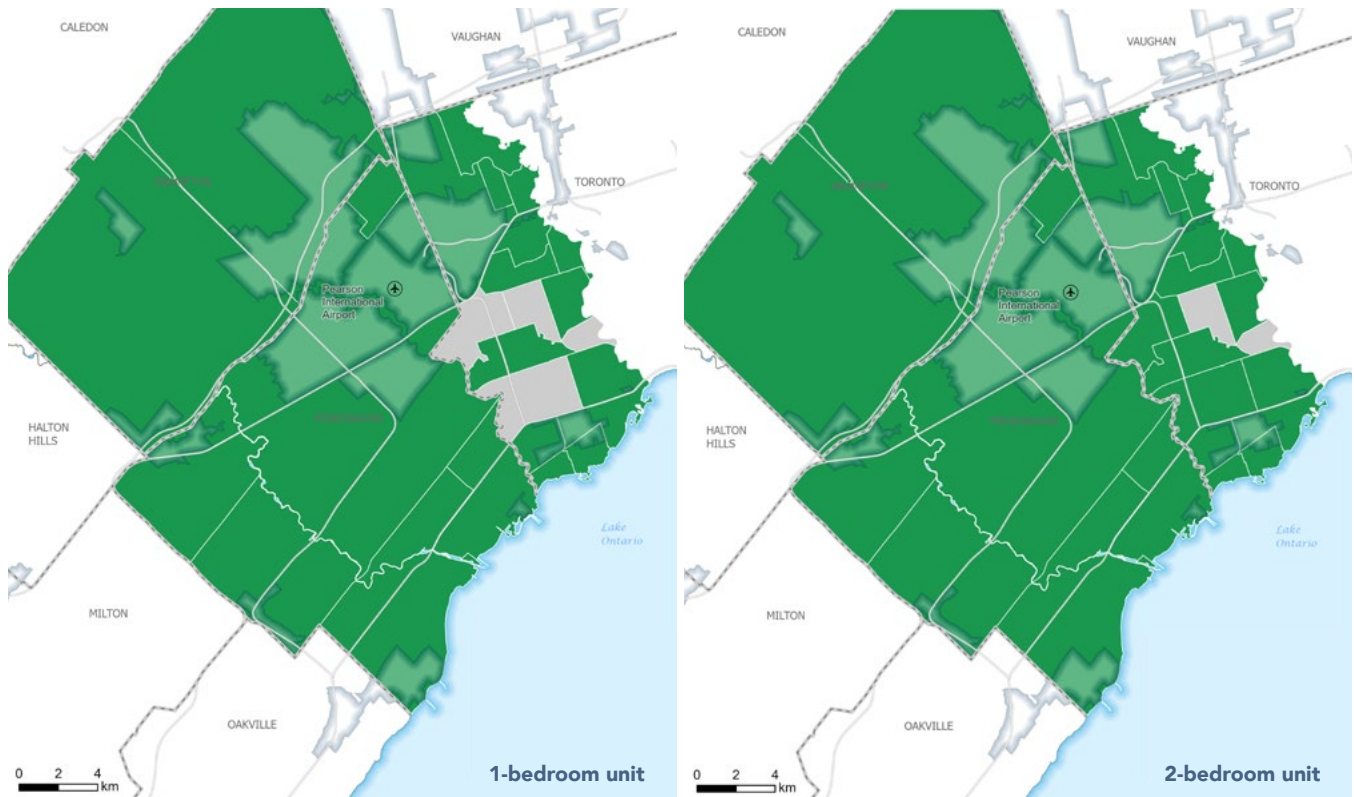
CASE STUDY 2

Assembler – mechanics

Median annual salary	44,269
After tax income	35,388
Monthly after-tax income	2,949

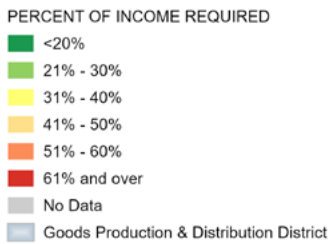
Source: Median annual salary data drawn from Statistics Canada- 2016 Census. Catalogue Number 98-400-X2016304.

Figure 6: CASE STUDY 3: Percent of Income Required for a Manager and Machine Operator to Rent a 1-Bedroom Unit or 2-Bedroom Unit

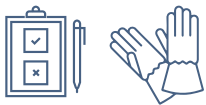


Source: TRBOT analysis based on CMHC Rental Market Survey (October 2020) and Statistics Canada- 2016 Census.

Note: Apartments Rental Prices by Bedroom Type at the Neighborhood level for Brampton, Mississauga, and Etobicoke.



For double-income households, renting near Pearson Airport might be affordable for some but not others. A double income household of a manager and machine operator, with annual median income of above C\$100,000, ends up paying less than 20% of their monthly after-tax income (C\$ 8,205) as rent to live either in a 1-bedroom or 2-bedroom unit in the GPDD (Figure 6).



