

**CANADA**  
**National Reporting to CSD-18/19**  
**Thematic Profile: Transport**

## **1 Preface**

Canada has a well-developed transportation system, with large investments in infrastructure, vehicles and fuel distribution networks. Transportation has contributed significantly to Canada's economy and quality of life. At the same time, issues associated with lack of access, availability and unintended effects of the operation of the transportation system remain. The Government of Canada and its partners are actively working towards a cleaner transportation system in Canada, while at the same time ensuring that the economic and social needs of Canadians are met.

### **1.1 Transportation Decision Making**

In Canada, three levels of government share responsibility for transportation. In general, the federal government is responsible for national, interprovincial and international transportation; provincial and territorial governments are responsible for intra-provincial transportation; and municipalities are responsible for urban transit, local roads, and local planning decisions. Federal and provincial Ministers of Transportation coordinate activities through the Council of Ministers Responsible for Transportation and Highway Safety.

Transport Canada is the main federal department governing Canada's national transportation system. The department advances sustainable transportation through policies, regulations and programs that work to reduce the harmful impact of all transportation modes on Canada's air and water. Natural Resources Canada, Environment Canada, Infrastructure Canada, Industry Canada and other federal departments and agencies also contribute to Canada's national sustainable transportation goals.

Given the nature of sustainable transportation issues and its shared jurisdiction, the federal government also works in cooperation with other levels of government, private industry, not-for-profit organizations, and individual Canadians.

### **1.2 Challenges**

Canada's efforts to advance sustainable transportation face a number of challenges, including geographical and economic factors. An expansive land mass and dispersed population means that both people and goods must be moved across large distances. Canada's cold climate, including ice, snow, and permafrost, poses further challenges in terms of operating and maintaining vehicles and transportation infrastructure, particularly in Canada's North.

The need to further manage transportation demand is becoming increasingly important. The use of urban transit transportation is rising in Canada, however Canadians continue to rely on private vehicles as a primary mode of transport and walking and cycling make up only a small proportion of trips.

### **1.3 Emissions Trends in the Transportation Sector**

Canada has made significant progress over recent years in reducing air pollutant emissions resulting from transportation, due to regulatory initiatives and stock turnover. Between 2000 and 2007, in

Canada's transportation sector, sulphur oxides decreased by 17.1 percent, nitrogen oxides by 12.4 percent, fine particulate matter by 13 percent, and volatile organic compounds by 25.6 percent. Further data is available in Canada's [National Pollutant Release Inventory](#).

Transportation greenhouse gas (GHG) emissions have grown since 2000 although at a slower rate than the previous five years. Emissions from the transportation sector increased an average annual rate of 0.9 percent between 2000 and 2006, from 180 to 190 megatonnes (Mt), compared with 2.4 percent between 1995 and 2000. As of 2007, the transportation sector was responsible for 27 percent of Canada's greenhouse gas (GHG) emissions. Further information is available in Canada's [Greenhouse Gas Inventory](#). Additional data and trends on GHG emissions and energy use in Canada's transportation sector can be found in Canada's [National Energy Use Database \(NEUD\)](#).

#### **1.4 Canada's ecoTRANSPORT Strategy**

In 2007, the Government of Canada introduced a multi-year \$463 million ecoTRANSPORT Strategy to improve efficiency and reduce air emissions and energy use in the transportation sector. The ecoTRANSPORT Strategy features the ecoMOBILITY program; the ecoTECHNOLOGY for Vehicles Program; the ecoENERGY for Personal Vehicles Program; and the ecoFREIGHT program. The ecoAUTO Rebate Program and Scrappage Program, introduced separately, are additional complementary programs. These programs will be described in further detail below, along with additional policies, programs, and other initiatives aimed to advance the environmental, social, and economic sustainability of Canada's transportation system.

## **2 Personal Transportation**

In Canada, personal vehicles are major contributors to smog and account for more than 12 percent of Canada's greenhouse gas emissions.

