



Québec Climate Change **Emerging Technologies Directory**



CO2 Solutions



PGE





Québec Climate
Change
**Emerging
Technologies
Directory**

Promising Innovations to
Mitigate Climate Change

December 2005



Québec 

Prepared by: Direction de l'environnement et des services aux entreprises

Published by: Direction générale des communications et des services à la clientèle

Cover photographs: CO2 Solution, Énergie PGE, Centre de recherche industrielle du Québec (Biosor)

The information in this directory is derived from a survey of climate change technology developers, conducted by the Centre de recherche industrielle du Québec on behalf of the ministère du Développement économique, de l'Innovation et de l'Exportation. We decline all responsibility for the directory's promotional content, or for errors or omissions. We invite the representatives of businesses, organizations and research centres wishing to make changes in their fact sheets or to point out any omission to contact:

Myriam Blais

Person in charge of climate change matters

Direction de l'environnement et des services aux entreprises

Tel.: (418) 691-5698, ext. 4062

Legal deposit

Bibliothèque nationale du Québec

ISBN 2-550-45880-X (print version)

ISBN 2-550-45881-8 (pdf version)

© Gouvernement du Québec 2005

PREFACE

It is our great pleasure to present the *Québec Climate Change Emerging Technologies Directory*.

Sustainable industrial development is certainly one of this century's primary challenges. The ministère du Développement économique, de l'Innovation et de l'Exportation is called upon daily to deal with complex economic development issues, the stakes of which always exceed the realm of economic profitability to encompass such crucial matters as the development of a region, urban revitalization and the preservation of jobs.

The fight against climate change is one of the complex issues facing our society and the Kyoto Protocol provides a framework for action by our governments. The challenge is an ambitious one. The integration of environmental considerations into traditional market mechanisms, as demanded by the Kyoto Protocol, disrupts accepted ways of doing things and requires innovative approaches and means of implementing them. This will not be achieved without the development and marketing of technologies that mitigate greenhouse gas emissions.

In Québec, researchers, research centres and businesses have been working for a number of years to develop technologies to fight climate change. But more progress must be made in bringing these technologies to market and disseminating them throughout the world. Some organizations are now ready to sell the fruits of their labour and seek customers, or partners prepared to market their technological innovation. Others need financing in order to finalize their development or to demonstrate their innovation. We invite you to read about the various technologies in development and to contact their developers with a view to establishing and consolidating business partnerships.



Gaétan Poiré, directeur
Direction de l'environnement et des services aux entreprises
Ministère du Développement économique,
de l'Innovation et de l'Exportation

TABLE OF CONTENTS

CO₂ capture 11	
CO ₂ Capture	13
Short Rotation and Intensive Culture (SRIC) of Willows.....	13
ENERGY EFFICIENCY	
Diagnostic Agent for Building Operators (DABO)	17
DEL Light – Department of Electrical Engineering.....	17
Optimization – Processes – Energy.....	18
Lumber Drying and Planing Practices Optimization System.....	18
Novaenergy	19
Solarwall®	19
Pool Cover System.....	20
Microwave-Assisted Washing.....	20
RENEWABLE ENERGIES	
Eoldie	23
Éclipse V Solar Vehicle	23
EQHH Technologies.....	24
Direct Drive Generator Technology for Wind Turbines	24
Hydrogen Storage on Metal Hydrides.....	25
Metal Hydride-Based Hydrogen Compressor	25
Integrated Renewable Energy Systems with Hydrogen Storage	26
Hydrogen Internal Combustion Engine.....	26
Catalytic Support for Polymer Electrolyte Membrane Fuel Cells	27
Hydrogen Storage for Transportation Applications	27
New Materials for Solid Polymer Electrolyte Membrane (PEM) Fuel Cells.....	28
Photovoltaic (Solar) Modules.....	29
PGE 35 kW Wind Turbines.....	29
Permanent Magnet Generator for Electric Energy Production.....	30
MEASUREMENT / ANALYSIS / CONTROL	
Landfill Gas Recovery Network Management Methods.....	33
Compact Atmospheric Sounding Interferometer (CATSI).....	33
Multiple Visual Field Lidar.....	34
Multimode Power Inverter SOLO.....	34
thermal treatment	
Biomass Gasification Unit.....	37
Regenerative Oxidation Processes	37
Air Stream Industrial Burner	38
Gasification Combustion Burner	38
Industrial Boiler Combustion Technology	39
BIOSYN Gasification	39
Cyclical Combustion System	40

Autocyclical Combustion System.....	40
DRY-REX™ Biomass Dryer.....	41
Calorex.....	41
Direct Contact Water Heater.....	42
TREATMENT / USE / RECYCLING	
Low-Temperature Anaerobic Treatment of Manure.....	45
Clinox Compact Filter (CCF).....	45
Volatile Organic Compound Concentration Reduction Process.....	46
High-Yield Chemical-Mechanical Pulping Process for Annuals.....	46
Enzyme Bioreactor.....	47
FIRSST Fractionation and Steam Explosion Process.....	47
Biofertilizer Solution for Aerobic Treatment of Manure.....	48
Biocov.....	48
Anaerobic Digester.....	49
NO _x Emission Reduction.....	49
Fuel Cell.....	50
TRANSPORTATION	
Lithium-Metal-Polymer Battery.....	53
Quasiturbine Engine.....	53
Nanocrystalline Perovskite-Based Materials.....	54
Industrial Gas Turbine Engine.....	54
Advanced Turbo Fan Integrator (ATFI) Engine.....	55
Fuel and Fuel Oil Additives.....	55
ACT-ION+ Fuel Combustion Optimizer.....	56
Permanent Magnet Rotary Machine for Transportation.....	56
VENTILATION / REFRIGERATION / HEATING	
CH ₄ MIN Flow-Reversal-Mode Catalytic Reactor.....	59
Integrated Refrigeration System.....	59
Cold Accumulation Truck Refrigeration Unit.....	60
Fuel Pellets.....	60
Chemical Heat Pump (CHP).....	61
Magnetic Refrigeration.....	61
High-Temperature Heat Pump for Wood Drying.....	62
Heat Accumulator for Heating in the Commercial and Institutional Sectors.....	62
High-Temperature Air Solar Water Heater System.....	63
Residential Integrated Mechanical System.....	63
Classroom Ventilation Device.....	64

LIST OF BUSINESSES AND ORGANIZATIONS

NAME AND TECHNOLOGIES	Page Number
ADERCO CHEMICAL PRODUCTS INC. Fuel and Fuel Oil Additives	55
AUDACE TECHNOLOGIES INC. Eoldie	23
AVESTOR Lithium-Metal-Polymer Battery	53
BIO-TERRE SYSTEMS INC. Low-Temperature Anaerobic Treatment of Manure	45
BIOTHERMICA TECHNOLOGIES INC. Biomass Gasification Unit	37
Clinox Compact Filter (CCF)	45
Landfill Gas Recovery Network Management Methods	33
Regenerative Oxidation Processes	37
BRAIS, MALOUIN AND ASSOCIATES INC. (BMA) Air Stream Industrial Burner	38
CANMET ENERGY TECHNOLOGY CENTRE CH ₄ MIN Flow-Reversal-Mode Catalytic Reactor	59
Diagnostic Agent for Building Operators (DABO)	17
Integrated Refrigeration System	59
CANSOLV TECHNOLOGIES INC. CO ₂ Capture	13
CENTRE D'ÉTUDES DES PROCÉDÉS CHIMIQUES DU QUÉBEC (CEPROCQ) Volatile Organic Compound Concentration Reduction Process	46
CENTRE SPÉCIALISÉ EN PÂTES ET PAPIERS High-Yield Chemical-Mechanical Pulping Process for Annuals	46
CO₂ SOLUTION INC. Enzyme Bioreactor	47
DELL-POINT TECHNOLOGIES INC. Gasification Combustion Burner	38
E-H₂ INC. EQHH Technologies	24
E.M. OPTIMIZATION INTERNATIONAL INC. Optimization – Processes – Energy	18

