



2005 Annual Report Supplement



SUSTAINABLE DEVELOPMENT
TECHNOLOGY CANADA™



Supplement to the 2005 Annual Report

Within the terms and conditions of the Funding Agreement executed March 31, 2005, Sustainable Development Technology Canada (SDTC) is required to provide, in addition to the Annual Report, a supplement to the Annual Report that Canada will be entitled to make public and to table in Parliament with the annual report.

Within this supplement, SDTC has provided the required information.

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SUSTAINABLE DEVELOPMENT
TECHNOLOGY CANADA™

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The following provides a brief description for each project approved for funding by SDTC's Board of Directors for all rounds since the commencement of the Foundation's activities. This report provides an update of SDTC's total project portfolio of allocated funding as of December 31st, 2005, including Rounds 1 to 7. The rounds specifically approved in 2005 are Rounds 6 and 7.

Bio-Terre Systems Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$2,305,000

SDTC Funding:

\$864,375

Leveraged Funding:

\$1,440,625

Bio-Terre is demonstrating a complete process chain designed to produce energy from hog manure and to manage nutrients from intensive pig farming in a sustainable fashion. The process is designed to capture and treat methane gas and then convert it into usable energy in accordance with site specific energy demand.

Consortium Members

Agriculture and Agri-Food Canada

Enviro-Accès inc.

Ferme Famille Saint-Hilaire

Hydro Québec

Richard Peloquin

Université de Sherbrooke (Groupe de recherche sur les technologies et procédés de conversion)

Carmanah Technologies Inc. *(Completed)*

Environmental benefit: Climate change/Clean air

Total Project Value:

\$2,035,062

SDTC Funding:

\$466,167

Leveraged Funding:

\$1,568,895

Carmanah is demonstrating an adaptation of solar powered LED technology to edge-lit signage, which will lead to the development of a more diverse and robust solar industry. This project is expected to enable solar powered lighting to enter mainstream applications.

Consortium Members

BC Hydro

British Columbia Institute of Technology

CO2 Solution Inc.

Environmental benefit: Climate change

Total Project Value:

\$6,829,961

SDTC Funding:

\$1,000,000

Leveraged Funding:

\$5,829,961

This technology consists of an enzyme bioreactor designed to operate in an aqueous environment. It leverages mechanical and physical chemical principles, as well as the catalytic action of an enzyme to sequester CO₂ in the form of inert, bicarbonate compounds.

Consortium Members

Agency of Energy Efficiency

Aluminum Association of Canada

CIFM (Centre intégré de fonderie et de métallurgie)

Elkem Metal Canada Inc.

Federation of Canadian Municipalities
(Green Municipal Investment Fund)

Fonderie industrielle Laforo inc.

Place Bonaventure

Ville de Québec

Mabarex inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$3,400,000

SDTC Funding:

\$1,190,000

Leveraged Funding:

\$2,210,000

Mabarex's Dry-Rex is a two-step, integrated, wet granular-drying process that uses low vacuum, forced-air stream at temperatures above 5°C as the main driving force to effectively dry paper mill biomass at temperatures much lower than other processes.

Consortium Members

EM Optimisation inc.

Enviro-Accès inc.

Kruger inc.

Natural Resources Canada
(CANMET Energy Technology Centre)

NOVA Chemicals Corporation *(Early Termination)*

Environmental benefit: Climate change/Clean air

Total Project Value:

\$1,408,081

SDTC Funding:

\$320,000

Leveraged Funding:

\$1,088,081

A new membrane technology has been developed that represents a two-orders of magnitude improvement in olefin-paraffin separation efficiency over existing membrane technologies, reducing capital cost of equipment required for separation while minimizing energy consumption and contributing to a reduction in GHG emissions.

Consortium Members

Alberta Research Council

University of Waterloo

Suncor Energy Inc.

Environmental benefit: Climate change

Total Project Value:

\$8,391,371

SDTC Funding:

\$2,250,000

Leveraged Funding:

\$6,141,371

This project addresses carbon sequestration and enhanced methane production in a closed cycle pilot project designed to capture CO₂ emissions, inject and sequester these emissions into a local subsurface coal reservoir and produce enhanced volumes of coal bed methane as a result.

Consortium Members

Alberta Energy Research Institute

Alberta Research Council

Encana Inc.

Federal Government (TEAM and PERD)

MGV Energy Inc.

TransCanada Pipelines Ltd.

Westport Research Inc.

Environmental benefit: Clean air

Total Project Value:

\$3,041,000

SDTC Funding:

\$1,000,000

Leveraged Funding:

\$2,041,000

Westport plans to demonstrate the technical and economic feasibility of operating heavy-duty (Class 8) trucks in a line-haul application using liquefied natural gas as the primary fuel mixed with diesel.

Consortium Members

Challenger Motor Freight Inc.

Enbridge Gas Distribution Inc.

Natural Resources Canada

Bruce R. Smith Inc.

DynaMotive Energy Systems Corporation *(Completed)***Environmental benefit: Clean air**

Total Project Value:

\$12,038,000

SDTC Funding:

\$5,000,000

Leveraged Funding:

\$7,038,000

DynaMotive is demonstrating its combined fast pyrolysis technology called BioTherm for the production of liquid fuels (bio-oil) from forest and agricultural residues (i.e. wood, bark and straw) in an integration platform with a 2.5 MW gas turbine developed specifically to run on bio-oil.

Consortium Members

Erie Flooring and Wood Products

Ontario Power Generation Inc.

Orenda – division of Magellan Aerospace Corporation

UMA Engineering Limited

Enerkem Technologies Inc. *(Completed)***Environmental benefit: Climate change/Clean air**

Total Project Value:

\$2,058,945

SDTC Funding:

\$750,000

Leveraged Funding:

\$1,308,945

Enerkem is in the process of developing a complete technology platform for the production of alcohol biofuels derived from complex wastes, using municipal solid waste as the demonstration feedstock.

Consortium Members

Enviro-Accès inc.

Québec Government

SOQUIP Énergie Inc.

Université de Sherbrooke (Groupe de recherche sur les technologies et procédés de conversion)

Ville de Sherbrooke

Ensyn Technologies Inc.**Environmental benefit: Climate change/Clean air**

Total Project Value:

\$8,895,871

SDTC Funding:

\$2,000,000

Leveraged Funding:

\$6,895,871

Ensyn plans to demonstrate an industrial integrated biomass refinery concept, including the core Rapid Thermal Processing (RTP) process that produces intermediate products and the multiple downstream refining that produces the final chemical, fuel and carbon products.

Consortium Members

Opeongo Forestry Service

Renfrew Industrial Commission

Highmark Renewables Inc. *(Completed)*

Environmental benefit: Climate change/Clean air

Total Project Value:

\$6,450,000

SDTC Funding:

\$1,000,000

Leveraged Funding:

\$5,450,000

Highmark Renewables plans to complete its late-stage development and demonstrate its IMUS technology, an anaerobic digestion system which utilizes cattle manure to produce energy, biobased fertilizer and reusable water.

Consortium Members

Agriculture Canada (Energy Co-generation from Agriculture and Municipal Wastes)

Alberta Agricultural Food and Rural Development

Alberta Agricultural Research Institute

Alberta Research Council

CETAC – WEST

Climate Change Central

Federation of Canadian Municipalities (Green Municipal Investment Fund)

Greenhouse Gas Mitigation Program for Canadian Agriculture

Highland Feeders Inc.

TEAM

University of Alberta

IBC Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$960,000

SDTC Funding:

\$266,000

Leveraged Funding:

\$694,000

IBC is proving a new, high efficiency combined ventilation and space/water heating system. This product is significantly more energy-efficient than standard systems.

Consortium Members

Dexon Canada Manufacturing Corporation

GSW Water Heating Company, a division of GSW Inc.

Mechanical Systems 2000 Inc.

Natural Resources Canada (CANMET Energy Technology Centre)

Nutech Energy Systems Inc.

