

# QUÉBEC

IN ACTION  
TO FIGHT  
CLIMATE CHANGE



*The only route that offers any hope  
of a better future for all humanity is that  
of cooperation and partnership.*

*KOFI ANNAN – Excerpt from his address to the UN General Assembly – September 24, 2001*



## **QUÉBEC'S COMMITMENT**

The Québec government feels that respecting the commitments made by the industrialized countries in Kyoto is essential and implementing them, critical to humanity's survival. Since the adoption of the *United Nations Framework Convention on Climate Change* in 1992, Québec has shown enormous leadership Canada-wide and internationally. It has chosen to mobilize and has made a firm commitment to do its share by contributing to global efforts.

In 1995, Québec published its first action plan to implement the *United Nations Framework Convention on Climate Change*. This action plan primarily targeted the stabilization of Québec's greenhouse gas emissions through the adoption of voluntary measures. Subsequently, in 2000, the government instituted a second, more ambitious action plan so that all Quebecers would report on and reduce GHG emissions.

## **QUÉBEC COOPERATES WITH ITS NEIGHBOURGS**

In 2001, Québec signed the *Conference of New England Governors and Eastern Canadian Premiers Climate Change Action Plan*, the first North American joint effort involving states and provinces fighting climate change—far before Canada ratified the Kyoto Protocol. This plan encompasses all activity sectors and provides a regional basis on which all participating governments work together.



## QUÉBEC'S STRONG PERFORMANCE

### ■ Major industries reduce emissions

Many heads of major businesses and governments are now convinced that once growth is controlled, social solidarity and environmental defence can go hand in hand with profit-making. Many Québec businesses have opted for greener operating methods.



Norsk Hydro Canada, a company operating out of Québec, is an eloquent example of this new approach. The company has been investing in R&D since 1990 in order to enhance its industrial processes. In 2005, it succeeded in reducing its emissions intensity by 98.5% and its energy consumption by 50%. An extraordinary performance!

Québec's aluminium industry has also been proactive in this area. From 1990 to 2004, it

successfully decreased its GHG emissions intensity factor per tonne of aluminium produced from 6 to 2.89, a **52% reduction, while increasing its aluminium production by 65%**.

### **Québec's GHG emissions: a positive picture**

*Québec's per capita GHG emissions ratio is almost half that of Canada as a whole: 12.1 for Québec vs. 23.4 tonnes CO<sub>2</sub> equivalent for Canada.*

*The Québec manufacturing sector succeeded in reducing its GHG emissions by 6.9% while increasing its GDP by 38% between 1990 and 2003.*

## TRANSPORTATION

### ■ Mass transit

The Québec government invests an average of \$350 million annually in mass transit projects on its territory. Through numerous government measures and sums invested by the Ministère des Transports, **ridesharing rose 8% over five years** despite strong competition from automobiles.

### ■ Cabotage

Cabotage on the St. Lawrence River is currently experiencing a revival. Over the past two years, the Québec government has supported coastal shipping projects, with positive results. Cabotage services on the St. Lawrence are apparently competitive with trucking, thereby making it possible to reduce GHG and pollutant emissions, in addition to significantly increasing highway safety.

### ■ Higher cylinder power = higher cost

A change in vehicle registration fees, effective January 1, 2005, encourages the reduction of vehicle GHG and pollutant emissions. Additional vehicle registration costs vary from \$30 to \$150 depending on the cylinder power and will be reinvested in Québec infrastructures. Further, the Heavy-duty Vehicle Inspection and Maintenance Program will be implemented in 2006.

## MUNICIPALITIES

Québec's municipalities can now participate in the stimulating GES-Énergie municipalités program. The program provides them with a comprehensive balance sheet of their GHG emissions by energy source and activity sector, as well as a compilation of the main environmental, energy and economic indicators linked to GHG emissions. Recent data showed that 93 municipalities have already registered.



## Renewable Energy: Québec Ranks among World Leaders

Québec is privileged in the field of energy. With close to 43 000 MW of installed power, it is the primary North American producer of electricity and the third-ranking world producer of hydropower. An impressive 97% of Québec's electricity is produced from clean, renewable sources. Hydroelectricity was recognized as clean, renewable energy at the 3<sup>rd</sup> World Water Forum held last year in Kyoto, at which 170 governments were represented.

