**Climate-smart Infrastructure**

**Submission to Infrastructure Canada**
**Recommendations: Phase II of the Government of Canada's Infrastructure Plan**

**By Équiterre**

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## About Équiterre – changing the world, one step at a time

With more than 130,000 followers, 18,000 paying members and 1953 media mentions (in 2014), Equiterre is Quebec's most prominent environmental group[i] and one of the most influential ENGO federally. For over 20 years, Equiterre has worked with citizens, farmers, organizations, think tanks, businesses, municipalities and governments of all stripes to influence environment and climate change policies and related practices in Quebec and Canada. Équiterre's national policy work is led out of its Ottawa office.

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# Climate-Smart Infrastructure:
# Recommendations to maximize GHG emissions reduction from Phase II Infrastructure Investments

## Executive Summary

We offer recommendations on the Government of Canada three infrastructure spending categories: public transit infrastructure, green infrastructure and social infrastructure. These recommendations are aimed at maximizing the climate change mitigation potential of Canada's Infrastructure Plan. Additionally, this plan presents an opportunity to fund sustainable and cost-effective infrastructure solutions and to ensure individual Canadians, municipalities and cities have the tools, financing and options needed to reduce their greenhouse gas (GHG) emissions.

**Public transit infrastructure**
Implement climate criteria to determine proposed transit projects eligibility for funding under Phase II of the Public Transit Infrastructure Fund. These criteria should asses whether proposed transit projects:

- Achieve the greatest GHGs reduction by assessing the carbon intensity of proposed transit projects;
- Achieve the greatest GHG at the lowest cost through a cost analysis of cost/ton of GHG emission reduction;
- Encourage high-density development by requiring full use of municipalities authorities to limit urban sprawl;
- Ensure adequate operation and maintenance (O&M) funding to maintain quality of public transit.

and

- Allocate $1 billion over 10 years for active transportation projects as part of Phase II of the Government of Canada's Public Transit Fund.
- Allocate at least $5 billion over ten years to support public transit electrification.
  This funding should be used in part to require public transit authorities across Canada to set a timeline for a complete phase out of their gasoline and diesel bus fleet, to be replaced with electric buses and light-rail.

**Green infrastructure**
Implement a 'green screen' criteria to determine proposed projects eligibility for funding under Phase II of the Green Infrastructure Fund including

- Full economic lifecycle cost assessment
- Full carbon cost assessment
- "Best Available Solutions" assessment

Allocate a minimum of $1 billion over ten years to:

- Purchasing and installing direct current fast charging (DCFC) stations to complete a national EV highway;

- Enter into financing agreements (such as cost-share agreements) with municipalities and public institutions (universities, airport authorities etc.) across the country to install electric vehicle charging stations;
- Provide funding to municipal transit authorities to install EV charging stations and dedicated EV parking at public transit stations.

In addition, do not allocate funding for natural gas or hydrogen fuelling infrastructure for on-road vehicles in Phase II of the Green Infrastructure Fund.

**Social infrastructure**

- Allocate $1 billion of Phase II of social infrastructure funding to provide financing for not-for-profit organizations to build highly energy efficient office buildings as social innovation hubs in all Canadian major cities;
- Develop strict energy-efficiency criteria for social infrastructure housing, require all new social housing to be built in Canada starting in 2017 to use the most efficient heating and cooling systems (for low daily energy use) and constructed according to the latest energy-efficiency standards;
- Require energy-efficiency criteria for all social infrastructure investments in First Nations communities including housing on First Nations, northern and Inuit housing, early learning and child care centres, social and recreational facilities and health care facilities;
- Allocate funding, including funding mechanisms, to attract private investments for deep-energy retrofits of existing social housing across Canada and set a national target for deep energy retrofit for social housing.

The success of Canada's international climate change commitments hinges on the sustainability of our infrastructure, as we build, repair and replace our existing infrastructure over the coming years. These major initiatives – climate mitigation and infrastructure – must therefore complement each other. This document points to some of the practical measures that Canada can take to reduce greenhouse gases through infrastructure spending that benefits all Canadians.

