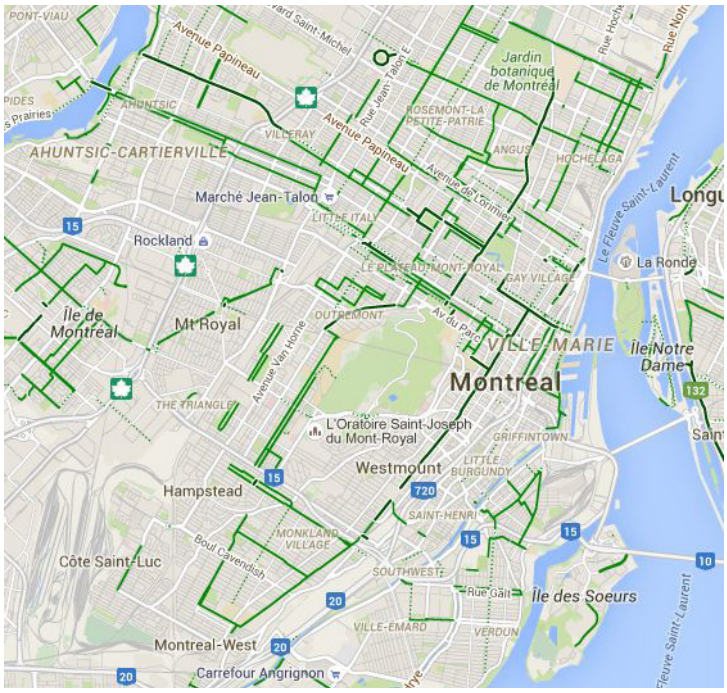
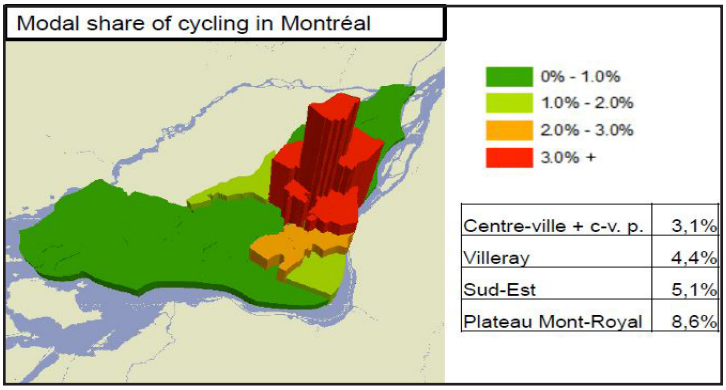
Developing an integrated cycling network in Montreal

Dear Mayor Denis Coderre,



Although Montreal likes to tout itself as a world-class cycling city, the fact is that **only about 2.4%**[1] of commuters in the city rely on bicycles. This number is not impressive, as other places in North America have much higher cycling mode shares, such as **Minneapolis (3.5%)**[2], **Vancouver (3.8%)** and **San Francisco (3.8%)**[3]. Major improvements need to be made if Montreal is to compete with other cycling capitals.

A major issue is the **uneven distribution** of cycling infrastructure across the city. The map[4] on the right shows dedicated bike lanes across the city. It is evident that some boroughs (like the Plateau) have lots of bike lanes, whereas others have none. The connections between boroughs on the bike network is very fragmented.



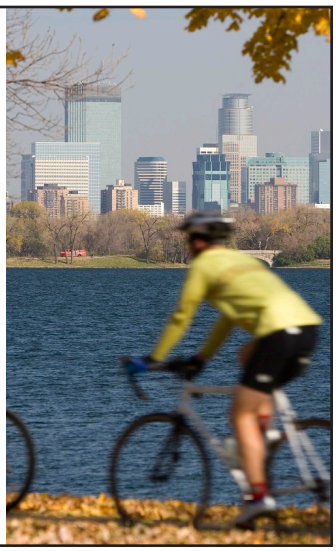
The result of this system is an uneven distribution of infrastructure, and thus an **uneven cycling mode share** across the city. The figure[5] on the left shows the boroughs with the highest cycling mode shares happen to correspond to places that have the most bike lanes. In order to increase mode share across the city, **a network needs to be created** with new infrastructure extending to places that are not well served by the existing system.

Current Policies

The 2008 Montreal Transport Plan[6] included a program to **double the number of bike lanes** in Montreal, from 400km to 800km, but many of the proposed paths are recreational trails along the river. There is **no consideration given** on how to integrate existing bike infrastructure with the new planned infrastructure, or how to better connect different boroughs.

Network Development

The City of Minneapolis also had a very fragmented cycling network. The City adopted aggressive policies in their bicycle plan[7] aimed at identifying and filling in the gaps in the network. Today, Minneapolis the one of the best cycling cities in the U.S. with a higher mode share than Montreal[8].



Policy Recommendations

In order to create a cohesive cycling network and increase cycling mode share, Montreal must:

1. Define and identify gaps in the existing network
2. Connect the existing network to surrounding communities
3. Encourage more capital projects in boroughs near downtown that do not have high cycling mode share
4. Give priority to new infrastructure projects that make an effort to connect to the existing network

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Produced by Joshua Adams
McGill School of Urban Planning

November 13, 2015

Urban Montréal and the Case for Bicycle Arterials

Dear Mayor Coderre,

As you have expressed the desire for Montréal to become an internationally-recognized bicycle capital, it is of utmost importance to have a targeted strategy in order to achieve this goal.

MONTRÉAL - A CYCLING CITY: IN CONTEXT

With 680km of bicycle lanes and growing, the city is positioned ahead of the curb when placed next to its North American counterparts.

Montréal sees a 2.5% modal share for bicycle commuters, while many of the international leading cities see numbers in the 10% - 40% range.