### ■ Hydropower

Harnessing the power of its watercourses to produce electricity, Québec enjoys a form of energy whose impact on the environment and climate is minimal compared to other traditional sources of power production. In 2003, electricity was responsible for only 1.7% of the sector's GHG emissions. Then Québec government estimates that by increasing hydropower production, emissions were reduced by more than 108 million tonnes CO<sub>2</sub> equivalent in 1990-2004.

This hydropower heritage gives Québec many advantages. Hydropower allows it to post a better GHG emissions performance: **almost half as much GHG as the Canadian per capita average.** Québec can also offer its citizens and businesses stable electricity rates that are among the lowest in North America.

Between 2001 and 2004, Québec implemented 1 600 MW (6.7 TWh) of renewable energy—110 MW wind energy and 1 489 MW hydro-power. **Annual GHG emission reduction** due to this production of electricity is estimated at **2.2 megatonnes.**



The major electricity network built up by Hydro-Québec has enabled Québec to develop expertise that is now recognized the world over. Many engineering companies and electrical equipment manufacturers were involved in the construction of this network and have become among the most internationally-renowned in their sector.

Québec invested approximately \$6.7 million between 2000 and 2004 in R&D in energy technologies development. It supported 70 projects which generated total investments of close to \$50 million and made impossible to reduce or curb GHG emissions in Québec.

## ENERGY EFFICIENCY

As of 1997, Québec was recognized as a leader in the field of energy efficiency with its creation of the Agence de l'efficacité énergétique. For the past eight years, this board has promoted energy efficiency for all forms of energy, in all activity sectors and throughout all Québec regions.

In 2005, the Québec government pursued this objective, asking Hydro-Québec to post energy savings of 4.1 TWh through an ambitious energy efficiency plan. This new goal represents electricity consumption equivalent to that of a city like Laval, the second largest in Québec. This plan will involve investments of close to \$2 billion and support approximately 18 000 jobs. In its 2005 summary of the environment-related performance of Canadian provinces, the David Suzuki Foundation pointed out that Québec had made *"impressive commitments on wind energy and energy efficiency."*

## ■ Wind energy

In the early 1970s, Québec seriously considered wind energy as an electricity production source. Wind turbines make it possible to increase energy security, promote regional development, improve health and reduce GHG emissions. Québec has decided to make greater use of wind force and hopes to become a North American leader in wind energy, establish the bases of a strong, prosperous wind turbine industry, and export its know-how.



To meet long-term electricity requirements, Québec has recently adopted measures to harness **more than 3 500 MW of wind energy by 2013**. These wind energy production projects represent investments of about \$5 billion and will contribute to the economic development

of local and Native communities. Once up and running, these projects will bring the share of wind energy in total electricity production to 8%.

## QUÉBEC'S INVENTIVENESS

*Man and his safety must be the main concern of any technological adventure.*

ALBERT EINSTEIN

## ■ Transportation

In Québec, many businesses design and manufacture parts, devices and even vehicles enabling GHG emission reduction in the transportation sector.

### **Miniaturization**

To help lower transportation costs and curb emissions, the Groupe Énerstat of Sherbrooke has designed a miniature heat pump to maintain a constant temperature in truck cabs. This device is powered by four of the truck's batteries. The market for this device is enormous, since it is both an air conditioner and a heating system. Annual fuel savings are as high as \$4 000 per truck.

### **Light metals**

Demand for increasingly lighter, more resistant vehicle parts is rising steadily. Québec is a major light metal producer, manufacturing magnesium and aluminium. This growing demand augurs well for our secondary processing sector, which is expanding every year.

### **Pressure vessels and tanks**

In another renewable energy sector, Québec has set up a hydrogen research facility, the Institut de recherche sur l'hydrogène at the Université du Québec à Trois-Rivières. This entity conducts avant-garde research on pressure vessels and tanks, another potential avenue for exporting.

### **Electric motors**

The electric motor system developed by Hydro-Québec's subsidiary TM4 will be mass-produced. As of 2008, several thousands of these systems will be supplied to S.V.E., a member of the Marcel Dassault industrial group, a European leader in aeronautics, informatics and the written media. TM4 is also developing another system, with a different vehicle integrator in order to expand its North American and European integrator clientele.