### **2.1 Economic Incentives**

The Government of Canada introduced the [ecoAUTO Rebate Program](#) in 2007 as an interim measure to encourage Canadians to purchase fuel-efficient vehicles before new fuel-efficiency standards take effect on model year 2011 vehicles. The program offered rebates from \$1,000 to \$2,000 towards the purchase or lease (12 months or more) of new fuel-efficient vehicles for the model years 2006, 2007 and 2008. Under the program, which expired in March 2009, \$191.2 million in rebates was distributed to Canadians to lease/purchase over 169, 800 eligible fuel-efficient vehicles. A **Green Levy** on gas-guzzling vehicles was also introduced in March 2007 and remains in effect (as of 2009). The Levy, which ranges from \$1,000 to \$4,000, applies to passenger vehicles with a fuel consumption rating of 13 litres or more per 100 kilometres.

In a further effort to encourage the purchase of fuel efficient vehicles, in 2009, The Government of Canada introduced a National Vehicle Scrappage Program, [Retire your Ride](#). The four year \$92 million program, delivered by the Clean Air Foundation, offers incentives to Canadians who turn in their older, more polluting vehicles and promotes sustainable transportation choices. Incentives include discounts on public transit passes, bicycles, memberships in car-sharing programs, or \$300 cash. The program also includes a National Car Recycling Code of Practice, which raises the standard of environmental care for vehicle recycling.

Finally, since 2006, the Government of Canada has offered a non-refundable [tax credit for public transit passes](#). The program was introduced to encourage individual Canadians to use public transit in order to reduce traffic congestion and reduce air pollution and greenhouse gas emissions.

## 2.2 Fuel Consumption Standards for Light-Duty Vehicles

Over the past thirty years, Canada has had a voluntary policy for improvements in fuel consumption from cars and light trucks. In 2005, vehicle suppliers signed a [Memorandum of Understanding \(MOU\)](#) to reduce GHG emissions from cars and light trucks by 5.3 million tonnes in 2010.

On April 1, 2009 the Government of Canada announced that it is proceeding with the development of regulations under the Canadian Environmental Protection Act, 1999 (CEPA, 1999) to limit emissions of carbon dioxide (CO<sub>2</sub>) from new cars and light-duty trucks to take effect beginning with the 2011 model year. These regulations will be harmonized with the national standards of the United States for improving vehicle fuel efficiency and reducing greenhouse gas emissions.

## 2.3 Emissions Regulations

Canada has developed and will continue to develop regulations to reduce smog-forming air pollutant emissions from all vehicles and engines in alignment with the world leading national standards of the United States Environmental Protection Agency. This includes smog-forming air pollutant emissions from new passenger cars and trucks, motorcycles and buses, small spark-ignition engines such as lawnmowers and chainsaws and for off-road diesel engines used in applications such as construction, mining, farming and forestry machines. As well, new regulations are being developed to address smog-forming air pollutant emissions of recreational marine engines and off-road vehicles such as snowmobiles, off-road motorcycles and all-terrain vehicles.

### *Canada-United States Co-operation on Vehicle Emissions Standards*

Canada and the United States have agreed to work together under the Canada-United States Air Quality Agreement to reduce transportation emissions by:

- harmonizing national vehicle and engine standards for emissions of smog-forming pollutants;
- optimizing vehicle and engine emissions testing activities, taking advantage of unique testing capabilities, and sharing emissions test data where appropriate to facilitate regulatory administration activities in both countries; and,
- sharing information and discussing strategies and approaches on greenhouse gas emissions standards for motor vehicles.

## 2.4 Driver Education

Canada's [ecoENERGY for Personal Vehicles Program](#) is investing \$21 million over four years to provide Canadians with tips and decision-making tools to assist them with buying, driving and maintaining their vehicles in a manner which reduces fuel consumption and greenhouse gas emissions. Resources include an annual [Fuel Consumption Guide](#) for passenger cars and light-duty vehicles; new driver training; and idle-free and tire inflation campaigns.

## 2.5 Community Partnerships – Funding for Sustainable Transportation

The Government of Canada contributes funding, through the following programs to encourage the implementation of sustainable transportation projects undertaken by non-profit organizations, municipalities, regional transportation authorities, and other community partners.