NAME AND TECHNOLOGIES	Page Number
ENERKEM TECHNOLOGIES INC.	
BIOSYN Gasification	39
FIRSST Fractionation and Steam Explosion Process	47
ENVIROGAIN INC.	
Biofertile Solution for Aerobic Treatment of Manure	48
ÉOCYCLE TECHNOLOGIES INC.	
Direct Drive Generator Technology for Wind Turbines	24
FORINTEK CANADA CORP. (FCC)	
Lumber Drying and Planing Practices Optimization System	18
FORINTEK CANADA CORP. (FCC) AND CO₂ SOLUTION INC.	
Biocov	48
FRYGY CUBE INTERNATIONAL INC.	
Cold Accumulation Truck Refrigeration Unit	60
GRANULES COMBUSTIBLES ÉNERGEX INC.	
Fuel Pellets	60
GROUPE DE RECHERCHE EN GAZOTECHNOLOGIES (GREG)	
Autocyclical Combustion System	40
Cyclical Combustion System	40
GROUPE ENERSTAT INC.	
Novaenergy	19
INRS-ÉNERGIE, MATÉRIAUX ET COMMUNICATIONS	
Chemical Heat Pump (CHP)	61
INSTITUT DE RECHERCHE EN BILOGOGIE VÉGÉTALE (IRBV)	
Short Rotation and Intensive Culture (SRIC) of Willows	13
INSTITUT DE RECHERCHE SUR L'HYDROGÈNE	
Catalytic Support for Polymer Electrolyte Membrane Fuel Cells	27
Hydrogen Internal Combustion Engine	26
Hydrogen Storage for Transportation Applications	27
Hydrogen Storage on Metal Hydrides	25
Integrated Renewable Energy Systems with Hydrogen Storage	26
Magnetic Refrigeration	61
Metal Hydride-Based Hydrogen Compressor	25
LABORATOIRE DES NOUVEAUX MATÉRIAUX POUR LES SYSTÈMES ÉLECTROCHIMIQUES ET ÉNERGÉTIQUES (LANOMAT)	
New Materials for Solid Polymer Electrolyte Membrane (PEM) Fuel Cells	28

NAME AND TECHNOLOGIES	Page Number
LABORATOIRE DES TECHNOLOGIES DE L'ÉNERGIE (LTE)	
Heat Accumulator for Heating Commercial and Institutional Sectors	62
High-Temperature Heat Pump for Wood Drying	62
MABAREX INC.	
DRY-REX™ Biomass Dryer	41
MATRIX ENERGY INC.	
Photovoltaic (Solar) Modules	29
Solarwall®	19
MCGILL UNIVERSITY – MACDONALD CAMPUS	
Microwave-Assisted Washing	20
NANOX INC.	
Nanocrystalline Perovskite-Based Materials	54
NAT-COM, NATIONAL COMBUSTION EQUIPMENT INC.	
Industrial Boiler Combustion Technology	39
PLASTIQUES GAGNON INC. / PGE ENERGY	
PGE 35 kW Wind Turbine	29
PRATT & WHITNEY CANADA	
Advanced Turbo Fan Integrator (ATFI) Engine	55
Industrial Gas Turbine Engine	54
NO _x Emission Reduction	49
PRECISIONH₂ POWER INC.	
Mutimode Power Inverter SOLO	34
PRODUITS CLN INC. (LES)	
ACT-ION+ Fuel Combustion Optimizer	56
QUASITURBINE AGENCE INC.	
Quasiturbine Engine	53
ROBERT CHARBONNEAU	
Anaerobic Digester	49
ROGER ROSBY AND PIERRE PERREAULT	
Calorex	41
SMARTSOIL ENERGY INC.	
Fuel Cell	50
SOFAME TECHNOLOGIES INC.	
Direct Contact Water Heater	42

NAME AND TECHNOLOGIES	Page Number
SOLUTIONS ÉNERGÉTIQUES ÉNERCONCEPT INC. High-Temperature Air Solar Water Heater System	63
THERMTECH INC. Residential Integrated Mechanical System	63
TM4 INC. Permanent Magnet Generator for Electric Energy Production	30
Permanent Magnet Rotary Machine for Transportation	56
TN CONSEIL INC. Classroom Ventilation Device	64
Pool Cover System	20

CO₂ CAPTURE

CANSOLV TECHNOLOGIES INC.
CO₂ Capture

Amine-based absorption system for the capture of CO₂ from smokestacks.

For more information on CO₂ capture technology, please contact:

Marcel Ayotte

Cansolv Technologies Inc.

8475, avenue Christophe-Colomb, bureau 2000

Montréal (Québec) H2M 2N9

Tel.: (514) 382-4411, ext. 21

Fax: (514) 382-5363

E-mail: mail@cansolv.com

Website: www.cansolv.com

INSTITUT DE RECHERCHE EN BIOLOGIE VÉGÉTALE (IRBV)
Short Rotation and Intensive Culture (SRIC) of Willows

SRIC is a means of efficiently producing wood biomass for various purposes (energy, bioproducts, etc.) in a renewable way. SRIC is a highly efficient system for capturing greenhouse gas emissions.

For more information about SRIC technology, please contact:

Michel Labrecque

Institut de recherche en biologie végétale (IRBV)

4101, rue Sherbrooke Est

Montréal (Québec) H1X 2B2

Tel.: (514) 872-0272

Fax: (514) 872-9406

E-mail: michel_labrecque@ville.montreal.qc.ca

Website: www.irbv.umontreal.ca

ENERGY EFFICIENCY

CANMET ENERGY TECHNOLOGY CENTRE
Diagnostic Agent for Building Operators (DABO)

DABO technology is a software tool developed by CETC-Varenes to help building operators detect and diagnose system malfunctions easily. The tool collects and analyses data from the HVAC&R system in order to detect irregularities and determine the causes, thus providing the necessary information to correct them. The software can also be used to anticipate power failures, minimize occupant discomfort before complaints arise, and prevent energy waste associated with improperly functioning systems or premature commercial or institutional equipment deterioration. It also detects malfunctions in mechanical systems.

For more information about DABO technology, please contact:

Méli Stylianou
CANMET Energy Technology Centre
1615, boul. Lionel-Boulet
Case postale 4800
Varenes (Québec) J3X 1S6
Tel.: (450) 652-6922
Fax: (450) 652-5177
E-mail: meli.stylianou@rncan.gc.ca
Website: <http://cedrl.mets.rncan.gc.ca>

ÉCOLE DE TECHNOLOGIE SUPÉRIEURE (ETS)
DEL Light – Department of Electrical Engineering

The DEL light is a non-polluting light that consumes approximately 25% of the energy of high-pressure sodium light bulbs and incandescent lights.