Mikro-Tek Inc. *(Completed)*

Environmental benefit: Climate change

Total Project Value:

\$3,871,600

SDTC Funding:

\$500,400

Leveraged Funding:

\$3,371,200

Mikro-Tek plans to demonstrate its technology to increase carbon sequestration through the application and management of naturally occurring soil fungi called mycorrhizae.

Consortium Members

North Sun Nurseries Inc.

Woodrising Consulting Inc.

Radiant Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$5,500,000

SDTC Funding:

\$1,000,000

Leveraged Funding:

\$4,500,000

Radiant is in the process of development, demonstration, and validation of a family of technologies that use microwave and high frequency energy to enable extraction and recovery of waste oils, contaminants and fine chemicals.

Consortium Members

Bunge Canada

Environment Canada

McGill University, Department of Food Science

NORAM Engineering and Constructors Ltd.

Science Applications International

Corporation Canada

University of New Brunswick

Environmental benefit: Climate change/Clean air

Total Project Value:

\$622,200

SDTC Funding:

\$260,000

Leveraged Funding:

\$362,200

UNB is furthering development and demonstration of high performance interconnection technologies based on power electronic inverters for wind and small hydro-distributed power generation systems.

Consortium Members

Briggs & Little Woolen Mills Ltd.

Custom Research Ltd.

Eoletech Inc.

NB Power Corp.

Turbowinds Canada Inc.

Village of Dorchester

ZENON Environmental Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$5,334,000

SDTC Funding:

\$1,760,000

Leveraged Funding:

\$3,574,000

ZENON is in the late-stage development and demonstration phases for a new, membrane-supported biofilm reactor for wastewater treatment. The process eliminates air emissions from the aerated bio-reactor typical of most applications.

Consortium Members

Environmental Technology Advancement Directorate (ETAD)

McMaster University

Ryerson University, Department of Applied Chemical and Biological Sciences

BET Services Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$14,050,000

SDTC Funding:

\$3,080,000

Leveraged Funding:

\$10,970,000

BET plans to test and demonstrate eight prototype hybrid-electric shuttle buses in daily operation in a municipal transit authority. The proponent claimed that its battery-dominant design combined with its ground-up lightweight bus manufacturing reduces GHG and CAC emissions by 40 percent compared with diesel. These buses are capable of driving for eighty kilometers solely on electric power, producing zero emissions. Small diesel engines, operating at optimum speed, would keep the batteries charged, thereby reducing emissions for longer-distance service runs.

Consortium Member

Overland Custom Coach Inc.

Société de transport de Montréal

Blue-Zone Technologies Ltd.

Environmental benefit: Climate change

Total Project Value:

\$8,100,000

SDTC Funding:

\$2,700,000

Leveraged Funding:

\$5,400,000

Blue-Zone has developed a technology to capture, reclaim, and purify halogenated inhalation anaesthetic gases, which are used in hospital operating rooms. These are very aggressive greenhouse gases, and some have global warming potential up to 1,900 times that of carbon dioxide. Most of these gases escape into the atmosphere during medical application. Blue-Zone claims that its technology, broadly called Delta™, can capture and recycle all of the vented gases. The anaesthetic can be re-used ten to twenty times. This offers hospitals significant savings in their expenditures on anaesthetic gas while preventing harmful GHG emissions.

Consortium Members

Bodycote Materials Testing Canada Inc.

Canadian Centre for Pollution Prevention

Highland Equipment Limited

Jayne Industries Inc.

Ontario Centre for Environmental Technology Advancement (OCETA)

University Health Network

University of Toronto, Faculty of Medicine

Cansolv Technologies Inc.

Environmental benefit: Climate change

Total Project Value:

\$4,562,000

SDTC Funding:

\$1,520,000

Leveraged Funding:

\$3,042,000

Cansolv has developed a way to reduce the cost of capturing CO₂ in flue gas. This technology grew from earlier projects that introduced ways of removing sulfur from process emissions, which the proponent successfully implemented at Noranda, Philips Conoco, and Petro-Canada. In this project, Cansolv would demonstrate its CO₂ capture technology in an oil-fired boiler at a large pulp and paper manufacturing site. The manufacturer will then use the captured CO₂ to acidify the pulp during the paper-bleaching process using carbonic acid.

Consortium Members

Abitibi Consolidated Inc.

Air Liquide Canada

Enviro-Accès inc.

Pulp and Paper Research Institute of Canada

Cellex Power Products, Inc.

Environmental benefit: Clean air

Total Project Value:

\$9,026,000

SDTC Funding:

\$2,000,000

Leveraged Funding:

\$7,026,000

Cellex developed fuel cell-based power products for use in industrial vehicles. This project focuses on demonstrating a fuel cell-powered lift truck (a.k.a. forklift). Cellex aims to target the electric- and ICE-powered lift truck market. Cellex believes that, with SDTC's help, it can be in a position to assemble Cellex Fuel Cell Power units for commercial use.

Consortium Members

Arpac Storage Systems Corporation
Fuel Cells Canada

Hydrogenics Corporation *(Completed)*

Environmental benefit: Clean air

Total Project Value:

\$3,545,182

SDTC Funding:

\$1,560,000

Leveraged Funding:

\$1,985,182

Hydrogenics plans to develop, demonstrate, and commercialize fuel cell-powered forklifts. This would involve outfitting two Class-1 forklifts with motors and fuel storage systems, as well as developing refueling facilities and demonstrating the newly outfitted forklifts to industrial end users. One of the technological challenges Hydrogenics hopes to overcome is to reduce refueling time, currently a major cost to warehouse operations.

Consortium Members

Deere and Company Inc.
Federal Express Canada Ltd.
General Motors of Canada Ltd.
NACCO Materials Handling Group Inc.

Paradigm Environmental Technologies Inc. *(Completed)*

Environmental benefit: Climate change/Clean air

Total Project Value:

\$818,000

SDTC Funding:

\$250,000

Leveraged Funding:

\$568,000

Paradigm developed a process for efficiently breaking down biological wastewater sludge. This technology, which the proponent calls MicroSludge, uses chemicals and rapid depressurization and deceleration from a high pressure homogenizer to pre-treat waste sludge before it goes into an anaerobic digester, where decomposition is far more efficient. Conventional waste-treatment methods are inefficient, and only break down 35 percent of the sludge. The remaining 65 percent, teeming with microbes, usually goes into a landfill, where subsequent uncontrolled decomposition releases significant amounts of methane into the atmosphere.

Consortium Members

CH2M HILL
Chilliwack Waste Water Treatment
National Research Council
Natural Resources Canada
Powertech Labs Inc.

Quantiam Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$9,768,313

SDTC Funding:

\$1,450,000

Leveraged Funding:

\$8,318,313

Quantiam has developed surface coatings for furnace coils inside olefin cracking units. These coatings are catalytic, thereby minimizing residue build-up, permitting lower operating temperatures, and reducing maintenance downtime. The proponents plan to demonstrate their technology and improve catalyst and coating production techniques. Other competitors, mainly in the US, Europe and Asia are developing olefin manufacturing processes that could lower temperatures by 200–300 degrees Celsius, but these will require new facilities built from the ground up. Quantiam's advantage is that its technology, which would lower temperatures by 50–100 degrees, is retrofittable to existing furnaces, thereby minimizing capital investment and providing a viable near-term solution.

Consortium Members

NOVA Chemicals Corporation

NOVA Research & Technology Corporation

Railpower Technologies Corp.

Environmental benefit: Clean air

Total Project Value:

\$3,634,902

SDTC Funding:

\$1,473,032

Leveraged Funding:

\$2,161,870

Railpower plans to demonstrate an ultra-energy-efficient switcher locomotive. Most railway switcher locomotives incorporate standard diesel-electric configurations which, because they are not built for the very demanding stop-go environment of the railway switching yard, tend to operate inefficiently and emit large amounts of particulates. Railpower's prototypes are powered by custom designed lead-acid batteries which are kept at full charge by a computer-controlled, smokeless diesel generator.

