Climate Change and Transportation Governance: Looking for Lessons in New York City, London, and Paris

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RESEARCH REPORT

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1. Key Messages:

- New York, London and Paris offer interesting instances of policy action at the intersection of urban climate change and sustainable transportation governance. An exploration of the underlying roots of their successes, and the limitations of the efforts, should be of interest to Canadian policy-makers at all levels of government;
- Each of these three cities illustrates the need for, and benefits of, taking a flexible, adaptive, and balanced approach to policy intervention. Each city has utilized regulation, service provision, and enabling actions in varying combinations to induce change by imposing costs directly on users and increase the cost of driving relative to other alternatives;
- Each city has taken measures to ensure the coherence of policy interventions across city departments and agencies, organizing transportation policy under the broader umbrella of urban sustainability and climate change governance;
- All three have taken aggressive action intended to drive a shift from automobile to alternative modes of transportation such as walking, cycling, and public transit and have had a measure of success by combining improved and expanded service provision with road re-purposing, infrastructure development, and pricing policies.
- Each, however, illustrates the challenge of managing metropolitan as opposed to regional transportation. In each city there is a distinct divide in each between the core (high population density, strong modal share for alternative modes) and suburban/exurban (lower population density, much higher reliance on automotive transportation) populations;
- This suggests that, in addition to a flexible, balanced, and integrated approach, there is a distinct need for more support (financial as well as jurisdictional) from upper levels of government as well as greater efforts to coordinate actions between levels of government;
- In order to increase policy impact in Canadian cities and address the considerable challenges, as well as the substantial local and global costs, related to intra-urban transportation Provincial and Federal governments need to develop policies and funding packages that enable more effective and innovative municipal policy intervention.

2. The Issue: How are climate change and transportation governance addressed in practice

The previous policy brief introduced the reasons why governments at all levels are faced with a pressing and immediate need to drive transformative change in the transportation sector. The negative byproducts of urbanization and individual actions related to transportation generate considerable costs for the local population (negative effects on public health, economic productivity, and quality of life) and are a major contributor to global climate change. As such, there is a pressing need to engage in policy intervention at the intersection of these issue areas – climate change and transportation – in order to reduce these negative effects of both. The challenge is to drive the transition to sustainability by reducing the need for travel in cities, shifting transportation to more efficient modes, and increasing the overall efficiency of the transportation system. While there are multiple points at which policy-actors can cut into this problem, the previous policy brief set out a number of propositions related to urban transportation sustainability: flexible policy intervention that responds to local political contingencies and utilizes both supply and demand levers of market-based instruments; combining these with regulatory policies that aim to impact demand for travel through alterations to the spatial form of the city; remaining sensitive to the opportunities of using co-benefits as a framing device along with the internal tensions that can emerge when policies are oriented towards competing objectives; ensuring policy intervention is holistic and integrated by coordinating across departments and managing coherence with overall sustainability plans and goals. It was also suggest that effective local policy likely requires enabling actions by upper levels of government, both financial and jurisdictional, and greater attention to coordination at both the regional and national scales.[1]

In order to assess these ideas in practice, and to see how climate change and sustainable transportation policy has been implemented, this brief focuses on the actions of three cities: New York, London, and Paris. These have been selected for a number of reasons. They are all global cities, in the sense that they are prominent, highly connected, and disproportionately responsible for global economic productivity.[2] Large urban centers are especially important in terms of climate change as their disproportionate percentage of global wealth, economic activity, and consumption is linked to a disproportionate percentage of global GHG emissions.[3] Departing

[1] See SP Policy Brief #1
[2] McKinsey Global Institute, 2011. *Urban World: Mapping the economic power of cities.* Available at: http://www.mckinsey.com/Insights/MGI/Research/Urbanization/Urban_world.
[3] McKinsey 2011; Arup, 2011. *Climate Action in Megacities: C40 Cities Baseline and Opportunities*. Available at: http://www.arup.com/Publications/Climate_Action_in_Megacities.aspx; Carbon Disclosure Project, 2011. *CDP Cities 2011: Global Report on C40 Cities.* Available at: https://www.cdproject.net/Documents/CDP-Cities-2011-Report.pdf

from the premise that large Canadian cities face many of the same issues as large global cities in other countries, there are potential lessons to be from an analysis of the three cities selected for this study. This is enhanced by the fact that London, Paris, and New York have all received international recognition for their sustainable transportation policy[4] and each has had a measure of success in terms of driving down sectoral emissions. Lastly, as the goal of this report is to generate recommendations for Canadian policy actors, it is important to look at cities within countries that have similar levels of economic development and institutional contexts. In this sense, the UK, US, and France, while divergent in a number of different ways, are broadly similar across all of these dimensions.

The policy actions introduced in the case studies below are meant to be illustrative rather than comprehensive. They have been selected to highlight particular dimensions of the sustainable transportation actions in each city and are presented in order to give the reader an impression of the kinds, and combinations, of policy interventions being utilized. While each of the cities profiled has experienced a measure of improvement in the transportation sector, in terms of GHG emissions, modal split, and total travel demand, there are numerous factors in addition to the reviewed policy actions that may have contributed to these outcomes. The story presented here is less one of direct cause and effect, and more one of assessing whether the lessons generated in the previous policy brief are defensible and provide traction in terms of understanding the successes, and limitations, of policy intervention in practice.