However, between 2013 and 2015, the city dropped from its #11 spot to #20 on the Copenhagenize Index of Bicycle-Friendly Cities.

Positive strides forward include the city's recent suggested changes for the Québec Highway Safety Code that places higher priority for cyclists.

ISSUES MOVING FORWARD

Although the amount of bicycle infrastructure in the city is deemed to increase significantly in the coming years, few reliable and direct arterial cycling routes have been proposed or exist currently through the city. Despite attempts at building protected infrastructure, paths seemingly end in a disconnected pattern of isolated lines and cause cyclists to use roads with fast-moving traffic or choose not to cycle at all.

STRATEGY: DEVELOP A STRONG ARTERIAL NETWORK VISION & PLAN

Montréal bicycle planning must focus on retaining and encouraging as many citizens to become commuting cyclists in order to see real modal share increases. Attention should be placed not on the kilometers of bicycle lanes and shared streets implemented, but on the strength of the network.

ARTERIAL ROUTES must be the backbone of a reliable and highly used urban bicycle network, to ensure commuters can travel as directly and efficiently through the city as possible. The city of Copenhagen has ensured that a high number of main boulevards in the urban centre have dedicated bicycle infrastructure in both directions, allowing cyclists ease of use and route choice.

GRADE PRIORITY should be given to more vulnerable modes of transport along these arterial corridors. Sidewalks, cycle tracks and road surface should each be curb-separated and placed at their own grade to allow each individual mode their own priority space without the need for bulky concrete medians.

ORGANIZED INTERSECTIONS are vital for connecting arteries while maintaining safety and fluidity between all modes of transport. Independent sets of well-timed lights for motorists, cyclists and pedestrians, as well as priority design (ie. 5 meter stop-lines & crosswalks) for vulnerable road users ensure safe and efficient passage for all.

INCREMENTAL CHANGES can and should be made to especially dangerous routes in the short-term through simple, low-intensive and effective redesigns. High-use lanes on roads such as Saint-Urbain Street, which place cyclists in the precarious position between fast-moving traffic and parked vehicles, can be easily repositioned to the far-right edge of the road, freeing cyclists from the danger of being between motorists.

YEAR-LONG MAINTENANCE has achieved an 80% retention of bicycle commuters in Copenhagen throughout the cold, snowy winter months. Priority cleaning and snow removal of the arterial routes in the winter increases reliability of the network and citizens' ability to become year-long bicycle commuters. The Netherlands has even discussed the possibility of implementing subterranean pipes for cycle tracks to combat frost.

POLICY RECOMMENDATION:
FINANCIALLY REWARD PEOPLE WHO CYCLE TO SUBURBAN TRANSIT STATIONS

Submitted by: Lindsay Vanstone, McGill University, School of Urban Planning
November 13, 2015

Dear Mayor Corderre,

Thank you for your efforts to increase cycling and to make Montreal a world-class cycling city.

Current Cycling Policies and Actions

Montreal has paid attention to cycling conditions in the central city and has provided opportunities for cycling for transportation by implementing and supporting Bixi. However, to greatly increase cycle mode share, cycling policies need to also target populations that do not already bike for transportation. In most cities, including Montreal, actions to increase cycling mode share have included both push factors, like parking fees and gas taxes, and pull factors, like improving bike facilities and allowing bikes on transit.

However, these have had limited impact on cycling mode share. Monetary rewards to encourage a shift to cycling have yet to be greatly explored.

Precedent for Financially Incentivizing Cycling

In 2014, certain cities in France piloted a monetary reward program where employees were paid for each kilometre they cycled to work.[1] After this 6-month pilot project, 219 participants continued to cycle to work, more than doubling the cycling mode share in the sample of 10160.

Policy Recommendation for Montreal

Using a financial reward system to incentivize cycling, I urge you to please consider applying a discount on the next month's transit passes for people who cycle to metro and commuter rail stations from suburban communities. This would be an action that no city has done before, which would further Montreal's place as an innovative cycling city.

Why are Montreal's suburban areas good to target?

- Suburban areas have commuter rail and metro stations, but limited feeder bus service, both making transit less appealing and driving to the rail station common
- Usually a long (around 30 minutes) walk to reach transit stations; cycling would greatly reduce this time
- Residents largely do not already consider cycling a transportation option to reach the stations; this would be an incentive to try it
- Less traffic in suburban communities makes it feel safer to bicycle
- Wider streets mean more space to introduce bike lanes

How might it work?

- Each time a person cycles to a station, they get a discount for the next month's transit pass
- The discount increases the more a person cycles and can be applied as a credit to their OPUS card when they tap it at a secured bike parking station

Costs

- Initial costs to install bike parking facilities and discounting system
- Concurrent improvements in cycling infrastructure at major intersection to access the stations
- Discounts for next month transit pass

Expected Benefits

- Short and long term changes in cycling behaviour and increase cycling mode share
- Lessen demand and need for car parking at stations
- Increased public transit use due to more 1.
- Montreal recognized as an innovative cycling city by targeting suburban populations

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Charlie Teisseire 260520888
Policy Brief 2: Prof. Elgeneidy, URBP 504

Making Biking More Efficient: Reducing Necessary Stops

Dear Montreal Mayor Denis Coderre,

Stopping on a bike is inefficient: it is tiresome and time consuming, especially when done numerous times. Unfortunately, Montreal bike lanes have numerous stop signs or traffic signals that force bicyclists to make frequent, inefficient stops. Some of these stop signs are located at intersections where the crossing street is small, and without a bike lane.

Many other cities have recognized that reducing the number of stops a cyclist has to make on his or her journey is an effective way of improving the active commute experience by reducing the time traveled, as well as the effort required to get from point A to point B. Copenhagen for example, has implemented the "green wave" on certain corridors: when bikers travel at 20 km/h, they will hit a green traffic signal at every intersection, greatly reducing the number of stops the cyclist has to make. Copenhagen continues to expand its green wave corridors, as some corridors have seen an increase in patronage of up to 15% since the green wave implementation (Andersen, 2014).

