3. ECONOMIC SUSTAINABILITY

The City of Toronto will support and enhance sectors related to automated vehicles, with a particular focus on attracting industries, investment, and employment, as well as on exporting products and services.

Toronto is well-positioned in the automated vehicle industry due in large part to the organizations at the provincial level that are leading the way in economic development.

The Autonomous Vehicle Innovation Network (AVIN) referenced in the background section, has built upon Ontario's leadership in the automotive manufacturing and supply jurisdiction, as well as its information and technology sector, to position itself as an economic development leader around automated and connected vehicle technology. AVIN provides resources such as "research and development funding, talent development, technology acceleration, business and technical supports, and demonstration grounds" to position Ontario-based connected and automated vehicle companies as North American leaders in this sector.[36]

This is only one area of the vast amount of expansion, growth and leadership occurring in Toronto within the AV industry.

Guiding Policies and Strategies:

Collaborating for Competitiveness (2013):[37]

> *Working with businesses, residents, and a broad set of stakeholders to foster employment and investment growth;*
>
> *Improving the City's finances by increasing assessment and generating new employment, thereby decreasing the need for social support payments and services; and*
>
> *Ensuring that City policies, programs and activities create an attractive climate for business investment and job creation.*

Summary of Goals and Tactics

Goals	Tactics	Key performance indicators
3.1 Expand Sectors	3.1.1 Expand Investment and Employment 3.1.2 Testing 'Sandbox'	Total economic output of sectors related to AVs
3.2 Expand Employment Opportunities	3.2.1 Talent Development 3.2.2 Workforce Reskilling 3.2.3 Community Benefits	Number of jobs created in AV-related sectors per 1000 jobs Percentage of workers who have transitioned into a new role
3.3 Demonstrate Sector Leadership	3.3.1 Global Competitiveness 3.3.2 Cross-Sector Collaboration	Global benchmarking

3.1 Expand Sectors

In 2050, the City will have harnessed the widespread adoption of automated vehicles to have retained and attracted additional investment in sectors closely related to automated vehicles.

3.1.1 Expand Investment and Employment

Proposed Tactic: Develop and implement a policy and mechanism to expand investment and employment in local sectors related to automated vehicles.

Ontario is poised to be one of the leaders in intelligent transportation, with expertise in connected and autonomous vehicle technology, artificial intelligence, connectivity, cybersecurity, and quantum computing. According to the Province, more than 170 companies in Ontario are involved in the connected and automated vehicle sector.[38]

These investments can be attributed to Ontario's large automotive and IT clusters the high-quality workforce, access to the North American market, a thriving research and development (R&D) environment, and its award winning manufacturing. The City will leverage these regional strengths and continue to develop its local automated vehicle sector.

Proposed progress to 2022: Partner with Toronto Global – the regional investment attraction agency – to research and learn about opportunities to expand sectors related to AVs.

3.1.2 Testing 'Sandbox'

Proposed Tactic: Develop and implement a testing 'sandbox' to allow industry to play, cluster, and innovate quickly.

Although better known in the agile software development field, an emerging best practice for testing disruptive technologies is to create a 'sandbox.'[39] A sandbox is a technical environment with a well-defined scope, which allows for isolated execution of software or programs for independent evaluation, monitoring or testing. This controlled environment allows for players to reduce the risk of technical errors prior to wide distribution of their product.[40]

Developing a testing sandbox within Toronto's boundaries could be beneficial –not only in terms of adapting AV technologies to local conditions – but also in terms of contributing to the economic development of the AV industry.

Proposed progress to 2022: Develop and implement an innovation corridor and innovation zones to accelerate proof-of-concept pilots.

3.2 Expand Employment Opportunities

In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure a smooth transition in the workforce to meet the needs of tomorrow.

3.2.1 Talent Development

Proposed Tactic: Develop and implement a mechanism to increase the local talent base in sectors related to automated vehicles.

Toronto is already the largest centre of education, research and innovation in Canada. The success of its educational institutions plays a large part in why some of the best businesses and brightest minds are attracted to this City.[41] Toronto is home to innovative programs like OCAD University's Strategic Innovation Lab and the University of Toronto's Institute of Aerospace & Engineering's aUToronto team which built a self-driving car. The City was ranked as the "best economy for young people" in 2015[42] and hosts one of the most diverse and highly educated talent pools within Canada. Talent has always been the driving force behind Toronto's economic prosperity and innovation, and will remain so with the introduction of AVs.

Proposed progress to 2022: Evaluate effectiveness of mechanisms for increasing the talent pool supporting the automated vehicle cluster.