Consortium Members

Alstom Transport Service

Southern Railway of British Columbia Limited

Saskatchewan Power Corporation

Environmental benefit: Clean air

Total Project Value:

\$7,367,900

SDTC Funding:

\$1,782,900

Leveraged Funding:

\$5,585,000

SaskPower plans to demonstrate mercury emissions reduction technology which uses recyclable activated carbon. Such technology would make low-rank coal-fired generating plants environmentally feasible. Currently, there is no commercially available technology for controlling mercury emissions.

Consortium Members

Alstom Canada Ltd.

Luscar Ltd.

Natural Resources Canada (CANMET Energy Technology Centre)

Saskatchewan Research Council

University of North Dakota Environmental and Energy Research Center

University of Regina

BIOX Canada Ltd.

Environmental benefit: Clean air/Climate change

Total Project Value:

\$34,504,071

SDTC Funding:

\$5,000,000

Leveraged Funding:

\$29,504,071

This project will involve the development and demonstration of a technology to convert any seed oil, recycled cooking oils, and animal tallows and fats into biodiesel at atmospheric pressure and near-ambient temperatures. It can also convert oils and fats to biodiesel faster than competing processes. BIOX believes these advantages will result in considerably lower production costs, making biodiesel competitive with petroleum diesel.

Consortium Members

CS Investment Capital Limited
 Dynex Capital Limited Partnership
 Madison Ventures Limited
 University of Toronto
 VentureLink Corporation
 Weatons Holdings Limited

DeCloet Greenhouse Mfg. Ltd.

Environmental benefit: Climate change

Total Project Value:

\$1,724,489

SDTC Funding:

\$569,082

Leveraged Funding:

\$1,155,407

This project will involve the development and demonstration of an integrated suite of greenhouse technologies. New greenhouse structural designs will include removable foam insulation, heat recovery and storage systems, micro-turbine cogeneration, new energy management process controls, infra-red thermal film, energy curtains, and supplemental lighting system technologies. According to the project proponents, these combined technologies can increase greenhouse energy efficiency by 50 to 75 percent, with corresponding reductions in operating costs and greenhouse gas emissions.

Consortium Members

Agricultural and Adaptation Council (CanAdapt program)
 Argus Control Systems Ltd.
 CEA Technologies International
 Elliot Energy Systems Inc.
 Enbridge Gas Distribution Inc.
 Greenhouse Engineering
 Quist Engineering & Consult.
 P.L. Light Systems Canada Inc.
 Union Gas

Fifth Light Technology Ltd.

Environmental benefit: Climate change

Total Project Value:

\$9,200,000

SDTC Funding:

\$3,036,000

Leveraged Funding:

\$6,164,000

This project will involve the development and demonstration of a microprocessor-based dimmer for magnetic ballasts in fluorescent lights. This enables fixture-level dimming control and could lead to significant energy savings. Fifth Light claims that its dimmer makes magnetic ballasts operate more efficiently even when they are not dimmed, and actually improves their performance with respect to flicker, noise, heat, and life expectancy. Fifth Light dimmers reduce electricity in direct proportion to the amount of dimming. This technology offers a substantial advantage over electronic ballasts.

Consortium Members

Lindsay Electronics
 New Orbit Technologies Inc.
 Smith and Anderson Electrical Engineering Inc.
 Toronto Hydro Energy Services Inc.

Gradek Energy Inc.

Environmental benefit: Climate change

Total Project Value:

\$25,322,000

SDTC Funding:

\$5,000,000

Leveraged Funding:

\$20,322,000

This project will involve the development and demonstration of a process for separating bitumen (raw oil) from oilsands and from tailings streams and ponds. The process is based on re-usable organic polymer beads to which hydrocarbons adsorb. Current oilsands processes leave vast, environmentally hostile tailings streams and ponds which are estimated by project proponents to leave millions of barrels of unrecovered bitumen.

Consortium Members

SNC-Lavalin
Syncrude Canada
University of Alberta

Lignol Innovations Corporation

Environmental benefit: Clean air/Climate change

Total Project Value:

\$5,110,000

SDTC Funding:

\$1,700,000

Leveraged Funding:

\$3,410,000

This project will involve the development and demonstration of a cellulose-biomass biorefinery process that claims to effectively and economically convert forest industry wastes into ethanol and other marketable products, leaving virtually no leftover waste. This is done in two general stages. First, lignin and several other wood components are chemically separated and extracted from the waste material with a proprietary organosolv process. The second stage involves breaking down the remaining insoluble cellulose to sugars, which are then converted to fuel grade ethanol, using an enzymatic and fermentation process. The conversion of this treated form of cellulose to ethanol is much more efficient than other methods.

Consortium Members

Bio-Gro, Inc.
Delta-T Corporation
Forintek Canada Corp.
Gryphin Co., Inc.
Hipp Engineering Ltd.
Michael Ainsworth
Suncor Energy Products Inc.
University of British Columbia Faculty of Forestry
West Fraser Timber Co. Ltd.
Zuellig Group North America

Nanox inc.

Environmental benefit: Clean air

Total Project Value:

\$4,463,248

SDTC Funding:

\$1,800,000

Leveraged Funding:

\$2,663,248

This project will involve the development and demonstration of a low-temperature catalyst powder that claims to significantly reduce the quantity of platinum group metals (PGMs) used in the coating on catalytic converters for the automotive industry. This new catalyst is capable of converting carbon monoxide and volatile organic compounds (VOCs) and methane, from engine exhaust, into water and carbon dioxide at lower temperatures than PGMs (which only catalyze pollutants when the converter is hot). In conventional PGM catalytic converters, there is a significant period between cold start-up and optimum temperature when little or no catalysis is taking place. During this period, the pollutants may be exhausted directly into the atmosphere.

Consortium Members

Business Development Bank of Canada
Hydro-Québec CapiTech inc.
Pangaea Ventures
Sovar s.e.c.
The Solidarity Fund QFL
Université Laval

NxtPhase T&D Corp.**Environmental benefit: Climate change**

Total Project Value:

\$2,958,660

SDTC Funding:

\$986,220

Leveraged Funding:

\$1,972,440

This project will involve the development and demonstration of optical current and voltage sensors to control and monitor large-scale electric power grids. It is expected that devices of this type will replace the instrument transformers and circuit breakers currently in use. Existing instrument transformers and circuit breakers are insulated either with toxic oils or sulfur hexafluoride (SF6) gas, the latter of which is an extremely potent greenhouse gas. The optical sensors represent a safe and environmentally friendly solution, with superior performance resulting in enhanced reliability of the grid (reducing the probability of events such as the August 14, 2003, blackout).

Consortium Members

BC Transmission Corporation
Hydro Québec
Powertech Labs
University of British Columbia

Sacré-Davey Innovations Inc.**Environmental benefit: Clean air/Climate change**

Total Project Value:

\$17,832,999

SDTC Funding:

\$5,879,000

Leveraged Funding:

\$11,953,999

This project will involve the development and demonstration of a hydrogen fuel refining, storage, distribution and infrastructure program. It will showcase fuel cells in power generation, heavy and light-duty hydrogen burning vehicles, and vehicle refueling technologies. The program is based on recovery and utilization of waste hydrogen from an electro-chemical plant to advance the hydrogen economy.

Consortium Members

Clean Energy Fuels Canada
Dynetek Industries Ltd.
Easy-wash Inc.
Greater Vancouver Transit Authority dba Translink
Hydrogen Early Adopters Fund
Hydrogen Technology and Energy Corp.
Natural Resources Canada – Canadian Transportation Fuel Cells Alliance
Nuvera Fuel Cells
Powertech Labs Inc.
QuestAir Technologies Inc.
Westport Research Inc.

Synodon Inc.

Environmental benefit: Climate change

Total Project Value:

\$2,570,176

SDTC Funding:

\$650,000

Leveraged Funding:

\$1,920,176

This project will involve the development and demonstration of a mobile (helicopter-based) remote natural gas sensor capable of detecting leaks in pipelines. This detector, called realSens™, is based on remote sensing methods and instrumentation developed at the University of Toronto. Certain components upon which realSens™ is based are currently in use on NASA's Terra satellite. This new technology will enable pipeline operators to increase their efficiency in pipeline leak repair.