Other solutions to reduce the number of stops a cyclist has to make can be made in regards to traffic laws: the Idaho stop, for example, allows cyclists to treat stop signs as a yields, to cross red traffic signals after making a complete stop, and to make yielding right turns at red traffic signals. The Idaho stop therefore allows to reduce the number of stops a bicyclist has to make. Since its introduction in 1982, the law change in Idaho has not been faced with controversy, and has even led to a 14.5% decrease in bike injuries in the year following implementation (Meggs, 2010).

Lastly, research shows that increasing safety facilities at intersections does not improve the perceived safety of cyclists. Research claims that this may be because added safety features at intersections may make the cyclist feel the intersection is risky, when it may otherwise have been seen as unthreatening (Parkin et al., 2007).

Taking these points in Mind, I would recommend the city of Montreal to:

- Eliminate unnecessary stop signs, especially at intersections where the crossing street has less traffic flow, and no bike lane. Speed bumps and other traffic calming tools could be used to mitigate the possible increase in speeding from auto traffic.
- Time traffic signals on bike corridors to allow for the reduction of stops when travelling at a cyclists pace
- Introduce the Idaho stop laws. Some dangerous intersections could be exempt from this by including signage stating all users must stop.
- Increase visibility of bike corridors at intersections by painting markings, and installing signs for car drivers to be aware they are crossing a bike corridor
- The corridors with less stops could be rebranded as "express" or "commuter", much like the frequent STM bus lines have their own branding.

These improvements would greatly improve the biking experience in Montreal, and have the capacity to reduce travel times as well. Furthermore, these implementations are low-cost, and low-risk as well as completely reversible.

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Policy Brief: Making Montréal a better and safer bicycling city

To: The Major of Montréal.

Improved infrastructure, programs, and policies that support bicycling can significantly increase levels of bicycling for daily travel, but the effectiveness of specific strategies or particular kinds of bicycle infrastructure cannot always be easily generalized, or the effect of each measure isolated. To be able to reach a diverse group of possible future bicyclists, a diverse range of initiatives ranging from the spheres of urban measures, behavioral change and cycling economy must be undertaken. Countries and cities with high levels of bicycling have extensive infrastructure, as well as policies and programs conducive to bicycle use.[1] Evidence from various studies suggests that a comprehensive approach has a greater impact on bicycling than individual measures that are not coordinated. Combining measures in the three spheres of urban, behavioral change and economic policies may be more effective than extensive investment in measures from one sphere alone, as currently occurs with infrastructure in many cities.

Programs that promote bicycling may help increase the effectiveness of investments in bicycle facilities.[2] Studies have reported long-term increases in bicycling following initiatives like “bike-to-work days” and “Safe routes to school” programs, and collective, community based interventions have proved more effective than attempts to modify individual behavior.[3][4] Lower speed limits for vehicles make bicycling safer and more attractive, and have been found to lead to a significant increase in bicycling. While the city of Montréal should continue developing the city´s bicycle network and infrastructure, it should not neglect the importance of behavioral aspects and economic measures in increasing bicycle use. It is important to implement a fully integrated combination and coordination of all factors, for the best possible outcome.

Possible policy measures to undertake:

- Investments in infrastructure should be supported by promotional and educational programs that facilitate bicycling, such as bike-to-work days, bicycle training and Safe Routes to School programs. including bike sharing systems and those that accommodate bicycles on buses and trains. Poor pavement quality and insufficient bike parking can be an obstacle to people choosing to bike.

- Urban measures are important and can directly affect cyclists. Speed has been called the “hidden infrastructure”, and roads are safest when speeds are under 30 km/hr.[5][6] Lowering travel speeds for cars will make the streets a safer and more pleasant place for cyclists. Policies that make driving more expensive (such as higher gasoline taxes and parking fees) and less convenient (such as less parking availability) can augment the effectiveness of bicycle infrastructure investments, and should be used to encourage more bicycling.

- To increase cycling opportunities, the city´s network of safe and comfortable bike routes should be extended by using a mix of bike lanes, cycle tracks, and bike paths that connect residents to an array potential destinations.[7] Development of infrastructure that maximizes the separation between bicyclists and motor vehicles should be a priority, without making bicyclists travel too far out of their way. Increased security will encourage new bicyclists further than on-street pavement markings.

- Integrating bicycling with public transportation increases the viability of each. Bike racks on buses and good bike parking at rail stations increase both bicycling and transit use.[8]

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Michael O'Neill / McGill School of Urban Planning - URPB 504 / 13 November, 2015

Policy Brief: 4 Approaches to Increase Cycling in Montréal's Suburbs

Context

If Montréal is serious about improving its standing among the world's best cycling cities, it must increase its cycling mode share significantly from the current 2.2%[i] to levels closer to those in cities like Boulder, CO (8.8%) or more ambitiously, Copenhagen, DK (36%)[ii]. The suburbs must be part of achieving this goal.

Employment and population in the region is increasingly decentralised. Just under ½ of the region's population lives off the island and 86% of jobs are located outside of the core[iii]. Efforts must be made to increase cycling in these areas, and not only to improve overall mode share. Investments in suburban cycling will improve transportation options for suburban residents and workers and offer benefits to cyclists in central Montréal by reducing the number of commuters who enter the core by car.

This brief recommends specific actions grouped into 4 themes to increase suburban cycling. Given the topic, many of these measures will require regional cooperation.