[4] Institute for Transportation & Development Policy, Sustainable Transport Award website. Available at: http://www.itdp.org/get-involved/sustainable-transport-award

3. Governing transportation in NYC, London, and Paris:

New York City: New York City has the highest rate of public transit commuting in the United States and a car ownership rate less than half of the US average.[5] As a result, transportation accounts for a smaller share of total GHG emissions in New York City (21%) than the national average (33%).[6] However, transportation still represents, after the buildings sector, the second largest source of emissions in the city.[7] The vast bulk of emissions from the transportation sector come from on-road vehicles, both passenger and freight, which account for 86% of emissions with public transit accounting for the remaining 14%.[8] There is some indication of success in terms of driving down emissions from transportation in the city. The percentage of total citywide GHG emissions from transportation has declined, from 26% in 1995 to 21% in 2010.[9] This declining contribution has come entirely from on-road transportation emissions, which have declined from 23% to 18%, with emissions from public transit steady at 3% across this timeframe.[10] In absolute terms, emissions from transportation have declined from 13 Mt (1995) to 11.4 Mt (2010) in spite of a population increase of just over 11%.[11]

Sustainable Transportation Policy and Planning: New York began aggressively engaging in local climate policy in 2007 with the launch *of PlaNYC*, a thirty year integrated economic development and sustainability plan cutting across, and linking together, multiple different areas of action including transportation.[12] Based on projected increases in city population of roughly 10% (an additional 800,000 citizens) by 2030 *PlaNYC* aims to develop a forward-plan to accommodate this increase in a sustainable manner. The plan is integrated with the NYC Department of Transportation's *Sustainable Streets* planning document, released in 2008 and together the two plans outline a number of actions aimed at driving down emissions from transportation in service of the objective of reducing GHG emissions 30% by 2030.[13] Oversight and coordination of

[5] Parshall, L., Haraguchi, M., Rosenzweig, C., Hammer, S., 2011. *The Contribution of Urban Areas to Climate Change: New York City Case Study*, in *Cities and Climate Change: Global Report on Human Settlements 2011*, UN Habitat. P. 7
[6] ibid; City of New York. 2011. *Inventory of New York City Greenhouse Gas Emissions*, Mayor's Office of Long-Term Planning and Sustainability, New York. P. 9
[7] City of New York 2011: 9
[8] ibid
[9] ibid
[10] ibid; City of New York, 2007. *Inventory of New York City Greenhouse Gas Emissions*, Mayor's Office of Long-Term Planning and Sustainability, New York. P. 24
[11] United States Census Bureau, State & County Quick Facts Website. Available at: http://quickfacts.census.gov/qfd/states/36/3651000.html; City of New York 2007: 21; 2009: 6; 2010: 6; 2011: 9. Transportation emissions in 2008 were 11.73 Mt and in 2009 were 9.86 Mt – thus confirming the overall downward trend but suggesting that attention be paid to the impact of exogenous factors such as the global/US economic crisis and local weather fluctuations.
[12] City of New York, 2007. *PlaNYC: A Greener, Greater New York*, Office of Long-Term Planning and Sustainability
[13] City of New York Department of Transportation, 2008. *Sustainable Streets;* City of New York 2007. *PlaNYC: A Greener, Greater New York*

sustainability actions are the responsibility of the Office of Long-Term Planning and Sustainability, created in 2006 with the sole intent of focusing on sustainability across the metro region.

***Demand-side MBIs*:** The use of demand-oriented policies such as bridge and tunnel tolls long pre-dates sustainability planning and policy intervention in New York City, but their use in service of emissions and congestion reduction have been limited and, where they have been attempted, have been met with considerable resistance.

Road pricing: The primary transportation sector component of *PlaNYC* was the proposed implementation of a congestion charging system for a large section of Manhattan. The proposed system was underwritten in part by a federal grant and had broad support from the public and business community but was ultimately defeated in the State Legislature. This was a major blow to efforts to reduce demand for automobile transportation and reflects, in many ways, the challenges of bridging the interests of city and surrounding suburbs and the implications of poor inter-governmental coordination on local policy.[14]

Parking fees: The city, however, has employed other demand-side MBIs in the effort to drive emissions reductions and reduce congestion. In 2000 the city introduced the *Commercial Curbside Parking Program*, featuring variable rate meter parking in the CBD for commercial vehicles.[15] The program replaced a complex and under-enforced set of parking regulations with a set of dedicated commercial vehicle parking spaces with rates that increase in hourly increments intended to reducing parking-related congestion and a variety of related, negative behaviors (parking shortages for commercial vehicles, double parking, traffic circling). In 2008, the city introduced *ParkSmart NYC* as a pilot project with variable meter rates for curbside parking as a means of using price signals to alter parking behavior during peak business hours.[16] New York is renowned for under-priced curbside parking and over-allocation of residential curbside parking permits, both of which lead to over-consumption of curbside parking and result in considerable amounts of traffic circling and double parking.[17] As a result, the program increases the cost of curbside parking spaces during peak hours as a means of reducing demand. Results indicate that the program has had a measure of success in reducing parking space occupancy during peak hours, and has been expanded as a result.[18]

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[14] Schaller, B., 2010. *New York City's Congestion Pricing Experience and Implications for Road Pricing Acceptance in the United States*, Transport Policy, 17. P. 1

[15] Institute for Transportation and Development Policy, 2010. *US Parking Policies: An Overview of Management Strategies.* P. 62-63

[16] ibid

[17] Shoup, D. 1997. *The High Cost of Free Parking*, Journal of Planning Education and Research, 17:1 pp. 3-20

[18] New York City Department of Transportation, Motorists & Parking Website. Available at: http://www.nyc.gov/html/dot/html/motorist/parksmart.shtml

Supply-side MBIs: In part as a result of the political defeat of the congestion system, New York City has implemented a variety of supply-side MBIs aimed at driving modal shift from automobile to alternative modes of transportation.