The [Moving On Sustainable Transportation \(MOST\) Program](#) was established in 1999 to support organizations in implementing sustainable transportation education projects and the development of

awareness and analytical tools. Since its inception, 97 projects have been funded by MOST in areas such as: Urban Planning and Smart Growth, Active Transportation, Ridesharing and Carsharing, Driving Practices, Fuels and Technology, Employer and Youth programs, Research Studies, and Awareness Campaigns and Educational Tools.

The [Urban Transportation Showcase Program](#) (UTSP), which operated from 2000 to 2009, was a federal contribution program which supported integrated urban transportation projects (“showcases”) aimed to reduce GHG emissions. The program funded eight multi-year initiatives across Canada that demonstrated and evaluated these approaches. The UTSP also had a capacity building component, creating sustainable transportation tools and resources for transportation practitioners and encouraging replication of successful components of the Showcases. The Program developed an extensive website which continues to include: a Case Study Library, a Transportation Demand Management (TDM) Resource Centre, links to Sustainable Transportation Research Reports and an Urban Transportation Directory.

The [ecoMOBILITY program](#), introduced in 2007 is a \$10 million program that includes capacity building and a contribution program that provides financial support to municipalities and regional transportation authorities for transportation demand management (TDM) projects. As of 2009 the ecoMOBILITY program has funded fourteen TDM projects in thirteen communities across Canada, which addresses transportation management in various ways: shifting personal automobile travel to other modes, reducing the number and length of car trips, and/or shifting trips to less congested times and routes.

Other community partnership programs funding sustainable transportation initiatives include the Green Municipal Fund™ and Equilibrium™ Communities Initiative. In 2000, the Government of Canada endowed the Federation of Canadian Municipalities (FCM) with \$550 million to establish the [Green Municipal Fund™](#). The Fund provides grants and below-market loans, as well as education and training services to support municipal initiatives that benefit the environment, local economies and quality of life. Eligible Sustainable Transportation Projects encourage modal integration and the development of comprehensive transportation networks and projects that aim to improve utilitarian transportation options. Up to \$4 million in loans and \$400,000 in grants can be requested for each project.

In 2009, the Government of Canada introduced a \$4.2-million [EQuilibrium™ Communities Initiative](#) which will provide financial, technical and promotional assistance to sustainable community projects chosen through a national competition. Winning teams (developers, planners, designers and municipalities) will develop and showcase neighbourhoods that are more sustainable and energy-efficient than most existing communities, including in the areas of land-use planning and clean-energy transportation.

Municipal and provincial/territorial governments, industry associations, academics, and not-for-profit organizations are also actively involved in the research and promotion of sustainable community transportation, including public transit and active transportation.

### **3 Freight Transportation**

The Government of Canada’s [ecoFREIGHT program](#) is investing \$61 million over four years to reduce the environmental and health effects of freight transportation through the use of technology.

The program includes a Freight Technology Demonstration Fund and Freight Technology Incentives Program, as well as mode-specific initiatives including an ecoENERGY for Fleets Program, and a Marine Shore Power Program.

The [Freight Technology Demonstration Fund](#) establishes cost-shared demonstrations to test and measure new and underused freight transportation technologies in real-world conditions, and disseminate information to industry. The [Freight Technology Incentives Program](#) provides cost-shared funding to companies and nonprofit organizations in freight transportation to help them to purchase and install proven emission-reducing technologies. The first two rounds of funding have allowed an uptake in technology of 1254 pieces of equipment under the Freight Technology Demonstration Fund and 1654 pieces of equipment under the Freight Technology Incentives Program, in projects across four modes of freight transportation.

### **3.1 Trucking**

The commercial highway freight sector is responsible for close to 10 percent of Canada's greenhouse gas emissions. [ecoENERGY for Fleets](#) is a federal funding program which provides information, training and workshops to bus and truck drivers in Canada to improve the energy efficiency of commercial and institutional fleet vehicles. In September 2009 the Government of Canada announced a pilot initiative under the Program to encourage the use of [SmartWay certified fuel-efficient technologies for heavy-duty trucks](#). Canada works in partnership with the U.S. Environmental Protection Agency's [SmartWay Transport Program](#), which offers outreach and tools to the freight sector to improve energy efficiency, and reduce greenhouse gas and air pollutant emissions. Given the large volume of heavy-duty vehicle movement between Canada and the United States, the two countries are collaborating to exchange innovative ideas to promote fuel-efficient practices in commercial fleets.