For more information about DEL light technology, please contact:

Kamal Al-Haddad
École de technologie supérieure
Department of Electrical Engineering
1100, rue Notre-Dame Ouest
Montréal (Québec) H3C 1K3
Tel.: (514) 396-8800
Fax: (514) 396-8950
E-mail: kamal@ele.ets.mtl.ca
Website: www.etsmtl.ca

E.M. OPTIMIZATION INTERNATIONAL INC.
Optimization – Processes – Energy

The E.M. experimentation method is designed to extensively analyse existing manufacturing processes in order to maximize their energy efficiency and minimize their greenhouse gas emissions.

For more information about the E.M. experimentation method, please contact:

Michel Galopin

E.M. Optimization International inc.

1000, rue Saint-Antoine Ouest, bureau 412

Montréal (Québec) H3C 3R7

Tel.: (514) 842-3610

Fax: (514) 842-2710

E-mail: info@emoptimise.com

Website: www.emoptimise.com

FORINTEK CANADA CORP. (FCC)
Lumber Drying and Planing Practices Optimization System

The system analyses, visualizes and monitors lumber drying practices in real time.

For more information about lumber drying and planing practices optimization technology, please contact:

François Léger

Forintek Canada Corp.

319, rue Franquet

Sainte-Foy (Québec) G1P 4R4

Tel.: (418) 659-2647

Fax: (418) 659-2922

E-mail: francois.leger@qc.forintek.ca

Website: www.forintek.ca

GROUPE ENERSTAT INC.
Novaenergy

Novaenergy technology encompasses cooling and heating units with thermal waste recycling, as well as fluid thermoregulators with energy recovery incorporating thermal storage banks.

For more information about Novaenergy technology, please contact:

Stéphane Bilodeau
Groupe Enerstat Inc.
125, rue Turgeon
Bromptonville (Québec) J0B 1H0
Tel.: (819) 846-1040
Fax: (819) 846-4036
E-mail: enerstat@groupeenerstat.com
Website: www.groupeenerstat.com

MATRIX ENERGY INC.
Solarwall®

Solarwall® technology consists in cladding with millions of small openings, placed a few inches from the exterior wall of a building, thereby creating a cavity. A fan is installed at the top of the wall so as to create negative pressure that promotes air intake between the two walls. By circulating through the panel, the outdoor air absorbs solar heat and carries it to the interior plenum. Once inside, the air is distributed through perforated ducts that destratify the warm air accumulated at the ceiling, thus reducing heat loss through the roof. The process results in a uniform ambient temperature and superior indoor air quality.

For more information about Solarwall® technology, please contact:

Brian Wilkinson
Matrix Energy inc.
16883, boul. Hymus
Kirkland (Québec) H9H 3L4
Tel.: (514) 630-5630
Fax: (514) 426-9123
E-mail: info@matrixenergy.com
Website: www.matrixenergy.com

**TN CONSEIL INC.
Pool Cover System**

A motorized indoor pool cover system for commercial and institutional uses (schools, municipalities, hotels, etc.).

For more information about motorized indoor pool cover technology, please contact:

Pierre Hosatte

TN Conseil inc.

1471, boul. Lionel-Boulet, bureau 26

Varenes (Québec) J3X 1P7

Tel.: (450) 652-0444

Fax: (450) 929-1271

E-mail: tnconseil@qc.aira.com

**MCGILL UNIVERSITY – MACDONALD CAMPUS
Microwave-Assisted Washing**

Microwave-assisted washing technology ensures more effective laundering of cotton textiles in four minutes rather than in 20 minutes with conventional washing, and requires less detergent. With the same amount of energy, a high energy sequence at the start of the cycle, followed by a reduction in power, improves washing as compared with constant microwave power.

For more information about microwave-assisted washing technology, please contact:

Vijaya Raghavan, Ph.D.

McGill University – MacDonald Campus

Department of Bioresource Engineering

21111, Lakeshore Road

Sainte-Anne-de-Bellevue (Québec) H9X 3V9

Tel.: (514) 398-7775

Fax: (514) 398-8387

E-mail: vijaya.raghavan@mcgill.ca

Website: www.mcgill.ca

RENEWABLE ENERGIES

AUDACE TECHNOLOGIES INC.
Eoldie

EOLDIE technology, developed by Audace Technologies Inc., is an automated wind-diesel coupling system composed of an electronic control device for one or more wind turbines in parallel that operate with one or more electric power units.

For more information about EOLDIE technology, please contact:

Jean-Louis Chaumel
Audace Technologies Inc.
91, rue du Séjour
Rimouski (Québec) G5L 9G8
Tel.: (418) 732-2552
Fax: (418) 724-1879
E-mail: lesvents@globetrotter.net
Website: www.atieolien.com

ÉCOLE DE TECHNOLOGIE SUPÉRIEURE (ETS)
Éclipse V Solar Vehicle

The Éclipse V solar vehicle is an experimental single-seat electric vehicle that runs on solar energy. It consists of a solar panel of about 2000 W, 25 kg of lithium-polymer batteries, a wheel motor (Éclipse-EPS) and an NGM motor controller. The model is essentially built as a race and demonstration car to make the public more aware of the use of renewable energies for all types of activities.

For more information about Éclipse V technologies, please contact:

Maarouf Saad and Réjean Tétreault
École de technologie supérieure (ETS)
Pavillon-Suzor Côté – UQTR
Department of Electrical Engineering
1100, rue Notre-Dame Ouest, bureau A-2238
Montréal (Québec) H3C 1K3
Tel.: (514) 396-8800, ext. 7535
Fax: (514) 396-8596
E-mail: eclipse@ele.etsmtl.ca
Website: www.etsmtl.ca

**E-H₂ INC.
EQHH Technologies**

The Québec government gave E-H₂ Inc. a mandate to make use of EQHH (Euro-Québec Hydro-Hydrogen) technologies and related projects. Examples of EQHH technologies are as follows:

- A city bus fitted with an internal combustion engine running on Hythane, a mixture of natural gas and hydrogen
- The development, demonstration and testing of containers for the intercontinental transport of hydrogen

For more information about EQHH technologies, please contact:

Gilles Champagne

E-H₂ Inc.

Pavillon-Suzor Côté - UQTR

3351, boulevard des Forges

Case postale 500

Trois-Rivières (Québec) G9A 5H7

Tel.: (819) 376-5218

Fax: (819) 376-5046

E-mail: g.champagne@e-h2.ca

Website: www.eh2.ca

**ÉOCYCLE TECHNOLOGIES INC.
Direct Drive Generator Technology for Wind Turbines**

The direct drive generator technology was developed for wind turbines using permanent magnets in a transverse flux configuration. The system makes it possible to eliminate gears in wind turbines. This results in lower maintenance costs, provided the proper electric machine geometric is used. The technology was developed in collaboration with the electrical engineering department of Université Laval.

For more information about direct drive generator technology, please contact:

Daniel Massicotte

Éocycle Technologies Inc.

49, rue du Bel-Air, bureau 106

Lévis (Québec) G6V 6K9

Tel.: (418) 833-0926

Fax: (418) 833-8152

E-mail: dmassicotte@eocycle.com

Website: www.eocycle.com

INSTITUT DE RECHERCHE SUR L'HYDROGÈNE
Hydrogen Storage on Metal Hydrides

The technology for hydrogen storage on nanocrystalline metal hydrides uses several types of hydrides: magnesium-based hydrides, solid solution-type hydrides and complex hydrides (borohydrides, amides).