Provision of enhanced public transit: The city, in partnership with the regional body responsible for transportation (the MTA) and supported by funding from the federal Department of Transportation, introduced the Select Bus Service (SBS) in 2008. Based on the Bus Rapid Transit model SBS is part of a broader effort to reduce passenger loads on the subway system by improving above ground bus service. Improvements aim at reducing trip times and are accomplished through integration of pre-boarding payment, multi-door entry/exit, and dedicated bus-lanes monitored by traffic cameras.[19] There are two SBS routes currently in operation, in the Bronx and midtown Manhattan, with several more planned. While implications in terms of reduced emissions are difficult to quantify, the implementation the SBS routes have resulted in a 7% to 9% increase in ridership and a 20% increase in average bus speed.[20]

Alternative transportation services & infrastructure: The city has constructed over 270 miles of bike lanes - including 20 miles of bike lane that are physically separated from the road – and has provided 3100 new bike racks since 2007.[21] This has helped to increase the number of bike commuters from by 60% increase while accomplishing a 54% decline in bicycle fatalities between 2001 to 2010.[22] These numbers are projected to further increase as New York rolls out a 10,000 bike/600 station bikeshare system, modeled on similar systems in London and Paris, in the spring of 2013. In addition, the city has reallocated road space through the creation of parking-lane protected cycling lanes.[23] There remains considerable room for improvement, however, as even with these increases in bike commuting it accounts for less that 1% of all commuting trips.[24] In part this is likely due to the fact that bike lanes and parking facilities, on a per capita basis, are

[19] Institute for Transportation and Development Policy. 2011. *Recapturing Global Leadership in Bus Rapid Transit.* P. 47. ITDP does not officially recognize the SBS system as BRT as it does not have physically separated bus lanes, pre-board payment systems, or distinctive raised stations.
[20] ibid
[21] Gronewald, N. 2010. *Pedestrians, Bicyclists spar for space in NYCs new no-car zones*, Greenwire; New York City Department of Transportation, Bicyclists Website. Available at: http://www.nyc.gov/html/dot/html/bicyclists/bikemain.shtml
[22] Gelinas, N., 2012. *Ungridlocked*, City Journal. Available at: http://www.city-journal.org; Pucher, John, Buehler, Ralph, Seinen, Mark, 2011. *Bicycling Renaissance in North America? An Update and Re-Appraisal of Cycling Trends and Policies.* P.459
[23] ITDP 2010: 63
[24] The Atlantic Cities, Is Bicycling Commuting Really Catching On? And if so, Where? Available at: http://www.theatlanticcities.com/commute/2011/09/substantial-increases-bike-ridership-across-nation/161/; See also Pucher et al 2011: 459. New York lags far behind US leaders such as Portland (5.8%), Seattle (3%), Minneapolis (3.9%) as well as Canadian cities such as Vancouver (3.7%), Montreal (2.4%), and Toronto (1.7%)

much lower in New York than in other, better performing, cities.[25] In addition, New York City has done a poor job integrating cycling with other modes of public transportation, providing little capacity for bike parking, storage, or carriage on city buses and subways.[26]

Road re-purposing: In addition, the city has undertaken measures to reallocate road space through the creation of pedestrian-only zones, expanded sidewalks, and conversion of curbside parking into public seating areas.[27] *Green Light for Midtown*, initiated in 2009, involved the repurposing of public space on Broadway. Large sections of existing road were converted into pedestrian-only zones (with public seating) along with dedicated bike lanes. Additional measures were taken to improve traffic flow, and the conversions have resulted in increased travel speeds for automobiles, substantial decreases in pedestrian and vehicle-related injuries, and increased pedestrian volumes.[28] Lastly, over 20% of the city has been rezoned with the goal of increasing population density around areas well-served by transit - the majority of upzonings have taken place in areas located less than ½ mile walking distance from public transit.[29] These regulations have the potential to substantially impact the demand for travel, as well as non-automotive modal share, by enabling growth in parts of the city that are well-served by transit and encouraging increased population density and mixed use.[30]

London: CO2 emissions from transportation have remained constant at roughly 21% of the citywide total over the past two decades, and in absolute terms have shown a small increase of .14 Mt CO2.[31] On a per capita basis, however, emissions from transportation have improved considerable given that population increased by nearly 13% over the same span of time.[32] Road traffic in the city trended downward between 2000 and 2009, with total car distance traveled