## Infrastructure investments and Canada's climate commitments

At the 21st UNFCC Conference of the Parties in Paris, Canada joined the rest of the world in committing to keep global temperatures below a two-degree increase. Canada's Environment and Climate Change Minister also endorsed an aspirational 1.5-degree target. To do its part, Canada pledged to reduce its emissions by 30 per cent below 2005 levels by 2030.

Canada will be required to monitor and report on its national emissions and to meet every five years to review progress. Taking the first step toward these targets, federal and provincial governments are developing a pan-Canadian climate change framework. The Vancouver Declaration on Clean Growth and Climate Change, which outlines the consensus reached at the First Ministers meeting in March 2016, explicitly links infrastructure to climate change, identifying as a specific action:

> "Supporting climate change mitigation and adaptation through investments in green infrastructure, public transit infrastructure and energy efficient social infrastructure".

Phase II of Canada's Infrastructure Plan will be of critical importance to meet these goals.

**Climate Change and Infrastructure**

Climate change poses a global infrastructure building challenge because the climate is changing quickly and infrastructure projects are built for the long term. Moreover, the carbon embedded in the bridges, buildings and roads built today will determine whether Canada can meet its long-term climate goals.

Canada's infrastructure choices have a major role to play in national climate resilience, adaptation and mitigation successes. Today's infrastructure investment decisions are essential to achieving our GHG emissions commitments.

Infrastructure shapes everyday lives of Canadians, for example, in deciding whether to drive to work on take transit, whether to buy an electric vehicle or a gasoline vehicle. 'Climate smart' infrastructure will encourage and facilitate sustainable behaviours, providing both direct and indirect benefits to Canada in the form of reduced cost of climate adaptation, improved air quality, improved health benefits, improved road safety for motorists, pedestrians and cyclists, and long-term job creation in the design and building of this new climate climate-smart infrastructure.

The carbon embedded in any infrastructure projects should be considered when evaluating projects eligible for federal infrastructure investments. Today's infrastructure projects lock us in to a carbon path over the multi-decade lifetime of the project. We need to think carefully about our infrastructure choices, favouring projects that yield co-benefits, including behavioural change and low-carbon technologies.

## Public Transit Infrastructure Fund

Phase I of the Public Transit Infrastructure Plan provides $3.4 billion for public transit over the course of three years. In total, the Government of Canada committed to $20 billion over ten years for Canadian public transit.

Phase I funding is available for rehabilitation of existing public transit systems as well as the planning of system improvements and expansions. System optimization and modernization are also eligible project categories. In all categories, projects are expected to deliver increased capacity, enhanced service or improved environmental outcomes.

Phase II of funding will be focused on the long term and will likely place more of an emphasis on transit system expansion projects. We urge that Phase II of federal transit investments be allocated according to the proposed climate criteria, rather than ridership.

**Rationale**
The transportation sector is currently responsible for 23% of Canada's GHG emissions and offers tremendous opportunities for significant emissions reduction. To reduce emissions in the transportation sector, Canada needs to drive a transition towards zero and low-emissions transportation modes, increase the use of cleaner fuels in Canada, encourage mode shifting towards walking, cycling and public transit, and encourage denser, mixed-use communities.

In Canada, of the approximately 15.4 million people who regularly commute, 12% use public transit as their primary mode of travel. Although the share of commuters choosing public transit is significant, over 12 million Canadians choose to use cars to get to work: 74% of commuters drive a private automobile, while another 5.4% ride as passengers[1]. Improvements in the availability and efficiency of public transit, incentives for mode shifting away from solo-car rides towards auto-share, public transit and active transportation would provide Canadians with concrete options to change their travel habits and do their part to tackle climate change.

The policy goal of Phase II of Public Transit Fund should be to maximize the GHG emissions reductions associated with public transit investments by assessing the carbon intensity of proposed projects, encouraging mode shifting (towards public transit and active transportation) and by increasing the utility derived from public transit investments, through an electrification strategy.

