POLICIES FOR DEVELOPING SUSTAINABLE COMMUNITIES
A REVIEW OF ONTARIO

by

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1.0 ABSTRACT

Public Policy plays a big role in creating noticeable changes in the activities within any region of the world. With the right policies in place, we can achieve a lot of positive changes. Developing sustainable communities is one decision that has a great deal of direct positive impact on the community members over the course of time, and this is seen in communities that have engaged on that route over the years. It influences their health, happiness, and also the financial aspect of their lives. The lack of sustainable living in the past century is costing us a lot today.

The negative impact of climate change in our world today cannot be over emphasized and is quite evident in day-to-day weather events. These climate change hazards will only get worse if we do not take the appropriate actions to mitigate the issue. Sustainability is the recurring answer that is given as a solution when the issue of climate change arises. Developing a sustainable community is a major step towards taking actions to correct and manage these effects.

This research examines what is being done to promote sustainable development in specific cities of Ontario. It also takes a look around the world for success stories, and prescribes achievable policy recommendations that could set Ontario on the right path towards sustainability. There are several plans in place within the municipalities of Ontario to develop sustainable communities. An observed shortfall of the two Ontario cities that were used as case studies for this research was the lack of any major success stories regarding sustainable development. Developing a sustainable community entails changing actions in various departments/aspects of life. Setting out to achieve all at once is quite ambiguous and involves a great deal of effort and hence yields no results. The municipalities will achieve more if they adopt a phased-out approach - focusing on one aspect with a set time line for implementation, and based on results achieved, expand into other aspects one after the other.
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In April of this year 2017, there were several issues of severe flooding in the Canadian cities of Gatineau, and Ottawa which caused a lot of damage to properties. In July 2017, there was severe flooding in Lagos Nigeria, which also caused several damages to properties and led to loss of lives. During the August long weekend (Civic Holiday – Weekend of August 4th to 7th) this year, there were several thunderstorm warnings on the news, and several cottages in Ontario were affected by the destructive thunderstorm. In Southern Ontario, the changing climate is predicted to have a significant effect on temperatures, which includes hotter summers, warmer winters, more rainfall, increase in extreme weather conditions - including thunderstorms and tornados etc. (Mattos & Heath, 2014). These effects can be mitigated and managed through policies for sustainable community development.

A sustainable community can be defined as a “community that uses its resources to meet current needs while ensuring that adequate resources are available for future generations” (Simon Fraser University, n.d.). Developing sustainable communities is a very broad idea. Through the course of this research it has been observed that it involves a wide range of activities; from, the energy usage in the community, the transportation modes, the waste management, the local economy, the density and intensity of development, the health of the community, the air quality, up to many more daily activities of the community members.

One of the significant factors affecting our ability to create sustainable communities today is the production and usage of energy, which also affects the ecological footprint of our communities (Mattos & Heath, 2014). The transportation system is also a key factor that can minimise or increase the ecological footprint of a community (Mattos & Heath, 2014). Sustainable transportation includes public transportation, electric/hybrid private vehicles, cycling, walking and carpooling. The city development style is yet another factor. A city with compact and diverse development is more sustainable than one with sparse development. “The compactness of urban form and the concentration of housing and jobs create the necessary critical mass to support transit and retail, ultimately reducing car dependence and traffic congestion” (Brampton Flower City, 2013).

Public Policy seeks to achieve a desired goal that is considered to be in the best interest of all members of society (Torjman, 2005). The importance of public policy is emphasised using the explanation “Public policy is a determinant of the quality of the air we breathe and the water we drink” (Torjman, 2005). It also plays a major role in the food we eat, it affects the way the food is harvested, where it can be distributed or sold, and even as much as the price we pay for the food (Torjman, 2005). Public policy controls the way in which we clean, the safety of the water supply and the limits on air emissions (Torjman, 2005). “Transportation is another example of a domain governed by a variety of public policies, most of which are concerned with the safety of travellers” (Torjman, 2005).

Policy makers play the largest role in creating an effective change to achieve a more sustainable environment. Informed decisions need to be made by these policy makers for us to have sustainable communities. For the purpose of this study, focus will be made on transportation systems and compact development – this will allow for detailed study and research outcomes based on the scope of this research paper.
6.0 LITERATURE REVIEW

It is important to look through the literature that exists on policy, transportation and community development to avoid reinventing the wheel. A better understanding on policy and its different classifications and types is examined.

6.1 Policy

Policies can be classified into vertical and horizontal. Vertical is a top down approach, with the instructions coming from the top while the bottom implements. Horizontal policy is one developed by two or more organisations (Torjman, 2005). “Governments increasingly are focusing their efforts upon horizontal policy-making in recognition of the fact that many of the objectives they seek to achieve are complex and relate to the mandates of two or more departments, jurisdictions or non-governmental organizations” (Torjman, 2005). “Areas of common interest include, climate change, Aboriginal issues and the range of concerns rooted in cities and communities” (Torjman, 2005). The policy options and recommendations for this paper will be focused on horizontal policies. Developing a community involves the collaboration of different departments/agencies including; the planning department, transit department, energy department, and the waste management department. Other departments also play individual roles like the economic/financial departments and some others that may not be mentioned in documents or reports.

6.2 Transportation

The issue of transportation is significantly broad, but a few reviews on what people have studied and documented on human behaviour and response to mode of transportation will be highlighted.