For more information on the technology for hydrogen storage on metal hydrides, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard_Chahine@uqtr.ca
Website: www.irh.uqtr.ca

INSTITUT DE RECHERCHE SUR L'HYDROGÈNE
Metal Hydride-Based Hydrogen Compressor

The metal hydride-based hydrogen compressor offers an alternative to the mechanical compressor. It has no moving parts, is very quiet and produces hydrogen of very high purity.

For more information about metal hydride-based hydrogen compressor technology, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard_Chahine@uqtr.ca
Website: www.irh.uqtr.ca

<p style="text-align: center;">INSTITUT DE RECHERCHE SUR L'HYDROGÈNE Integrated Renewable Energy Systems with Hydrogen Storage</p>
--

R&D on integrated renewable energy systems with hydrogen storage has shown that, on the one hand, hydrogen is practical, safe and reliable for energy storage for systems using wind turbines and solar panels as primary energy sources and that, on the other, it is efficient to incorporate fuel cells into the electric energy production cycle.

For more information about integrated renewable energy systems with hydrogen storage, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard_Chahine@uqtr.ca
Website: www.irh.uqtr.ca

<p style="text-align: center;">INSTITUT DE RECHERCHE SUR L'HYDROGÈNE Hydrogen Internal Combustion Engine</p>
--

Hydrogen is a promising fuel for internal combustion engines because the exhaust gas consists only of water and a little NO_x. It requires that the engine be configured with an appropriate supply and control system, and that various minor mechanical changes be made compared with the conventional gasoline engine.

For more information about hydrogen internal combustion engine technology, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard_Chahine@uqtr.ca
Website: www.irh.uqtr.ca

<p style="text-align: center;">INSTITUT DE RECHERCHE SUR L'HYDROGÈNE Catalytic Support for Polymer Electrolyte Membrane Fuel Cells</p>
--

The Institut de recherche sur l'hydrogène is developing various types of carbon for use as a catalytic support for polymer electrolyte membrane fuel cells.

For more information about catalytic support technology, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard.Chahine@uqtr.ca
Website: www.irh.uqtr.ca

<p style="text-align: center;">INSTITUT DE RECHERCHE SUR L'HYDROGÈNE Hydrogen Storage for Transportation Applications</p>

The technology for hydrogen storage for transportation applications is in the development stage and consists in the storage of hydrogen at lower pressure in nanoporous materials.

For more information about hydrogen storage technology for transportation applications, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
Université du Québec à Trois-Rivières
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard.Chahine@uqtr.ca
Website: www.irh.uqtr.ca

**LABORATOIRE DES NOUVEAUX MATÉRIAUX POUR LES
SYSTÈMES ÉLECTROCHIMIQUES ET ÉNERGÉTIQUES (LANOMAT)
New Materials for Solid Polymer Electrolyte Membrane (PEM) Fuel Cells**

The new materials are as follows:

- A first generation of palladium-based catalysts has been developed with a view to reducing the oxygen in hydrogen/oxygen PEM fuel cells for electric vehicles. Other new classes of catalysts are also being developed. In addition, new materials and methods of manufacturing them are being found for use in commercial PEM fuel cells.
- New proton membranes for fuel cells. Existing polymers of little or no use in PEM fuel cell applications are being modified. Membranes now used in low-temperature PEM fuel cells (<100°C) are being modified in order to make them operational at high temperature.

For more information about the new materials for solid polymer electrolyte membrane (PEM) fuel cells, please contact:

Ouamarou Savadogo

**Laboratoire de nouveaux matériaux pour les
systèmes électrochimiques et énergétiques (LaNoMat)**

École Polytechnique de Montréal

C.P. 6079, succ. Centre-Ville

Montréal (Québec) H3C 3A7

Tel.: (514) 340-4711

Fax: (514) 340-4468

E-mail: osavadogo@polymtl.ca

Website: www.newmaterials.polymtl.ca

**MATRIX ENERGY INC.
Photovoltaic (Solar) Modules**

The photovoltaic effect consists in the direct conversion of sunlight into electricity. The solar cell or photovoltaic cell is a light-sensitive semiconductor. It is made of silicon, which does not pollute and is found in virtually unlimited quantities in the form of silica sand. Photovoltaic cells operate at relatively stable voltages, while the direct current they produce varies with light intensity.

For more information about photovoltaic modules, please contact:

Brian Wilkinson

Matrix Energy Inc.

16883, boul. Hymus

Kirkland (Québec) H9H 3L4

Tel.: (514) 630-5630

Fax: (514) 426-9123

E-mail: info@matrixenergy.com

Website: www.matrixenergy.com

**PLASTIQUES GAGNON INC. / PGE ÉNERGY
PGE 35 kW Wind Turbines**

Small-power, dynamic, variable pitch rotor control wind turbine technology is very quiet (73 RPMs). Simple to install, the turbines require only minimal maintenance, and provide the cheapest kilowatt on the market and the most efficient energy/wind ratio in their category.

For more information about PGE 35 kW small-power wind turbines, please contact:

Monika Gagnon

Plastiques Gagnon inc. / PGE Energy

117, de Gaspé Ouest

Saint-Jean-Port-Joli (Québec) G0R 3G0

Tel.: (418) 598-3361

Fax: (418) 598-3342

E-mail: pqejb@globetrotter.net

Website: www.energiepge.com

<p style="text-align: center;">TM4 INC. Permanent Magnet Generator for Electric Energy Production</p>

The permanent magnet generator is used for electric power unit, wind turbine, micro-hydro turbine and mini-hydro turbine systems. TM4 inc. has developed a whole range of generators (10 kW, 20 kW, 40 kW and 170 kW) with features specially adapted to decentralized energy production applications.

For more information about permanent magnet generator technology, please contact:

Patrice Dupont

TM4 inc.

135, rue J.-A. Bombardier, bureau 25

Boucherville (Québec) J4B 8P1

Tel.: (450) 645-1444

Fax: (450) 645-1864

E-mail: patrice.dupont@tm4.com

Website: www.tm4.com

MEASUREMENT / ANALYSIS / CONTROL

BIOTHERMICA TECHNOLOGIES INC.
Landfill Gas Recovery Network Management Methods

Biothermica Technologies Inc. has developed a system for the analysis and evaluation of the level of biodegradation of organic matter and the effectiveness of gas recovery. The technology reduces fugitive emissions of methane into the atmosphere and maximizes production.

For more information about landfill gas recovery network management methods, please contact:

Guy Drouin

Biothermica Technologies Inc.

426, rue Sherbrooke Est

Montréal (Québec) H2L 1J6

Tel.: (514) 488-3881

Fax: (514) 488-3125

E-mail: biothermica@biothermica.com

Website: www.biothermica.com

**DEFENCE RESEARCH AND DEVELOPMENT CANADA VALCARTIER
(DRDC)
Compact Atmospheric Sounding Interferometer (CATSI)**

The compact atmospheric sounding interferometer (CATSI) is used for standoff detection of gases in the atmosphere. The device has a Fourier transform high-resolution infrared spectrometer that measures, at a distance, the presence and quantity of such atmospheric gases as pollutants, greenhouse gases and gases produced by chemical warfare agents. It can also measure humidity and atmospheric temperature profiles.

For more information about CATSI technology, please contact:

Jean-Marc Thériault

Defence Research and Development Canada Valcartier (DRDC)

2459, boul. Pie XI Nord

Val-Bélair (Québec) G3J 1X5

Tel.: (418) 844-4000

Fax: (418) 844-4511

E-mail: jean-marc.theriault@drdc-rddc.gc.ca

Website: www.valcartier.drdc-rddc.gc.ca

**DEFENCE RESEARCH AND DEVELOPMENT CANADA VALCARTIER
(DRDC)
Multiple Visual Field Lidar**

The DRDC's Lidar (Light Detection and Ranging) system is for the detailed mapping of natural and artificial clouds. Measurements can be taken simultaneously in time and space in order to characterize phenomena such as ice fog, smokestack fumes, dust clouds and aerosols.