### Recommendation: Implement climate criteria to determine project eligibility. Funding for Phase II of the Public Transit Infrastructure Fund should be conditional upon projects meeting the following climate criteria:

- **Achieve the greatest GHGs reduction:** assess the carbon intensity of proposed transit projects through a lifecycle assessment of GHG emissions using total km travelled and on a per passenger km (PKM) basis. PKM gives you the ability to better compare across different types of transportation. Provide funding to projects that maximize GHG reduction;

[1] Statistics Canada. (2013). NHS in Brief: Commuting to Work—National Household Survey (NHS), 2011. (Catalogue no. 99-012-2011003). Labour Statistics Division: Turcotte, M. Government of Canada.

- **Achieve the greatest GHG at the lowest cost:** Proponents of public transit projects should demonstrate their project achieves the GHG emissions reductions at the lowest cost through a cost analysis of cost/ton of GHG emission reduction.

- **Encourage high-density development:** In their request for federal transit funding, municipalities should demonstrate that they have used their legislative, planning and zoning tools to limit urban sprawl by having fixed urban boundaries and establishing densification strategies (minimum target for all new residential development).

  Similarly, the federal government should establish minimum density criteria (number of people or jobs) for higher order (light or heavy rail) transit infrastructure funding. Minimum densities should also be established at transit hubs and along transit corridors (Ontario's Growth Plan for the Greater Golden Horseshoe provides a model). The Government of Canada, in collaboration with cities and municipalities should identification of target markets to be served by transit infrastructure and estimates or forecasts of mode shifting.

- **Ensure adequate operation and maintenance (O&M) funding to maintain quality of public transit:** The federal government should require that municipalities demonstrate they have funding strategy in place (including support for revenue tools) for adequate long-term funding for operations and maintenance to support new investments in public transit.

**Additional Recommendation:**

- **Eliminate the federal public transit tax credit:** In 2006 the Canadian federal government introduced an income tax credit, the Public Transit Tax Credit, covering 15% of the annual (eligible) cost of public transit. In 2012, the total cost to government of transit expenses claimed under the program was over $1.38 billion at a cost over $280million per year in foregone tax revenues (Canada Revenue Agency, 2014). Recent research demonstrates that this income tax credit is costly and ineffective in promoting transit use in Canada. Moreover, it is a regressive tax credit, available only to those with income tax owing[2]. We recommend that the Public Transit Tax Credit be eliminated starting in budget 2017. There are better ways to incentivize public-transit use than subsidizing transit passes.

[2] Rivers, Nicholas and Plumptre, Bora, The Effectiveness of Public Transit Subsidies on Ridership and the Environment: Evidence from Canada (January 29, 2016). Available at SSRN: http://ssrn.com/abstract=2724768or http://dx.doi.org/10.2139/ssrn.2724768

## Active Transportation

The Government of Canada's Public Transit Fund should include funds dedicated strictly to active transportation projects, including walking and cycling paths, and consider incentives to encourage mode shifting from single vehicle rides towards active transportation and public transit. Investments in public transit and active transportation are progressive and equitable, providing benefits to low and middle-income Canadians. Investments in active transportation are a cost-effective way to reduce GHG emissions, can be deployed rapidly through many 'shovel ready' projects in communities across Canada. In addition, they will deliver significant co-benefits in terms of reduced car fatalities, promoting an active lifestyle and reducing local air pollution. Active transportation infrastructure is a necessary complement to public transit infrastructure and should go hand-in-hand in urban planning strategies. Walking and cycling are solutions to the problem of 'the last mile': connecting people from their public transit drop-off location to their final destination.

Across Canada, cycling and walking are growing in popularity as a daily commuting option. It offers a healthy, convenient and affordable solution to driving and will play an increasingly important role in helping Canada meet its carbon commitments. However, not all cities are investing in cycling and walking infrastructure to the same degree, particularly when it comes to creating separated lanes and other measures that improve safety and attract new cyclists and pedestrians. Understanding the current cycling and walking infrastructure in cities across Canada will help the Government of Canada identify opportunities to improve infrastructure as well as adopt or support policy tools to ensure these modes are a viable transportation option. Based on the proposed national benchmarking assessment, cities and major municipalities should develop targets for mode shifting (walking, cycling and ride share programs).