A question “why do people prefer private cars over public transit?” was asked by Quora (a Question-and-answer website for public opinion) and a couple responses are summarised below:

“Owning a car is so much better because it’s much faster to get from point A to point B. You don’t have to sit and wait for the bus, and busses where I’m from have very specific routes so in some events you’d have to take two busses to get somewhere. This process could take up to an hour or maybe even two depending on what side of the city you’re on and where you’re going. A comparable trip in a car could take about 15–20 minutes. it’s also easier to transport multiple things, like if I’m running errands and I need to go to the grocery store but I also need to go pick something up from my office at work, and maybe I have to bring my dad his Father’s Day gift I can do all that, and not have to carry everything everywhere with me, and it would take far less time to do so. A car turns that from an all-day task into errands that can be done in a couple hours or less”. (Hann, n.d.)

This response shows that the public transit option is not effective for this commuter - comparing an hour or two by public transit to fifteen - twenty minutes with a privately-owned vehicle.

“As an owner of a private car - they are incredibly useful in the not urban environment. In the urban environment, I imagine they are an expensive pain to park, fuel, and maintain. Public transit is the way to go in the urban places. I take the train into NYC; I wouldn’t drive up there for love nor money. However, out of the urban environment, public transportation becomes less and less economical, timely, and swift. Private ownership of vehicles is the only feasible solution in the suburban and rural environments.” (Griffith, n.d.)
This vantage point speaks precisely on the main criticalities of my policy direction. The compact urban cities have more people, hence more public transit options which make it faster and economical to take the public transit, and private car usage tends to be more stressful and expensive.

An article on the city of Windsor website titled *Personal Vehicles Versus Public Transit* highlights the benefits of taking public transit. The article states that “Car drivers are only paying the direct costs of operating their vehicles, but we're all paying the rest of the price: congestion, pollution, and road maintenance.” (City of Windsor, 2017) Analysing the public transit usage proportionally to number of cars, the article explained in a comparison that one busload of passengers is responsible for 40 fewer vehicles on the road during rush hours, and the estimates fuel savings for this number of cars is about 70,000 litres, and also, the approximate emissions avoided is about 175 tonnes a year (City of Windsor, 2017). “Generally, it is estimated that a single bus can replace up to 50 single-occupancy vehicles. Therefore, taking the bus instead of your car reduces GHG by almost 2/3.” (City of Windsor, 2017).

Statistically, it is calculated that the average car will spill about 34.4 Kg of hydrocarbons a year, 4029.3 Kg of carbon dioxide (CO2) and 29.6 Kg of nitrogen oxides (NOx). If we multiply the emissions by each of the over 13 million cars in Canada, then a clearer picture of the magnitude of this problem is seen (City of Windsor, 2017). Based on studies, six of the seven major air pollutants come from cars and light trucks (City of Windsor, 2017).

Looking at the benefits of transit oriented development, and usage of Public transit, a summary of the advantages can be highlighted as follows;

Transit Oriented Development improves the health of the public: - “A community with a strong and dependable transit system and streetscaping elements can discourage vehicle dependence and congestion” (Delaware Complete Communities, n.d.). Transit saves about $115 million in annual health care costs related to respiratory illness (City of Windsor, 2017). A transit oriented development community is thought to improve community health and even reduce obesity (Delaware Complete Communities, n.d.). A research article titled *The Effect of Light Rail Transit on Body Mass Index and Physical Activity* found that commuters who took the train were about 6.45 pounds lighter than those who continued driving to work (MacDonald, Stokes, Cohen, kofner, & Ridgeway, 2010). The use of LRT to commute to work was associated with an average 1.18 reduction in BMI. The results of the study suggest that improving neighborhood environments and increasing the public's use of LRT systems could provide improvements in health outcomes for millions of individuals (MacDonald, Stokes, Cohen, kofner, & Ridgeway, 2010).

Transit Oriented Development creates a more sustainable community. Transportation contributes about 28 percent of all greenhouse gas (GHG) emissions (Delaware Complete Communities, n.d.). However, public transit usage has the potential to reduce annual GHG emissions. “Transit reduces annual greenhouse gas (GHG) emission by 2.4 million tonnes, valued at $110 million” (City of Windsor, 2017). “The Delaware Valley Regional Planning Commission found in their GHG inventory that Philadelphia had lower transportation-related emissions per capita because of a higher reliance on public transit” (Delaware Complete Communities, n.d.).

Local economies are also strengthened by transit oriented development. Improving local public transit can cut vehicle transportation costs and time spent on commuting. With reduced commuting times and costs, people will be able to spend their time and money at restaurants, shops, and museums in the local area (Delaware Complete Communities, n.d.). “The Center for Transit-Oriented Development
reports that a compact community with a strong transit system can create jobs and also attract a young, innovative talent pool, it also costs less than suburban sprawl” (Delaware Complete Communities, n.d.). “Sprawl development is costly because it requires the expansion of public infrastructure and utilities” (Delaware Complete Communities, n.d.). With Public transit, there is a significant reduction in the economic costs of traffic collisions by over a billion annually (City of Windsor, 2017). “The economic benefit of Canada’s existing transit systems is at least $10 billion annually” (City of Windsor, 2017).