Canada's Provinces and Territories have also been collaborating on efforts to reduce energy consumption within the freight transportation sector, and released a collaborative [Guide for Purchasing Aerodynamics for Heavy-Duty Tractors and Trailers](#) in 2009.

## **4 Freight and Passenger Transportation**

### **4.1 Rail Transportation**

In 2007, the Government of Canada and the Railway Association of Canada signed a Memorandum of Understanding (MOU) identifying commitments of the Canadian railway companies to voluntarily reduce GHG and criteria air contaminant emissions. The agreement includes 2010 efficiency-based GHG emission targets, fleet renewal strategies for 2006 to 2015, and other measures and actions to further reduce emissions. The industry has made demonstrated progress towards its emissions targets, with initiatives including locomotive fleet changes, anti-idling devices, acquisition of higher capacity freight cars and improvements to operational practices. The industry reports on its progress in its [Annual Reports on Locomotive Emissions Monitoring Program](#).

The Government of Canada is currently developing new regulations to limit railway emissions, under the *Railway Safety Act*, to take effect in 2011.

## 4.2 Marine Transportation

While Canada's marine transportation system provides important passenger services in the form of ferries and cruise ship activities, it primarily supports the movement of goods. The Government of Canada is actively working with the United States and other countries to reduce pollution and greenhouse gas emissions in the marine sector. In late 2009, Canada tabled nine International Conventions to Parliament related to Maritime Pollution and Safety - eight of the International Maritime Organization (IMO) and one of the International Labour Organization (ILO). The conventions deal with the reduction of air and water pollution from ships, maintaining biodiversity and ensuring the safety of vessels, goods and workers on board.

Under MARPOL, the main international convention covering prevention of pollution of the marine environment by ships, Canada is leading a review of Annex V regarding garbage pollution. The Government of Canada has also identified the implementation of an amended Annex VI, which incorporates higher fuel-quality and emission standards, as an express goal of its Clean Air Regulatory Agenda. In 2007-2008, the Government of Canada commenced the drafting of regulations under the Canada Shipping Act, 2001 for controlling emissions of air pollutants from ships and is participating in the work of the IMO on greenhouse gases.

In 2009, Canada and the United States submitted a proposal to the International Maritime Organization (IMO) to establish an Emission Control Area (ECA) in North American coastal waters. Parties to Annex VI (regarding air emissions) of the MARPOL Convention will consider formal adoption of the proposal in March 2010. The proposed Canada-US ECA will subject large ships operating in the designated areas to stringent standards. The measures will reduce nitrogen oxides emissions by 80 percent and sulphur oxides by 96 percent, as well as reducing emissions of fine particles.

The Government of Canada has also allocated \$6 million over four years to a [Marine Shore Power Program](#) to demonstrate the use of shore-based power for marine vessels in Canadian ports in order to reduce air pollution from idling ship engines in some of Canada's largest urban centres. Canada's biggest port, Port Metro Vancouver used program funding in 2009 to install shore power for cruise ships, the first port in Canada and third in the world to implement this technology.

## 4.3 Aviation

Canada is the first country in the world to have negotiated a Memorandum of Understanding (MOU) with its aviation industry to reduce emissions of greenhouse gases from aviation sources. The agreement, signed in 2005 between the Government of Canada and the Air Transport Association of Canada (ATAC), sets an annual fuel efficiency target that will achieve a cumulative reduction in greenhouse gas emissions of 24 percent by 2012, relative to 1990 levels. The industry reports its progress in [Annual Reports on the Reduction of Greenhouse Gas Emissions](#).

Canada is also supporting the work of the International Civil Aviation Organization (ICAO) to develop international standards and recommended practices for the reduction of greenhouse gas and air pollutant emissions from aviation sources. The Government of Canada participates in the work of the ICAOs Committee on Aviation Environmental Protection (CAEP) concerning aircraft engine emissions, aircraft noise and land use planning, as well as an ICAO Group on International Aviation and Climate Change.