1: Integrate cycling with public transit

Making first and last mile connections easier to complete by bike will reduce the number of people driving to access transit and increase transit use[iv]. It also expands the catchment area of stops compared to pedestrian accessibility, and can reduce loads on transit in the centre and demand for expensive feeder routes. Schemes which allow people to travel on transit with their bikes are also popular[v]. This approach is important to encourage people travelling long distances to use bikes for a portion of their trip.

a) Provide bicycle parking at stations and stops. Covered parking is more desirable.
b) Connect transit nodes to surrounding neighbourhoods by clear bike routes.
c) Allow bicycles on trains and buses whenever possible, including during peak hours. Install bike racks on buses.
d) Expand Bixi to areas around major suburban transit nodes.

2: Build better links

To encourage cycling within suburbs and to central Montréal, the suburban network will need to be expanded and improved. Links should focus on improving safety, comfort, and travel speed[vi].

a) Build bicycle "highways" between major destinations. Routes should be direct, physically separate from vehicles and pedestrians, paved, well-lit, signed, given priority at intersections, and maintained year round[vii].
b) Improve existing bridges and create new links. As the majority of existing bridges are designed for automobiles and can create significant detours for cyclists, consider improved ferry service for commuters. Integrate high-quality bike infrastructure into future bridge projects.

3: Embrace non-traditional technology

To attract new suburban cyclists and expand the range of options available to existing cyclists, E-Bikes and folding bikes should be promoted. E-bikes make it easier for those with limited mobility to cycle, and extend the distance people and frequency people are willing to bike and the terrain they will bike on[viii]. Folding bikes makes the integration of cycling and transit trips easier, as specialised facilities are not necessary to bring your bike along.

a) Use marketing strategies to promote the use of folding and E-bikes
b) Offer a subsidy for E-bike purchase, like that existing for electric cars.
c) Work with the province to mandate manufacturer speed limits for E-bikes
d) Ensure bike infrastructure design standards accommodate the use of E-bikes

4: Seize the opportunity

Physical interventions are important, but so is the timing of implementation. Montréal should view the traffic problems caused by major infrastructure works in a positive light, as they offer the opportunity to shift people out of vehicles and onto bikes. In Antwerp, major construction was used as an impetus to make improvements to the cycling network, which was followed by an increase in cycling[ix].

a) Use major works expected to cause congestion, like the Turcot Interchange project, to push improvements to Montréal's cycling network.

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Jack Neal
260517592

Planning for Two Wheels

Decreasing Dependency & Stimulating Self-Sufficiency Through Bikeability

Montreal: the 20th Best City

For every car in the world there are two bikes. And despite the average car trip in North America being a mere two miles, (a distance that can easily be achieved on a bike in just four minutes), **Montreal's bicycle share is just 2.4%** (Pucher & Buehler, 2005). While this is a great achievement—the highest percentage for cities in North America—it still trails Copenhagen (45%) and Amsterdam (38%), and has slipped a staggering 12 places since 2011 on the semi-annual list compiled by the Copenhagenize Index of bicycle-friendly cities worldwide (Copenhagenize.com). This policy brief will shed light on the important influences that made cities such as Copenhagen and Amsterdam so bicycle-friendly while highlighting Montreal's encouraging potential to follow in their footsteps in **reclaiming its position among the bicycle capitals of the world**.

Why

Bicycling is a crucial step towards making a number of shifts that Montreal and other North American cities at large will need to undertake in the coming years as they shift towards:

Buses, trains, and carpools produce less pollution and traffic, but lack the privacy and autonomy of the private vehicle—so they're not an attractive option. Increasing bike share is an important method for not only answering to the lack and unappealing aspect of public transport and reducing greenhouse gas (GHG) emissions (Pucher & Buehler, 2005); **bicycles are the most energy-efficient form of travel**—pound for pound—and offer bicyclists a total autonomous, enjoyable, and social way of getting around (Sorensen, 2007)—given the required infrastructure exists. **The largest and most obvious setback** to becoming a bicycle-focused city **is the car**, and despite popular belief, Amsterdam and Copenhagen were not always the bicycle-capitals they are now. In fact—

"It wasn't until the 1970s that Amsterdam reverted its streets to prioritize bicycling"

—following the death of 400 children from road collisions (van der Zee, 2015). Don't let Montreal get to that point: **Be proactive and begin the change now** before the city gets too caught up in maintaining it's status as a car's paradise—because as it stands, Montreal isn't even close to that either.

Amsterdam & Copenhagen (& Montreal)

These two cities have focused on two aspects for adapting their urban fabric for bicycles: Policies, and Infrastructure—combining to create a physically-bikeable city, in turn fostering sustainable, altered, and healthier human behavior with a focus on self-sufficient transportation. The following chart demonstrates policy and infrastructural measures introduced by Amsterdam and Copenhagen that are applicable to Montreal.

Mtl?	Policy	Infrastructure	Mtl?
✔	Road speed-reduction	Painted Bike Lanes	✔
✔	Idaho Stop	Increased bike parking	✔
✔	Increased fines (for car drivers hitting bikes)	Bike Traffic Lights (that favour them)	✔
✔	Using 10% of road budget on bikes	Plentiful Map Stations	✔
✔	Working with planners	Re-pave streets & lanes	✔
✔	Educational programs	**NO** shared bike lanes	✔

Further Recommendations:

- **Subsidize bikes** (either 100% or enough to incentivize people of **all social classes** to purchase)
- **Move car parking spaces** to outside the downtown core (near subway stops)
- **Create painted bike lanes** in the space left
- Get rid of one-way streets for bikes
- **Mandate bike racks** at every public space, office block, and leisure building
- Do **not** ban bikes from pedestrianized roads
- Borrow **traffic-calming measures** from Paris

Neither Copenhagen nor Amsterdam were bicycle capitals from the beginning; **they both made a switch to be bicycle-focused** through planning and policies during the 1970s. Since Montreal already has a strong lead in North America, **lets make the 2020's the new '70s** and build for a more sustainable, socially-interactive, and a truly accessible and safe Montreal. The proposed changes aren't huge, but the impact and much more enjoyable ways of life, will be—it's time.