Consortium Members

Airborne Energy Solutions Ltd.

Mosaic Mapping Systems Inc.

TransCanada Pipelines Ltd.

Whitefox Technologies Canada Ltd.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$6,487,990

SDTC Funding:

\$2,608,545

Leveraged Funding:

\$3,879,445

This project will involve the development and demonstration of a membrane technology which is believed to reduce the overall cost of ethanol production in any ethanol plant by 3.5 cents per litre. In current ethanol production, a grain-based feed is fermented, separated and distilled. Conventional approaches are unreliable and inefficient because they use molecular sieve beds or plate and frame membranes. The Gen-X process is much less energy intensive and has higher reliability.

Consortium Members

KATZEN International Inc.

Natural Resources Canada

Permolex Ltd.

University of Calgary

Virtual Materials Group Inc.

Alternative Green Energy Systems Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$1,789,393

SDTC Funding:

\$588,875

Leveraged Funding:

\$1,200,518

This project will demonstrate a system for converting wet biomass waste materials into usable fuel that, as an alternative to fossil fuel, can reduce greenhouse gases and help eliminate detrimental climate change. Specifically, the project will employ patented AGES/KDS technology to dewater wet biomass waste materials such as pulp and paper biosolids, e.g. sludges and hog (wet bark), kinetically, without heat, and using less than half the energy of conventional drying systems. The AGES fuel-preparation technology enables the combusting or value-added separation of wastes that otherwise carry heavy disposal costs.

Consortium Members

First American Scientific Corporation
 Flakeboard Company Ltd.
 Hydro-Québec CapiTech inc.
 Thermix Combustion Systems Inc.
 University of Toronto—Forestry Department

Atlantic Hydrogen Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$6,454,479

SDTC Funding:

\$2,000,000

Leveraged Funding:

\$4,454,479

This project will demonstrate commercially viable grid-connected energy systems that integrate the CARBONSAVER™ hydrogen-delivery system developed by Precision H2 Power Inc. with modified internal combustion engines and with Hydrogenics Fuel Cell Engines. Being taken forward by Precision H2's sister company, Atlantic Hydrogen Inc., CARBONSAVER™ offers advantages over existing technologies by competitively producing hydrogen without creating GHG emissions. While future hydrogen sourcing may come from renewable energy and water, it is widely recognized that the transition to a hydrogen economy will depend on extracting hydrogen from fossil fuels. The innovation demonstrated through this project is expected to be of particular importance for its efficacy in distributed power and refueling applications linked to the existing natural gas distribution grid.

Consortium Members

Enbridge Canada
 Energy Reactions Inc. (McGill University)
 Hydrogen Engine Center
 PrecisionH2 Power Inc.
 University of New Brunswick

Atlantic Packaging Products Ltd.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$7,620,000

SDTC Funding:

\$2,514,600

Leveraged Funding:

\$5,105,400

This project proposes to build a demonstration system for creating process steam from paper mill residual biosolids. By generating steam in this way, the system is expected to reduce paper mill consumption of natural gas. The demonstration unit will use the patented TORBED® Expanded Bed Reactor to process residual biosolids from a 100% recycled fibre paper mill. The consortia group believes this demonstration unit will prove the Torftech system a viable alternative to handling paper mill biosolids.

Consortium Members

Teng and Associates Inc.

Torftech (Canada) Inc.

B.C. Eco-Systems Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$5,000,000

SDTC Funding:

\$500,000

Leveraged Funding:

\$4,500,000

This project will demonstrate the environmental, technological and economic viability of an integrated, "biomass-to-renewable-energy ecosystem." Including agricultural, municipal and industrial partners, the project's demonstrated solution will replace current manure-management approaches, reducing the volume of waste currently going to landfill and rendering. The solution itself combines single-phased thermophilic anaerobic digestion (AD), co-generation, and hydroponics technologies. The project will demonstrate the ability of these technologies to mitigate environmental impact while recovering value for partners in the form of renewable energy, clean water, organic fertilizer, hydroponic cattle feed, and GHG emission-reduction credits.

Consortium Members

Aggasiz Research Centre

Bifano Farms Ltd.

CETAC West

FULL Systems

The North Okanagan Regional District (NORD)

Olds Agricultural College

RCM Digesters

University of British Columbia

Dofasco Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$3,000,000

SDTC Funding:

\$1,000,000

Leveraged Funding:

\$2,000,000

Dofasco's Zyplex™ Technologies has developed a new, lightweight structural laminate with potential to improve fuel efficiency by reducing the weight of motor vehicles. This project will demonstrate the efficacy of this new laminate by applying it to vehicle body panels, and will assess the savings achieved in automotive applications.

Consortium Member

General Motors of Canada Ltd.

Great Northern Power Corp.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$6,988,114

SDTC Funding:

\$1,981,914

Leveraged Funding:

\$5,006,200

This project will demonstrate a system for economically producing electricity and heat using wood waste. Intended for medium-sized wood-processing operations, this solution is designed to eliminate reliance on external energy suppliers. The benefits are reduced greenhouse gas emissions in Canada, and substantial energy cost savings for wood-processing operations.

Consortium Members

Northland Forest Products Ltd.

Powerhouse Engineering Inc.

M.A. Turbo/Engine Ltd.

Environmental benefit: Clean air

Total Project Value:

\$332,270

SDTC Funding:

\$152,844

Leveraged Funding:

\$179,426

M.A. Turbo/Engine Ltd. has developed a water-injection system for marine diesels, achieving significant reductions of NOx and particulate emissions in this engine type. This project will extend the technology to heavy-duty engines in mobile applications where engine loads vary constantly. The project will demonstrate the technology in maritime port equipment such as yard tractors, fork lifts and gantry cranes.

Consortium Members

Neptune Bulk Terminals (Canada) Ltd.

Rival Technologies Inc.

QuestAir Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$21,848,000

SDTC Funding:

\$3,890,000

Leveraged Funding:

\$17,958,000

This project will demonstrate applications for Pressure Swing Adsorption (PSA), involving the development and demonstration of technology for recovering hydrogen from various process streams in oil refineries. QuestAir believes that its compact, modular gas purification technology will allow oil refineries to economically recover and re-use waste hydrogen, reducing net hydrogen consumption and its associated GHG emissions. The recovered hydrogen will also help refineries meet low sulphur fuel regulations. Although not part of the project, QuestAir believes the product will be a platform that can be used for other applications such as the recovery of methane fuel from renewable sources such as landfill gas, which results in significant reductions in emissions of both greenhouse gases and local air pollutants from landfills.

Consortium Members

ExxonMobil Research and Engineering Company

Techint Goodfellow Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$12,262,110

SDTC Funding:

\$3,678,633

Leveraged Funding:

\$8,583,477

This three-year project will include a full-scale demonstration of Techint Goodfellow Technologies' proprietary EFSOP™ (Expert Furnace System Optimization Process) system, which is capable of continuously measuring the exhaust gases from a steelmaking Electric Arc Furnace (EAF). The project will involve three industries that have been identified as significant contributors to greenhouse gas generation in Canada: Basic Oxygen Furnace (BOF) steelmaking, cement production, and thermal power. Many other high-temperature combustion processes would also benefit from real-time, robust off-gas characterization and control, both for energy optimization and for emission abatement. The purpose of the project is to apply the expertise and equipment developed for the Goodfellow EFSOP™ system, and to evaluate new optical instruments in other combustion-intensive industries.

Consortium Members

The Ontario Centre for Environmental Technology Advancement (OCETA)

Unisearch Associates Inc.

University of Toronto

Stelco Inc.