In 2008, Canada also began work with the Canadian Airports Council to implement Air Quality Management Plans involving the establishment of emission inventories and determining operational opportunities to reduce emissions.

## 5 Sustainable Transportation Fuels

As a percentage of total transportation fuel, the production of renewable fuels and the use of alternative fuel are both increasing in Canada. Canada supports the production and use of clean fuel sources and low carbon fuels through its [Renewable Fuels Strategy](#). The Strategy encompasses four components, including increasing the retail availability of renewable fuels through regulation; supporting the expansion of Canadian production of renewable fuels; assisting farmers to pursue new opportunities in this sector; and, accelerating the commercialization of new technologies. The Renewable Fuels Regulation and the ecoENERGY for Biofuels program are two key aspects of the Renewable Fuels Strategy.

Canada is currently drafting regulations on renewable fuels with an approach similar to that of the U.S. This will include the development of a renewable fuel regulation that would require an average renewable fuel content of at least 5 percent based on the volume of gasoline, to be implemented by September 2010, and a 2 percent renewable fuel content for diesel fuel and heating oil, to be implemented by 2011 or earlier, subject to technical feasibility.

The [ecoENERGY for Biofuels program](#) (2008-2017) will support the domestic production of renewable fuels by providing a per litre operating incentive to producers of gasoline and diesel. Investments of up to \$1.5 billion over nine years will spur Canada's biofuels production, supporting local industry and helping Canada reduce its greenhouse gas emissions.

The Canadian Government also conducts and promotes research and development associated with alternative and advanced fuel technologies, as detailed in a later section of this report.

## 6 Sustainable Transportation Infrastructure

Sustainable transportation infrastructure is eligible for funding under Canada's seven year (2007-2014) [Building Canada Plan](#) in addition to other targeted infrastructure funding programs. The \$8.8 billion [Building Canada Fund \(BCF\)](#) supports investments in 16 categories, including public transit, shortsea shipping, shortline railways, and roads and bridges.

Investments in Canada's **public transit infrastructure** aim to promote mobility and reduce urban congestion. Federal funding for transit infrastructure has increased significantly in recent years. Sources of funding include the Building Canada Fund (BCF), the 2006 Public Transit Fund (\$400 million), the 2006 Public Transit Capital Trust (\$900 million) and the 2008 Public Transit Capital Trust (\$500 million). The Building Canada Fund requires large-scale transit infrastructure expansion projects to incorporate transportation demand management measures to help build ridership and reduce environmental impact. Public transit passenger infrastructure purchased with federal funding must also be accessible for persons with disabilities. The Public Transit Capital Trust supports high-occupancy-vehicles and bicycle lanes, in addition to rapid transit and transit buses. A 2005 report, [Urban Transportation in Canada: Needs and Opportunities](#), released by Canada's federal-provincial/territorial Urban Transportation Task Force, identifies investment

requirements for public transit and urban roads in Canada, while a 2009 follow up report, entitled [Urban Transit in Canada: Taking Stock of Recent Progress](#) outlines trends and challenges in transit.

Investments in **local roads** under the Building Canada Fund, improve road safety, mobility and sustainability, and support economic and community development. For large-scale investments, new capacity projects are limited to major arterials and urban bypasses, and require transit features as a key component. Projects must be compatible with official development plans or other strategies to promote the sustainable development of the municipal area in which they take place.

The Building Canada Fund supports **short-sea shipping infrastructure** and **shortline railways** to help reduce congestion on highways and at border crossings, and to support sustainable economic and community development. Shortsea shipping is also an eligible category for federal investment under the Provincial-Territorial Base Fund, Gateways and Border Crossing Fund, and Public-Private Partnership Fund.

In 2009, the Government of Canada provided an additional \$4 billion **Infrastructure Stimulus Fund** for the construction of infrastructure projects to be built over the next two years (2009-10 and 2010-11). Eligible project categories include transit, port infrastructure, and roads.