[25] Pucher, J. R. Buehler, M. Seinen. 2011. Bicycling Renaissance in North America? An update and re-appraisal of cycling trends and policies, *Transportation Research Part A*, 45: 464. New York has 8 km of bike lane/capita as of 2010. Compare with Montreal (27 km/capita), Washington, DC (27 km/capita), Minneapolis (70 km/capita), and Portland (73 km/capita). The figures for bike parking facilities are similar, with New York at 75 spaces/capita as compared with Montreal (802 spaces/capita), Washington, DC (1056 spaces/capita), Minneapolis (4599 spaces/capita), and Portland (725 spaces/capita)
[26] ibid: 470
[27] New York City Department of Transportation, Pedestrians & Sidewalks Website. Available at: http://www.nyc.gov/html/dot/html/sidewalks/sidewalks.shtml
[28] New York City Department of Transportation, About DOT Website. Available at http://www.nyc.gov/html/dot/html/about/broadway.shtml
[29] Furman Center for Real Estate and Urban Policy (2010) *How Have Recent Rezonings Affected the City's Ability to Grow?* Policy Brief. p. 10. Between 2003 and 2007 over 70% of all upzonings (rezoning actions that increase population density by >10%) took place in areas within a ½ mile walk of an entrance to the subway system or other regional rail services.
[30] City of New York 2007
[31] Greater London Authority, 2011. State of the Environment Report for London, June 2011. Available at: http://data.london.gov.uk/datastore/package/state-environment-report-london-june-2011. The most recent data show emissions a decline in CO2 emissions from road transportation, from 19.5% of total city GHG emissions in 2005 to 18.8% in 2010, in absolute terms of decline of .74 Mt CO2e
[32] ibid

declining by 6.5% while the percentage of all trips made in the city by car/motorcycle transportation dropped from 43% to 37%.[33] At the same time, public transportation (subway, bus, rail) increased from a 34% to 41% share of all trips in the city and cycling doubled from 1% to 2% of all trips.[34] Bus transportation in particular increased noticeably from 2000 to 2009, from 15% to 21% of all trips within city. And while cycling in London increased by 83% between 2002 and 2008, the percentage of Londoners traveling by bicycle remains much closer to the North American average and far below front-running European cities such as Amsterdam and Copenhagen.[35]

Sustainable Transportation Policy and Planning: Enacting legislation mandates the GLA, among other things, to produce and periodically review a spatial development strategy for London that integrates economic, transportation, environmental, and social interests.[36] In part as a response to chronic underinvestment in public transportation, projections regarding increases in population and work commuting, and costs related to congestion and carbon pollution, the city produced *T2025: Transport Vision for a Growing World City*, a 20 year strategic planning document, in 2006. The plan, which includes the objective of reducing CO2 emissions from transport 22% by 2025, is integrated with both the Climate Change Action Plan (2007) and the city's foundational strategic planning document, The London Plan (2004).[37] Oversight for transportation actions is the responsibility of Transport for London (TfL), an arms-length agency over which the Mayor has considerable influence, while sustainability across the metro region is the overseen by GLA staff.

Demand-side MBIs: London is a pioneer in the use of pricing mechanisms to drive transformation in the transportation sector, and relies heavily on such measures to induce change as well as provide funding for investment in alternative options.

[33] Greater London Authority, 2011: 54

[34] ibid

[35] Pucher, J and R. Buehler. 2007. At the Frontiers of Cycling: Policy Innovations in the Netherlands, Denmark, and Germany. *World Transport Policy and Practice* 13(3): 13-19

[36] Ween, C. 2012. 'London, England: A Global and Sustainable Capital City,' in T. Beatley, ed. G*reen Cities of Europe: Global Lessons on Green Urbanism*. Island Press: London. P. 186

[37] Greater London Authority, 2007. *London CO2: Action Today to Protect Tomorrow. The Mayor's Climate Change Action Plan*; Greater London Authority, 2004. *The London Plan*; Transport for London, 2006. *T2025: Transport Vision for a Growing World City*. The GLA updated the London Plan in 2011 and the Transport Strategy in 2010. While the GLA has officially adopted a GHG mitigation target of 60% below 1990 levels by 2025, it has also explicitly acknowledged its' reliance on actions taken by other levels of government in order to achieve this objective.

Road pricing: Most prominently, the GLA implemented a central city congestion system in 2003. A zone was created within which all vehicles (with the exception of emergency vehicles, public transport, taxis, and high efficiency vehicles) pay a price to enter.[38] Vehicles are identified, and payments allotted, through the use of a camera and license place recognition system. The immediate results were significant – after one year there was a 21% decrease in overall traffic, a 30% decline in congestion, and an increase of 43% in cycling.[39] The system showed a net profit of £137 million in 2006, with the bulk of this (82%) used to fund improvements in the bus network.[40] In spite of these positive effects, attempts to expand the system were rescinded following concerted political resistance.[41]

As a complement to the congestion system, the city created a Low Emissions Zone (LEZ) in 2008 that covers most of the city. The LEZ sets pollution standards for all vehicles operating in the zone, and imposes strict financial penalties on vehicles operating inside the zone that do not meet pollution standards. The system operates on a full-time basis and is supported by a camera and automatic license plate recognition system linked to a database of registered vehicles. Lastly, several GLA boroughs have updated on-street parking fees, making use of differential rates based on time of day (peak vs. non-peak) level of vehicle CO2 emissions (higher polluting cars to pay more, lower polluting cars to pay less), and free parking for EVs and carshare vehicles.[42]

Supply-side MBI's: While the major thrust of policy intervention have been focused on driving change through pricing mechanisms, the city has implemented several supply-oriented MBIs that aim to decrease the relative cost of alternative modes of transportation and encourage modal shifting.

