

TAC Sustainable Urban Transportation Award

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Overview of Hamilton's Bike Share Program

The City of Hamilton, in partnership with Hamilton Bike Share and Social Bicycles Inc., implemented a bike share program in 2015. The new system utilizes smart-bike technology developed by Social Bicycles Inc., and the innovative design gives users greater flexibility compared to traditional dock-based systems.

The full fleet of 750 bikes and 116 hubs, spanning over 30 square kilometers, was deployed in spring 2015 for the official launch of the program. Uptake has been very successful and as of December 2015 there are over 7,300 regular users and a total of 9,300 individuals have used the system at least once. Members have traveled over 445,000 kilometers during the first year of operation, taking 215,000 trips.

Program goals include reducing single occupant vehicle use, decreasing greenhouse gas emissions, improving air quality and increasing physical activity, connecting to public transit, increasing transit use and providing opportunities for residents and visitors to connect to the urban and natural environments. In a recent survey, SoBi riders reported that since the system launched they are driving less, replacing motor vehicle trips with bike share trips, and often utilizing bike share to connect with transit. Over 55% of users indicated that before using bike share they cycled once a month or less, which means that most bike share users are not regular cyclists. Therefore, bike share is achieving transportation demand management goals of reducing single occupant vehicle trips and increasing active modes of transportation, in order to achieve Transportation Master Plan goals and metrics.

Contributions to the Development and Enhancement of Sustainable Urban Transportation

Hamilton's bike share program has made a significant contribution to the development and enhancement of sustainable urban transportation. The service area is centered on Hamilton's urban core, serving numerous neighbourhoods, business improvement areas (BIAs) and tourist destinations. Many of the stations are located within areas identified by Hamilton's Neighbourhood Action Strategy, a program aimed at improving the lives of residents in low-income areas. Through the incorporation of social, economic and

environmental component, Hamilton's bike share program addresses the *Centre for Sustainable Transportation's* definition of a sustainable urban transportation system.

Social Considerations

Hamilton's bike share program helps to meet the basic need of convenient, reliable and affordable transportation within the community. The system, which is centered on Hamilton's urban core, provides regularly spaced and highly visible stations. Station locations were based on input from the community. Further, the system technology that was selected allows users to lock bikes anywhere within the service area, not just at stations, providing a level of convenience that other forms of transportation do not offer. The system is very reliable, and the operator provides an exceptional level of service that enables users with questions or issues to receive assistance quickly. The system is available 24 hours a day, 365 days of the year.

Another important social component of this program is the benefit to human health. Cycling is an excellent form of exercise and stress relief. It facilitates social interactions and improves community participation levels by enlarging residents' "lifestyle radius" and removing lack of transportation as a barrier to engagement.

Equality between users is another important component of this program. The program has partnered with an external funding partner to provide subsidized memberships to residents of Hamilton who cannot afford the membership fees, but who would benefit most from the program. This initiative is described in more detail in the following sections.

Economic Considerations

Hamilton's bike share program provides a very affordable mode of public transportation. Compared to the cost of traveling by bus, taxi, or single occupancy vehicle, the cost of a year-long membership is far less expensive (\$85). McMaster University students, and a host of local employers, also have access to a discounted rate. Compared to other bike share systems in North America, this is one of the most affordable systems. Further, SoBi Hamilton actively works with community partners to offer subsidized memberships to people with low incomes.

This system operates very efficiently. Hamilton Bike Share, the local operator, is a non-profit organization with nine staff members. They work closely with the City of Hamilton, who owns the bikes and stations.

This program also indirectly benefits the local economy. Studies have indicated that bike share stations can improve nearby property values¹. Convenient and affordable access to transportation through Hamilton's bike share program is also expected to improve access to local businesses, and ultimately stimulate the local economy.

Environmental Considerations

There are several positive environmental impacts associated with Hamilton's bike share program. Program goals include reducing single occupant vehicle use, decreasing greenhouse gas emissions and improving air quality. Survey results of bike share members indicate that 30% of their bike share trips replace auto-related trips. This system provides a transportation option that is accessible to the community and does not consume non-renewable resources nor emit greenhouse gasses. There are no by-products of using the system aside from regular maintained repairs which are minor compared to those associated with motor vehicles. Once the bicycles reach the end of their life, metal components will be recycled and electronic components will be recycled as e-waste. The bicycles and replacement parts are modular and are designed to be swapped out rather than replacing the entire bike..