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Cycling Priorities for Montreal

Perception • Connectivity • Reach

Eleanor M Mitchell November 13, 2015 McGill University

CYCLING: LEVERAGE POINTS

People want a transport mode that is reliable, advantageous, and gets them to the places they want to go.

To give cycling an advantage over other modes, cycling strategy must target its network connectivity, public perception, and extent of influence.

FOCUS 1: PERCEPTION

It has been shown that perception of cycling and of the cycling environment are crucial factors to ridership[1,2] and that actual safety is a function of ridership[3].

Recommended Actions:

1. **Visual marketing campaign throughout transit: Metro** station monitors, posters in stations, train and subway cars, buses, and bus shelters.
2. **Focus on positive images, rather than safety concerns**[4].
- Highlight health benefits, mobility, and enjoyment.
3. **Maximize comfort for timid riders**
- Separate bike paths with painted buffers, berms, concrete barriers, or 'floating' parking lanes[2,3].
- Use clear visual cues, such as painting bike lanes a solid color to further distinguish from general traffic[2].

FOCUS 2: CONNECTIVITY

To compete with other modes, the bicycle network must be reliable and utilitarian[1,2,5].

Recommended Actions:

1. **Connect network to major destinations** including transit hubs, business centers, and attractions.
2. **Keep routes short and free of obstructions by providing:**
- Short-cuts through long blocks, parks, campuses, and at dead-end streets
- Ramps alongside stairs-especially at overpasses and transit stations
- Reliable routes where closure for construction and large events will not be frequent.
- Routes which are continuous and easy to navigate

FOCUS 3: REACH

Although needs and perceptions vary across communities, the city can extend the benefits of cycling to all residents with appropriate outreach and distribution:[4,5,6].

Recommended Actions:

1. **Localize Outreach**
- Tailor campaign how cycling can benefit specific communities.
- Understand and address existing stigmas against cycling
2. **Distribute resources equitably**
- Identify areas which have the lowest quality cycling environments
- Ensure provision to underserved neighbourhoods
- Engage in local consultations to design infrastructure that meets neighbourhoods' needs

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CHARIS LOONG | MCGILL SCHOOL OF URBAN PLANNING

AN EXTENSIVE AND COHESIVE BICYCLE NETWORK

Dear Mayor Coderre,

In view of Montreal's goal of becoming a top-class cycling city, we respectfully urge you to consider the following policy recommendation of developing an **extensive and cohesive cycling network**.

Respectfully,
Charis Loong

Context

The current bicycle network in Montreal is *fragmented* and *limited in coverage*. Cyclists often find themselves stranded without a safe route and forced into vehicular traffic when *cycling paths end abruptly*. In order to achieve an extensive and cohesive cycling network, the City must confront the car-oriented planning approach and convert to a bicycle-centred approach.

Objective

Expand the cycling network coverage by developing east-west and north-south corridors that are dedicated for cyclists and free of cars.

Implementation Process

The implementation process should be one that is *progressive* and *incremental*.

1. Identify potential routes that are important for the accessibility of cyclists, giving priority to roads leading to major destinations.
2. Conduct pilot testing by closing predetermined streets to cars on Fridays, Saturdays and Sundays. Parking spaces should be properly allocated so drivers can access their destinations.
3. Collect feedback and evaluate the effectiveness of car-free streets for cyclists.
4. Expand this cycling-centred initiative geographically and temporally as appropriate.

Rationale

The incremental, but consistent implementation of cyclist-dedicated routes will gradually expand the cycling network and foster a culture that is appreciative and supportive of a cycling-oriented city. It will provide physical segregation of cyclists and drivers, reduce the risk of dooring, and improve cyclists' perception of safety and comfort.

Dear, Mr. Mayor Coderre,

There is nothing better (for transportation planning of Montreal) than your vision of making the city " The Cycling Capital of the world". Unfortunately presently, Montreal has 650 bike-car collisions each year [1]. In a 6-years period from 2003 to 2008, over 5,000 cyclists were seriously injured [2]. Most of Montrealers spent around more than an hour commuting and travelling (home based trips) and congestion price is more than two hundred dollars per capita. [3]. Traffic congestion costs 1.7 billion dollars per year to the Montreal's economy [3]. To achieve your intriguing vision, I would suggest you to implement much needed policy of electronic road pricing (ERP) on major arterials on Montreal. It will decrease the vehicles on road which will subsequently increase the usage of active transportation modes. ERP has positive effects of reducing vehicular volumes, generating revenues and reduction in accidents and greenhouse emissions [4]. ERP (or congestion pricing) is not a new concept, it was implemented in Singapore in mid-1970's [5]. Today it is an integral part of traffic management in major cities of the world such as London and Stockholm [6]. It involves installing licence plate detection cameras and electronically charging any vehicle that drives on a congested priced road.[4].

Implementation in Montreal

Especially During peak hours of traffic (6:30-8:30 AM and 3:30-6:00PM) on major highways, tunnels and roads.

Pricing according to vehicle class (Car, SUV, H.G.V etc.)

To impose ERP on bridges, consent from federal government will be needed as they fall under their jurisdiction.

Yearly/monthly passes for daily commuters using personal vehicles.

High pricing on Sherbrooke, Racheal, St Denis, Ontario, St Laurent, Papinueu and Mont Royal (most bicycle accident prone/high traffic volume streets [7]).

Emergency vehicles, state owned vehicles and public transit vehicles are exempted of these charges.

Trucks should only be allowed during night or at high price (if during day), as more than 15 % of cycling fatalities were cycle-truck collision (large blind spots).

Advantages of ERP

People will prefer cycling or walking (as increased cost of vehicle running) [4].