## GHG REDUCTION TECHNOLOGIES

Québec's environment industry is dynamic and of international calibre. The companies offering products and services to fight climate change are a hub of this industry. Among other things, they provide solutions to problems linked to GHG emissions in fields such as CO<sub>2</sub> capture and sequestration, alternative fuels, use of farm manure (liquid and solid), use of landfill site biogases, use of other types of biomass, production of renewable energy and energy efficiency in the industrial, institutional, commercial and residential sectors.

### ■ Partnerships

#### **CO<sub>2</sub> Solution**

The Québec government has supported a demonstration project designed to apply CO<sub>2</sub> Solution technology to the Québec City incinerator. The goal of the project is to study the development of a CO<sub>2</sub> recycling enzymatic bioreactor and make recommendations in order to install a larger-scale assessment unit.



#### **Biobus and Biomer**

From March 2002 to March 2003, 155 buses involved in the Biobus project drove around downtown Montréal on biodiesel, fuel manufactured from vegetable oils or inedible, recycled animal fats. This project was designed to test the use of biodiesel in real-life conditions, especially cold weather, to study the biodiesel supply capacity of a mass transit commission and to evaluate the potential of biodiesel fuel as a factor in reducing the emission of GHGs and other atmospheric pollutants. The project posted very positive results.



A similar project, entitled BIOMER, used biodiesel to operate tour boats on the St. Lawrence around Montréal. It was just as conclusive. In its wake, a biodiesel production plant was built in the Montréal suburbs. Replacing one liter of diesel by one liter of fuel containing 20% biodiesel reduces GHG vehicle emissions by approximately 16%.

*Québec now grants a tax credit for the production and marketing of ethanol fuel in Québec and a tax exemption applicable to biodiesel in the mass transit sector.*

#### **Electric vehicles**

Québec is particularly well-placed for designing and using electric vehicles and the Centre d'expérimentation des véhicules électriques du Québec (CEVEQ) is one of Québec's main players in this area. The Centre's activities include tests on electric vehicles, international symposiums, and Montréal 2000, a project designed to introduce light electric vehicles into commercial and institutional car fleets in Montréal.



In conjunction with the City of Saint-Jérôme, CEVEQ is currently testing the use of electric vehicles to ascertain the most favourable conditions for introducing them into city traffic.

# THE FUTURE – RESEARCH



## **OURANOS: a positive initiative**

The OURANOS Consortium on Regional Climatology and Adaptation to Climate Change has earned a place among world leaders in regional climate modelling. Ouranos combines the knowledge and disciplines of a group of researchers with the goal of advancing knowledge related to the choices and challenges inherent in climate change and adaptation to this change on a North American scale.

Ouranos itself comprises a team of some one hundred scientists and specialists while partnerships between the consortium and several universities and other institutions directly or indirectly contribute more than 150 additional researchers.

Recently, Ouranos developed complex analysis methods in the fields of climate science and adaptation to climate change. Its work generated cooperation with groups of researchers from several countries throughout the world.

The creation of Ouranos was made possible through the initiative and commitment of the Québec government, Hydro-Québec, Meteorological Service of Canada and Valorisation-Recherche Québec. More than nine Québec government departments and agencies participated, along with four universities: Université du Québec à Montréal, McGill University, Université Laval and Institut national de la recherche scientifique.

## **SILA Network**

SILA (means climate in Inuktitut) is a network of permanent observatories for climate change and Northern environments. Created in spring 2003 by the Centre d'études nordiques de

l'Université Laval, SILA received Québec government funding.

The installation of six observatories (five in Québec, and one in Baffin Land) is almost completed and a seventh is planned for

Ellesmere Island in the Northwest Territories. Data from these observatories will make it possible to specify the characteristics and assess the scope of environmental changes in the various Northern bioclimatic zones.





## ***The fight against climate change for the future of our societies***

*Over the years, Québec has been able to develop  
recognized expertise in GHG reduction and elimination.*

*Québec wishes to share this expertise and thereby help attain the objectives  
adopted by all world countries to meet one of the most critical environmental  
challenges of the 21<sup>st</sup> century.*

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Envirodoq : ENV/2005/0279

### **Photos**

National capital transportation network

CO<sub>2</sub> Solution

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Courtesy of IIJD/ENB-Leila Mead

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