Innovation

Technical Innovation

The City of Hamilton's bike share program is the fourth bike share program in Canada, following Toronto and Montreal. Of these systems, it is the first "Smart Bike" system and the largest Smart Bike system in North America. The "Internet of Things" is a term used to describe the ever growing connectedness of everyday physical objects or "*things*" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. Hamilton's bike share system uses Social Bicycles' technology which is the first to employ the Internet of Things philosophy to bike share, establishing what is known as the "Smart Bike". This allows Hamilton Bike Share to collect important data that other systems cannot collect including the path that individual bikes travel from origin to destination - giving planners the ability to match infrastructure such as bike lanes and bike parking infrastructure, to areas where citizens are most frequently travelling. The system also allows members to park bikes anywhere in the City and not just at stations, reserve bikes before they are going to use them, sign out bikes by tapping them with a "Smart Card", and prevent theft. The stations are not powered or smart and do not require kiosks, so any bike rack can become a bike share station. For

¹ El-Geneidy, A. van Lierop, D., & Wasfi, R. (accepted). Do people value bicycle sharing? A multilevel longitudinal analysis capturing the impact of bicycle sharing on residential sales in Montreal, Canada. Transport Policy.

major events, or “pedestrian predominant” areas, whole parks, streets or other public spaces can become bike share stations.

Process Innovation

The involvement of community stakeholders and residents in the station location decision making process is an example of process innovation. Using a web-based and smart phone application-based tool called Social Cyclist, users can suggest where they want a station to be located and vote for stations other users suggest. The system also allows users to leave comments for stations and precisely geolocate them. This on-line crowdsourcing tool was replicated “off-line” by placing 11 paper maps in various locations in the bike share service area where citizens could use stickers to suggest bike share locations. A month-long campaign period used email, social media, traditional media, social networks, community groups and workshops to promote the station crowdsourcing and engaged 3,000 residents who placed 500 votes for stations.

SoBi Hamilton also uses innovative incentive strategies to assist with communications, marketing and operations. For example, the design of the bikes allows users to securely lock bikes to racks that are not established stations for user convenience. While this does incur an additional fee of \$1, users receive a 10 minute riding credit each time they pick up a bike that was parked out of station and return the bike to a station. SoBi Hamilton also uses incentives to promote the program. For example, on Bike to Work Day (May 25, 2015), members who rode a SoBi to the main event in downtown Hamilton automatically received a \$10 riding credit.

Everyone Rides Initiative

Through the Everyone Rides Initiative, SoBi Hamilton actively works with community partners to offer subsidized memberships to people with low incomes. This will be the first bike share system in Canada to provide a discounted pass program for low-income residents. Further, while most bike share systems only operate in high-density urban cores in order to maximize profits, the Everyone Rides Initiative is working to extend the service area into lower-density residential neighbourhoods in order to better serve residents of Hamilton who may not be able to afford access to transportation due to socio-economic factors.

Transferability of the Approach, Outcomes and Findings of Hamilton’s Bike Share System

Hamilton bike share is an excellent example of a program that is both transferable and scalable, and it certainly has the potential to be used as a model for other communities in Canada and North America.

Approach

Based on the nature of the technology that was selected for this system, the size of the system is completely scalable and as such, the same technology has been used for systems as small as 50 bikes, to as large as 750 bikes. Hamilton is currently the **largest system** using this technology. This type of system is ideal for medium-sized cities, such as Hamilton. Based on population alone, Hamilton is the fifth largest municipality in Ontario, and the tenth largest municipality in Canada. There are many medium-sized municipalities that would be ideal candidates for similar bike share programs, and best practices and lessons learned from Hamilton could be used to help guide the development of such programs.