Taking the research, a little further to get into commuters’ heads and understand why they choose private cars over public transit, Jaffe (2013) shares an experimental result showing that people will generally want to stick with personal cars as a preferred mode of transportation. The article explains how several people had to choose between cars and metro, and most people stuck to cars even though the cost of using a car was varied and most times higher while the cost of the metro was fixed. “This experimental study shows that, in repeated travel mode choice, available information is not properly processed, cognitive efforts are generally low and rational calculation play a limited role” (Jaffe, 2013). It is concluded that “for all the technical and spatial hurdles of implementing an efficient urban transit system, there are significant psychological ones too” (Jaffe, 2013).

MacKechnie, (2017) further breaks down the cost comparison of taking transit versus driving. He concludes that owning an automobile is far more expensive than taking transit, and that people who find transit to be expensive probably do not know that much about either transit or how much it costs them to drive. Some of the recurrent costs that are not taking into consideration when comparing private vehicles to transit were highlighted which include monthly insurance, scheduled maintenance and unscheduled maintenance. These can be added to the gas prices which is the common comparison cost and the cost of transit ends up being cheaper.

Golombek, (2012) in his article titled “Taking public transit for a break from winter driving? Take a tax break too” explained how using the public transit in Canada also helps reduce the tax you pay. He explained the requirements and approvable transit pass which are eligible for tax credits. “Under the Income Tax Act, you can claim the cost of monthly or annual public transit passes for travel within Canada on public transit. These passes must permit unlimited travel on local bus, streetcars, subways, commuter trains or buses, or even local ferries” (Golombek, 2012).

Thompson, (2013) puts together four photographs of a street in Toronto to show that driving personal cars causes congestion, and public transit is the solution to such congestion. The Figures 1-4 show his illustration. The space on the road occupied by about thirty six persons in a street car can not be compared to that occupied by thirty six persons, each in a private car.
In his short article, he states that if the argument of the tons of emissions caused by the number of cars on the road isn’t good enough to make you see the benefits of public transit, then consider that trains, trams, buses and the likes, reduce traffic congestion as seen in the four sequential figures above, which is good for the life satisfaction of everybody behind the wheel.

Another sustainable option for transportation is the electric and hybrid private vehicles. The main attraction is that electric vehicles benefit the environment and this is a good solution for people looking to minimize their carbon footprint as much as possible (DeMuro, 2014). The plug-in hybrid uses both a conventional engine and an electric motor; the best hybrids achieve significantly better fuel efficiency, pollute less and save drivers money through fuel savings (Union of Concerned Scientists, n.d.). These cars can offer much-improved environmental performance and increased fuel savings by substituting grid electricity for gasoline (Union of Concerned Scientists, n.d.). “Hybrids that can’t be recharged from an outlet aren’t generally considered to be electric vehicles, as they rely exclusively on gasoline or diesel for energy” (Union of Concerned Scientists, n.d.). “Battery electric vehicles only use an electric motor and
battery, avoiding conventional engines altogether. Because they don't use gas or diesel, battery electrics are often cleaner and cheaper than hybrids and conventional vehicles” (Union of Concerned Scientists, n.d.). These environmentally safe vehicles also provide tax savings. For a fuel-efficient vehicle with focus on gas-pump savings and tax rebates, both plug-in hybrids and EVs meet the criteria (DeMuro, 2014). “While plug-in hybrids still need to be filled with gas occasionally, fuel costs are still much lower than traditional cars. More importantly, federal income tax rebates apply to both plug-in hybrids and EVs, as do most state tax credits” (DeMuro, 2014). Jeff Cobb reports the cumulative global sales of highway legal plug-in electric passenger cars and light utility vehicles reaching the one-million-unit milestone in September 2015 (Cobb, One Million Global Plug-In Sales Milestone Reached, 2015). The global sales increase to over two million by December 2016 (Cobb, The World Just Bought Its Two-Millionth Plug-in Car, 2017). In five years, global sales of highway legal light-duty plug-in electric vehicles have increased more than ten-fold (Wikipedia, 2017). A chart showing the growth in sales and country contribution is shown in the Figure 5:

![Global annual sales of light-duty plug-in electric vehicles in top selling markets (2011 - 2016)](image)

Figure 5 Global annual sales of EV vehicles from 2011 to 2016 per region
Source: (Wikipedia, 2017)

Active transportation is another source of transportation which is very sustainable. It refers to all human-powered forms of transportation, in particular walking and cycling (Transport Canada, 2011). “It includes the use of mobility aids such as wheel chairs, and can also encompass other active transport variations such as in-line skating, skateboarding, cross-country skiing, and even kayaking” (Transport Canada, 2011). Active transportation can also be combined with other modes, such as public transit. “Active transportation also helps upgrade and improve the overall performance and safety of the transportation network through traffic calming, streetscape improvements, traffic speed reductions,
vehicle restrictions, and road space reallocation. The safety benefits generated by these improvements not only apply to pedestrian and cyclists, but also drivers. (Transport Canada, 2011). "

Transport Canada quoted in a documentation that auto dependent countries are in the midst of an obesity epidemic which is linked to a declining physical activity (Transport Canada, 2011). The health disadvantages of obesity include heart disease, stroke and other chronic conditions, including cardiovascular disease, type 2 diabetes, and various cancers (Transport Canada, 2011). Physical activity is associated with positive health outcomes like; improved fitness, physical, mental and social health, and active transportation involves a lot of physical activity (Transport Canada, 2011). Investing in active transportation infrastructure to increase levels of walking and cycling will help to reduce motor vehicle congestion and improve access to transit and other services (TCAT, 2013). Comparing the obesity rates to the use of walking, cycling and public transit across some countries, we see an inverse relation between the use of public transit with active transportation and the obesity rates (Transport Canada, 2011). The Figure 6 shows the chart comparison:

![Figure 6 Relationship between Obesity rate and Active transportation use in countries](source: Transport Canada, 2011)

Active transportation also comes with a lot of economic benefits not only to the commuters but also to business owners and the city at large. A report by Toronto centre for active transportation captures that business owners get more from customers who arrive by foot and bicycle; they visit the most often and spend the most money per month (TCAT, 2012). It has also been noticed that “bike lanes, recreational trails, and other infrastructure that promotes active transportation have been shown to increase property values for homes and businesses located nearby” (TCAT, 2012).