Xantrex Technology Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$15,000,000

SDTC Funding:

\$5,000,000

Leveraged Funding:

\$10,000,000

Xantrex and its consortium partners will develop and demonstrate a new integrated variable-speed drive system for large wind turbines. The system converts the highly variable mechanical energy from the wind into high-quality electrical power that can be supplied to the utility grid. The technology will reduce the cost and improve the performance of large wind turbines, enabling increased adoption of wind power generation, which is a renewable energy-generation technology that produces no direct greenhouse gases or other air pollution.

Consortium Members

Loher GmbH

Winergy AG

The following projects were approved for funding in 2005.

Angstrom Power Incorporated

Environmental benefit: Climate change/Clean air

Total Project Value:

\$1,346,775

SDTC Funding:

\$444,436

Leveraged Funding:

\$902,339

Angstrom is proposing to develop and demonstrate a complete hydrogen systems power solution to remote/off-grid field operations by integrating Angstrom's fuel cell and hydrogen storage technology into portable devices such as flashlights and hand held radios powered by their prototype micro fuel cell technology fuelled by hydrogen. The distributed devices would be coupled with a portable, centralized hydrogen refueling system based on conventional compressed gas storage. The Angstrom system will compete directly with gasoline generator—charger—battery systems in use today.

Consortium members

City of Vancouver, Urban Search and Rescue, Canada Task Force 1

HTEC Hydrogen Technology & Energy Corp.

Powertech Labs Inc.

The BOC Group

University of Victoria

Vancouver Airport Authority

Clean Current Power Systems Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$3,435,500

SDTC Funding:

\$933,000

Leveraged Funding:

\$2,502,500

Clean Current is proposing to design, build, install and test a 65 kw tidal turbine generator to demonstrate tidal current power. The unit will be installed on Race Rock Island, part of a BC Ecological Reserve, and will eliminate the use of 2 diesel generators currently supplying power to the Island. The Consortium has secured all required regulatory approvals and partial funding from EnCana Environmental Funds. SDTC funding is required for actual unit fabrication, installation and testing. A successful demonstration would lead to commercialization globally with initial roll-out likely in coastal regions of higher power costs.

Consortium members

AMEC Americas Ltd.

AMEC Dynamic Structures Limited

EnCana Corporation

Lester B. Pearson College of the Pacific

Ocean Works International

Powertech Labs Inc.

Triton Consultants Ltd.

Electrovaya Corp.

Environmental benefit: Clean air/Climate change

Total Project Value:

\$5,615,000

SDTC Funding:

\$1,732,000

Leveraged Funding:

\$3,883,000

Electrovaya Corp is proposing the development of its award winning and patented lithium ion Superpolymer® battery system for use as the energy source to power zero-emission electric vehicles (EVs), principally in vehicle fleet applications. In this submission, Electrovaya is partnered with Unicell Inc., a manufacturer of commercial vehicle body shells and a systems integrator for complete commercial vehicles and Southwestern Energy, a services firm providing vehicles to the electric utility industry. Electrovaya's Superpolymer® technology is a technology platform where fast Lithium ion conduction takes place. This technology platform can accommodate new electrode materials as they evolve. A new positive electrode material being developed in partnership with the National Research Council, could provide further increased cell energy density of around 50% while further decreasing battery costs.

Consortium Members

Halton Hills Hydro
SouthWestern Energy Inc.
Unicell Limited
Purolator

Encelium Technologies Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$8,665,000

SDTC Funding:

\$2,820,000

Leveraged Funding:

\$5,845,000

Encelium's Energy Control System (ECS) consists of patented hardware, software and communication technologies that deliver optimum light levels to each workspace in a building without wasted energy by allowing every building occupant to control their own personal workspace light "environment" from their desktop computer. The "Advanced Negawatt ECS" will build on this system and allow for remote management of the load shedding capability of the system across a portfolio of buildings with extended control capability including HVAC, building automation systems, cost-effective advanced metering to communicate accurate time based energy data, and improved ability for integration into existing and emerging energy management systems. This system will enable the negotiation protocols for large-scale energy and capacity transactions for loads at the wholesale level while still enabling individual space control. The proposed project would demonstrate this system in 2,000,000 sq. ft. (5-10 sites) of commercial office space for 1 year.

Consortium members

Toronto Hydro Energy Services Inc.

EnerWorks Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$7,489,100

SDTC Funding:

\$2,449,100

Leveraged Funding:

\$5,040,000

The Project proposes to integrate solar thermal domestic hot water heating and geexchange space heating and cooling technologies into a managed utility solution. As an initial demonstration, the Consortium intends to install 300 solar thermal water heaters in residential retrofit and new build applications together with 200 integrated systems in residential new builds. The thermal generation assets will be owned by the ThermUtility with homeowners paying on a monthly basis for the energy consumed. The ThermUtility concept can potentially remove the main barrier to market adoption – initial capital cost – while at the same time introduces an efficiency innovation in thermal renewable energy generation for the residential community.

Consortium members

Clean Energy Developments Corp.
The Quantum Leap Company Limited
Toronto Hydro Energy Services Inc.
Windfall Ecology Centre

GE Canada

Environmental benefit: Climate change/Clean air

Total Project Value:

\$24,100,000

SDTC Funding:

\$6,000,000

Leveraged Funding:

\$18,100,000

The objective of the proposed three year program is to develop the next generation of high performance wind turbines. The focus is the Generator and Drive Train for the 3.x (3+MW) series of land based turbines. The Drive Train has been the “Achilles heels” of wind turbine development, limiting turbine size, market growth, and investor confidence. This initiative will take the turbine to the next level of reliability and performance, and accelerate the introduction of the large capacity multi MW wind turbines which the market is seeking.

Consortium members

École de technologie supérieure
McGill University
University of Western Ontario

Group IV Semiconductor Inc.

Environmental benefit: Clean air/Climate change

Total Project Value:

\$6,434,000

SDTC Funding:

\$2,145,000

Leveraged Funding:

\$4,289,000

This radically new solid-state lighting (SSL) technology, unlike all other SSL approaches based on conventional light-emitting diode (LED) technology, employs a silicon nanocrystal approach which can achieve much higher brightness and energy efficiency, much lower cost, and other desirable features such as consistency and stability of colour. The brightest of today’s LED devices delivers only about 60 lumens; 1/20th of the light produced by a 100 watt incandescent light bulb. Group IV devices can deliver over a thousand lumens from a single die with a 92% reduction in energy use compared to conventional light bulbs, operate directly from high voltages such as 110V AC, and are inherently low cost because they are silicon based and not defect-limited in size. The result will be a light bulb that achieves the performance and price that will enable widespread adoption and the full energy savings potential of SSL.

Consortium members

Canadian Photonics Fabrication Centre (NRC)
Carleton University Faculty of Engineering
McMaster University Faculty of Engineering

NORAM Engineering and Constructors Ltd.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$16,471,426

SDTC Funding:

\$5,203,500

Leveraged Funding:

\$11,267,926

NORAM and its partners propose to develop and demonstrate the first full-scale implementation of their progressive approach to creating a completely closed-loop pulp mill, starting with a chloride removal and alkaline bleaching filtrate recovery system. By progressively closing the water consumption and effluent loop, the project will demonstrate the viability of a number of technologies which lead to; reduced GHG impacts through chemical recycling and increased use of biomass as a fuel; reduced demand for water, and reduced waste effluent. If this project is successful, it will potentially leapfrog current European-based best-practices for environmentally-friendly pulp mills.

Consortium members

PAPRICAN (Pulp and Paper Research Institute of Canada)

Tembec Industries Inc.

Parkland BioFibre Ltd.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$11,130,000

SDTC Funding:

\$3,000,000

Leveraged Funding:

\$8,130,000

Parkland BioFibre proposes to design, build and operate a 36,000 tonne/year industrial scale plant to decorticate and separate the stalk portion of industrial hemp into bast (long) fibre, hurds (short) and fines and to test, certify and demonstrate the hemp insulation, non-woven matting and animal bedding products. This will eliminate the atmospheric emissions from the current practice of burning hemp plants after grain harvest and will sequester carbon for a long time if it is used in long life buildings. The basic technology for small scale operations in Europe will be scaled up and automated to enable production of products at a low enough cost to be marketed competitively. Insulation must be produced from Canadian grown hemp in the Canadian factory to rigid specifications to be certified for building construction.