## 6.1 Gas Tax Fund

In Canada, federal and provincial/territorial taxes make up about a third of the price of gasoline. In 2006, the Government of Canada committed to share gas tax revenues to support environmentally sustainable infrastructure for cities and communities through the creation of a Gas Tax Fund (GTF). In 2007, this Fund was extended from 2010 to 2014 at \$2 billion per year and was made a permanent measure in Canada's 2008 Budget. The Gas Tax Fund (GTF) supports municipal infrastructure that contributes to cleaner air, cleaner water and reduced GHG emissions. Eligible categories of investment include public transit, and local roads and bridges that enhance sustainability outcomes. The GTF also provides funding to increase the capacity of communities to undertake long-term planning. Funding for planning capacity is complemented by a requirement for communities to develop Integrated Community Sustainability Plans (ICSPs), which are long-term plans aimed at improving sustainability outcomes in Canada's communities. Communities report on their use of the funds on an annual basis.

## 7 Regional and Global Transport System Integration Encouraging Efficient Modes

### 7.1 Global Transport System Integration: Canada's Gateways and Corridors Initiative

Canada has developed a [National Policy Framework for Strategic Gateways and Trade Corridors](#) and has been developing individual Gateway Strategies, including the Asia-Pacific Gateway and Corridor Initiative that was announced in October 2006, as well as the Ontario-Quebec Continental Gateway and Trade Corridor and the Atlantic Gateway, which are still under development. These strategies will serve as frameworks for long-term planning and strategic investment, optimization of existing transportation infrastructure, better integration of major transportation systems, environmental protection, and enhancing transportation security.

The \$2.1 billion [Gateways and Border Crossings Fund \(GBCF\)](#) is a merit-based program to fund transportation infrastructure and other related initiatives to develop Canada's strategic gateways,

trade corridors and border crossings and to better integrate the national transportation system. Key objectives of the GBCF are enhanced transportation system efficiency, reliability and integration and innovative technology applications designed to improve and maximize the capacity of the existing system, eliminate bottlenecks and optimize the use of all transportation modes. The outcomes of GBCF investments (e.g. intermodal connections, shortline railways and shortsea shipping) include mitigating congestion and minimizing environmental impacts of transportation such as reduced emissions of air pollutants and greenhouse gases, and negative land-use impacts.

## **7.2 Short-Sea Shipping**

The Government of Canada has taken a multi-faceted approach to promote shortsea shipping as a means to facilitate trade and contribute to the efficiency and sustainability of the transportation system through better use of inland and coastal waterways.

The promotion of shortsea shipping is a key marine element in Canada's Gateways approach. The Government of Canada announced funding support for shortsea shipping valued at \$42.6 million in the Lower Mainland of British Columbia in 2008. The same year, Transport Canada held a Working Session on Shortsea Shipping in Atlantic Canada in collaboration with the Atlantic provinces and completed an "Assessment of Environmental and Social Impacts and Benefits of Shortsea Shipping in Canada" and a study on [Potential Hub and Spoke Container Transshipment Operations in Eastern Canada for Marine Movements of Freight](#) (Shortsea shipping). A Trilateral Working Group on Shortsea Shipping was further established in 2009 between Canada, the United States, and Mexico. The objective of the group is to facilitate the development and coordination of marine projects that will improve the integration of maritime transportation (cargo and passengers) into the national transportation systems of the participating nations.

## **7.3 Regional Transport System Integration: Intercity Rail**

In 2007, the Government of Canada announced \$516 million in capital funding over five years, for [VIA Rail Canada Inc.](#), a Crown corporation, to revitalize inter-city passenger rail services in Canada. Ridership on VIA Rail has been growing steadily in Canada, with passenger miles increasing by 14 percent between 1990 and 2006. The funding allows for equipment refurbishment and other infrastructure upgrades, making the rail system more efficient and accessible to Canadians, and improving service reliability, on-time performance and faster trip times. The equipment refurbishment will also enhance the carrier's environmental performance through increased fuel efficiency and reduced greenhouse gas emissions per passenger.