The cost of owning a bike per annum is dramatically lower than the costs associated with owning a private car (TCAT, 2012). This makes active transport users enjoy lower costs of living and more savings. The cost savings for the city comes from the reduced costs of road maintenance due to increased active
transportation modes. “Active modes require considerably less space and cause very little wear damage to road surfaces” (TCAT, 2012). “A decrease in the volume of motor vehicles on the roads would also diminish the demand for roadway expansion and parking, thus creating considerable savings within provincial and municipal budgets” (TCAT, 2012).

Generally, there are several means of sustainable transportation. Figure 7 shows a pictorial illustration of the different transport options that improve the environment and are cost effective.

![Figure 7 Sustainable Transportation Options](Info Diagram, n.d.)

A pyramid illustration showing the best transport options to the worst is shown in Figure 8. The sustainable options are highlighted in shades of green while least sustainable options are highlighted in shades of red. This is a pictorial view of the best to worst transportation options.
6.3 Compact Development

Compact development involves development in existing areas to conserve land and protect farmland and wildlife habitat (U.S. Green Building Council, 2017). The Great Communities Collaborative explains that to “support a vibrant neighborhood with shops, jobs, and homes in walking distance of each other, with public plazas, parks, and community services, and a connection to the wider region through rapid transit, a Great Community needs to be a compact neighborhood” (Great Communities, 2009). Compact development promotes livability, walkability, and transportation efficiency, including reduced vehicle distance traveled (U.S. Green Building Council, 2017). It also improves public health by encouraging physical activity daily which is associated with alternative modes of transportation and compact development. “Compact development around transit stations minimizes traffic, supports transit, improves air quality, preserves open space, supports economic vitality, creates walkable communities and provides a range of housing options” (Great Communities, 2009).

The National Association of Home Builders (NAHB) states in an article that “an important part of smart growth is using land more efficiently and preserving those lands that are most environmentally sensitive” (National Association of Home Builders, 2017). This mode of development also reduces costs through more efficient use of infrastructure, which in turn makes housing more affordable (National Association of Home Builders, 2017). It provides opportunities for pedestrian access and densities that can be efficiently served by transit.

There can be different types of compact development. Cluster developments allow for development lots to be grouped and preservation of environmental sensitive areas like forests and wetlands (National Association of Home Builders, 2017). Mixed-Use Developments produce diverse and very convenient
communities, where work places, schools, markets and parks are within walking/cycling distances (National Association of Home Builders, 2017). This reduces dependence on cars, thereby reducing traffic and encouraging an active transport community. “Design elements of traditional neighborhoods such as narrow streets, front porches, mixed uses and pedestrian orientation contribute to the quality of our built environment and have a significant impact on the activities that take place within them” (Local Government Commission, 2013).
7.0 METHODS

The approach used for this research involved engaging a typical small city and a big city in Ontario. For the purpose of this research, the Town of Oakville and the City of Brampton were contacted and used as case studies. Information to give an understanding of what is currently being done to build sustainable communities within the two cities was gathered and reviewed, then a few observations were made and policy directions were recommended. A review of what other cities around the world have done and are currently doing to achieve success was also documented at the end of this section.

In engaging with the two cities, it was evident that a lot of work has been put into developing sustainable communities - clearly the provincial direction of reducing GHG emissions in the province has forced all cities and municipalities to the drawing board to ensure sustainable living and development within their regions. A common trend that was observed in the documentation of reports on strategies and plans to achieve sustainability in the two cites was in the date of the feasibility studies and mapped-out policy plans. Most of these plans were concluded up to eight years ago but with little or no action taken. The plan was approved by the province two years after being issued for the Town of Oakville, and then a recent visit to review and draw out an implementation strategy kicked off as part of the scheduled 5-year review put in place.

7.1 Review of Actions in Ontario

A detailed summary of the cities’ actions and plans towards developing a sustainable community is documented in this section:

7.1.1 Town of Oakville

The town of Oakville has a laid-out development plan to develop a liveable city with an intensified urban development. The city carried out studies to update the land policies and engaged with the community on the plans to intensify and increase the density by zones. Some residents in the community are open to intensification while others are just good with the existing plans and do not want a change (Town of Oakville, 2015).

Questioning the contact person for the “Town of Oakville - liveable city plan”, It was stated that “there will always be oppositions to change. The council is going ahead to implement the plans to intensify growth for the new development areas and just minor changes in the existing communities” (Woods, 2017). The Liveable city plan is a long-term plan with a target date of 2041 (Woods, 2017).