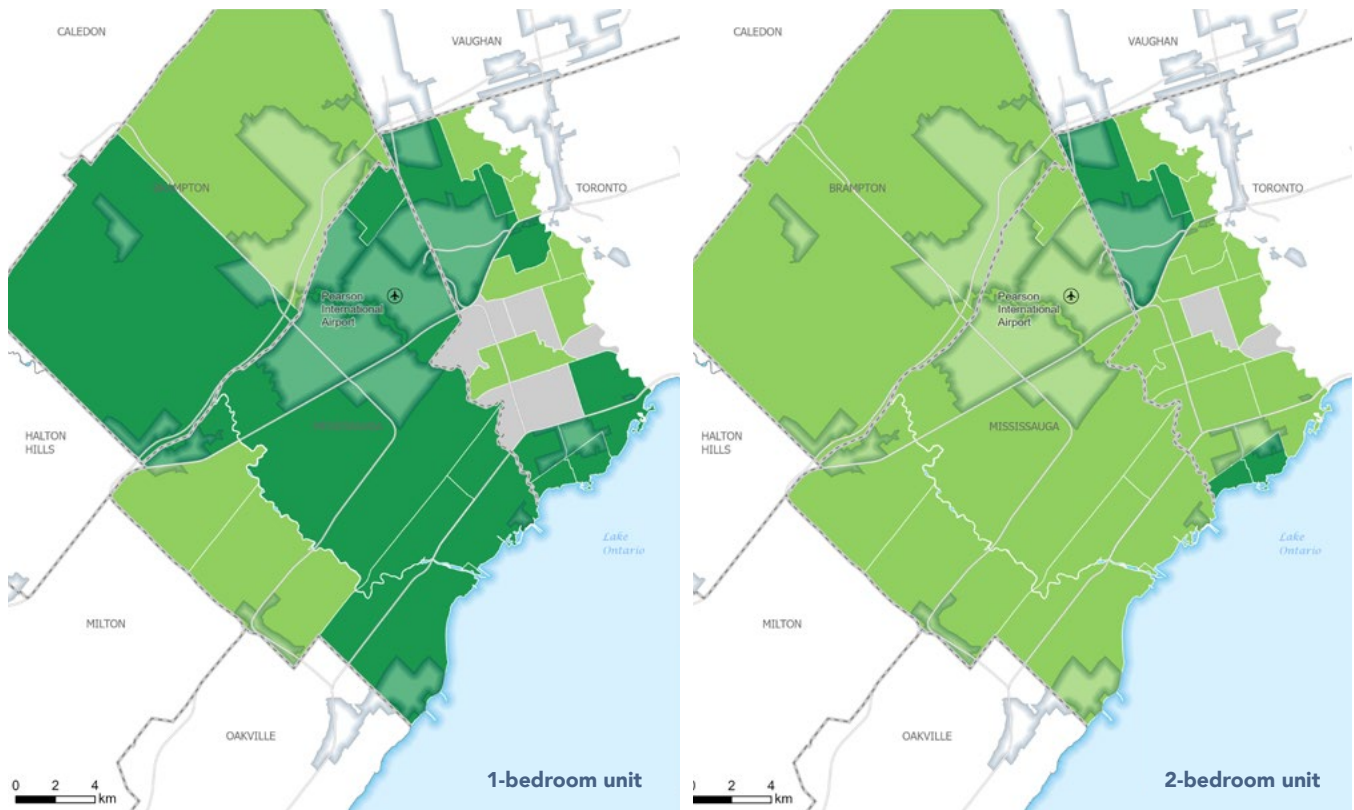
**MANAGER +
MACHINE OPERATOR**

less than 20%
of monthly after-tax income
to rent a 1 or 2-bedroom
unit in the GPDD

CASE STUDY 3	Manager – manufacturing	Machine operator (mineral & metal products)	Total
Median annual salary	83,247	45,750	128,997
After tax income	62,006	36,456	98,462
Monthly after-tax income	5,167	3,038	8,205


Source: Median annual salary data drawn from Statistics Canada- 2016 Census. Catalogue Number 98-400-X2016304.

Figure 7: CASE STUDY 4: Percent of Income Required for a Process Operator and Labourer to Rent a 1-Bedroom Unit or 2-Bedroom Unit



Source: TRBOT analysis based on CMHC Rental Market Survey (October 2020) and Statistics Canada- 2016 Census.

Note: Apartments Rental Prices by Bedroom Type at the Neighborhood level for Brampton, Mississauga, and Etobicoke.



**PROCESS OPERATOR
+ LABOURER**

20-30%

of monthly after-tax income
to rent a 2-bedroom unit in
the GPDD

PERCENT OF INCOME REQUIRED

- <20%
- 21% - 30%
- 31% - 40%
- 41% - 50%
- 51% - 60%
- 61% and over
- No Data
- Goods Production & Distribution District

This is likely to be the same for another double-income household of a process operator and labourer if they are renting a 1-bedroom unit. However, the same household will have to pay 20% to 30% of monthly after-tax income (C\$5,708) to afford a 2-bedroom unit in areas near the Pearson Airport Employment Zone (Figure 7).