[38] Ween 2012: 198
[39] ibid
[40] TfL 2009: 220
[41] Litman, T., 2011. *London Congestion Pricing: Implications for Other Cities*, Victoria Transport Policy Institute
[42] ITDP 2011: 43-44; City of London 2011: 210. Jurisdiction over on-street parking was officially devolved to borough councils as part of The Road Regulation Act (1991). Similarly, the GLA has little direct control over parking regulations. However, several boroughs have updated or discarded parking minimums for new developments in areas that are well-served by public transit.

Provision of Enhanced Public Transportation Services: The GLA has invested heavily in expanding and improving bus services in the city. As noted above, roughly 80% of net revenue generated from the congestion charge program is invested in improvements to the bus system. Beginning in 2000, the city set out to increase bus ridership by introducing nearly 200 miles of dedicated bus lanes, providing real-time service information at bus stops and on buses, and prioritizing traffic signals for bus transport.[43] These measures contributed to an increased in ridership of nearly 60% from 2001 to 2009.[44] The GLA has also invested heavily in upgrading the Underground metro system – expanding service, increasing system efficiency through better signaling and coordination, and upgrading stations. The city has further improved integration in the transportation system through introduction of a single fare, integrated payment system – the Oyster Card – in order to facilitate use of public transportation and movement between subway, bus, and light rail by speeding up transfers and boarding.[45]

Alternative transportation infrastructure & services: The city introduced a 6000 bike/400 station bikeshare system, modeled on the Parisian Velib', in 2010. Funded through a sponsorship naming-rights deal with Barclays Bank, the system is complemented by four dedicated bike lanes linking the outer areas of London with the core as well as a network of bike lanes throughout the city. The vast majority of these bike lanes, however, are not physically separated from car traffic, and the city makes relatively minimal use of traffic-calming measures. TfL did increase the annual cycling budget by over 330% between 2000 and 2007, and used this increase in funds to expand the cycling network in the city, provide education and cycle safety training, increase the number of parking facilities for bikes throughout the city, and improve integration of biking with other modes of public transit.[46] The GLA has made provision of cycling facilities mandatory in all public facilities, and included provision of cycling and pedestrian infrastructure as mandatory planning components in all new developments requiring GLA approval.[47] However, cycling continues to hold a very low mode share – 1.6% of all trips as of 2010.[48]

The city is also working to develop a supportive infrastructure for electric vehicles, installing charging points throughout the city (400 currently installed; 1300 planned by 2013) and imposing regulations mandating the provision of charging points (or capacity to install) in all new developments requiring GLA approval.[49] These measures are relatively recent, and so it is difficult to ascertain their effect. Lastly, the city has taken measures to increase the walkability of

[43] Ween 2012: 200; City of London 2007: 151; City of London 2011: 193
[44] Ween 2012: 200
[45] Ween 2012: 198; City of London 2007: 143
[46] GIZ, 2012. *Urban Transport Climate Change Action Plans: Examples from Hamburg, London and Tokyo.* P. 21
[47] City of London 2004: 132; 2007: 143; 2011: 195
[48] Pucher et al 2011
[49] City of London 2011: 205

the city by re-allocating public and road space, including widening sidewalks, tree planting, construction of pedestrian bridges across the River Thames, and provision of information and services to citizens.[50] However, the fact that primary authority regarding the reallocation of road space away from automobiles and the use of traffic calming measures is located at the local council level leaves the GLA with limited capacity to make use of this approach.

Paris: Paris is one of the densest cities in the world and possesses a well-developed transit system and highly compact and walkable urban profile.[51] Transportation accounts for 24% of total GHG emissions in the City of Paris and has increased by 1% from 2004 to 2009.[52] However, in absolute terms emissions from transportation decreased 1% over this period in spite of population growth of roughly 3%.[53] Over this time, emissions from passenger vehicles declined substantially (-16%) while emissions from public transit showed a slight increase (+5%) likely as a result of modal shifting to bus, rail, and tram systems.[54] Total distance traveled by car in Paris decreased by 13% from 2003 to 2007.[55]

Sustainable Transportation Policy and Planning: The city government first explicitly engaged in climate change and transportation governance in 2007 with the release of the Paris Transportation Plan (PDP) and Paris Climate Plan. The PDP sets out to reduce GHG emissions from transportation 25% by 2013, and 60% by 2020 (relative to 2004 baseline emissions) by reducing car use while shifting transportation to low and no-carbon modes such as walking, cycling, and public transportation.[56] The PDP as a planning document reaches beyond the jurisdictional authority of the city, and is aimed in part at contributing to the regional approach to transportation sustainability.[57] Implementation oversight and coordination is the responsibility of the Urban Ecology Agency, located within the department of Parks and Environment, but is limited as a result of jurisdictional fragmentation.[58]

[50] Ween 2012: 201
[51] ITDP 2011: 52. The corresponding figures for the GLA and New York City are 4761/square km (GLA) and 2,050 (New York City).
[52] Mairie de Paris, 2009. *Bilan Carbone 2009*
[53] ibid
[54] Separate data indicate that between 2001 and 2007 – prior to development of the PDP – car traffic declined by 19% in Paris. See Laurian, L., 2012. Paris, Franc: A 21st Century Eco-City, in Beatley, T., ed .*Green Cities of Europe: Global Lessons on Green Urbanism*, Island Press.
[55] ITDP 2011: 52
[56] Mairie de Paris, 2007. *Paris Climate Protection Plan.* P. 38; New South Wales, 2008. *Transport Problems Facing Large Cities,* Briefing Paper 6/08
[57] Mairie de Paris, 2007.
[58] Travers 2005

Demand-side MBIs: Paris has made relatively limited use of demand-oriented MBIs, likely as a result of jurisdictional fragmentation and political resistance and as a result has strongly emphasized supply-oriented interventions.[59]

Supply-Side MBIs: The bulk of sustainable transportation policy in Paris has focused on efforts to re-allocate roadspace away from private automobiles and towards alternative modes of transportation and increase the availability, quality, and frequency of public transit services.