The town also has an active transportation plan which was developed in 2009 and is being revisited for updates and implementation. Currently there is a short term (0-10 years) plan for the map routes that will be implemented, and a few long-term (10-20 years) plan routes (Town of Oakville, 2016). Based on surveys carried out within the community to know the opinion of the people about active transportation, the results in Figure 9 was gotten.
One major contrast seen in the result is that of the high percentage of the community that feel comfortable walking or cycling compared to the low percentage of the community that choose to walk or cycle. Also, the percentage of the community that own a bicycle is really high compared to the total percentage of the community that will either bike primarily or secondarily.

7.1.2 City of Brampton

A sustainable development guideline has been prepared by the city of Brampton, highlighting the importance of sustainable development and the expectations for a sustainable development in Brampton. In 2012, a presentation by Alex Taranu, the Manager of urban development for the city of Brampton, highlighted the health importance of developing a sustainable community and the actions that need to be carried out by the city of Brampton to achieve sustainable development (Taranu, 2012). The presentation stated the infeasibilities and high costs of achieving a sustainable development in a city like Brampton, including mixed-use developers being scarce and the need for Governmental funding to achieve sustainable development (Taranu, 2012). The recommendation was to take a gradual approach towards achieving sustainability, having a guideline will help guide future developments and council support will make a difference (Taranu, 2012). The city completed a Sustainable Community Development Guideline in 2013. This document was used in the development of the Mount Pleasant area.

The city of Brampton invested in the Mount Pleasant area, and developed a sustainable region with transit being the focus of transportation and the community was also developed with a focus on active

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**Figure 9 Town of Oakville survey results on active transportation**

*Source: (Town of Oakville, 2016)*

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<table>
<thead>
<tr>
<th>CYCLING RESPONSES</th>
<th>PEDESTRIAN RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mode choice</strong>...</td>
<td><strong>Mode choice</strong>...</td>
</tr>
<tr>
<td>8% primary</td>
<td>14% primary</td>
</tr>
<tr>
<td>16% secondary</td>
<td>13% secondary</td>
</tr>
<tr>
<td><strong>Trip frequency</strong>...</td>
<td><strong>Trip frequency</strong>...</td>
</tr>
<tr>
<td>23% daily</td>
<td>76% daily</td>
</tr>
<tr>
<td>43% weekly</td>
<td>20% weekly</td>
</tr>
<tr>
<td><strong>Trip purpose</strong>...</td>
<td><strong>Trip purpose</strong>...</td>
</tr>
<tr>
<td>54% heart</td>
<td>66% heart</td>
</tr>
<tr>
<td>29% home</td>
<td>42% home</td>
</tr>
<tr>
<td>11% bike</td>
<td>21% bike</td>
</tr>
<tr>
<td>9% walk</td>
<td>20% walk</td>
</tr>
<tr>
<td><strong>Comfort level</strong>...</td>
<td><strong>Comfort level</strong>...</td>
</tr>
<tr>
<td>😊 71% feel comfortable / somewhat comfortable cycling</td>
<td>😊 96% feel comfortable / somewhat comfortable walking</td>
</tr>
<tr>
<td><strong>Potential improvements</strong>...</td>
<td><strong>Potential improvements</strong>...</td>
</tr>
<tr>
<td>76% more infrastructure</td>
<td>57% more infrastructure</td>
</tr>
<tr>
<td>56% improve existing facilities</td>
<td>51% more parks</td>
</tr>
<tr>
<td>62% better treatments at intersections</td>
<td>57% improve crossings</td>
</tr>
<tr>
<td>55% improve crossings</td>
<td>46% better connections</td>
</tr>
</tbody>
</table>

Town of Oakville | Active Transportation Master Plan (ATMP) Update | Public Information Centre #2 | WSP | MMM
transportation (City of Brampton, 2017). The city tags Mount Pleasant as an “Urban Transit Village” - it has a major Go station situated right in the middle of the community with bicycle parking (City of Brampton, 2012). The city reports all its plans and states the development of the Mount Pleasant area as its pilot development for sustainable community - but no data within the city’s documentation shows the current success stories. All reports of success are referenced to the articles written in 2011 during the planning stage of the development.

After engaging with the city to acquire data that shows the success of developing the Mount Pleasant area as a transit oriented community, the Brampton Transit department of the City of Brampton then provided the transit ridership data within Mount Pleasant area. Table 1 shows the average daily ridership data for fall of 2013 and 2016 in the Mount Pleasant Area.

<table>
<thead>
<tr>
<th>Route</th>
<th>2013</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 55</td>
<td>N/A-</td>
<td>39 persons</td>
</tr>
<tr>
<td>Route 60</td>
<td>N/A-</td>
<td>107 persons</td>
</tr>
<tr>
<td>Route 9</td>
<td>70 persons</td>
<td>90 persons</td>
</tr>
<tr>
<td>Route 29/29A</td>
<td>Approx. 150 persons</td>
<td>180 persons</td>
</tr>
<tr>
<td>Route 4/4A</td>
<td>206 persons</td>
<td>273 persons</td>
</tr>
<tr>
<td>Route 505 Züm</td>
<td>N/A-</td>
<td>156 persons</td>
</tr>
<tr>
<td>Route 5/5A:</td>
<td>188 persons</td>
<td>175 persons</td>
</tr>
<tr>
<td>Route 561 Züm:</td>
<td>N/A-</td>
<td>90 persons</td>
</tr>
<tr>
<td>Route 1:</td>
<td>N/A-</td>
<td>89 persons</td>
</tr>
<tr>
<td>Route 23:</td>
<td>93 persons</td>
<td>163 persons</td>
</tr>
<tr>
<td>Route 26:</td>
<td>N/A-</td>
<td>86 persons</td>
</tr>
<tr>
<td><strong>Total Daily Ridership</strong></td>
<td>707 persons</td>
<td>1,448 persons</td>
</tr>
</tbody>
</table>