CASE STUDY 4	Central control & process operator	Labourer - food & beverage	Total
Median annual salary	56,909	28,695	85,604
After tax income	43,744	24,752	98,462
Monthly after-tax income	3,645	2,063	8,205

Source: Median annual salary data drawn from Statistics Canada- 2016 Census. Catalogue Number 98-400-X2016304.



BUYING A HOME OFTEN NO LONGER POSSIBLE ON A GOODS-PRODUCING WAGE

FOUR CASE STUDIES

A simple back-of-the envelope estimate would make it truly clear that our four case-study households or families could not afford to purchase the average detached home in the GTA unless they somehow had access to an astronomically large down payment. Notably, the average sales price has been over \$1.3 million between January and May 2021³⁸. However, prices can vary substantially between homes depending on their type, size, and location. Instead, we want to know: if there are any properties that families could afford, and of what type?

To determine the maximum purchase price for each family, the current Office of the Superintendent of Financial Institutions (OSFI) stress test was applied³⁹. The parameters are as follows:

- 40% of the after-tax income was taken for each of our four cases, as the maximum monthly payment that the families could afford;^{xi}
- Each case study household made a 10% down payment on the property;
- No additional closing costs, taxes, etc. were applied; and
- The mortgage was amortized over 25 years at the stress-test rate of 5.25% to determine the maximum monthly payment.

Using data provided by the Toronto Regional Real Estate Board (TRREB), we determined how many property sales in the GTA between January and May 2021, of each type, would have been affordable for our case

study families.^{xii} Here the Toronto region is defined as the City of Toronto, Halton, Peel, York, Durham Regions as well as Dufferin and Simcoe counties. Many of these properties would be a substantial commute from workplaces in the GPDD.

Of the 59,077 properties sold in the GTA between January and May of 2021, the two single-earner family case studies could have only afforded 194 and 51 respectively, far less than 1% of all property sales. The majority of these were condominium apartments. However, even within that one class, the percentage was less than 1%. In short, given their income and the price of all forms of housing in the GTA, it is highly unlikely that the single-income household could find a property they could buy with a mortgage they could qualify for.

Case 3 and 4, the two double-income families, fare better. They qualify to purchase 18.8% and 2.7% of all properties, respectively. As with the two single family case-studies, the majority of these are condominium apartments followed by condominium townhouses. For Case 4, it would be a struggle, but these families could likely find a condo that they could afford to purchase, though buying other forms of housing is likely not an option. And this housing may be a substantial distance from where they work. For Case 3, they have substantially more options to purchase a condo apartment or townhouse. Purchasing other forms of property would be quite a challenge, as they would qualify for a mortgage for less than 3% of all other forms of home sales from January to May 2021.

To put this challenge in perspective, note that Case Study 4 has an after-tax annual income of C\$73,524, which is near the median after-tax annual income (C\$93,800) for Canadian families where the highest-income earner was under 65 years of age⁴⁰. Case Study 3, with an after-tax income of C\$105,768 has a joint after-tax income well-above the median. While a family earning nearly \$140,000, before tax, is well above the Canadian median, their only real property options are condos.

Table 9: Housing affordability for each case study household in Toronto

	CASE STUDY 1	CASE STUDY 2	CASE STUDY 3	CASE STUDY 4
Annual family salary ^{xiii}	71,991	47,988	139,833	92,795
Monthly after-tax income ^{xiv}	4,524	3,170	8,814	6,127
Mortgage payment (40%)	1,810	1,268	3,526	2,451
Max. affordability ^{xv}	327,000	230,000	635,000	443,000
No. of homes sold in each category - year-to-date 2021^{xvi}				
Detached ^{xvii}	21	4	655	83
PERCENT OF TOTAL ^{xviii}	0.1%	0.02%	2.4%	0.3%
Semi-detached	-	-	137	3
PERCENT OF TOTAL	0.0%	0.0%	2.5%	0.0%
Att/Row/Townhouse	1	-	168	6
PERCENT OF TOTAL	0.0%	0.0%	3.0%	0.1%
Condo Townhouse	6	1	1,238	95
PERCENT OF TOTAL	0.1%	0.0%	26.9%	2.1%
Condo Apt	150	42	8,799	1,341
PERCENT OF TOTAL	1.0%	0.3%	57.1%	8.7%
Link	-	-	11	-
PERCENT OF TOTAL	0.0%	0.0%	2.9%	0.0%
Co-op apt	12	3	39	24
PERCENT OF TOTAL	19.4%	5.4%	61.7%	38.8%
Det condo	0	-	9	1
PERCENT OF TOTAL	0.5%	0.0%	17.1%	2.0%
Co-ownership apt	4	0	30	17
PERCENT OF TOTAL	12.1%	0.9%	85.9%	48.2%
Total	194	51	11,085	1,570
PERCENT OF TOTAL SALES	0.3%	0.09%	18.8%	2.7%