By decreasing the vehicles on roads cyclists will be more relaxed (will feel safer) in sharing the roads with the less number of vehicles.

The city can than increase the number of cycle lanes (by decreasing parking spaces, bus lanes and car lanes) which will allow accommodate more cyclists.

Expected increase in the passenger ridership for public transit (more profit for STM)

Users will tend to use alternative routes decreasing vehicles on congested routes.

Public awareness of the negative externalities of cars such as accidents, emissions and parking spaces.

Revenue generation (estimated 300 million per annum in Montreal) [8].

Positive health and economic benefits. (Increased physical activity, less emissions) [4].

ERP- World Wide

Cities have experienced decrease in automobile usage up to 45 percent in Singapore. (London 25%, Dublin 22%, New York 17%) [5]

Victoria (BC) plans congestion pricing as the way to increase cycling. (And other non-motorized transports) [9].

The City of Toronto also plans to impose congestion tax to the cars entering the downtown [8].

London has smartly invested the revenue generated from congestion pricing in mass transport and infrastructure upgrades [10].

Montreal Transportation Plan also enlists a development of Toll pricing system. The revenue generated from it will be used in public transit and active transportation [11].

In order to increase the modal share of cyclist in Montreal, transportation plans should focus on giving preference to the cycling infrastructure. The fact that motorized vehicles have more freedom (no road pricing) on the road will inevitably encourage them to take all the space on our roads. With the implementation of ERP (or the congestion pricing) it will discourage the commuters who are from medium to low income households. They will definitely prefer active transportation modes. Most importantly the revenue generated could be used for improving, maintaining and implementing cycling policies (and infrastructure).

Lastly, I would recommend a complete feasibility analysis of the measure before implementing it to the City of Montreal.

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Muhammad Yousuf Khan-

Policy Brief 2 –

Dated: 13th November 2015.

LET'S STAY AHEAD OF THE RACE

MONTREAL HAS EVERYTHING IT TAKES TO BE A WORLD-CLASS CYCLING CITY

NOW LET'S MAKE IT HAPPEN!

WE ALREADY KNOW THAT CYCLING IS GREAT FOR PEOPLE'S HEALTH AND HAPPINESS

→ BUT HOW IS CYCLING GREAT FOR CITIES?

- **Cycling boosts residential real estate and commercial sales**
  Cycling calms vehicle traffic and reduces noise pollution, which improves neighbourhoods. Homes along new cycling paths can increase in value by up to 11%. [1] Even simply installing bike racks near small business can increase commercial sales by 3%. [2]
- **Cycling reduces congestion and saves cities money**
  Cycling incurs virtually no wear-and-tear on roads and uses minimal space. A single round-trip commute on a bicycle saves the local economy $21 in reduced infrastructure costs and gas money, which would otherwise leave the local economy. [3]
- **The world pays attention to cities with good cycling culture**
  Cities with good cycling infrastructure enjoy an improved international reputation on quality-of-life measures. When Montreal shows the world that we have a good bike infrastructure, it also signals that we're a forward-looking metropolis, which helps attract talent and high-tech industries.

MONTREAL HAS THE RECIPE FOR SUCCESS

→ PUBLIC SUPPORT FOR CYCLING IS HIGH
→ NEARLY 20% OF CAR TRIPS IN MONTREAL ARE SUITABLE FOR CYCLING IF PROVIDED WITH THE RIGHT INVESTMENTS [4]

BUT WE ARE FALLING BEHIND

Other cities such as Minneapolis, Portland, and Vancouver are increasingly closing our North American lead in both rankings and funding.

CYCLING IS A PERFECT FIT FOR MONTREAL

→ HERE ARE THE SOLUTIONS TO STAY AHEAD:

1. ***Create new paths that improve the connectivity of the current network***
   Montreal already outperforms its peers in terms of kilometres of bike paths and lanes. To be world-class, Montreal needs to **make useful connections to existing bike paths** that following commuting patterns, such as improved north-south connections from the Rachel to the Maisonneuve bike path.
2. ***Emphasize comfort and safety***
   The number one reason people choose not to cycle is because of fear of faster vehicle traffic. In fact, it has been found that for each percent increase in perceived safety, modal share also increases by one percent. [5] **Separate car and cycling lanes** wherever possible by creating buffers, such as placing parked cars between car and bike lanes.
3. ***One path does not fit all.***
   People have different skill levels and preferences for speed. [6] **Build a variety of bike paths**, including direct and fast on-road lanes and quieter side-street paths and bike boulevards to attract the widest range of cyclists.

MONTREAL WAS NORTH AMERICA'S FIRST BIKE FRIENDLY CITY, AND IT'S OUR TITLE TO KEEP!

Cycling isn't only about health, congestion, pr rankings. Cycling culture in Montreal is our legacy to defend. It tells the world about who we are: a forward-thinking, innovative, world-class city. It's' an investment in our local economy and in investment for the happiness of our citizens. Montreal invented the "Best Biking City in North America" trophy. Equipped with these proven solutions, this is our title to defend!

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Moving to Benefit the Public; steps to increase the role of bicycling in Montreal's transportation system

Executive Summary

Respectfully to Mayor Coderre,

There are substantial public benefits associated with increasing the portion of trips taken using bicycles in cities. In order to increase the role of cycling and capture these benefits Montreal needs a more comprehensive and expanded bicycle infrastructure plan. This needs to be coupled with political will. Below are five discrete policy recommendations intended to assist in plans to increase the number of bicycle commuters in the city.

Potential

According to a 2011 study **18% of auto trips on the island of Montreal, 350,000 daily trips, could be replaced with reasonable bike trips [1].** The city's objective should be to capture these trips. In order to do so the city needs to understand why people don't cycle. Rationales exist on an individual level. However, functionally we can meet the most important individual needs by focusing on two areas; ***increasing perceived safety and personal convenience.***

Recommendations

(1)Create a standardized best practice design manual for Montreal bike infrastructure.