** N/A – Route was not in Service or did not run to Mount Pleasant at this time.
** Approx. - Estimated number due to unavailability of Data

Analysing the transit data shows that there has been some noticeable increase in transit ridership in the region. For instance, if the same bus routes in 2013 were the only routes available in 2016, assuming the number of people on each available route remains the same as on the ridership data, there would have been an increase in ridership from 707 to 881 persons. With the added transit route options between 2013 and 2016, there was an increase of more than 100% in ridership between 2013 and 2016. Generally, an increase in population causes an increase in the transit ridership, plus, an increase in transit options also gives an increase in transit ridership. It will be important to get a survey of the number of community members who are homeowners that cycle, walk, and use the transit as their primary means of transportation.

7.2 Review of Actions outside Ontario
A review on what other cities around the world have done to achieve success is documented as a focus policy outlook for policy makers.
7.2.1 Vauban, Freiburg, Germany

This community was developed intentionally to be a green environmental model to other communities (Thorpe, 2014). Vauban demonstrates how communities can become more sustainable and reduce their inhabitants’ carbon footprints (Abellard, 2011). In Figure 10, we see a children’s playground which is within walking distance from the residential apartments in the community.

![Figure 10 children on the playground in Vauban](source)

The city fosters public transit and makes cars unnecessary (Abellard, 2011). It has pedestrian and bicycle paths that form a green transportation network, all homes are within walking distances from a tram stop, businesses, schools and shopping centres are all within walking and cycling distances from each other (Abellard, 2011) (Thorpe, 2014). Figure 11 shows the community members walking and cycling around the local market.

![Figure 11 community members walking and cycling to local market](source)
This community is a car free community and it is estimated that 57% of people moving into the community let go of their cars, and a total of 70% of the community members live without cars (Abellard, 2011). This community and the Freiburg city has seen so much success in maintaining a green city because “the Freiburg city council in June 1995 adopted a resolution that it would only permit construction of "low energy buildings" on municipal land, and all new buildings must comply with low energy specifications” (Thorpe, 2014). Also, the city benefits from a high concentration of professionals working in sustainability fields (Thorpe, 2014). Therefore, could it be possible that the more educated and enlightened the people are on sustainable development, the higher success rates we have in developing sustainable communities?

7.2.2 Vancouver
In Vancouver, a not-for-profit start up developed a Car Cooperative initiative which started in 1997 with sixteen members and grew to five thousand members in 2009 (Bains, 2009). This initiative aims to reduce personal cars and about 20% of its members gave up their personal cars after becoming a member (Bains, 2009). The company rebranded and is now known as MODO with over eighteen thousand members, eight hundred businesses and one hundred building developers subscribed to it (MODO Cooperative, 2017). This company has also included electric vehicle and hybrid in their car fleet to continuously support sustainability. Vancouver is taking the lead in the car sharing initiative. It is the first city in the world to have more than one hundred thousand members for car sharing and there are a few more providers of the car sharing service in Vancouver (Baker, 2016). Some of the companies have strictly hybrid and electric vehicles.

7.2.3 Northampton County Virginia
Northampton County is known for its rich natural and cultural assets which include a diverse habitat for over two hundred and sixty species of birds and countless other fish and wildlife species (RAND Corporation, 1997). The county is also reported to have been one of the poorest in Virginia. The county formed a partnership with federal state and local governments to set up a Special Area Management Plan (SAMP) for sustainable development, and create enforceable policies to protect coastal habitat and promote economic development (RAND Corporation, 1997). The Virginia Coastal Program initiated the annual Eastern Shore Birding Festival. The festival celebrates the annual fall migration of songbirds, raptors, shorebirds, and other birds (RAND Corporation, 1997). Figure 12-14 show some of the fall migration festival photos.

Figure 12 Beautiful view of the birds in Northampton
“Over 160 species are usually seen during the Festival weekend and several hundred thousand dollars are brought in by the birdwatchers” (RAND Corporation, 1997).
7.2.4 Grandview Gateway Kansas

The city of Grandview carried out a renovation project for her streets and decided to design a complete street for the Main Street (Grandview MO, 2016). Grandview is a city whose community is made of racial minority, most of whom are low income earners and depend on public transit and walking as their means of commute. Since a lot of the citizens in Grandview are dependent on walking and public transit services, creating a walkable community and having retail services within walking distance is a primary need for the city (MARC, 2016). “Main Street improvements have emphasized walkability and the right-sizing of streets using complete street and road diet concepts” (MARC, 2016). The city has a goal of driving retail revitalization, more than $375 million have been invested in major projects over the past three years, and the investments have led to more jobs and nearby services for the people of Grandview (MARC, 2016). “The improvements themselves have emphasized low-impact construction, including landscape designs that use native plant species to handle storm water sensibly, narrow and reduced lanes, along with wide, comfortable sidewalks have created a new street that is pedestrian-friendly and environmentally responsible” (MARC, 2016).

“The Main Street Improvement project has kicked off the rejuvenation of Grandview and served as a catalyst for the revitalization of two shopping centers built in the 1950s and the development of the Gateway Sports Village” (MARC, 2016).