Source: Authors' calculations based on data from BMO mortgage calculator and TRREB



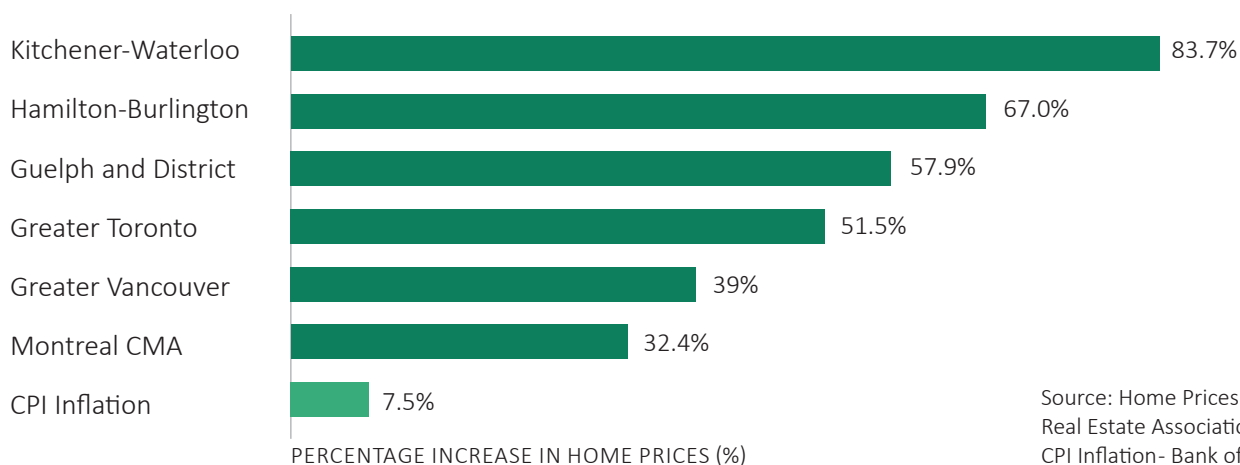
THE AFFORDABILITY CHALLENGES ARE NOT LIKELY TO IMPROVE

The affordability challenge shown through the case studies exists due to the rise in home prices prior to and during the pandemic. Throughout the pandemic, home prices have risen to astronomical highs across North America, and particularly in Southern Ontario.

Vancouver, Toronto and Hamilton are the three most expensive large real estate markets in North America, relegating San Jose and Los Angeles to fourth and fifth-place respectively⁴¹. This leaves an estimated 74% of Ontarians between the ages of 18 and 34 believing that they may never be able to afford a home⁴².

The sharp increase in home prices in Southern Ontario predates the pandemic. According to the Canadian Real Estate Association (CREA), in the five years prior and one year during the pandemic, single-family home prices rose by over 50%, with Kitchener-Waterloo experiencing increases of over 80%. This trend substantially exceeded the house price growth in other Canadian markets such as Vancouver and Montreal by an order of magnitude larger than the modest 7.5% increase in the Consumer Price Index (CPI) during this period (Figure 8).

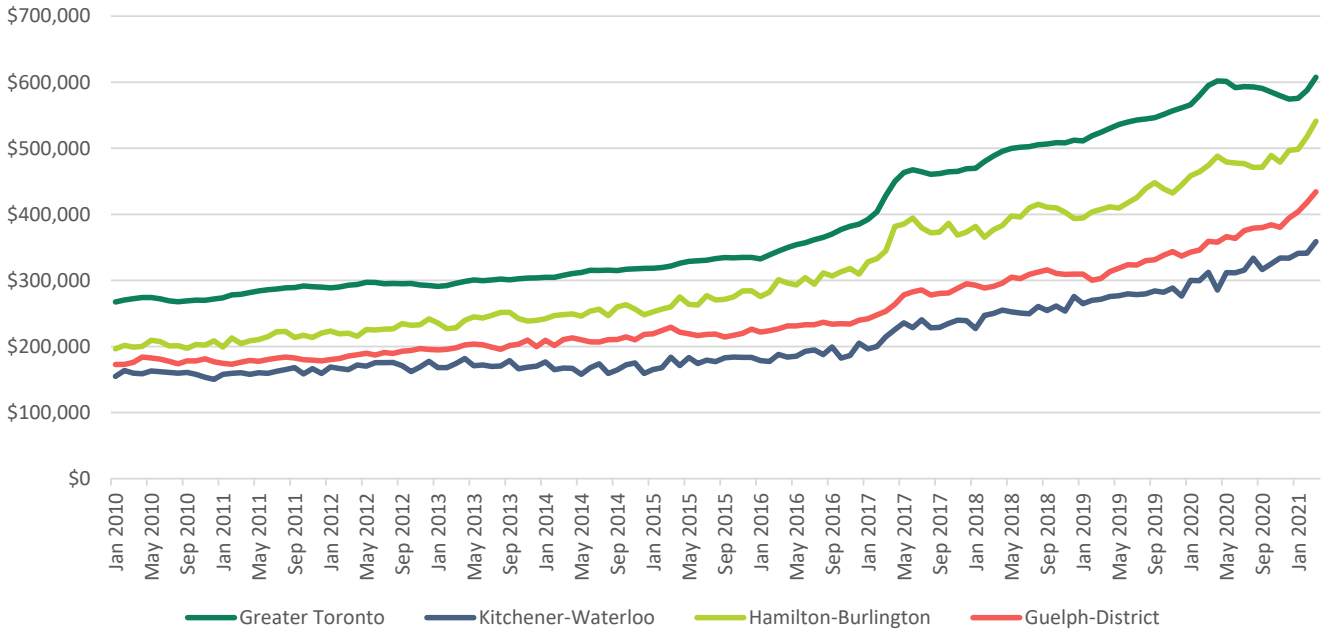
Figure 8: Single Family Benchmark Home Price Increase, February 2015 – February 2021