*Équiterre welcomed the Government of Canada's decision to include active transportation projects as eligible for funding under the Québec-Canada agreement on Public Transit Infrastructure Funding in July 2016.*

*http://www.equiterre.org/communique/bonne-nouvelle-du-financement-pour-le-transport-actif-et-collectif-au-quebec*

## Recommendation: Allocate $1 billion over 10 years for active transportation projects as part of Phase II of the Government of Canada's Public Transit Fund.

**Additional Recommendation:**

- The Government of Canada should develop a biennial national benchmarking report, mandated by Transport Canada, that tracks progress in such areas as cycling and walking infrastructure (dedicated bike lanes, paths, trails, etc.), integration with transit hubs and corridors, cycling policies, public health and safety indicators, in order to guide additional investments in walking and cycling infrastructure[3];

[3] See for example *L'état du vélo au Québec: http://www.velo.qc.ca/fr/expertise/etat-du-velo-au-Quebec*

## Electrification of Public Transit

Maximizing the GHG emission reduction from transit infrastructure will require investments to support rapid electrification of transit fleet across Canada. In addition, such infrastructure investments should be tied into ongoing efforts and commitments to clean the electricity grid, so that buses and trains are ultimately powered by renewable energy sources such as solar, wind and hydro.

Canadian bus builders are already active in the design and testing of electric buses (e-buses) with the support of public funding. However, implementation of those new technologies in urban transit fleets is almost non-existent. The federal and provincial governments should disseminate the results of the few ongoing demonstrations projects, to demonstrate the logistical and financial feasibility of these projects. Secondly, it is recommended that a tool be developed to assist transit authorities to appraise the adequacy of e-buses on their routes, and to allow transit authorities to rapidly and inexpensively identify those opportunities for deployment of e-buses.

Since 2010, municipalities have increasingly cited the need to move towards all electric zero emissions vehicles (i.e. battery electric and fuel cell electric vehicles) as part of their internal and municipal sustainability programs. The Partners for Climate Protection (PCP) program is a network of Canadian municipal governments that have partnered together to actively reduce GHGs. In Canada, more than 250 municipalities, making up more than 65% of the Canadian population, have joined PCP by making a public commitment to reduce emissions. Transit electrification has frequently emerged among Canadian municipalities as one of the most realistic goals over the next decade.

Transit electrification is both cost-effective and realistic. Transitioning Canadian bus fleets from gasoline and diesel to electric would happen very quickly, with appropriate funding. Since the average Canadian transit vehicle is typically 6.5 years old and buses are typically kept in service for 12 to 18 years, more than half of transit buses in Canada will need to be replaced over the next decade.

A dedicated fund for public transit electrification will promote and encourage the technological innovation that is already making electrification a stable and efficient means of running municipal public transit systems. For example, recent advances in battery technology have greatly increased their energy storage capacity. Hydro-Quebec is currently developing new, environmentally friendly battery systems that will enhance vehicle performance, reduce costs and increase safety for passengers.

Electrified public transit is an established and reliable technology, with large –and growing – advantages over conventional fuel-based systems with regards to lifetime costs and greenhouse gas emissions. Fully electric buses are already on the road in many cities and new automatic charging stations are capable of quickly recharging buses from any manufacturer.

### Recommendations:

- **Allocate at least $5 billion over ten years to support public transit electrification.**
  **This funding should be used in part to require public transit authorities across Canada to set a timeline for a complete phase out of their gasoline and diesel bus fleet, to be replaced with electric buses and light-rail.**

## Green Infrastructure Fund

Phase I of the Green Infrastructure Fund announced in Budget 2016 contained over $5 billion allocated towards climate change adaptation projects in buildings, electric vehicle and alternative fuels infrastructure, regional electricity cooperation, supporting municipal climate change and green projects, community capacity for asset management and clean water and waste water fund. While we welcome these initial investments, we recommend the investments under Phase II of the Green Infrastructure fund be more targeted and subjected to a rigorous screen for their GHG emissions mitigation potential.