In terms of scalability, the design chosen for the Hamilton bike share system is highly flexible. Stations, which consist of a minimum of five docks, are relatively easy to reposition and change in size (increase or decrease the number of docks) and move, as they are completely modular unlike other bike share systems, and they do not require power or bolting to the ground. In traditional systems, the stations are “smart” and the bikes are “dumb” - the kiosks and docks are powered and handle the communications. In a Smart Bike system like SoBi Hamilton, the stations are well branded bike racks, and the bikes have all the communication technology and a GPS on board.

This has proven to be highly beneficial in the first year of operation because it has allowed for SoBi Hamilton to tweak station locations and sizes based on observed user trends. The flexibility of this system also allows communities differing in population and density to execute successful systems. Furthermore, the GPS-enabled bikes are the first in North America to show exactly what paths users take to get to their destination. This allows City Planners to better develop infrastructure that meets community needs.

Outcomes and Findings

SoBi Hamilton has been very willing to share data and best practices with other system operators, interested municipalities and the general public. As such, this program will continue to support the development of similar programs in other cities across North America. This “open data” approach combined with light and portable infrastructure allows the system to employ crowdsourcing techniques to truly make the bike share system a public resource developed for and by the citizen.

Activities Meriting Added Value

The nature of the system's "Smart Bike" technology allows for a substantial amount of information to be collected and analysed including demographics, routes and more. There is significant added value in this functionality, and collected data will be used to help inform planners and decision makers to make better informed decisions about active transportation infrastructure within Hamilton.

Further, there are many expected indirect benefits of this program. Benefits include increased return on investment, decreased pressure on Hamilton's road networks, a stimulus for the local economy, improved access to jobs and job retention, improved public health, improvements to public safety through the provision of cycle training and education, increased opportunities for members to access community services and community engagement, community revitalization, and overall improvements to the quality of life within the Hamilton community.

Bike Share, as a first-last mile connector to transit, has coordinated stations with Hamilton's B-Line and A-Line transit routes. It is also "Rapid Ready" and will feed the Light Rail Transit system currently being designed. Thirty percent (30%) of SoBi members report using bike share to ride to transit. This is very significant, especially with the construction of two new GO Transit stations in Hamilton. Bike share is a form of on-demand transit and, just like taxis and uber, it represents an important multi-modal connector to transit.

Summary of Performance in the First Year of Operation

Overall, the first year of operation for Hamilton's Bike Share program has been a huge success. Uptake has been very successful and as of December 2015 there are over 7,300 regular users and over 9,000 individuals have used the system at least once. Members have traveled over 445,000 kilometers during the first year of operation, taking 218,000 trips. A recent user survey indicated that approximately 30% of trips made by SoBi bicycles would have been made by motor vehicle had the system not been available. Based on this information, we estimate that nearly 110,000 vehicle kilometers traveled have been avoided since the launch of the system. As the user base continues to grow in future years, it is expected that this will continue to increase on an annual basis.

Looking forward, there are many exciting opportunities on the horizon for SoBi in the next year. SoBi is currently exploring the possibility of expanding into a lower density residential area to better serve Hamilton's Neighbourhood Action Strategy priority areas. More training and education opportunities will be available to members in the coming year, as well as more group rides.

Appendix A: Ridership Data

Table 1 (below) highlights key usage statistics from Hamilton bike share's first year of operation. Please note that between January 2015 and March 20, 2015 the system was not fully operational; the full system launch took place on March 20.

Table 1. Summary of usage statistics from the first year of operation.

Hamilton Bike Share 2015 Usage Summary	
Unique users	9,097
Active users	7,377
Number of trips taken	218,628
Number of kilometers traveled (km)	445,922
Vehicle kilometers traveled (VKT) avoided* (km)	108,804

*VKT calculated based on results from the SoBi rider survey (see below).

Key findings from SoBi Rider Survey

In September 2015, all SoBi members were asked to participate in a rider survey. In total, over 590 members responded. Key findings included:

- Before using SoBi, 51% of users rode once per month or less.
- Since subscribing to SoBi, 73% of respondents reported an increase in the amount of cycling they do.
- Travelling by car is the primary mode of transportation for 43% of respondents.
- Since subscribing to SoBi, over one-third (35%) of respondents reported that the amount of driving they do has decreased.
- 24.4% of respondents would have made the trip in a vehicle rather than active transportation had they had not used SoBi to make their most recent SoBi trip.
- Approximately 32% of respondents reported connecting to the HSR bus and/or GO Transit.