Provision of enhanced public transit: Paris, in concert with regional and national stakeholders, introduced the *Mobilien* bus network in 2004. *Mobilien* is a BRT system with 17 lines in operation in Paris. Buses operating on dedicated, physically separated lanes, have priority signaling, raised stations, and are supported by real-time service information. While implementation has lagged behind objectives, the system has contributed to a 17% increase in total number of trips utilizing public transportation in the city.[60]

Alternative transportation infrastructure and services: The City has built 190 km of dedicated lanes that are shared by bus and taxis, a portion of which (nearly 70 km) are physically separated.[61] In 2007 Paris introduced the Velib' bikeshare system with 20,000 bikes and 1450 docking stations located throughout the city. The second-largest system in the world, Velib' currently has over 220,000 subscribers and an average of over 100,000 trips per day.[62] The city introduced Autolib', a car-sharing service, in 2011, featuring 1700 electric vehicles and 1100 charging stations located throughout the city.[63] In order to support the system the city has begun to create a charging infrastructure by installing 84 recharging stations throughout the city.[64]

Road re-purposing: In concert with these actions, the city has re-allocated a substantial amount of road-space to cyclists, pedestrians, and bus traffic. Beginning in 2001, the City installed over 440 km of cycling lanes, giving the city a total network of over 640 km, many of these physically separated from car traffic.[65] The City has also passed regulations allowing two-way cycling on one-way roads in low-speed zones, effectively adding 700 km of bike lanes across the city.[66] These actions have contributed to a 48% increase in cycling as a percentage of total trips in the city, as

[59] Prud'homme & Kopp 2008: 257-258. There is some indication that the National Government did consider a congestion charge system for the City of Paris in 2006 but the was not supported by the City Government and was dropped as a result of political resistance.
[60] www.impacts.org/euroconference/**Paris**2012/presentations/1_**Paris**.pdf
[61] Laurian 2012: 45
[62] The Bike-sharing Blog. Available at: http://bike-sharing.blogspot.ca/search/label/Paris
[63] Autolib' Website. Available at: https://www.autolib.eu/
[64] Laurian 2012: 44
[65] ibid: 49
[66] ibid

well as a 20% decrease in public vehicle and 11% decrease in truck and tour bus use.[67] However, the modal share for cycling in Paris (2.5%) remains far lower than European cities such as Amsterdam (37%) and Copenhagen (20%).[68]

In 2002 the City launched the *Quartiers Verts* (Green Neighborhoods) program, a variety of measures intended to slow traffic and increase pedestrian safety and comfort (wider sidewalks, speed bumps, pedestrian crossings, bike lanes, tree plantings, reduced speed limit). Zones with these measures now cover over 21% of the total area of the city.[69] Paris has also aggressively updated the allocation of public space to pedestrians. From 2001-2009 the city decreased the total area allocated to streets by 5% and increased allocation to sidewalks by 13%.[70] In addition, the city has implemented a number of time-specific car-free zones throughout the city – closing city roads to car traffic and opening them up to cyclists and pedestrians.[71] The most prominent examples are *Paris Plage*, which shuts down a large section of the Pompidou Expressway to car traffic for one month in the summer, and *Paris Respire*, which converts central city roadway to pedestrian-only zones every Sunday.[72]

The city has also taken steps to increase the cost of parking, removed minimum parking requirements for new developments within a 500-meter range of existing metro stops, and reduced the supply on-street and curbside parking. Political resistance was, at least in part, overcome by simultaneously reducing the cost of street parking for residents living in the outer neighborhoods. Road space previously dedicated to on-street parking has been reallocated to other uses such as Velib' and Autolib' docking stations and motorcycle/scooter parking. Total on-street parking supply in the city was reduced 9% from 2003-2007, while at the same time 95% of free parking spaces were converted to paid parking spaces.[73] The imposition of these measures, first adopted in 2001, are correlated with an 11% decline in traffic in the City.[74]

[67] Nadal, L., 2008. Bike Sharing Sweeps Paris Off Its Feet, *Sustainable Transport*, Institute for Transportation and Development Policy
[68] Pucher et al 2011: 471; Pucher, J., Buehler, R., 2007. *At the Frontiers of Cycling: Policy Innovations in the Netherlands, Denmark, and Germany*, World Transport Policy and Practice
[69] Laurian 2012: 48
[70] ibid
[71] Laurian 2012: 49
[72] 70,000 cars per day use this road, which traverses Paris and runs alongside the Seine River.
[73] ITDP 2011: 53
[74] ibid

4. Analysis and Lessons

Lesson #1: Use Market Incentives Through Demand and Supply Interventions: All three case studies illustrate the flexible use of market-based instruments to drive transformative change in the transportation sector. New York has continued to make use of traditional demand-side pricing mechanisms with little alteration, and has experimented with increased pricing for on-street parking, local political conditions have driven the city to rely primarily on supply-side policies that serve to increase the relative cost of automobile transportation, drive modal shift towards public and alternative modes of transportation, and strategically increase population density in areas well-served by public transit.