Additionally, in its 2009 Economic Action Plan, the Government of Canada announced \$407 million of additional capital funding for VIA Rail to support further improvements to passenger rail services, including higher train frequencies and faster speeds. In an effort to encourage active transportation, VIA Rail has also added new bike trains, which allow cyclists to take their bikes on board without boxing or dismantling them.

In 2009, the Government of Canada also announced \$7.9 million for new capital projects for two First Nations railways, operating in Manitoba, and in Quebec and Labrador, to upgrade track infrastructure and acquire additional equipment.

## 8 Transport Technology Research and Development

The Government of Canada works in partnership with the private sector and academic community to advance sustainable transportation innovation in Canada, through a number of research and development activities.

Canada's Transportation Development Centre (TDC) manages a multimodal research and development (R&D) program aimed at improving the safety, security, energy efficiency, and accessibility of the Canadian transportation system, while protecting the environment. Additional Innovation and R&D programs which support Canada's sustainable transportation goals are detailed below.

### 8.1 Vehicle Technology Development

An Automotive Innovation Fund and Automotive Partnerships Canada (APC) are investing in environmental innovation in the automotive sector. The [Automotive Innovation Fund \(AIF\)](#), introduced in 2008, provides \$250 million over five years to automotive firms in support of strategic, large-scale research and development projects to build innovative, greener and more fuel-efficient vehicles. [Automotive Partnerships Canada \(APC\)](#), was additionally created in 2009 as a partnership between five federal research and granting agencies. The program provides \$145 million in funding over five years to support collaborative R&D projects in specific areas, including alternative fuels, next-generation manufacturing, advanced power trains and lighter or more sustainable materials.

The Government of Canada's [ecoTechnology for Vehicles program](#) is investing \$15 million over four years to accelerate the adoption of advanced vehicle technologies that reduce greenhouse gas (GHG) emissions and promote a reduction of fuel consumption in the Canadian fleet of light-duty vehicles. This objective is being achieved by acquiring and testing emerging environmental light-duty vehicle technologies, informing Canadians about these new technologies through showcasing and publications and working in partnership with key stakeholders including industry, consumers, other Government departments. An [Electric Vehicles Technology Roadmap](#), led by industry and coordinated by a federal government secretariat is identifying critical energy technology requirements, gaps and milestones needed to advance electric vehicles in Canada. The Government of Canada is also testing Plug-in Hybrid Electric Vehicles (PHEVs) to evaluate emission and fuel consumption performance in Canadian weather conditions, and is working with the United States to develop harmonized test procedures and reporting protocols.

Canada's CANMET Materials Technology Laboratory (MTL) also conducts research to reduce the environmental impact of vehicles. The Laboratory is developing advanced structural materials, processes and fabrication techniques to reduce the weight of next-generation vehicles without compromising passenger safety. Through national and international collaboration, [CANMET-MTL](#) conducts research on light metals, advanced high-strength steels and composite materials.

### 8.2 Alternative Fuels

The Government of Canada funds and performs research, development and demonstration projects through the Program of Energy Research and Development (PERD, and ecoENERGY Technology Initiative (ecoETI), under the [Clean Transportation Systems \(CTS\) Portfolio](#). The activities undertaken by the Government of Canada, the private sector, and academic researchers aim to foster the development and use of cleaner sustainable transportation fuels and systems in order to improve environmental quality, reduce greenhouse gases and other emissions, and increase economic

activity through the development of domestic and export markets. The Portfolio develops, implements, maintains and reinforces the research, development and demonstration activities for advanced vehicle technologies, including hydrogen fuel cells, plug-in hybrid electric vehicles, emission reduction technologies, advanced fuels and materials.

The Government of Canada's [CanmetENERGY](#) undertakes research and development and demonstrates and evaluates fuelling options for a variety of on-road and off-road hydrogen-fuelled vehicles. Activities build on the achievements of the Canadian Transportation and Fuel Cell Alliance (CTFCA). The CTFCA was a seven year program that developed and demonstrated hydrogen-fuelled vehicles and fuelling stations in real-world conditions across Canada. A number of CTFCA achievements are highlighted in a [Hydrogen and Fuel Cell Timeline](#). CanmetENERGY also researches future transportation fuels derived from alternative and non-traditional petroleum, such as oil sands, and blends of fuels to ensure a smooth transition into the fuel market with existing engines and advanced combustion engine technologies. Collaboration is continuing as a result of a joint Canada-US [Roadmap Workshop on Nonpetroleum-based Fuels and Advanced Combustion Research](#).