Consortium members

McMunn & Yates Building Supplies

North American Natural Fibers

Olds Agtech Industries Inc.

Parkland Industrial Hemp Growers Coop

Plant Fibre Technology

UKAL (Canada) Ltd.

Prairie Pulp and Paper Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$12,740,000

SDTC Funding:

\$3,400,000

Leveraged Funding:

\$9,340,000

Prairie Pulp and Paper proposes to develop a \$600 million Tree-Free pulp & paper facility to be located in rural Manitoba. The mill is intended to produce 200,000 tonnes per year of computer printer, facsimile paper and photocopy paper, made exclusively from waste agricultural fibres, resulting in the annual recycling of 516,000 tonnes of straw; generating an incremental profit stream totaling \$26 million per year for Manitoba farmers. The project is to produce and market test 200,000 sheets of the paper prior to other analysis and validation tasks necessary prior to financing and construction.

Consortium members

Bannatyne Financial

Manitoba Straw Producers Co-op Ltd.

Provincial Government of Manitoba

SNC Lavalin Engineering

Pratt & Whitney Canada Corp.

Environmental benefit: Clean air/Climate change

Total Project Value:

\$17,045,000

SDTC Funding:

\$5,624,850

Leveraged Funding:

\$11,420,150

The aim of the project is to develop and validate low emission and fuel conditioning technologies in gas turbine engines designed and manufactured by P&WC. The first innovative key technology is the TALONTM (Technology for Advanced Low Nox) combustor which utilizes a rich burn quick quench combustion scheme, carefully controlling fuel-air mixing, reaction temperatures and chemical residence times, to reduce NOx, VOC, CO and PM emissions. The second innovative key technology is fuel deoxygenation, which is achieved by passing fuel through a Fuel Stabilization Unit (FSU), which relies on a nickel foam separator. This stabilized fuel is less prone to form coke and together with a heat exchanger can reduce turbine cooling air, thus improving fuel burn and CO₂ emissions. Integration of TALON and FSU technologies into P&WC's new generation of engines must address weight and operational requirements before being adopted. Emissions reductions with the new engines is predicted to be: 20% for NOx, 45% for CO, 60% for VOC, 75% for PM and 2-3 % for CO₂.

Consortium members

Goodrich Corporation's Turbine Fuel Technologies division
Hamilton Sundstrand Corporation
INCO Ltd.
National Research Council
United Technologies Research Center
University of Toronto – Institute for Aerospace Studies

Science Applications International Corporation (SAIC Canada)

Environmental benefit: Climate change/Clean air

Total Project Value:

\$4,596,300

SDTC Funding:

\$1,516,779

Leveraged Funding:

\$3,079,521

The concept of underground thermal energy storage (UTES) is simple: store the energy (cold or heat) underground when it is available and use it when we need the stored cold or heat in the next season. This is a new and innovative concept in the Canadian energy market. The proposed projects would be the first ones of its kind in Canada and North America utilizing underground thermal energy storage technology.

Consortium members

ATCO Gas and Pipelines Ltd.
City of Medicine Hat
EnerWorks Inc.
IF Technology International
Sterling Homes Ltd.
Town of Okotoks
United Acquisition II Corp.

Sunarc of Canada Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$1,495,000

SDTC Funding:

\$493,350

Leveraged Funding:

\$1,001,650

Sunarc has developed a dynamic, transparent water-based foam insulation for greenhouses, and a system for circulating it between the translucent layers of greenhouse roofs and walls. The computer-controlled system consists of mechanical foam generation, circulation through the wall and roof cavities, and automatic dissipation when weather conditions warrant. When the foam dissipates and returns to liquid state, it is recycled back into liquid surfactant and redeployed as foam.

Consortium members

Agriculture and Agri-Food Canada,
Greenhouse and Processing Crops Research Centre
Fonds en efficacité énergétique
Les Industries Harnois Inc.
Les Jardiniers du Chef
Université Laval, Faculté des sciences de l'agriculture et de l'alimentation

Terra Gaia Inc.

Environmental benefit: Climate change/Clean air

Total Project Value:

\$32,500,000

SDTC Funding:

\$5,300,000

Leveraged Funding:

\$27,200,000

Terra Gaia has designed, proven and patented a technology that simultaneously eliminates two of the largest hazardous wastes produced by the steel industry, Electric Arc Furnace ("EAF") dust and contaminated acid (waste hydrochloric acid). Current disposal practices for each waste results in a substantial cost to the industry including significant environmental liabilities, energy consumption and GHG production. Terra Gaia proposes to operate a low pressure, low temperature process which is cost competitive, produces significantly less GHG emissions and provides additional revenue streams in the form of saleable products.

Consortium members

Bateman Engineering

Empower Corp.

Norambar (Stelco Inc.)

University of British Columbia

Environmental benefit: Climate change/Clean air

Total Project Value:

\$7,098,914

SDTC Funding:

\$2,342,600

Leveraged Funding:

\$4,756,314

This proposal is for an advanced high performance building envelope with 90 kW of integrated photovoltaic panels, mechanized solar shading devices, mechanized light-shelves for day-lighting, and natural ventilation components including mechanized operable windows and other energy saving components, coupled with an extensive adaptive sensing, monitoring and controls system, to be installed in the new Centre for Interactive Research on Sustainability (CIRS) to be built in Vancouver, B.C. CIRS is intended to be a "living laboratory" and demonstration centre for environmentally sustainable building design, technologies and operation and, as such, provides the ideal venue to test, de-risk and demonstrate the advanced building envelope and monitoring and controls systems proposed in this application.

Consortium members

Busby Perkins + Will Architects

British Columbia Institute of Technology (BCIT) - Technology Centre

Keen Engineering

Siemens Building Technologies Ltd.

Visionwall Corporation

The following projects were approved for funding in 2005.

AirScience Technologies Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$3,248,000

SDTC Funding:

\$1,038,180

Leveraged Funding:

\$2,209,820

The consortium led by AirScience Technologies Inc. will demonstrate a new process, Terragas, to economically produce hydrogen from biogenous feedstocks such as landfill gas. The project will use two new process technologies under license from Unitel Technologies: one for cleaning landfill gas and the second to convert the clean gas to hydrogen and CO₂. The cleaning process will cost-effectively remove trace contaminants from biogas that would otherwise damage internal combustion engines, turbines or an auto-thermal reforming reactor, without having to dry the gas and/or remove oxygen and CO₂. Production of hydrogen from landfill gas at a commercial scale would generate an estimated 4-6 times the economic value of electricity produced from landfill gas.

Consortium members

Air Liquide Canada, Inc.
Municipality of Dolbeau, Que./
SmartSoil Energie
University of Waterloo

Clear-Green Environmental Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$9,505,504

SDTC Funding:

\$2,300,000

Leveraged Funding:

\$7,205,504

Clear Green and its partners will demonstrate an innovative, three-stage process to treat dead stock and slaughter waste that couples pretreatment, anaerobic digestion and nutrient recovery for renewable energy and fertilizer applications. The technology will demonstrate the ability to extract valuable fertilizer nutrients from digested waste, replacing commercial fertilizer. The goal is to eliminate waste storage and land disposal systems and allow for intensive livestock facilities to be located closer to infrastructure while eliminating concerns over water, air and soil contamination as well as odours.

Consortium members

Ag West Bio Inc.
Agriculture and Agri-Food Canada
Agriculture and Bioresource Engineering
Clear-Green Environmental Inc.
Cudworth Pork Investors Group (CPIG) Inc.
Prairie Agricultural Machinery Institute (PAMI)
Saskatchewan Research Council
SaskPower
Sinnett Pork Farm Ltd.
University of Saskatchewan

Dépôt Rive-Nord inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$9,304,740

SDTC Funding:

\$3,070,564

Leveraged Funding:

\$6,234,176

Dépôt Rive-Nord and its consortium partners will demonstrate an end-to-end treatment and transformation process for residual wastes from several sources including municipalities, agriculture, agri-food, and industrial, commercial and institutional (ICI) operations. The project involves the integration of existing commercial waste processing technologies to produce recyclable materials such as paper and plastic; biogas (upgraded to pipeline-quality natural gas); and organic fertilizers. The new solution will optimize conventional treatment methods, minimize the amount of waste sent to landfill sites and reduce greenhouse gas emissions.