The GLA has had success combining pricing interventions with improvements in the provision of alternative modes of transportation. The congestion charging system remains a model for cities around the world, and in combination with the creation of the Low Emission Zone creates a substantial disincentive to car transportation in the city center. In addition, the earmarking of road pricing revenues for improvements in bus service and infrastructure has been a key to providing meaningful alternatives that enable modal shifting and improved mobility throughout the city.[75] The city has combined these actions with measures aimed at reallocation of road space, most importantly the creation of a network of dedicated bus lanes.

Paris, while jurisdictionally limited in terms of its ability to develop broad-based pricing mechanisms, has relied nearly exclusively on supply-side policy interventions. The city has been aggressive and innovative on this front, and the combination of reallocation of road space, removal of parking spaces, and provision of bike and BRT services has contributed to modal shifting within the city.

[75] Kamal-Chaoui, L., Roberts, A., eds. 2009. *Competitive Cities and Climate Change,* OECD Regional Development Working Papers, #2. OECD Publishing.

Lesson #2: Leverage Co-Benefits; Beware of Cross-Purposes: New York has effectively framed road re-purposing interventions in terms of quality of life, public safety, and economic benefits and has also taken steps to positively link transportation investment with development opportunities. However, there are a number of areas where the city has failed to take action to reduce the implicit subsidization of automotive transportation: city bylaws continue to mandate a minimum number of parking spaces for new developments even in areas well-served by public transit[76]; on-street parking remains, for the most part, substantially under-priced; and the city continues to issue relatively large numbers of residential parking permits.[77]

In London, the details of the congestion and LEZ systems that are oriented towards pollution reduction (exemption or price reductions for low-emissions vehicles) have the potential to create tension with congestion reduction goals. The fact that congestion levels have hit pre-system levels is indicative of this tension.[78] Paris has worked to link transportation with quality of life benefits associated with re-purposing of road space into pedestrian or cycling infrastructure. This has had positive effects in terms of driving modal shift within the city core, and reducing car use and levels of traffic. However, benefits of these actions are not felt in areas of the city that rely on longer-distance commuting or that have lower access to public or alternative modes of transportation.

Lesson #3: Integrate and Balance Policy Interventions: New York established transportation as one of the central pillars of PlaNYC and has used this strategic plan to set objectives for the transportation sector and to guide policy interventions by various city departments. Furthermore, NYC created the Office of Long Term Planning and Sustainability (OLTPS) to oversee implementation and drive policy coherence. This has allowed New York to integrate traditional transportation-oriented policies (creation of bike lanes and bikesharing service, provision of enhanced bus service, traffic management, road re-purposing) with a rezoning strategy aimed at shifting development patterns and population density to areas well-served by its' extensive public transportation system.[79] However, the fact that the regional transportation agency (the MTA) is controlled by the state, rather than the city, presents an ongoing challenge to effective transportation policy coordination.

[76] Been, V., Brazill, C., Madar, J., McDonnell, S., 2012. *Searching for the Right Spot: Minimum Parking Requirements and Housing Affordability in New York City*, Furman Center for Real Estate and Urban Policy, Policy Brief
[77] ITDP Streetsblog Website. Available at: http://www.streetsblog.org/2011/04/18/to-curb-congestion-parking-reform-must-be-in-planyc-update/.
[78] Transport for London. Available at: http://www.tfl.gov.uk/roadusers/congestioncharging/6723.aspx
[79] Furman Center for Real Estate and Urban Policy, 2010. *How Have Recent Rezonings Affected the City's Ability to Grow?* Policy Brief.

In London, the GLA has similarly organized transportation policy under a citywide planning document (the London Plan) and climate change action plans. The GLA relies on a stand-alone agency to develop and implement transportation policy (TfL) and does not have a dedicated coordinating department, relying instead on GLA staff to perform this task. Furthermore, the fragmented nature of authority over elements of city planning (parking policy, development, zoning) between the GLA and borough councils creates challenges related to policy implementation and coherence.

Paris has explicitly linked the city transportation plan with the local climate change action plan, and implementation and coordination of climate policy and the climate action plan are overseen by a Deputy Mayor supported by a small staff embedded within the Urban Ecology Agency. However, there is no city agency tasked explicitly with coherence and coordination across government departments and sectors, and the diffusion of authority over transportation amongst city, regional, and national governing bodies creates substantial potential for incoherence. This, along with the fragmentation of jurisdictional authority over the transportation system, presents considerable challenges in terms of balancing policy actions.

None of the three cities, however, does terribly well in terms of balance and integration in the local transportation system. This requires integration of payment methods, inter-modal connectivity (bike-share linked to surface and sub-surface public transportation; bike parking at public transit stations; on-board capacity for bikes) and multi-modal trip planning and real-time information services. Furthermore, it suggests the need for viable, interconnected alternative cycle networks supported by priority or dedicated signaling, in order to enable meaningful increases in the modal share for cycling, which remains anemic in all three cities as compared with front-running cities.