Appendix B: Supporting Images and Photos

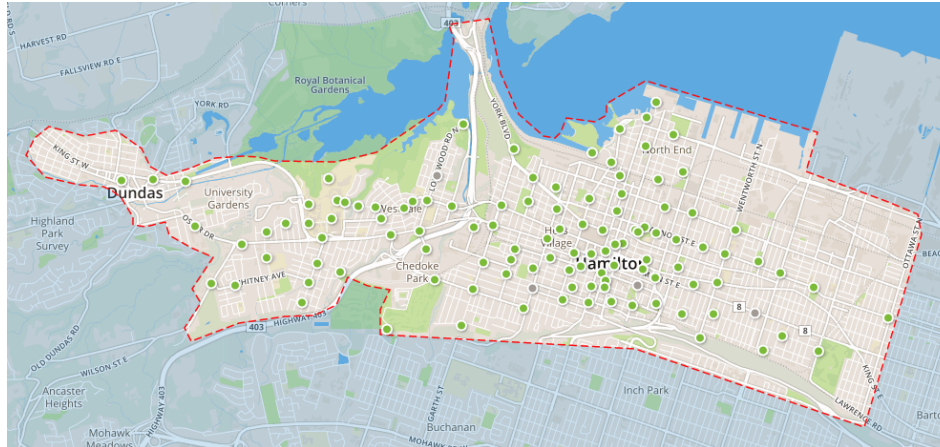


Figure 1: Hamilton bike share service area and stations (green and grey dots) as of February 2016.

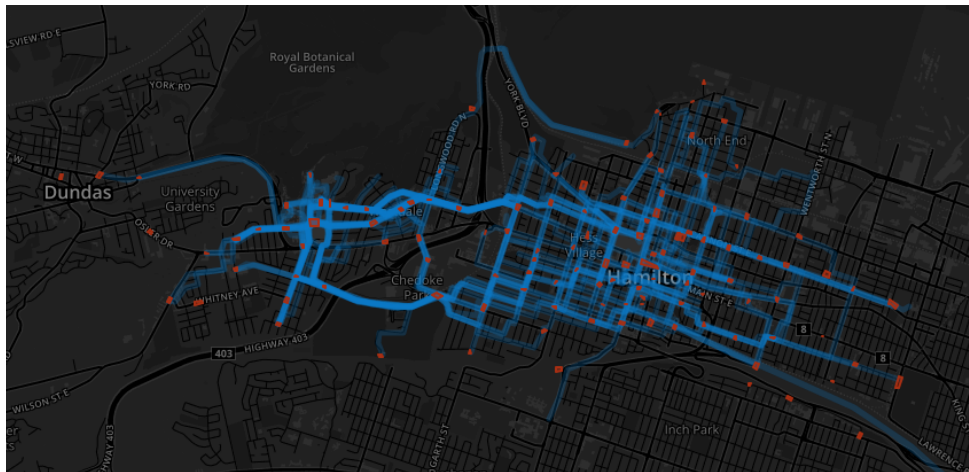


Figure 2: Heat map of bike share trips made on the morning of October 21, 2015.



Figure 3: Photo from the launch of Hamilton's bike share program (March 21, 2015).

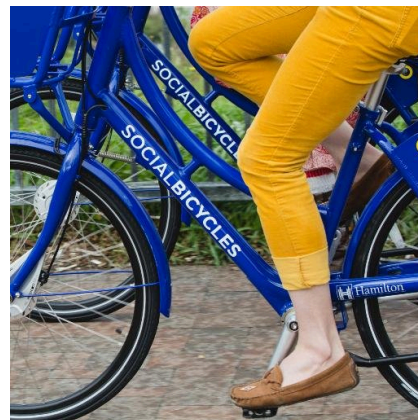


Figure 4: Hamilton bike share promotional photo.