The city reports an increased number of businesses, sales tax receipts are up, and the population of the city as a whole has started to rise which is a first since 1980, (MARC, 2016).

7.2.5 Buenos Aires, Argentina

Argentina’s capital, a city of three million people, recently introduced two major bus rapid transit services within a former 20 lanes of traffic which use to commemorate the city’s love of cars (Valente, 2014). “City work crews ripped out four of those traffic lanes in the middle of the roadway, in just seven months, they gave the space entirely to buses and the people who ride them” (Valente, 2014). It has helped to unclog traffic and reduced travel times for just about everybody traveling through the area (Valente, 2014).

“Buses used to run on the narrow and busy downtown streets nearby, now those buses have been diverted to the exclusive lanes and the city has turned about 100 blocks of those once noisy and polluted roads into either fully pedestrianized streets or pedestrian-priority zones” (Valente, 2014). The community members celebrate that the busiest part of the city is thus becoming a pleasant place to go for a walk, and how early in the morning, it is possible to hear birds singing and the patter of footsteps on pavement (Valente, 2014).
“To add to the ambiance at night, iconic buildings within the area were lit up with energy-saving LED lamps. This is all part of an effort to get people to move downtown, close to their workplace. The idea is to add value to the area, create a more active nightlife and variety of tourist attractions. On the new pedestrianized streets, restaurants and bars have put up tables on the sidewalks and night-time activity has greatly increased” (Valente, 2014).

7.2.6 Suwon, South Korea
Suwon, a city south of Seoul in South Korea, organized a festival that lasted for a month to help residents imagine what a car-free environment might feel like (Schiller, 2014). This activity was to show that basic needs can be achieved without dependency on private vehicles.
Over four thousand community members had to go on a car free diet for one month - making their daily commute, shopping trips, and visit to leisure activities by foot, cycling, light electric vehicle or public transit. This experience changed the mindset of the community members and they began providing recommendations for the city planning team (EcoMobility World Festival, 2013). “Moving forward, the festival demonstrated that moving away from car dependency is feasible, beneficial and can improve quality of life for the citizens of Suwon” (EcoMobility World Festival, 2013).
7.2.7 West Concord, Massachusetts

Within this city is a good example of a sustainable community development. The Concord Riverwalk development has 13 homes built in it with a general outdoor fireplace and garden (Now Communities, n.d.). This community has the parking spaces situated away from the homes and the entrance of each house is facing the common garden (Now Communities, n.d.). The Figures 20-21 tells the story better of how beautiful and relaxing a home can be. The designed plan is also attached as Figure 22 showing the full design of the community. “Parking is discretely located, and the neighborhood is a short walk to the train station and West Concord town center” (Now Communities, n.d.). The developers of the community describe it as “a pocket-neighborhood that celebrates the natural environment, fosters a sense of community, and encourages social interaction. It is thoughtfully built to be loved and enjoyed for generations. It is a place that nurtures the soul” (Now Communities, n.d.).
The community parking is discretely located on the other end of the community right opposite the reserved guest parking. Therefore, all community members have to walk in the park before entering their homes.
8.0 POLICY OPTIONS

There are a lot of plans and ongoing work being carried out by Oakville and Brampton to achieve sustainable development and reduce GHG emissions within both cities. Also, other cities in Ontario that were not discussed in this report have plans and ongoing work to achieve sustainable development, following the vision of the province. Based on the observed trends in this research, and taking a look at what other cities have achieved in their pursuit for a sustainable community, the following policy options have been identified suitable for the Brampton and Oakville cities.

8.1 Start with New Community Development Plans

It is important to effect changes on new plans to achieve gradual success. Changing existing facilities to fit sustainability can be very expensive, therefore, starting the changes with new plans becomes a cost effective option. Most of the cities have a policy or draft policy for sustainable development. There are certain criteria in the policy document that determines if it meets the minimum sustainability standard for the city. The municipalities can ensure that before a new development plan is approved, the developers must design the community such that it meets the minimum criterion.

We want to have at the very least complete street designs, compact development and sufficient transit options within walking distance from all homes. So, this should be included in all plans for new development before approval.

8.2 Fixed timeline and achievable goals

There is a lot that needs to be done to achieve sustainability. Figure 23 captures the major checkpoints for a fully sustainable community.

![Sustainable Development Goals](image)

*Figure 23 The Wide Range of Sustainable Development Goals
Source: (Wikipedia, 2015)*

Trying to achieve all at once leads to achieving none all together. It is important to select a particular goal that the city aims to achieve, with a feasible timeline. Phasing the plans and following through also
improves success. Once the first goal is achieved, the success can be monitored and be a driver for the next phase of the sustainable plan within the city. A pilot project could be to convert some of the less busy streets into complete streets, reducing the car lanes and creating clearly demarcated cycling lanes and expanded pedestrian paths. Most of these streets have bus schedules that are thirty to forty minutes apart, the time between the schedules can be reduced to fifteen to twenty minutes apart. Based on how successful these are, the plans can then be expanded to other busy streets.

8.3 Develop a dedicated team for all sustainability developments
It is important to have a dedicated team working with all the necessary departments to achieve sustainability. The issue of sustainable development cuts across several departments within the Municipal or City Government. These departments are busy with several daily activities that involve the community members and their needs. Without a dedicated team to focus on the sustainability aspect of developments, it runs the risk of being put in the back of the priority list for the city.