Source: Home Prices- Canadian Real Estate Association
CPI Inflation- Bank of Canada

The price of an apartment experienced a similar increase, as prices started rising rapidly in 2016, and by early 2021 were near double their levels in 2015 (Figure 9).

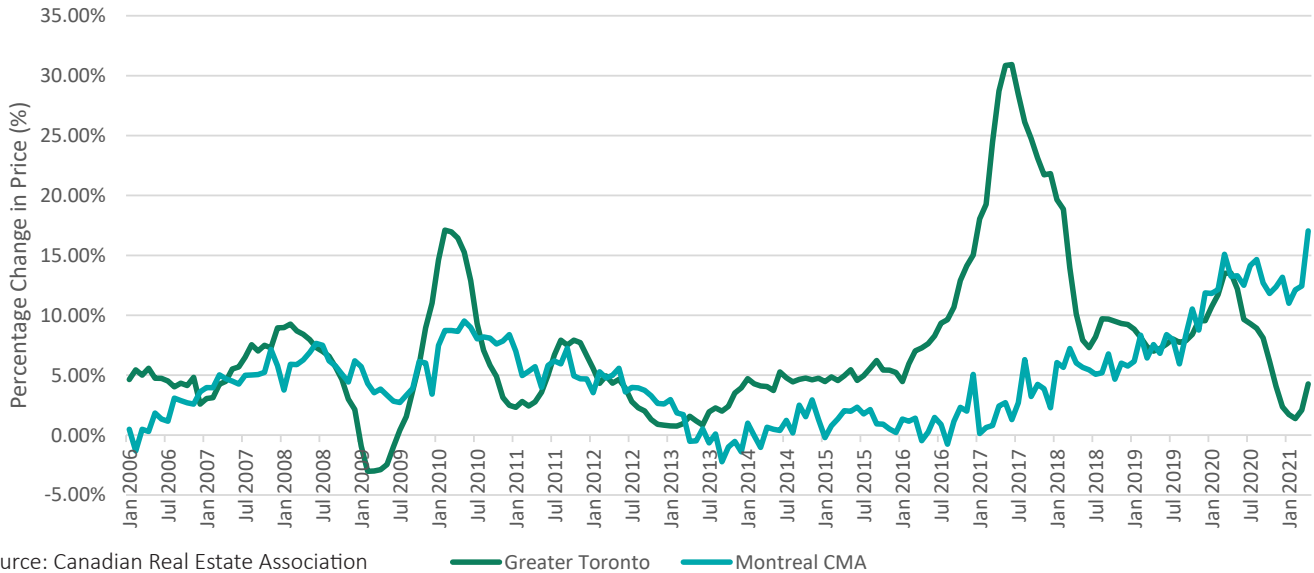
Figure 9: Benchmark Apartment Price for Four Communities



Source: Canadian Real Estate Association

It is important to keep in mind that the surge in house prices is context-specific, and there is great variation across regions. For example, while housing prices start to surge in the Toronto Area in 2015, Montreal only experienced modest growth in apartment prices from 2017 on (Figure 10).