The Lidar system consists of a neodymium (Nd) pulsed laser operating at 1064 and 532 nm and special receiving optics that simultaneously measure the energy backscattered to seven visual fields. It makes it possible, for example, to measure from a distance the atmospheric parameters that affect the size, concentration and phase (solid or liquid) of aerosols. It can also be used in scanning mode to quantitatively map natural or artificial aerosol plumes, such as insecticide and herbicide spraying, and industrial emissions.

For more information about Lidar technology, please contact:

Luc Bissonnette

Defence Research and Development Canada Valcartier (DRDC)

2459, boul. Pie XI Nord

Val-Bélair (Québec) G3J 1X5

Tel.: (418) 844-4000

Fax: (418) 844-4511

E-mail: luc.bissonnette@drdc-rddc.gc.ca

Website: www.valcartier.drdc.rddc.gc.ca

**PRECISIONH₂ POWER INC.
Multimode Power Inverter SOLO**

PrecisionH₂ Power inc. manufactures its own power control and conditioning system concepts required for the use of the output power generated by distributed power production systems, including solar power, wind power, hydrogen fuel cells and so on. PH2 Inverters allow for modular adaptation, stacking and integration to satisfy inverter requirements for DC power generation systems with most configuration changes made via digital controls.

For more information about the SOLO multimode inverter, please contact:

Daniel Fletcher

PrecisionH₂ Power inc.

551, Main Road, C.P. 483

Hudson Heights (Québec) J0P 1J0

Tel.: (450) 458-7341

Fax: (450) 458-0162

E-mail: danfletcher@precisionh2.com

Website: www.precisionh2.com

THERMAL TREATMENT

BIOTHERMICA TECHNOLOGIES INC.
Biomass Gasification Unit

Gasification is a thermochemical process that transforms solid matter into gas, which can be used as fuel. The application of the technology reduces waste containment and the resulting production of methane, and reduces fossil fuel consumption through energy substitution.

For more information about biomass gasification technology, please contact:

Guy Drouin

Biothermica Technologies Inc.

426, rue Sherbrooke Est

Montréal (Québec) H2L 1J6

Tel.: (514) 488-3881

Fax: (514) 488-3125

E-mail: biothermica@biothermica.com

Website: www.biothermica.com

BIOTHERMICA TECHNOLOGIES INC.
Regenerative Oxidation Processes

Through Biotox technology, industries that emit volatile organic compounds (VOCs) can eliminate up to 99% of their toxic emissions while maintaining minimal or no consumption of fuel (natural gas).

For more information about Biotox technology, please contact:

Guy Drouin

Biothermica Technologies Inc.

426, rue Sherbrooke Est

Montréal (Québec) H2L 1J6

Tel.: (514) 488-3881

Fax: (514) 488-3125

E-mail: biothermica@biothermica.com

Website: www.biothermica.com

BRAIS, MALOUIN AND ASSOCIATES INC. (BMA)
Air Stream Industrial Burner

An air steam industrial burner is a special type of burner placed directly in ventilation ducts. An industrial version using natural gas is in development. The burner's technical performance is better than that of competing burners now available on the market: NO_x and CO₂ emissions are considerably reduced and the length of the burner flame is cut by half. In addition to environmental benefits, such features make it possible to manufacture smaller burners and at three or four times less annual cost.

For more information about air stream industrial burner technology, please contact:

Louis-Michel Malouin

Brais, Malouin et Associés Inc. (BMA)

5450, Côte-des-Neiges, bureau 600

Montréal (Québec) H3T 1Y6

Tel.: (514) 382-8866, ext. 225

Fax: (514) 382-8488

E-mail: lmalouin@bma.com

Website: www.bma.ca

DELL-POINT TECHNOLOGIES INC.
Gasification Combustion Burner

Gasification combustion burner technology is an integral part of the wood pellet-burning stove developed by Dell-Point. The stove operates during power failures. The use of biomass materials as fuel instead of oil or gas would reduce greenhouse gas emissions by several million tons.

For more information about gasification combustion burner technology, please contact:

Mark Drisdelle

Dell-Point Technologies Inc.

4055, rue Lavoisier

Boisbriand (Québec) J7H 1N1

Tel.: (514) 331-6212

Fax: (514) 979-2944

E-mail: drisdelle@pelletstove.com

Website: www.pelletstove.com

NAT-COM, NATIONAL COMBUSTION EQUIPMENT INC.
Industrial Boiler Combustion Technology

Industrial boiler combustion technology provides a highly efficient system that produces very low emissions of NO_x (<9 ppm with natural gas). The technology is applicable to fire-tube boilers of small and large power (80 to 1500 BHP), and to water-tube steam boilers (15 to 350 X 10⁶ BTU/hour).

For more information about industrial boiler combustion technology, please contact:

Normand Brais

NAT-COM, National Combustion Equipment Inc.

8515, boulevard Lafrenaye

Montréal (Québec) H1P 2B3

Tel.: (514) 326-2571

Fax: (514) 326-9347

E-mail: nbrais@national-combustion.com

Website: www.natcomonline.com

ENERKEM TECHNOLOGIES INC.
BIOSYN Gasification

BIOSYN technology is a process for the conversion of heterogeneous biomass and waste into synthetic gas, and the subsequent use of Syngas.

For more information about BIOSYN technology, please contact:

Esteban Chornet

Enerkem Technologies Inc.

615, boul. René-Lévesque Ouest, bureau 1220

Montréal (Québec) H3P 1P5

Tel.: (514) 875-0284

Fax: (514) 875-0835

E-mail: echornet@enerkem.com

Website: www.enerkem.com

GROUPE DE RECHERCHE EN GAZOTECHNOLOGIES (GREG)
Cyclical Combustion System

Cyclical combustion technology consists in catalytic combustion that can process lean mixtures (less than 10% of methane, biogas).

For more information about cyclical combustion technology, please contact:

Danilo Klvana
Université de Montréal
Groupe de recherche en gazotechnologies (GREG)
de l'École polytechnique
C.P. 6079, succ. Centre-ville
Montréal (Québec) H3C 3A7
Tel.: (514) 340-4711, ext. 4927
Fax: (514) 340-4159
E-mail: danilo.klvana@polymtl.ca
Website: www.polymtl.ca

GROUPE DE RECHERCHE EN GAZOTECHNOLOGIES (GREG)
Autocyclical Combustion System

Autocyclical combustion technology consists in catalytic combustion that eliminates unburned particles and volatile organic compounds.

For more information about autocyclical combustion technology, please contact:

Danilo Klvana
Université de Montréal
Groupe de recherche en gazotechnologies (GREG)
de l'École polytechnique
C.P. 6079, succ. Centre-ville
Montréal (Québec) H3C 3A7
Tel.: (514) 340-4711, ext. 4927
Fax: (514) 340-4159
E-mail: danilo.klvana@polymtl.ca
Website: www.polymtl.ca

MABAREX INC.
DRY-REX™ Biomass Dryer

DRY-REX™ is a low-temperature biomass dryer that runs on heat recovered from industrial processes or with highly efficient heat pumps.