Consortium members

Bio-Metha Inc.
Biotechnology Research Institute - National Research Council Canada
EBI Energie Inc.
EBI Environnement Inc.
Gestion Environnementale Econord Inc.
Industries Machinex Inc.

EcoSmart Foundation Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$5,165,728

SDTC Funding:

\$1,721,909

Leveraged Funding:

\$3,443,819

EcoSmart and its partners will develop a system that will allow developers, architects, engineers, contractors and material suppliers to optimize the use of supplementary cementing materials (SCMs) by simulating the effects of varying these materials on construction projects. By determining optimal SCM levels, the system will reduce costs along with emissions of greenhouse gases and air contaminants by directly reducing the amount of Portland cement required for construction projects. The system will gather scientific and technical knowledge, experience and intellectual property on SCMs and make it available to industry through a continuously updated, computer-based system.

Consortium members

Greater Vancouver Regional District (GVRD)
Halcrow Yolles
Lafarge Canada
Natural Resources Canada - CANMET - Materials Technology
Public Works & Government Services Canada (PWGSC)
Read Jones Christoffersen Ltd.
University of New Brunswick
University of Calgary
Yolles Partnership

Envirogain Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$4,077,729

SDTC Funding:

\$1,285,164

Leveraged Funding:

\$2,792,565

Envirogain and its partners will develop and demonstrate a fertilizer stabilizing and drying process that uses heat from both a previously commercialized hog manure treatment system (Biofertile[®]) and the new process. The new approach converts a cost centre to a revenue centre by taking hog manure that would otherwise require treatment and disposal and converting it into saleable fertilizer, while also reducing emissions of greenhouse gases. The project is an example of environmental co-benefits that include soil and water.

Consortium members

F. Ménard Inc.
William Houde Ltée.

Hatch Ltd.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$25,814,016

SDTC Funding:

\$8,604,672

Leveraged Funding:

\$17,209,344

The consortium members will design, build and operate a 2,000-barrels-of-oil-per-day demonstration plant to field test a patented process (N-Solv™) for in-situ extraction of oil from tar sands using a pure condensing solvent. The principal advantages of this process are commercially attractive oil-production rates with – when compared to steam injection – a 90 percent reduction in energy costs and an effective 80 percent reduction in greenhouse gas emissions. In addition to that, the process does not consume any water and produces an enhanced-quality oil product with higher value. The N-Solv demonstration plant will provide the data required to confirm the key technical, geological, environmental and economic parameters of the process. An oil company will host the demonstration plant.

Consortium members

N-Solv Corporation

Nenniger Engineering Inc.

Maratek Environmental Inc.

Environmental Benefit: Clean air/Climate change

Total Project Value:

\$7,305,000

SDTC Funding:

\$1,900,000

Leveraged Funding:

\$5,405,000

A consortium led by Maratek Environmental will build a world's-first demonstration project that will recover and reuse the solvent in dirty print shop towels, thereby eliminating an environmental liability, reducing disposal costs and creating a revenue stream from the recycled solvent. Maratek's process utilizes a volatile organic compound (VOC) removal system that removes over 95 percent of the used solvent from dirty shop towels and then recycles the towels. The process will incorporate a next-generation solvent distillation system that recovers most of the waste solvent for reuse and enhanced waste water treatment.

Consortium members

Fuji Hunt Chemicals

Omega Recycling

Netistix Technologies Corporation

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$1,370,350

SDTC Funding:

\$540,554

Leveraged Funding:

\$829,796

A consortium led by Netistix Technologies Corporation seeks to deliver a low-cost vehicle monitoring and information system. It targets consumers who wish to reduce emissions, fuel, and lifecycle costs, while improving vehicle reliability and safety. The system will indicate real situations when driving behaviours are inefficient, resulting in more fuel use, or when maintenance is required. The system analyzes both vehicle and driver behaviour data and provides reporting mechanisms to consumers on their driving history. An education program will be developed to inform consumers where improvements can be made to reduce fuel consumption and operating costs. Other key elements of the project are the development of a low-cost, compact in-car device to collect vehicle and driver data, driver behaviour and vehicle performance algorithms, secure communications, and a scaleable system design.

Consortium members

Automotive Industries Association of Canada

Carleton University

Jacques Whitford

Petro-Canada Certigard

Nexterra Energy Corp.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$5,900,000

SDTC Funding:

\$1,950,000

Leveraged Funding:

\$3,950,000

Nexterra and its partners will install a full-scale biomass (wood waste) gasification system that will be used to heat an existing lime kiln at a pulp mill in western Canada. The direct firing of the synthetic gas - utilizing a dual fuel (syngas/natural gas) burner nozzle - will potentially enable lime kilns to convert their energy feedstock from fossil fuels to gas produced from their own wood residue, thereby reducing energy costs as well as greenhouse gas emissions.

Consortium members

Pulp & Paper Research Institute of Canada (PAPRICAN)

A major integrated pulp and paper producer

Outland Technologies Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$6,000,000

SDTC Funding:

\$2,000,000

Leveraged Funding:

\$4,000,000

Outland Technologies, Inc., in conjunction with its partners, will develop and demonstrate a new technology capable of generating electricity with reduced emissions using waste energy at gas pressure let-down sites (sites where gas pressure is deliberately reduced for processing or to facilitate safe distribution to customers). The "rotary positive displacement" (or CvR™) technology will achieve the same result as a piston but in rotary motion, allowing for significantly higher output relative to size. The project will involve the demonstration of CvR Technology coupled with 20kW and 400kW electricity generators, the combination of which Outland refers to as a "Power Recovery Generator." The technology represents a new operational principle for piston devices with numerous applications including rotary positive displacement pumps and possibly engines.

Consortium members

BP Canada Inc.

Braeside Fabricators Inc.

Cojo Technology Inc.

Crimtech Services Inc.

L.O.P. Omnitech Inc.

Single Buoy Moorings Inc.

Zed.i.solutions Inc.

Petroleum Technology Research Centre

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$9,603,000

SDTC Funding:

\$3,168,990

Leveraged Funding:

\$6,434,010

The Petroleum Technology Research Centre and its partners will develop, demonstrate and evaluate a more environmentally sensitive and energy-efficient enhanced oil recovery (EOR) process for heavy oil reservoirs in western Canada. The technology uses a solvent vapour extraction process instead of steam to recover the heavy oil, reducing CO₂ emissions and fresh water use by over 90 percent.

Consortium members

Canadian Natural Resources Limited

Husky Energy Inc.

Nexen Inc.

Plasco Energy Group Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$21,147,000

SDTC Funding:

\$6,600,000

Leveraged Funding:

\$14,547,000

Plasco and its partners will demonstrate a Plasma Gasification Process that will economically convert municipal solid waste (MSW) into synthetic gas, inert solid material and heat. The heat and gas will be utilized in a combined cycle co-generation power plant to produce electricity for sale into the electricity grid. Plasco has developed an economically viable means of treating MSW that reduces the environmental impact compared with current disposal methods such as landfill. The project will process up to 75 tonnes/day of MSW at Ottawa's Trail Road landfill site and generate a net 4 megawatts of electricity for sale to the grid. The City of Ottawa will provide a site and related services for the demonstration project while Hydro Ottawa will facilitate its integration into the grid.

Consortium members

Ameresco U.S.

City of Ottawa

HERA Holdings S.L.