Figure 10: Year-over-Year Price Growth, Apartment Benchmark

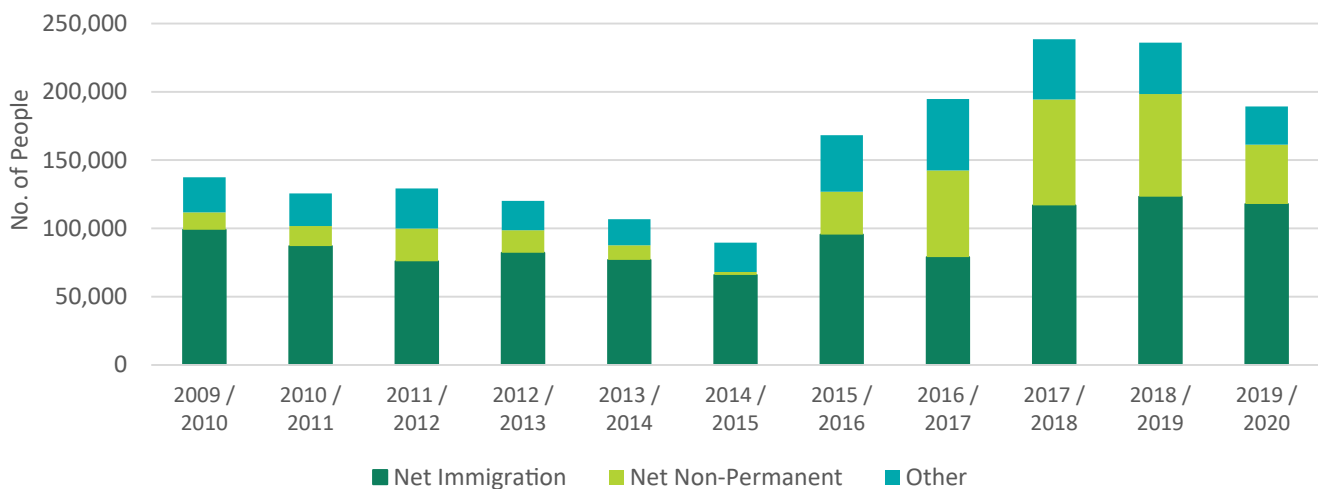


Source: Canadian Real Estate Association

The price increase was caused by rise in demand for housing, fueled by unexpected and rapid population growth in Southern Ontario through migration and influx of international students. Prior to 2016, Ontario had consistently grown by approximately 125,000 people per year. However, starting in late 2015, the population growth rate nearly doubled, thanks to an influx of non-permanent residents. These were primarily international students and graduating international students through the post-graduation work permit program (Figure 11).

Insufficient housing supply is causing both continued price escalation, as well as an exodus of young workers to more affordable communities.

Figure 11: Ontario Population by Source



Source: Drawn from Statistics Canada Table 17-10-0138-01- Components of population change by economic region, 2016 boundaries

The influx of young talent is a good thing for the Ontario economy: it allows the province to increase the pool of available talent, meet labour market demand, while letting people from different cultures to work together effectively. International students are also terrific candidates to apply for permanent residency: they are likely to be young, highly educated, trained within the Canadian educational system, proficient in at least one of the official languages, and have essential soft skills to navigate problem-solving and adapt to different cultures.

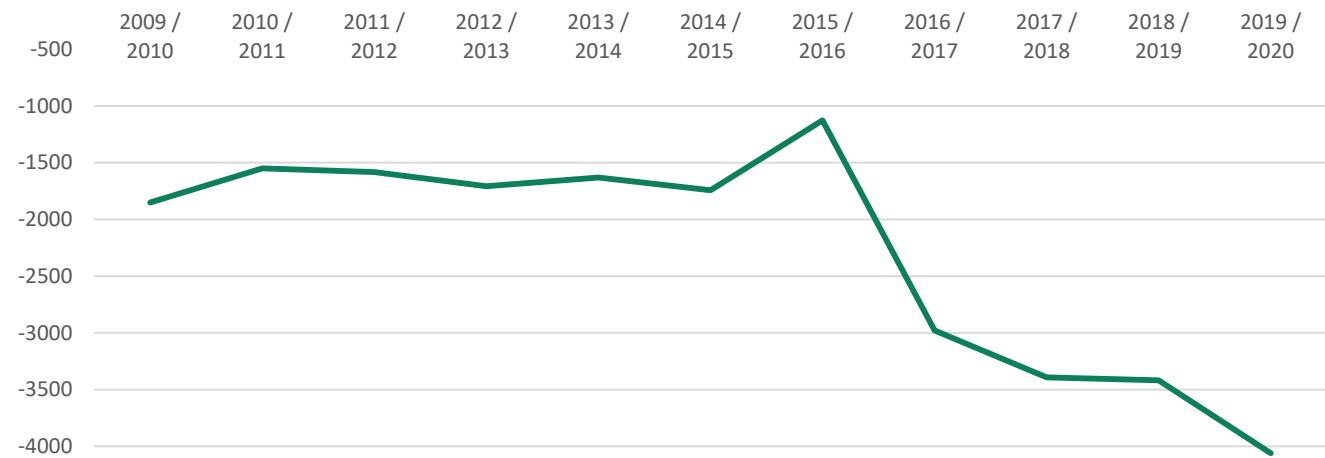
However, insufficient housing supply is causing both continued price escalation, as well as an exodus of young workers to more affordable communities, a phenomenon known as “Drive Until You Qualify”.^{xix} This is evidenced by the number of young children

who have been moving out of the Toronto region. The net number of children under the age of five leaving Toronto CMA had consistently hovered between 2,000 and 3,000 per year until 2016, when the figure exceeded 4,000; it has increased ever since. There has not been a corresponding increase in the net number of children moving into the surrounding CMAs. The number of children under the age of 5 leaving the Innovation Corridor is now exceeding 4,000 per year (Figure 12). Young families that are in search of housing are having to drive significant distances to find a place they can afford to live in. This outmigration is not just limited to children, as the total net number of people leaving the Innovation Corridor has steadily risen since 2016, reaching nearly 40,000 people in 2020 (Figure 13).