For more information about DRY-REX™ technology, please contact:

Louis Barré

Mabarex Inc.

2021, rue Halpern

Saint-Laurent (Québec) H4S 1S3

Tel.: (514) 334-6721

Fax: (514) 332-1775

E-mail: lbarre@mabarex.com

Website: www.mabarex.com

ROGER ROSBY AND PIERRE PERREAULT
Calorex

Calorex is an oxygen regulator combined with a second combustion chamber for gases emitted in wood combustion.

For more information about Calorex technology, please contact:

Pierre Perreault

Roger Rosby and Pierre Perreault

445, rue Pasteur

Sherbrooke (Québec) J1J 2T5

Tel.: (819) 563-1492

E-mail: ghismai@hotmail.com

SOFAME TECHNOLOGIES INC.
Direct Contact Water Heater

“Ultra-efficient” direct contact water heater technology provides more than 95% efficiency in the heating of premises. The water heater and the direct contact condensation recuperator operate according to a simple principle. The two devices consist of a cylindrical reservoir placed vertically and containing a heat transfer zone filled with stainless steel nodules. The devices are contra-flow heat exchangers in which water is placed in direct contact with the combustion gases.

For more information about direct contact water heater technology, please contact:

Luc Mandeville

Sofame Technologies Inc.

500, rue Alphonse D. Roy

Montréal (Québec) H1W 3Y8

Tel.: (514) 523-6545, ext. 328

Fax: (514) 524-6183

E-mail: lmandeville@sofame.com

Website: www.sofame.com

TREATMENT / USE / RECYCLING

BIO-TERRE SYSTEMS INC.
Low-Temperature Anaerobic Treatment of Manure

The technology for the low-temperature anaerobic treatment of manure is a natural process in which bacteria, in the absence of oxygen, degrade organic matter and produce biogas (70% methane). The technology provides for optimal treatment of manure in a complete cycle of sustainable farm management. The by-products are used in the farm's operations in order to fertilize the land with high agronomic value fertilizer, supply the buildings with power through use of the biogas and manage surplus biofertilizers.

For more information about the technology for the low-temperature anaerobic treatment of manure, please contact:

Richard Royer
Bio-Terre Systems inc.
150, rue Vimy
Sherbrooke (Québec) J1G 3M7
Tel.: (819) 562-3871, ext. 256
Fax: (819) 563-8984
E-mail: bioterre_systems@yahoo.ca

BIO THERMICA TECHNOLOGIES INC.
Clinox Compact Filter (CCF)

The Clinox filter is a stainless steel, cell-like, fabric filter for high-temperature gases. It filters high-pressure gasifier gases in cogeneration systems from biomass and municipal waste.

For more information about Clinox filter technology, please contact:

Guy Drouin
Biothermica Technologies Inc.
426, rue Sherbrooke Est
Montréal (Québec) H2L 1J6
Tel.: (514) 488-3881
Fax: (514) 488-3125
E-mail: biothermica@biothermica.com
Website: www.biothermica.com

CENTRE D'ÉTUDES DES PROCÉDÉS CHIMIQUES DU QUÉBEC (CEPROCQ)
Volatile Organic Compound Concentration Reduction Process

The process uses the principle of cryocondensation to reduce the volatile organic compound content of the solvent vapour produced by workshops or other sources of emissions. The technology functions continuously and can process a wide range of flows.

For more information about the process for reducing VOC concentrations in gaseous emission sources, please contact:

Serge Alex

Centre d'études des procédés chimiques du Québec (CEPROCQ)

6220, rue Sherbrooke Est

Montréal (Québec) H1N 1C1

Tel.: (514) 255-4444

Fax: (514) 251-3696

E-mail: salex@ceprocq.com

Website: www.ceprocq.com

CENTRE SPÉCIALISÉ EN PÂTES ET PAPIERS
High-Yield Chemical-Mechanical Pulping Process for Annuals

Through this process, fibers from annuals (straw, corn stalks and so on) can be pulped for the manufacture of paper and cardboard. The process is high-yield and "green", since the waste liquor can be used as fertilizer.

For more information about high-yield pulping technology, please contact:

Mario Parenteau

Centre spécialisé en pâtes et papiers

2250, rue Saint-Olivier

Case postale 97

Trois-Rivières (Québec) G8Y 5J5

Tel.: (819) 372-0202, ext. 256

Fax: (819) 372-9938

E-mail: mario.parenteau@cegeptr.qc.ca

Website: www.cspp.net

**CO₂ SOLUTION INC.
Enzyme Bioreactor**

CO₂ Solution inc. has developed patented generic technology that can be adapted to virtually all industrial sectors. It captures CO₂ through natural biocatalysis and converts it into a stable aqueous solution of bicarbonate ions that can be used for :

- The production of a carbonate derivative (for example, industrial quality calcium carbonate for the pulp and paper industry)
- Active desorption, i.e. the regeneration of industrial quality CO₂, in order to stimulate, for example, the growth of plants in greenhouses
- The conditioning of the bicarbonate solution, with a view to, for example, its injection into deep aquifers

For more information about enzyme bioreactor technology, please contact:

Ghislain Th  berge
CO₂ Solution inc.
2300, rue Jean-Perrin
Sainte-Foy (Qu  bec) G2C 1K8
Tel.: (418) 842-3456
Fax: (418) 842-1732
E-mail: info@co2solution.com
Website: www.co2solution.com

**ENERKEM TECHNOLOGIES INC.
FIRSST Fractionation and Steam Explosion Process**

The FIRSST process fractionates homogeneous waste biomass into constituent molecular families and uses each family.

For more information about FIRSST technology, please contact:

Esteban Chornet
Enerkem Technologies Inc.
615, boul. Ren  -L  vesque Ouest, bureau 1220
Montr  al (Qu  bec) H3B 1P5
Tel.: (514) 875-0284
Fax: (514) 875-0835
E-mail: echornet@enerkem.com
Website: www.enerkem.com

<p style="text-align: center;">ENVIROGAIN INC. Biofertile Solution for Aerobic Treatment of Manure</p>
--

BIOFERTILE technology is a complete process for the five-stage treatment of manure:

- primary filtration (FILTRAMAT)
- activated sludge-type aerobic biological treatment
- mechanical sludge clarification (SKIMMAT)
- water and gas treatment through a fixed bacteria-type bioreactor (FLAIR)
- electrochemical purification of waste water (POLIPUR)

Lastly, carbon is returned to the soil through the biofertilizer produced.

For more information about BIOFERTILE technology, please contact:

Jocelyn Douh ret

Envirogain inc.

1112, boulevard de la Rive-Sud
Saint-Romuald (Qu bec) G6W 5M6

Tel.: (418) 834-2640

Fax: (418) 839-1419

E-mail: jocelyn.douheret@envirogain.com

Website: www.envirogain.com

<p style="text-align: center;">FORINTEK CANADA CORP. (FCC) AND CO₂ SOLUTION INC. Biocov</p>
--

BIOCOV technology was developed jointly by FCC and CO₂ Solution inc. It consists in the close integration, in a single treatment unit, of a bark-based biofilter and an enzyme bioreactor that biodegrade the atmospheric emissions of the composite wood panel industry.