The Government of Canada also participates in international energy R&D and acts in a number of international contexts, namely; the International Energy Agency (IEA), the European Union (EU), the Asia-Pacific Economic Cooperation (APEC), and the International Partnership for a Hydrogen Economy (IPHE).

Other federal agencies actively involved in transportation research and development, include the National Research Council's Centre for Surface Transportation Technology and Sustainable Development Technology Canada (SDTC). The [Centre for Surface Transportation Technology](#) provides world-class surface transportation development and testing services for the rail and road transport industries, defence departments and a wide range of vehicle and equipment manufacturers. [Sustainable Development Technology Canada](#) finances and supports the development and demonstration of clean technologies through a \$550 million SD Tech Fund™ and a \$500 million NextGen Biofuels Fund™.

## **9 Policies and Progress on Transport Access**

The Government of Canada continues to be a world leader in the field of accessibility by removing undue obstacles to the mobility of persons with disabilities in the national transportation system. Through the [Canadian Transportation Agency](#), Canada has established minimum service standards for all modes of transportation and introduced a facilitation and mediation program to assist travellers in planning their travel and in resolving difficulties.

In 2002, in cooperation with provincial governments and not-for-profit associations, the Government of Canada developed an [Access to Travel \(ATT\) website](#). The site provides information on accessible ground transportation in communities, on accessible transportation between Canadian cities by intercity bus, ferry, passenger rail and air, as well as a variety of travel resources across Canada with the aim of making traveling easier and more enjoyable for persons with disabilities.

Transport Canada also developed a unique interactive disability awareness-training program entitled "Getting on Board" destined for employees of transportation service providers operating in the national transportation network. The training program comprises a disability awareness-training

manual, a guide to physically assisting persons with mobility disabilities, a workshop guide, and a training video. Canada also hosted the [11<sup>th</sup> World Conference on Mobility and Transport of the Elderly and Persons with Disabilities \(TRANSED\) in 2007](#), an international event which provides experts with the opportunity to exchange research and showcase innovative and technological solutions for the transportation needs of an aging population and persons with disabilities.

## **10 Road, Rail and Marine Systems Construction Standards and Changes in Anticipation of Climate Change Impacts**

In Canada, infrastructure design is governed by national and local codes and standards. Provincial, territorial and municipal governments are responsible for the planning, design, construction, operation, maintenance and financing of highways and transit systems within their jurisdiction. The federal government provides policy guidance and funding support for this work.

The [Public Infrastructure Engineering Vulnerability Committee](#) was created in 2005 to conduct an engineering assessment of the vulnerability of Canada's public infrastructure to the impacts of climate change and to facilitate the review of national and local codes and standards for infrastructure design, operation and maintenance. Co-funded by the Government of Canada and Engineers Canada, the Vulnerability Committee is a major Canadian initiative involving all three levels of government and non-governmental organizations. As part of its work, the Committee will specifically explore codes and standards for roads and associated structures.

The Government of Canada also promoted and encouraged research on climate change impacts and adaptation, through a Canadian Climate Impacts and Adaptation Research Network (C-CIARN), which operated from 2001 to 2007. Products of C-CIARN, including a [report on Adapting to Climate Change](#) for Canadian municipalities, remain accessible to the public through the Network's website.

### **10.1 The North**

Climate change will have a significant impact on transportation and public infrastructure in the North and, as such, requires particular attention to adaptation measures. The Government of Canada works with Canada's northern territorial governments and other northern stakeholders to prepare for these challenges through its support of science capacity building in the North and focus on research to address knowledge gaps in northern transportation, in particular to better understand the interaction of transportation infrastructure with permafrost and marine needs in a changing climate. The Government of Canada is also funding an Ice Hazard Radar program with the objective of improving safe and efficient navigation in Northern and Arctic waters.