While an influx of talented international students and visa workers is a welcoming advantage for the Toronto area, the region must ensure that there is adequate housing for those who live in the region and those that would like to. As young working-class families move out of the Innovation Corridor, this creates skills shortages for the jobs that will be created by the GPDD.

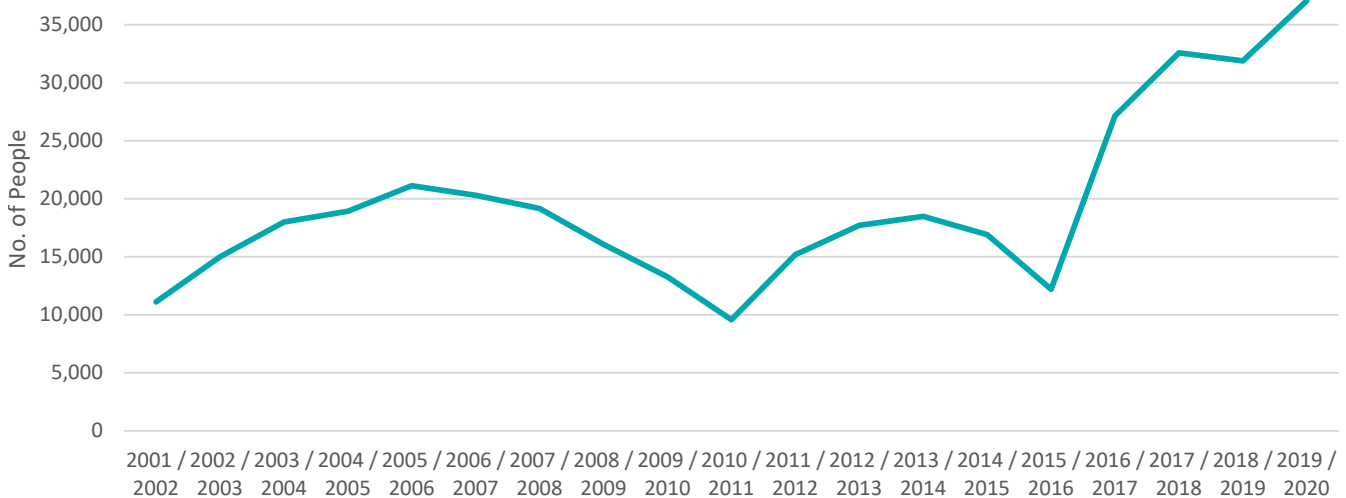
The population-growth related housing pressures that have caused price escalation over the last decade are unlikely to go away. Nor would we want them to, given the advantages an influx of young talent has for the region. However, we must ensure that an adequate supply of housing is available for families of all income levels.

Figure 12: Net Within-Canada Migration 0-4 Years Old in the Innovation Corridor



Source: Drawn from Statistics Canada Table 17-10-0136-01- Components of population change by census metropolitan area and census agglomeration, 2016 boundaries

Figure 13: Net Population Loss from the Innovation Corridor to the Rest of Canada (Including Other Parts of Ontario)



Source: Drawn from Statistics Canada Table 17-10-0136-01- Components of population change by census metropolitan area and census agglomeration, 2016 boundaries



CONCLUSION

The GPDD has tremendous medium- and long-term job creation potential. Over the next three years the need to build-back-better will create a substantial number of jobs in the manufacturing and warehousing industries, along with high-number of spin-off jobs. Wal-Mart and Amazon, among others, have announced substantial investments in the region to build and operate the types of facilities necessary to compete in a world of e-commerce.

In the longer-term, the global push to hit net-zero GHG emissions by the middle of the century creates a need to manufacture the technologies required to get us there. The types of manufacturing jobs will differ significantly depending on the manner which the country chooses to decarbonize, but under any scenario, net new manufacturing jobs will be created. Based on modelling provided by Navius Research Inc., we forecast that 55,000 to 80,000 additional manufacturing jobs will be created in the GTA between now and the middle of the century.

The jobs that can be created are in a variety of different occupations, with many having salaries substantially

higher than the Canadian median. Despite the pay levels of these jobs, workers would struggle significantly to find somewhere they can afford to live which is near these jobs. Taking four typical households as case-studies, we find that single-earner assemblers would find it difficult to make monthly rent payments on even a 1-bedroom unit near Pearson Airport, though dual-earner couples and those in managerial positions would have an easier time. Some families would not qualify for a mortgage to purchase any form of property, while for higher earning dual-income couples a condo purchase would be possible, but other forms of owned housing are likely out of the question.