For more information about BIOCOV technology, please contact:

Richard L pine

Forintek Canada Corp. (FCC)

319, rue Franquet
Sainte-Foy (Qu bec) G1P 4R4

Tel.: (418) 659-2647

Fax: (418) 659-2922

E-mail: francois.leger@qc.forintek.ca

Website: www.forintek.ca

ROBERT CHARBONNEAU
Anaerobic Digester

The technology consists in a polyethylene fabric placed on a storage tank that serves as an anaerobic reactor. The fabric is perfectly impervious, creating an anaerobic environment. The gases emitted in digestion are kept under the fabric, then captured by a gas recovery system.

For more information about anaerobic digester technology, please call:

Robert Charbonneau

250, Saint-Sylvestre, app. 1

Longueuil (Québec) J4H 2W4

Tel.: (450) 442-3444

Fax: (450) 442-7688

E-mail: charbro@enter-net.com

PRATT & WHITNEY CANADA
NO_x Emission Reduction

The technology in development is aimed at reducing nitrogen oxide emissions from industrial and aircraft engines.

For more information about NO_x emission reduction technology, please contact:

Hany Moustapha

Pratt & Whitney Canada

1000, boul. Marie-Victorin

Longueuil (Québec) J4G 1A1

Tel.: (450) 647-2546

Fax: (450) 647-7779

E-mail: hany.moustapha@pwc.ca

Website: www.pwc.ca

SMARTSOIL ENERGY INC.
Fuel Cell

The biofuel cell solution marketed by Smartsoil is a high-performance technology used to stabilize waste in five years and produce more biogas of better quality at a constant rate. The technology significantly extends the lifespan of landfills and increases their capacity, while generating income from the sale of energy and CO₂ credits.

For more information about biofuel cell technology, please contact:

Marc-Antoine Pelletier

Smartsoil Energy Inc.

1751, rue Richardson, bureau 6119

Montréal (Québec) H3K 1G6

Tel.: (514) 846-0088

Fax: (514) 846-3299

E-mail: annie.boulanger@smartsoil.com

Website: www.biofuelcell.com

TRANSPORTATION

AVESTOR
Lithium-Metal-Polymer Battery

The lithium-metal-polymer battery is an energy storage component, one potential application of which is in the electric automobile.

For more information about lithium-metal-polymer battery technology, please contact:

Alain Vallée

Avestor

1600, rue de Coulomb

Boucherville (Québec) J4B 7Z7

Tel.: (450) 655-3161

Fax: (450) 655-9297

E-mail: avallee@avestor.com

Website: www.avestor.com

QUASITURBINE AGENCE INC.
Quasiturbine Engine

The Quasiturbine is a no-crankshaft rotary engine having a 4-face articulated rotor with a free and accessible centre, rotating without vibration or dead time, and producing a strong torque at low RPM under a variety of modes and fuels. The Quasiturbine can also be used as air engine, steam engine, Stirling engine, compressor and pump. It is at the crossroads of three modern engines: Inspired by the turbine, it perfects the piston and improves upon the Wankel. The Quasiturbine is universal in terms of energy sources: liquid and gaseous fuel, hydrogen, steam, pneumatic, hydraulic. The engine makes use of a complex computer-calculated quasi-oval shaped stator housing that creates regions of increasing and decreasing volumes as the rotor turns. The engine is also designed to burn fuel in detonation mode. The concept is the result of research begun in 1990 to unify the two turbines in a gas turbine engine, namely, the compressor turbine and the power turbine.

For more information about Quasiturbine technology, please contact:

Gilles Saint-Hilaire

Quasiturbine Agence Inc.

3535, avenue Papineau

Case postale 2804

Montréal (Québec) H2K 4J9

Tel.: (514) 527-8484

Fax: (514) 527-9530

E-mail: info@quasiturbine.com

Website: www.quasiturbine.com

NANOX INC.
Nanocrystalline Perovskite-Based Materials

Nanocrystalline perovskite-based technology was developed by Nanox through its patented mechanical-chemical synthesis process. The mixed oxides (perovskites) enter into the composition of high-performance catalysts with applications in the automobile industry.

For more information about nanocrystalline perovskite-based material technology, please contact:

Gaston Perron

Nanox Inc.

4975, rue Rideau, bureau 100

Québec (Québec) G2E 5H5

Tel.: (418) 692-1131

Fax: (418) 692-1165

E-mail: perron.gaston@nanoxnps.com

Website: www.nanoxnps.com

PRATT & WHITNEY CANADA
Industrial Gas Turbine Engine

Pratt & Whitney Canada is developing a stationary industrial generator with a free turbine for rapid start-up with a view to obtaining full load. These engines are perfectly suited to carrying loads at constant speed, particularly generators. The positive environmental impact is the reduction of nitrogen oxide emissions.

For more information about industrial gas turbine engine technology, please contact:

Hany Moustapha

Pratt & Whitney Canada
Technology Office

1000, boul. Marie-Victorin

Longueuil (Québec) J4G 1A1

Tel.: (450) 647-2546

Fax: (450) 647-7779

E-mail: hany.moustapha@pwc.ca

Website: www.pwc.ca

PRATT & WHITNEY CANADA
Advanced Turbo Fan Integrator (ATFI) Engine

The ATFI engine is designed to improve the performance of components that reduce fuel consumption and, therefore, to reduce combustion product emissions.

For more information about the ATFI engine, please contact:

Hany Moustapha
Pratt & Whitney Canada
Technology Office
1000, boul. Marie-Victorin
Longueuil (Québec) J4G 1A1
Tel.: (450) 647-2546
Fax: (450) 647-7779
E-mail: hany.moustapha@pwc.ca
Website: www.pwc.ca

ADERCO CHEMICAL PRODUCTS INC.
Fuel and Fuel Oil Additives

Fuel oil additives provide better combustion and help keep equipment clean, which directly reduces fuel oil consumption. The decreased consumption proportionately reduces greenhouse gas emissions.

For more information about additive technology, please contact:

Michel Bisailon
Aderco Chemical Products Inc.
2048, Autoroute 40 Ouest
Laval (Québec) H7S 2M9
Tel.: (450) 978-7671
Fax: (450) 978-0155
E-mail: mikeb@aderco.com
Website: www.aderco.com

**LES PRODUITS CLN INC.
ACT-ION+ Fuel Combustion Optimizer**

ACT-ION+ technology consists in a wave generator that energizes fuel. The generator produces a specific magnetic field and optimizes the oxygen/fuel relationship. It is proven that additional oxygenation of gasoline or diesel fuel increases the efficiency of combustion, making it more complete.

For more information about ACT-ION+ technology, please contact:

Bernard Royer

Les produits CLN inc.

1170, boul. Lebourgneuf, bureau 302

Québec (Québec) G2K 2E3

Tel.: (418) 626-5557

Fax: (418) 626-5597

E-mail: bernard.royer@pollustop.net

Website: www.pollustop.net

**TM4 INC.
Permanent Magnet Rotary Machine for Transportation**

Permanent magnet electric machine technology is used in automobile traction/propulsion systems. Size and weight are reduced by half, compared with conventional technologies.

For more information about permanent magnet rotary machine technology, please contact:

Patrice Dupont

TM4 inc.

135, rue J.-A. Bombardier, bureau 25

Boucherville (Québec) J4B 8P1

Tel.: (450) 645-1444

Fax: (450) 645-1864

E-mail: patrice.dupont@tm4.com

Website: www.tm4.com

VENTILATION / REFRIGERATION / HEATING

**CANMET ENERGY TECHNOLOGY CENTRE
CH4MIN Flow-Reversal-Mode Catalytic Reactor**

CH4MIN is an innovative technology developed by CETC-Varenes to efficiently oxidize dilute methane in the ventilation air of coal mines. The technology could also be used to oxidize low-concentration methane emitted in natural gas transport and/or in the methanization of waste buried in a landfill. The methane oxidation process yields clean energy that can be recovered.