By keeping the design simple, effective, and standardized, costs can be reduced and roads can become safer. Standardized paths, lanes, and shared space make streets more legible to motorists, cyclists, and pedestrians. This makes users more comfortable and leads to perceived and real safety. High visibility, though marking bike lanes through intersections for example, should be a design goal. Many city design manuals exist for reference, and Transport for London, a particularly good one, is listed in the appendix.

(2) Investing in safety and perceived safety.

Increasing the use of lanes or paths separated from fast moving traffic, and focusing on safety at intersections is crucial. At intersections, priority signaling and well defined bike boxes are important. Shared bus/taxi/bike lanes are perceived as unsafe by most cyclists and potential cyclists. A good question to ask when considering new or existing bike infrastructure is "Would you ride with your 11 year old daughter/son here?". If the answer is yes, the route can be considered safe.

(3) Focus on connectivity of bicycle infrastructure.

Current safety issues exist largely due to the fragmented nature of the bike network. More observation and planning should be conducted on a network wide scale. As a rule of thumb, there should be a safe and relatively efficient bike route between any two points in the city.

(4) Take steps to slow traffic and disincentivize private automobile use for short trips.

Many success stories with bicycling policy don't just involve carrots (incentives), they also involve sticks (disincentives). Real commitment to cycling involves making cycling one of the most convenient choices for travel. Slowing traffic and reducing the directness of auto routes can have substantial effects on bike safety and convince, which can result in growth in cycling rates. Short trips should be made to be more convenient on bicycle than in a car.

(5) Provide long term cycling growth objectives.

While Montreal laid out relatively short term goals for cycling in 2008, long term goals are needed. Montreal should develop a 25 year plan for cycling, with substantial goals in terms of replacing automobile trips with bike trips. Upwards of 20% all trips occurring on a bicycle by 2035 is a reasonable goal given the success of many European cities.

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URBP 504 / Assignment 2

The Seed to Montreal Cycle Renaissance

How can we transform Montreal in one of the cycling capitals of the world?

Dear Mr. Mayor:

To focus only in the construction of bicycle infrastructure will help increase the number of cyclist, but will not create the *cycling culture* required to transform Montreal. The following sets of recommendations are divided into three dimensions: behavioral changes, cycling infrastructures, co-creation infrastructure.

A. Behavioral Changes

- *Increase the amount of elementary and high school students commuting by bike.* The seed of bike culture needs to be early planted by stimulating and supporting the habit of everyday cycling at schools. A choice that has greater chances to last over time due to its early bird integration.
- *Promote tax-savings campaigns.* To applaud companies that encourage their employees the use of bike as transportation.

B. Cycling Infrastructure:

- *Typologies of cyclist VS Typologies of facilities*. The chosen type of cycling infrastructure to be implemented needs to fulfill the main concerns that prevent the non-cyclist from biking.
- *Prioritized the creation of well-connected networks of cycling infrastructure,* rather than isolated facilities.
- *A law-mandatory inclusion of cycling infrastructure* in all new types of urban developments.
- *A flawless experience to commuters using bike-transit facilities*, either by a personal bike or a bike-sharing system.

C. Co-creation Infrastructure:

- *Promote communication with-in involved parties*. An adequate space is required where cyclist advocacy groups, governmental institutions, planners and transportation experts are able to co-create, debate and implement ideas. Further, to monitor the effectiveness of the enforce policies.
- *Shared the experience and challenges.* Other cities around the world are also on the same page, and their lessons learned could be crucial into Montreal decision-making processes.

FOR A BETTER AND SAFER BICYCLE INFRASTRUCTURE NETWORK IN MONTREAL

POLICY BRIEF NOVEMBER 13, 2015

CONTEXT AND IMPORTANCE OF THE PROBLEM

Montreal is one of the leading cycling cities in North America[1]. In the past fifteen years, important efforts have been made by the City of Montreal and its boroughs in order to increase the size and quality of the bicycle infrastructure network. For instance, the City nearly doubled the total length of bike paths to 680 km within the last ten years[2]. Linkages between disconnected paths and traffic calming measures, like curb extensions and speed bumps, were also built in central neighbourhoods[3]. These initiatives have paid off since the bicycle modal share increased from 1.6% to 2.2% between 2005 and 2010[4].

Despite these encouraging results, there are many things that remain to be done or can be improved. The current modal share could be increased, and, whereas Vélo Québec aims to increase the modal share to 10-15% in the central neighbourhoods by 2021[5], it is possible for Montreal to achieve a modal share of over 20% in the future, bringing it into the top list of cycling cities in the world[6]. However, to achieve such goals, the City should revise some of its design policies and follow some acclaimed guidelines and examples in order to create better, safer, and more attractive conditions for cyclists.

CRITIQUE OF POLICIES

The 2008 Transportation Plan from the City of Montreal raised many good initiatives for the bicycle network in Montreal[7]. However, many of these elements have not yet been met or do not comply with best practices and design guidelines recommended by leading authorities such as the National Association of Cycling Transportation Officials (NACTO)[8] and the City of Copenhagen[9]. For instance, the plan's objective to have 800 km of bike paths by 2015 has not yet been reached, and the recommended year-round maintenance of bike lanes is effective for only a select few corridors[10]. The plan also promotes shared space between bicycles and motorized vehicles, including the use of dedicated bus lanes by cyclists[11]. However, many potential cyclists do not perceive these options as safe and attractive[12]. Moreover, the types of bike paths preferred by the City are narrow and often adjacent to traffic, despite the availability of safer options, such as those presented in NACTO's urban bikeway design guide[13].