### Recommendation: Funding for Phase II of the Green Infrastructure Fund should be conditional upon projects meeting the following 'green screen' criteria:

**A. Full economic lifecycle cost assessment**

Many government infrastructure projects fail to consider full lifecycle costs. Lifecycle costing should consider the impacts of climate change and more extreme weather. An approach that integrates natural infrastructure, such as wetland and trees, with built infrastructure can mitigate the impact and cost of extreme weather such as flood and storm waters, saving the government billions in repair costs.

**B. Full carbon cost assessment**

Accounting for carbon in any given infrastructure project demands we consider carbon at all stages of its lifecycle, including the carbon emitted during decommissioning or as a result of project maintenance. For example, efforts to reduce embodied emissions have an immediate climate mitigation effect, while operational emissions, though often far more significant in terms of total volume, return benefits over time. End of life emission reduction efforts may not return climate benefits for many years or decades. Full lifecycle carbon accounting can minimize the climate impacts at each phase of a project's life.

**C. "Best Available Solutions" assessment**

Based on the Alternative Land Use Services model, project proponents should be required to undertake an analysis of whether the need associated with the infrastructure project can be met through a different type of infrastructure that performs better under one or both of the first two screens, using the analysis of a qualified expert.

## Invest in electric vehicle infrastructure in Canada

Zero-emission vehicles (ZEV)are vehicles that emit little to no carbon pollution at tailpipe, such as battery-electric vehicles. Creating infrastructure needed for the rapid deployment of where ZEVs will move Canada toward its GHG emission targets while spurring technological innovation, as similar policies have done in places like California. The country is poised to quickly increase the number of ZEVs on the road with more than a quarter of Canadians ready to purchase a ZEV, the right infrastructure decisions could bring translate demand into reality on Canadian roads.

Federal infrastructure investment to support EV charging stations would complement existing electric vehicle purchase incentive programs and charging infrastructure investments in Ontario, Quebec and B.C.. The effectiveness of all of these policies will be amplified by current efforts to phase out coal-generated electricity and increase renewable generation in the electricity sector.

Electric-vehicle charging stations should also be a priority along highways, at public transit hubs and in strategic locations, in order to make it easier for Canadians to adopt EV technology. The federal and provincial governments should reach a funding agreement to complete the deployment of fast charging stations on national highways.

Budget 2016 allocated $62.5 million for zero-emission vehicles (ZEVs) and related infrastructure. Phase II of green infrastructure funding should solidify the Government of Canada's role in ensuring the rapid deployment of electric vehicle infrastructure in Canada. In addition, budget 2016 provided funding for alternative transportation fuels infrastructure, including natural gas. Given the increasing demand of electric vehicles in Canada and the readiness of the technology for on-road vehicles, alternative fuels infrastructure, such as natural gas and hydrogen, are not necessary, nor competitive with electricity with regards to GHG emissions.

**Recommendations: Allocate a minimum of $1 billion over ten years to:**

- **Purchasing and installing direct current fast charging (DCFC) stations to complete a national EV highway;**
- **Enter into financing agreements (such as cost-share agreements) with municipalities and public institutions (universities, airport authorities etc.) across the country to install electric vehicle charging stations;**
- **Provide funding to municipal transit authorities to install EV charging stations and dedicated EV parking at public transit stations.**

**In addition, do not allocate funding for natural gas or hydrogen fuelling infrastructure for on-road vehicles.**

## Social Infrastructure Fund

Budget 2016 allocated $2.3 billion in new investments for social infrastructure projects. Aimed at building stronger communities and lifting more Canadians out of poverty, funding includes $1.2 billion for social infrastructure investments in First Nations, Inuit and Northern communities, as well as $1.5 billion for affordable housing and $342 million for cultural and recreational infrastructure. The provinces and territories themselves will be given the opportunity to identify priority areas for affordable housing.

## Supporting the not-for-profit sector: Funding for highly energy-efficient office buildings

Phase II of social infrastructure spending should include innovative funding mechanisms aimed at improving collaborative, affordable and highly energy-efficient buildings for community organizations across Canada. Net zero buildings (a building which produced as much energy as it uses over the course of the year), LEED Platinum certified buildings and other highly energy efficient buildings can be built in Canada as a result of advances in construction technologies and the availability community renewable energy systems.