3.2.2 Workforce Reskilling

Proposed Tactic: Develop and implement a policy to address the anticipated need for workforce reskilling as a result of AVs.

The adoption of vehicle automation technologies by firms has the potential to both create employment opportunities and render some existing jobs obsolete.[43] As noted by the Brookfield Institute for Innovation and Entrepreneurship, this potential varies by industry and is the result of a number of factors, "including the fit between changing skills demand and the skills of workers within local labour markets, the ability and willingness of workers to upskill or retrain, and the availability of training programs tailored to the needs of local firms and workers."[43] For example, driving jobs could see a decline while information technology-focused occupations such as software developers, web designers, and user support technicians could experience growth.[44]

The introduction of AVs may create new business models and render some obsolete. With these conditions comes several challenges. First, individuals occupying in-demand roles need to possess the right skill sets. Second, individuals in impacted roles need to receive the right amount of upskilling and retraining to remain employable as the technology changes. Finally, individuals in roles that will be phased out need to be retrained now to transition effectively prior to mass integration of AVs.[44]

Proposed progress to 2022: Monitor workforce and social assistance impacts and work with partners – in government, postsecondary, labour unions and private sectors – to connect Toronto residents to training and reskilling opportunities.

3.2.3 Community Benefits

Proposed Tactic: Develop and implement a mechanism to ensure that large-scale infrastructure projects related to automated vehicles identify ways to achieve inclusive economic development through community benefits opportunities.

The City of Toronto's Poverty Reduction Strategy acknowledges significant potential to reduce poverty in Toronto through City policies and programs aimed at leveraging the City's economic powers to drive inclusive economic development. For example, the City's Social Procurement Program focuses on leveraging an institution's purchasing power to create social impact and inclusive economic growth, hence achieving a double bottom line through City procurement.

With the integration of automated vehicles and the potential impact to both infrastructure developments, as well as Toronto's labour force, the City of Toronto is aiming to incorporate community benefits initiatives and opportunities into its upcoming projects to ensure that equity-seeking groups and impacted labour sectors are able to benefit from this technology.

Proposed progress to 2022: Use the City's Community Benefits Framework (forthcoming) to guide how to leverage community benefits through large transit projects, and infrastructure developments.

3.3 Demonstrate Sector Leadership

In 2050, the City will have harnessed the widespread adoption of automated vehicles to be recognized as a leader in sectors closely related to automated vehicles, particularly in ways that support this Tactical Plan.

3.3.1 Global Competitiveness

Proposed Tactic: Develop and implement a mechanism to increase Toronto's recognition and competitiveness in sectors related to automated vehicles.

Toronto has a natural competitive advantage when it comes to attracting investment in AV related sectors, which can be attributed to several factors: its location at the centre of the 4th largest metropolitan area in North America, its thriving economy with a GDP of over $172 billion in 2017 – about 10% of Canada's total GDP, a highly skilled, multilingual workforce of 1.52 million people, almost 64% of whom have a post-secondary education, and major transportation hubs like Pearson International Airport, the Port of Toronto, and many major highways and multi-modal railway facilities within the area. [45]

Currently, Southern Ontario is the fourth largest exporter of vehicles in the world, with manufacturing facilities for GM, Fiat-Chrysler, Ford, Toyota, Honda and their supply chains. The Toronto-Waterloo Region Corridor includes research universities and technology companies, attracting Uber and General Motors and creating jobs in the region.[46] With so much technological innovation and entrepreneurship already taking place in Toronto, the City will ensure that it leverages this competitive advantage in order to create a hub for automated transit technology.

Proposed progress to 2022: Develop an economic development strategy to make Toronto a hub for automated transit vehicle technology.

3.3.2 Cross-Sector Collaboration

Proposed Tactic: Develop and implement a mechanism to facilitate cross-sector collaboration between sectors related to AVs and Toronto's other economic sectors.

Toronto is Canada's business and financial capital. It is competitive in an array of major business sectors, including technology, green energy, food and beverage, film and television, digital media and more. This industrial diversity drives cross-sectoral interactions and knowledge sharing that has led to leading-edge hybrid sectors like med-tech, green-tech, and food-tech, which are currently thriving within the City.[47]

Toronto is well-placed to facilitate collaboration between industries involved in developing AV technology – including the service industry, safety & security industry, in-car intelligence and assistance, autonomy, infrastructure & connected cars, intelligent manufacturing, onboard sensors, and the specialty vehicle industry.[48] The City aims to facilitate this collaboration

amongst AV industries, and between AV and other thriving sectors in Toronto, to ensure the continued development of an economically competitive municipality.

Proposed progress to 2022: Implement an initiative to foster collaboration among the AV cluster.

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