8.4 Complete street design implementation on street renovation/reconstruction
Most streets within the residential and commercial areas of a city should have dedicated bicycle lanes which are demarcated with safety barriers or pedestrian way to ensure safety of bicycle riders. The highways and some industrial streets may not require cycling lanes, but a cycling path network that connects commuters to their destination is necessary. With the annual road maintenance construction, bicycle lanes with barriers can be added to the streets undergoing maintenance construction. A great example of a complete street with such accommodations is Queens Quay in downtown Toronto. Figures 24 and 25 show the before and after image of the street.

![Figure 24 Queens Quay before complete street design](Source: TCAT, 2017)
![Figure 25 Queens Quay after complete street design](Source: TCAT, 2017)

This is a beautiful transformation creating wider pedestrian path, dedicated cycling lane, street car lane, and one lane each for the different direction of traffic as against the previous 3 lanes per direction of traffic.
The design could be as simple as that of Brealey Drive in Peterborough. The cycling lane clearly demarcated from the vehicle lane and the pedestrian path.
8.5 Incentives and tax credits for Electric Vehicle (EV)/hybrid vehicle users

Ontario as a province is very large in land mass and so is the GTA. Commute from and to certain parts of the city do not have direct transit options, so most commuters who can afford cars will always choose to use private cars for their commute. The city can also provide some attractive incentives and tax credits to their community members who invest in EVs or hybrid vehicles. A research in the United States showed that a combination of incentives is the driver for increased use of EV vehicles. Figure 28 shows the EV share per state compared to the mixture of incentives, and it is noticed that a few states with only subsidies as incentives do not have very positive results. (Searle, 2015)
Norway has the most successful market for Electric vehicles, this is due to the policies the government put in place to support it. Policies like free public charging stations, toll free roads, HOV and bus lanes usage and majorly tax-free system for EV’s as compared to the high taxes for conventional vehicles. (The Nordic Page Norway, 2015)

8.6 Educating the Public
Education plays a major role in changing the mindset and affecting the lifestyle of people. Vauban Freiburg community in Germany is filled with sustainability and environmental workers, hence the success. The city of Suwon in South Korea experienced a total change in the mindset of their community members on the use of private cars, after the one-month car free experience. These two cities have experienced great success from education, it will be beneficial for Ontario government to try increasing the education on sustainable development and living. This may result in a community willing to embrace the policies for developing sustainable communities.

This education can be done in different ways - most people do not have the time to gather at a town hall meeting for sustainability education. For example, on the 400 series highways in Ontario, there are electronic highway signs displaying; updates on traffic ahead, duration to get to some exits, and sometimes on weekends impaired driving warnings. Those highway signs can also display messages such as; “Tired of traffic? Use the transit system, ride a bicycle, or just take a walk”, “Carpooling can help the environment”, “Ride a bike, save our planet”. Companies could also play a part in this by setting up transit and cycling contests for their employees. They can also declare some weeks or months “No driving Week/Month”. These are different ways we can engage the public and educate people on the benefits of sustainable living.

8.7 Improving the Public Transit System
The transit system needs to be improved. Certain routes require express buses to reduce the transit time for commuters. Cities in Ontario can also introduce a campaign whereby for certain days of the week, transit is free. It could be every Tuesday for one month or a week of free transit. This will be a way to increase transit users and get people off their personal cars.

The density within a region affects the transit options within that region; hence it is necessary to have compact development within the city so as to improve the transit system.
9.0 POLICY RECOMMENDATION

- Ontario cities can start with converting the less busy streets into complete streets, and based on the success, form a cycling network that transport commuters to their destinations. All new developments within the cities need to meet the compact development standards; this will aid the transit planning and upgrades within the Ontario cities.
- Cycling lanes should be constructed such that the pedestrian ways are between the cycling lane and the motor ways. This will provide more security to bike riders and reduce the risks of bike and vehicle accidents.
- Express public transit routes need to be developed for certain areas.
- The use of personal cars will not be going away, since the province has a very large land mass, and commute through the city is most times faster with private cars. Investments into infrastructures for electric vehicles need to be accelerated within the city.
- Education and training on the benefits of sustainable developments and how to achieve sustainable living should be invested in by the province (MTO). Also, companies have an important role to play in educating their staff and encouraging sustainable life styles e.g. active transportation.

10.0 CONCLUSION

Most of the cities around the world that have engaged in initiatives for sustainable development have success stories in one aspect or the other of their projects. Ontario is doing a lot to achieve sustainable development, and so are most of the cities within the province. (TCAT, 2017) (Ontario Ministry of Transportation, 2013) There is need for cities like Brampton and Oakville to focus on the particular goal they want to achieve within a specific timeframe. It is also necessary to monitor and document the success achieved after implementing a sustainable development initiative. For example, the transportation habits of the community members should be monitored, change in transportation means and lifestyles need to be documented, and increase in business revenue within the community need to be documented as well. This will make accounting for progress easier and encourage the continuity in sustainable development practices.

Compact development affects transit planning within the cities, so it is also important for the cities to follow through with the compact development plans to help sustain their public transit route options. Ontario cities like Oakville and Brampton, can ensure that New development proposals meet the compact development requirement before approval.

Sustainable development improves the life expectations of the community members, saves money for the government on health care, increases revenue within the community and also reduces GHG emissions. The province of Ontario can become one of the known sustainable communities with spectacular success stories, by implementing most of the findings from several sustainable development research and reports.
11.0 REFERENCES