POLICY RECOMMENDATIONS

- The City should focus on linking the disconnected paths of the existing network in order to increase its connectivity and efficiency, as is practiced in Copenhagen[14].
- Separated bike paths should be prioritized over bike lanes sharing road space with motorized vehicles. Projects including designated bus lanes shared with cyclists should be revised to provide separated infrastructure for bicycles[15].
- Bike paths should be located between parked cars and the sidewalk in order to protect cyclists from traffic and "dooring." Smaller curbs should be created and the paths should be widened to accommodate large flows of cyclist traffic while allowing riders to overtake safely. Visibility of the bike paths could also be increased by painting them with bright colors, even across intersections[16].
- A program should be implemented to maintain the entire network year-round, as is done in Oulu, Finland[17].

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His Worship Denis Coderre
Mayor of Montreal
275 Notre-Dame Est
Montreal, QC

Four Season Cycling

Dear Mr. Mayor:

Montreal enjoys a cycling season of 5.8 months [1]. Aside for a few links around its Reseau Blanc, most of Montreal cycling facilities are closed during the winter season. Despite aggressive weather conditions, many cyclists still prefer to use their bicycles to commute. Several studies have shown that road surface conditions affect cycling more than the actual temperature and weather [2]. In order to make Montreal a world-class cycling city and increase cycling mode share significantly, a year-round available and clear cycling network should be provided.

Current Situation

Due to the closure and lack of maintenance of most cycling facilities during winter, cyclists change their travel patterns. Many cyclists bike in the same path as motorized vehicles, while others refrain from cycling. Conventional plowing techniques have proven to be expensive and inefficient. On one hand, the cost associated with conventional plowing techniques results in the closure of a large portion of the cycling network. On the other hand, the drastic amount of snow piling on the sides of the cycling paths hinders the quality of circulation.

New Technology

A new concept of heating pavements has been increasingly used in many cities to effectively mitigate the impact of aggressive weather. The basic premise of this technology is to use electric currents or embedded warm fluids pipes to heat the pavements [3]. Hydronic pavements use heated fluid to circulate through embedded pipes. Electrically heated pavements use embedded conductors (e.g. heating cables and grid mesh mats) or conductive materials added to the pavement mixture. The resistance to the current through the conductor is converted to heat energy that melts the snow [3]. Lower stress levels related to slipping and sliding were reported by pedestrians in the city of Holland in Michigan after the implementation of hydronic heated pavements in 1988 [4]. Equally, the city of Oslo in Norway has been gaining worldwide popularity after the implementation of electrically heated pavements [5].

Equitable and Economic Benefits

An equitable transportation system recognizes the needs of all road users whether they be transit riders, drivers, cyclists, or pedestrians; and does so throughout all seasons of the year. Electrically heated cycling paths provide an accessible, clear, and safe mode of travel for cyclists. Due to the precise control of heat output, electrical heating of pavements could be an economically feasible option for clearing the entire cycling networks in Montreal during winter. In addition, costs associated with maintenance and rehabilitation of pavements due to free-thaw damage (e.g. cracking and rutting) as well as de-icing salts damage (e.g. corrosion) could be significantly reduced when using heated pavements [3].

Policy Recommendation

Although a portion of the De Maisonneuve path is a part of the Reseau Blanc, a significant part of it in the Westmount area is not. This makes it a suitable test bed to the proposed electrically heated paths. This link could then be assessed to measure the potential increase in the level of cyclists in winter.

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POLICY BRIEF

MAKING MONTREAL THE LEADING CYCLING CAPITAL OF THE WORLD

Dear Mr. Coderre,

In an era of automobility, the task to transform Montréal into a cycling capital may at first seem insurmountable. However, given your political commitment and the city's accomplishment of increasing its network of bike paths from 400 to 680 km since 2008 (City of Montréal, 2008 and City of Montréal, 2015b), Montréal can take all the steps necessary to become a leading cycling capital.

The importance of promoting cycling is quite simply based on concerns for better health, environmental justice, transport efficiency and public safety. Transportation researchers suggest that the greater the number of people cycling and walking, the safer streets become for the public (Sagaris, 2015). It has also been repeatedly found that individuals using bicycling as a mode of transport have a much lower risk of developing cardiovascular disease and conditions such as depression (Reynolds et al, 2010). There is no doubt that promoting active transportation, while simultaneously reducing dependency on motorized vehicles, could play a major role in reducing urban air pollution as well. In addition, cycling can be seen as a more efficient way of commuting in densely populated areas. But these benefits cannot be achieved without the improvements in bicycling infrastructure.

Montréal's existing network of bike paths is mostly concentrated in the center of the city (City of Montréal, 2015a), indicating that the network does not provide equal access across all areas of Montréal. This disparity exists in conjunction with the fact that the current network is disconnected and consists of isolated segments that poorly serve utilitarian trip purposes (Larsen et al, 2013). More over, cyclists in the city are exposed to harmful particulate matter released from motor vehicles, especially on congested roads.

These problems can be addressed with the adoption of a comprehensive strategy to generate a cycling economy, induce behavioral change amongst commuters and establish all the urban and infrastructural measures necessary (Sagaris, 2015). In particular, Montréal can make better use of services, such as the Bixi system and the Mon Resovelo phone application, to observe and understand the preferred route choices of cyclists. Collected information can be used to determine not only where to build new bicycling infrastructure but to also identify reasons for the underutilization of certain routes. Improving access to public transit, by prioritizing cycling paths and parking infrastructure on routes otherwise served by feeder buses connecting to major public transit routes (Krizek and Stonebraker, 2010), could be another way of making the city more cycling-friendly.

Under your leadership, the City of Montréal can set higher targets to promote cycling. The city can aim to achieve a cycling modal share of at least 20% over the next decade and reduce driving modal share from its current 55% to 35%. These goals can be attained feasibly, as in the case of cities like Amsterdam and Copenhagen, all while making Montréal a more livable city.

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