Lesson #4: Empower Cities and Enable Flexibility: The provision of BRT, as well as expansion of the subway system, in New York have been supported by federal and state funding. However, efforts by the city to use regulatory authority to drive efficiency improvements in the taxi sector ran into jurisdictional resistance from the federal government and were ultimately rejected by the US Supreme Court.[80] The defeat of the proposed congestion charging system reflected an inability to resolve the interests of suburban and core residents, and the state legislature enabled these differences to block the proposal.[81]

[80] Chan, S. 2008. *Judge Blocks Hybrid Taxi Requirement*, New York Times, City Room Website. Available at: http://cityroom.blogs.nytimes.com/2008/10/31/judge-blocks-hybrid-taxi-requirement/
[81] Schaller 2010

Both London and Paris have benefited enormously from considerable, if uneven, financial and jurisdictional support, not only from their respective national governments but also from the European Union. The UK government invested the GLA with the necessary political authority to implement the congestion system that has had positive effects in terms of reducing congestion and associated emissions while generating a steady stream of revenue that the city has been able to invest in bus service improvements. Paris, on the other hand, is embedded within jurisdictional configurations that render it highly reliant on other actors (regional and national government) with negative implications both for local policy flexibility and regional coordination. In terms of financial support, both cities have received funding support for expansion and improvement of transportation systems the national and European governments. Paris, however, benefits considerably from a much higher level of access to local tax revenues, thus providing the city with increased financial flexibility as compared to either London or New York.[82]

Lesson #5: Improve Coordination: New York illustrates the challenges of coordination in federal political systems such as the United States. At times, multiple levels of government have succeeded in working together in the service of broader objectives, including expansion of the subway and commuter rail systems and creation of bus rapid transit service. However, the ongoing divide between metropolitan and regional populations suggests the need for ongoing efforts at inter-jurisdictional coordination in order to address transportation in the broader urban agglomeration.

The weak authority of the GLA vis-à-vis the boroughs thus acts as a major barrier to effective supply-side MBI policy and has resulted in patchwork initiatives related to parking policies, road space reallocation, and creation of alternative transportation infrastructure. The GLA is also handcuffed by its' relatively weak powers over land-use and zoning, leaving it with limited ability to influence population density and growth patterns and leading to projections of substantial future population growth at the outer fringes of the city.[83] However, some coordination is ensured through requirements that sustainability plans at each level of government must conform to the general principles of those established by next level government up the ladder (the GLA must conform to national principles and plans; the boroughs must conform to the GLA London Plan).

[82] Allport, R., Brown, R., Glaister, S., Travers, T., 2008. *Success and Failure in Urban Transport Infrastructure Projects*
[83] City of London 2006: 27

In Paris there is evidence of positive and negative coordination. In 1996 the national government passed a law requiring all cities over a population threshold to prepare urban transport plans. This spurred the preparation of local plans, setting of targets for reduced car travel, and increased investments in alternative transportation services and infrastructure. However, there have been major political tensions around development of the regional transportation network between the City, the Ile de France, and the national government that have led to policy stagnation.[84] The regional governing body has weak powers of coordination with respect to its' constituent members, which has contributed to a stark distinction in Paris between the inner city and remainder of the regional agglomeration: the former well-served by public and alternative transit services and infrastructure and exhibiting much higher modal shares as a result; the latter remaining car-oriented and poorly connected to the dense network of alternative transportation services and infrastructure.

[84] Laurian 2012: 47

5. Recommendations:

Broaden the popular understanding of market-based instruments to include actions that address underlying subsidies and public perceptions in addition to those that operate through more traditional direct pricing mechanisms. At the end of the day, imposing direct prices on users and reducing implicit or explicit subsidization of the status quo both serve the same purpose: they create incentives for individuals to reconsider the extent, and mode, of travel as a result of increased cost imposition.

Balance the expanded menu of policy approaches and ensure they are coherently implemented. Cities need to utilize the multiple modes of authority that they possess and intervene by pulling multiple different policy levers while remaining sensitive to the ways that they interact with one another. This requires local resources dedicated to implementation and attention to policy coherence between different types of actions undertaken by various city departments and agencies.

Integrate policy interventions into broader sustainability planning and objectives. Sustainable transportation policy needs to be oriented towards common objectives, and operationalized across government and local sectors and departments. High level political involvement and dedication of resources and authority is likely necessary in order to ensure that actions related to land-use planning, streets and parking, zoning regulations, tailpipe pollution, public health and safety, public transit, and parks and are coordinated and coherent.

Empower municipal governments by providing financial resources and jurisdictional capacity. Providing access to a substantial and stable pool of financial resources can allow cities to complement supply-oriented MBIs with improvements in alternative transportation infrastructure and services that might not otherwise be possible due to local resource constraints. With the current infrastructure fund set to expire in 2014 there exists an opportunity to enhance the fiscal context in which Canadian municipalities operate and to enable innovative and meaningful local policy actions in areas related to infrastructure and service provision, land-use planning and zoning upgrades, and pricing mechanisms.

Coordinate actions and objectives between all three levels of government in Canada. There is a need to develop better mechanisms and processes of coordination in order to facilitate positive enabling of local policy intervention and alignment with national objectives. Traditionally a weak-point in Canadian intergovernmental relations, the recent involvement of Canadian cities via the Federation of Canadian Municipalities (FCM) in a national dialogue on long-term infrastructure planning and funding is a good start but needs to be expanded and strengthened in order to more effectively bring cities into the national discussion on climate change and transportation governance.[85]

[85] Federation of Canadian Municipalities, News Releases, 2012 Website. Available at: http://www.fcm.ca/home/media/news-releases/2012/statement-by-fcm-president-on-the-completion-of-the-federal-governments-regional-infrastructure-roundtables.htm