This lack of affordable places to raise a family not only squeezes the budgets of working households, but also makes it difficult to attract and retain workers, creating overall labour shortages. Furthermore, the outmigration of young families across the province creates substantial environmental pressures. To ensure both positive economic and environmental outcomes, governments across the GTA must ensure an adequate supply of housing for working families of all income levels.

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ENDNOTES

- i Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue no. 98-400-X2016364.
- ii The CGE model used is the gTech which gives jobs creation at the national and provincial levels only. In order to estimate jobs for the Innovation Corridor, the job creation numbers for Ontario were pro-rated at the Innovation Corridor level. This was done based on the current share of manufacturing jobs in the CMAs making up the Corridor, relative to those in the province.
- iii This source classifies employment as per the National Occupational Classification (NOC) and the calculation includes NOC-9 Occupations in manufacturing and utilities. Occupations with manager-level roles in manufacturing (NOC-09) were not included due to lack of segregated data.
- iv Disclaimer: The analysis of Business Districts is based on Census 2016 place of work data obtained from Statistics Canada for census tract geographies. These data are subject to area and data suppression that has been adopted to further protect the confidentiality of individual respondents' personal information. The values, including totals, provided by Statistics Canada are randomly rounded either up or down to a multiple of '5' or '10' to ensure confidentiality. These values are the basis of TRBOT's estimates of jobs for each respective Business District, based on overlaying census tracts with employment areas and where boundaries did not match, TRBOT allocated jobs based on percentage of overlapped area. Job numbers provided for Business Districts are estimates based on TRBOT's methodology and should be interpreted as such.
- v Gross Domestic Product (GDP) by expenditure – results drawn from CGE modelling.
- vi These are full-time equivalent (FTEs) jobs and the actual magnitude of increase within the range depends on the pathway to decarbonization adapted that is, Electrons, Resources, or Blended.
- vii As per the Labour Force Survey (LFS).
- viii This part of the analysis uses employment statistics from the Labour Force Survey (LFS) in which the average employment (2016-2020) in the manufacturing sector in the Innovation Corridor makes up 70% of total manufacturing employment in the province. The LFS data allows to track manufacturing industries at a similar level of granularity as in the gTech model. Elsewhere in the report, the same calculation is done using the 2016 Census according to which, the figure stands at 60%.
- ix While job numbers are available at the GPDD level, income data is available only at the Innovation Corridor level. Hence, income data is presented for manufacturing jobs across the 5 CMAs forming the Innovation Corridor. It can be reasonably expected that income levels of manufacturing workers do not vary significantly across the five business districts.
- x The median annual salary numbers in this section are extracted from the 2016 Census and have been adjusted for inflation using the latest Consumer Price Index (CPI) numbers from Ontario. With an inflation adjustment factor of 8.4% (2016 to May 2021). All after-tax income have been calculated using an online tax calculator for the tax year 2020.
- xi These are the same case studies used in the Section 6, but now the after-tax income has been adjusted upward for inflation to be put into 2021 dollars. The analysis also assumes that the families have no other monthly debt payments.
- xii The TRREB data lists the number of properties sold in increments of \$100,000, such as \$200,000 to \$299,999. Clearly a family with a maximum price of \$230,000 could afford any property in the \$100,000-\$200,000 range, but not those \$300,000 and above. Since we do not know how many properties in the \$200,000-\$299,999 range would be under \$230,000, we use the crude estimate that since 30% of the range is within the affordable scale, that 30% of the properties in that category would fall under \$230,000. A similar method was used for each of the four case studies. This is almost certainly an overestimate over the number of properties that fall under the cut-off that overestimates the number of affordable properties.
- xiii Annual family salary is before taxes.
- xiv Monthly after-tax incomes have been adjusted for inflation using an adjustment factor of 8.4% (2016 to May 2021).
- xv The maximum possible affordability for a house has been determined using the BMO Mortgage Payment Calculator using a down payment rate of 10% and an interest rate of 5.25% to align with the stress test cut-off: <https://www.bmo.com/main/personal/mortgages/calculators/payment-calculator/>
- xvi The data on the number of homes sold in each category of housing was extracted from TRREB (2021).
- xvii This includes the cumulative homes in each category that are deemed affordable by each case study family.
- xviii This represents the percent of each category of homes sold in the specific affordability range as a percent of total homes sold in that respective category. For example, 0.02% of detached homes (out of all detached homes) that are affordable for the family in Case Study 2 were sold in year-to-date 2021.
- xix As explained by the CMHC⁴³, “The expression “drive until you qualify” has become popular in recent years. It refers to the response households have had to rising home prices. Because of rising prices, many households can't afford to buy homes in the urban, central sectors of their cities. Households therefore drive further and further... until they find housing they can afford (and a mortgage they can qualify for).”

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