For more information about CH4MIN technology, please contact:

Mouloud Amazouz
CANMET Energy Technology Centre
Natural Resources Canada
1615, boul. Lionel-Boulet
Case postale 4800
Varenes (Québec) J3X 1S6
Tel.: (450) 652-6922
Fax: (450) 652-5177
E-mail: mouloud.amazouz@rncan.gc.ca
Website: <http://cedrl.mets.rncan.gc.ca>

**CANMET ENERGY TECHNOLOGY CENTRE
Integrated Refrigeration System**

The integrated refrigeration system is a new technology based on a dual-loop system, heat recovery and a variable pressure compressor. The system contains 80% less synthetic coolant and consumes 40% less energy than conventional systems.

For more information about integrated refrigeration system technology, please contact:

Gilles Jean
CANMET Energy Technology Centre
Natural Resources Canada
1615, boul. Lionel-Boulet
Case postale 4800
Varenes (Québec) J3X 1S6
Tel.: (450) 652-6922
Fax: (450) 652-5177
E-mail: gilles.jean@rncan.gc.ca
Website: <http://ctec-varenes.nrcan.gc.ca>

FRYGY CUBE INTERNATIONAL INC.
Cold Accumulation Truck Refrigeration Unit

The cold accumulation truck refrigeration unit produces and stores cold when the truck is stopped for the night and unstores it when the truck is in use during the day. The unit consists of a compressor driven by an electric motor, a condenser and a storage system containing a saline solution that undergoes a liquid-solid phase change at -30°C.

For more information about cold accumulation truck refrigeration technology, please contact:

Pierre Archambault

Frygy Cube International inc.

2573, chemin des Écossais

Bromptonville (Québec) J0B 1H0

Tel.: (819) 823-5447

Fax: (819) 823-6839

E-mail: frygycube@hotmail.com

Website: www.frygycube.com

GRANULES COMBUSTIBLES ENERGEX INC.
Fuel Pellets

The fuel pellets are densified biomass-based pellets that can be used for home and industrial heating.

For more information about fuel pellet technology, please contact:

John Arsenault

Granules combustibles Énergex inc.

3891, Président-Kennedy

Rimouski (Québec) G6B 3B8

Tel.: (819) 583-5131

Fax: (819) 583-5862

E-mail: jwa@energex.com

Website: www.energex.com

INRS-ÉNERGIE, MATÉRIAUX ET COMMUNICATIONS Chemical Heat Pump (CHP)

With CHP technology, cold is produced in a very wide temperature range with no major turning parts (compressor) and, at the same time, heat is produced in a useful temperature range for practical applications. A comparison of the machine with the technologies currently in use shows that, in a conventional industrial facility, two different machines fill the same needs. Cold is produced by an ammonia compression system (screw compressor) connected to a cooling tower, and heat (hot water) is produced by a natural gas boiler. The CHP creates about twice less CO₂ than a conventional industrial facility producing the same amount of cold and heat.

For more information about CHP technology, please contact:

Valko Valkov
INRS-Énergie, Matériaux et Communications
1650, boul. Lionel-Boulet
Varenes (Québec) J3X 1S2
Tel.: (450) 929-8137
Fax: (450) 929-8102
E-mail: valkov@emt.inrs.ca
Website: www.emt.inrs.ca

INSTITUT DE RECHERCHE SUR L'HYDROGÈNE Magnetic Refrigeration

Magnetic refrigeration uses the magnetic-caloric effect of certain magnetic materials in order to exchange heat between a hot source and cold source by applying a periodic magnetic field. This technology is potentially more efficient and compact than traditional refrigeration.

For more information about magnetic refrigeration technology, please contact:

Richard Chahine
Institut de recherche sur l'hydrogène
3351, boul. des Forges
Case postale 500
Trois-Rivières (Québec) G9A 5H7
Tel.: (819) 376-5139
Fax: (819) 376-5164
E-mail: Richard_Chahine@uqtr.ca
Website: www.irh.uqtr.ca

LABORATOIRE DES TECHNOLOGIES DE L'ÉNERGIE (LTE)
High-Temperature Heat Pump for Wood Drying

The high-temperature heat pump for wood drying is a compact or stand-alone unit, fitted with electric compressors and fans that can recover the heat from the wood dryer and return it to temperatures equal to or greater than 100°C.

For more information about high-temperature heat pump technology for wood drying, please contact:

Vasile Minea

Laboratoire des technologies de l'énergie d'Hydro-Québec

660, avenue de la Montagne

Shawinigan (Québec) G9A 5H7

Tel.: (819) 539-1400, ext. 1507

Fax: (819) 539-1409

E-mail: minea.vasile@lte.ireq.ca

Website: www.hydroquebec.com

LABORATOIRE DES TECHNOLOGIES DE L'ÉNERGIE (LTE)
Heat Accumulator for Heating in the Commercial and Institutional Sectors

The heat accumulator is an intelligent electric heating device that stores heat during off-peak periods of electricity consumption and restores it when electricity demand is high. The device thus enables customers to optimize their energy consumption profile. The accumulator can ease major loads during peak periods lasting several hours. For example, the heat accumulator can deliver the equivalent of an 80 kW furnace for eight consecutive hours solely with the energy accumulated in the storage mass. The accumulator uses clean energy and profitably replaces gas or oil heating devices (in terms of purchase and maintenance costs).

For more information about heat accumulator technology, please contact:

Alain Moreau

Laboratoire des technologies de l'énergie d'Hydro-Québec

600, avenue de la Montagne

Shawinigan (Québec) G9N 7N5

Tel.: (819) 539-1400, ext. 1507

Fax: (819) 539-1409

E-mail: Moreau.alain@lte.ireq.ca

Website: www.hydroquebec.com

SOLUTIONS ÉNERGÉTIQUES ÉNERCONCEPT INC.
High-Temperature Air Solar Water Heater System

High-temperature air solar water heater system technology uses air as the heat-transfer medium for the heating of space, supplementary ventilation air or domestic hot water.

For more information about high-temperature air solar water heater system technology, please contact:

Christian Vachon

Solutions énergétiques Énerconcept inc.

720, rue Longpré

Sherbrooke (Québec) J1G 4L3

Tel.: (819) 829-1690

Fax: (819) 829-1691

E-mail: info@enerconcept.com

Website: www.enerconcept.com

THERMTECH INC.
Residential Integrated Mechanical System

The residential integrated mechanical system provides heating, ventilation, water heating, recovery of overheating and regeneration of indoor air in a home.

For more information about the residential integrated mechanical system, contact:

Luc Muyldermans

Thermtech inc.

723, chemin Frappier

Ayer's Cliff (Québec) J0B 1C0

Tel.: (819) 838-5203

E-mail: luc.muyl@abacom.com

TN CONSEIL INC.
Classroom Ventilation Device

The new ventilation system developed is a very high performance device for suitably airing school classrooms, which are usually ventilated improperly or not at all.

For more information about classroom ventilation technology, please contact:

Pierre Hosatte

TN Conseil inc.

1471, boul. Lionel-Boulet, bureau 26

Varenes (Québec) J3X 1P7

Tel.: (450) 652-0444

E-mail: tn.conseil@qc.aira.com



Innover...
prospérer

www.mdeie.gouv.qc.ca

Développement
économique, Innovation
et Exportation

Québec 