The not-for-profit sector has historically been an early adopter of new technologies and has the potential to lead the deployment of sustainable buildings across Canada through demonstration projects. Financial support could take the form of federal lands donations, low cost financing, loan guarantees, capital cost tax exemptions and grants to support the construction of innovative office buildings by and for the non-profit sector. Just as the Government of Canada enters into 50% cost-share agreements with provinces for infrastructure investments, the Government of Canada could enter into cost-share agreements with the not-for-profit sector.

**Équiterre La Maison du Développement Durable in Montreal**

Eight socially and environmentally minded organizations have united to create the Centre for Sustainable Development, which offers space for reflection, innovation, education and the meeting of minds on sustainable development. This demonstration green building, the first to receive LEED Platinum Certification in Quebec, aims to inspire everyone from property developers to the general public. The five-story building aims to:

Maximize the potential of socially and environmentally minded organizations through the sharing of space and resources;

Serve as a place for reflection, education, innovation and the meeting of minds on sustainable development;

Offer citizens, businesses and governments new educational tools on sustainable development;

Offering a research tool for Canadian researchers interested in green buildings.

Non-profit organizations offer opportunities for education and innovation on sustainable building practices. Building sustainable social innovation hubs across the country will amplify the potential for collaboration within the sector and will support organizations already working at the forefront of green building innovation. Federal support for net-zero building spaces would make a significant contribution to the financial stability of the not-for-profit sector in Canada, providing a new source of equity and resulting in significant energy savings that can be passed on to organizations.

Financing mechanisms to encourage not-for-profit organisations' building and owning highly efficient office space could be an important component of the Minister of Employment, Workforce Development and Labour Social Innovation and Social Finance strategy for the sector. This recommendation is in line with the federal government's social infrastructure goal of building stronger communities.

**Recommendation:**
**Allocate $1 billion of Phase II social infrastructure funding to provide financing for not-for-profit organizations to build highly energy efficient office buildings as social innovation hubs in all Canadian major cities.**

### Energy efficient and sustainable social housing infrastructure

Affordable housing can and should be sustainable. There are many examples of low-cost innovative residential buildings with low carbon building components and, most importantly, that maintain low energy use requirements over their lifespan. This is particularly relevant to Indigenous peoples, who are facing important infrastructure deficits that urgently need to be addressed. Sustainable social housing complement current Government of Canada commitment to ensure that all indigenous communities have sustainable energy supplies, safe drinking water as well as adequate waste infrastructure.

One in four Canadian households cannot afford their current housing, including more than 50% of low-income seniors. Meanwhile, residential buildings offer major opportunities for GHG reduction. Direct and indirect household emissions accounted for 46% of Canada's total GHG emissions in 2004 in Statistics Canada's latest estimates, with residential fuel use ranking third highest per capita among G8 countries. The University of Calgary reports that Alberta's residential housing sector could reduce its GHG emissions by 4 million tonnes per year by improving its energy efficiency. This is equivalent to a 35% reduction in household emissions by 2050.

Energy-efficient buildings have additional community benefits, including happier tenants, improved indoor air quality and lower heating and cooling costs. Mixing cement and slag, using low-emitting paint and installing energy-efficient lights are all ways a residential building can be both cost-effective to build and energy-efficient to inhabit. Energy savings resulting in energy-efficient social housing can be passed on to tenants– a major benefit for low-income households. Organizations such as the Canada Green Building Council already offer programs along these lines.

**Recommendations:**

- **Develop strict energy-efficiency criteria for social infrastructure housing, require all new social housing to be built in Canada starting in 2017 to use the most efficient heating and cooling systems (for low daily energy use) and constructed according to the latest energy-efficiency standards;**
- **Require energy-efficiency criteria for all social infrastructure investments in First Nations communities including housing on First Nations, northern and Inuit housing, early learning and child care centres, social and recreational facilities and health care facilities;**

- **Allocate funding, including funding mechanisms, to attract private investments for deep-energy retrofits of existing social housing across Canada and set a national target for deep energy retrofit for social housing.**