Power Diagnostic Technologies Ltd.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$5,200,000

SDTC Funding:

\$1,716,000

Leveraged Funding:

\$3,484,000

The consortium led by Power Diagnostic Technologies Ltd. will develop a portable leak detection and repair (LDAR) technology to detect and image gas leaks in confined spaces such as refineries and natural gas processing plants. The new gas imaging detection system will be capable of detecting and imaging leaking gases such as methane. The system will be a light, hand-held and highly portable device engineered for LDAR inspectors. A module to calibrate the rate of a detected leak will also be developed. If successful, this tool will enable the petrochemical industry to find leaks more efficiently, accurately and cost-effectively, with the industry-requested feature of calibrating the leak rate of fugitive emissions in compliance with the new regulatory climate.

Consortium members

Alberta Research Council

SHEC LABS (Solar Hydrogen Energy Corporation)

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$6,230,000

SDTC Funding:

\$2,076,667

Leveraged Funding:

\$4,153,333

The consortium led by SHEC LABS will demonstrate hydrogen production using solar energy, featuring the world's first commercial-scale renewable solar hydrogen "Dry Fuel Reformation" (DFR) reactors, unique solar concentrator designs and "Direct Water Splitting" (DWS) technologies. Natural gas will be used initially to verify the performance of the DFR systems, with the ultimate goal of testing the complete DFR process using landfill gas (methane) at the project's location, the City of Regina Fleet Street landfill. Currently, steam reformation of fossil fuels is responsible for 95 percent of the world's hydrogen production. A key project objective is to demonstrate that SHEC LABS' technology can be cost-competitive with steam methane reformation as well as dramatically reducing greenhouse gas emissions and other air pollutants. SHEC LABS' solar hydrogen production will provide a net energy gain when converting methane into hydrogen since the energy used to drive the process is harvested from the sun. The technology is particularly attractive for smaller and distributed production of hydrogen at end-user sites, but could also be applicable for large-scale hydrogen production in the future. The DWS technology, the next generation of solar hydrogen production, will also be demonstrated on a smaller scale and will involve direct water splitting with only water as the primary feed component.

Consortium members

Clean 16 Environmental Technologies Corp.

Giffels Associates Limited (An Ingenium Group Company)

Praxair

University of Toronto - Department of Chemical Engineering and Applied Chemistry

Vaperma Inc.

Environmental Benefit: Climate change/Clean air

Total Project Value:

\$13,600,750

SDTC Funding:

\$4,486,138

Leveraged Funding:

\$9,114,612

The consortium led by Vaperma will develop and demonstrate an advanced dehydration process for the biofuel industry using an innovative polymer membrane to separate water vapour from organic compounds such as ethanol. The process offers increased energy efficiency – reducing energy costs by up to 40 percent – lower greenhouse gas emissions, easy integration into any fuel-grade ethanol process, modularity, flexibility, simple operation and low maintenance. Applications for the technology include gas separation in the chemical, petrochemical and natural gas processing industries. Vaperma has teamed up with Canada's largest producer of ethanol, Commercial Alcohols Inc. to prove the technology prior to industrial-scale commercialization.

Consortium members

Accura Embedded Systems Inc.

BP Canada Energy Company

BP Refining Technology, USA

Cantronic Systems Inc.

Commercial Alcohols Inc.

Interay BV

NRCAN/CANMET – TEAM

Opgal Optronics Industries Ltd.

Public Works & Government Services Canada

Dr. Mark Rockley, Oklahoma State University

The following represents the announced SDTC contribution amounts to the projects approved for funding in Rounds 1 – 7 covering the period from inception to December 31st, 2005.

| Funding Round | Lead Consortia Member | Announced SDTC Funding | % of Total Eligible Project Costs |
|--------------------------------|--|-------------------------------|--|
| Round 1 - 2002-A | Bio-Terre Systems Inc. | \$864,375 | 38% |
| | Carmanah Technologies Inc. | \$466,167 | 23% |
| | CO2 Solution Inc. | \$1,000,000 | 15% |
| | Mabarex inc. | \$1,190,000 | 35% |
| | NOVA Chemicals Corporation ¹ | \$320,000 | 23% |
| | Suncor Energy Inc. | \$2,250,000 | 27% |
| | Westport Research Inc. | \$1,000,000 | 33% |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$5,000,000 | 42% |
| | Enerkem Technologies Inc. | \$750,000 | 36% |
| | Ensyn Technologies Inc. | \$2,000,000 | 22% |
| | Highmark Renewables Inc. | \$1,000,000 | 16% |
| | IBC Technologies Inc. | \$266,000 | 28% |
| | Mikro-Tek Inc. | \$500,400 | 13% |
| | Radiant Technologies Inc. | \$1,000,000 | 18% |
| | University of New Brunswick | \$260,000 | 42% |
| | ZENON Environmental Inc. | \$1,760,000 | 33% |
| Round 3 - 2003-A | BET Services Inc.* | \$3,080,000 | 22% |
| | Blue-Zone Technologies Ltd. | \$2,700,000 | 33% |
| | Cansolv Technologies Inc.* | \$1,520,000 | 33% |
| | Cellex Power Products, Inc. | \$2,000,000 | 22% |
| | Hydrogenics Corporation | \$1,560,000 | 44% |
| | Paradigm Environmental Technologies Inc. | \$250,000 | 31% |
| | Quantiam Technologies Inc. | \$1,450,000 | 15% |
| | Railpower Technologies Corp. | \$1,473,032 | 41% |
| Saskatchewan Power Corporation | \$1,782,900 | 24% | |

* Amounts are based on approved project values – contracting to be finalized.

¹ Due to technological difficulties the project was terminated.

| Funding Round | Lead Consortia Member | Announced SDTC Funding | % of Total Eligible Project Costs |
|-------------------------|---------------------------------------|------------------------|-----------------------------------|
| Round 4 - 2003-B | BIOX Canada Ltd. | \$5,000,000 | 14% |
| | DeCloet Greenhouse Mfg. Ltd. | \$569,082 | 33% |
| | Fifth Light Technology Ltd. | \$3,036,000 | 33% |
| | Gradek Energy Inc.* | \$5,000,000 | 20% |
| | Lignol Innovations Corporation* | \$1,700,000 | 33% |
| | Nanox inc. | \$1,800,000 | 40% |
| | NxtPhase T&D Corp.* | \$986,220 | 33% |
| | Sacré-Davey Innovations Inc. | \$5,879,000 | 33% |
| | Synodon Inc.* | \$650,000 | 25% |
| | Whitefox Technologies Canada Ltd.* | \$2,608,545 | 40% |
| Round 5 - 2004-A | Alternative Green Energy Systems Inc. | \$588,875 | 33% |
| | Atlantic Hydrogen Inc. | \$2,000,000 | 31% |
| | Atlantic Packaging Products Ltd.* | \$2,514,600 | 33% |
| | B.C. Eco-Systems Inc.* | \$500,000 | 10% |
| | Dofasco Inc.* | \$1,000,000 | 33% |
| | Great Northern Power Corp. | \$1,981,914 | 28% |
| | M.A. Turbo/Engine Ltd. | \$152,844 | 46% |
| | QuestAir Technologies Inc.* | \$3,890,000 | 18% |
| | Techint Goodfellow Technologies Inc. | \$3,678,633 | 30% |
| | Xantrex Technology Inc.* | \$5,000,000 | 33% |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Announced SDTC Funding | % of Total Eligible Project Costs |
|---------------------------|---|------------------------|-----------------------------------|
| Round 6 - 2004-B | Angstrom Power Incorporated* | \$444,436 | 33% |
| | Clean Current Power Systems Inc.* | \$933,000 | 27% |
| | Electrovaya Corp.* | \$1,732,000 | 31% |
| | Encelium Technologies Inc.* | \$2,820,000 | 33% |
| | EnerWorks Inc.* | \$2,449,100 | 33% |
| | GE Canada* | \$6,000,000 | 25% |
| | Group IV Semiconductor Inc.* | \$2,145,000 | 33% |
| | NORAM Engineering and Constructors Ltd.* | \$5,203,500 | 32% |
| | Parkland BioFibre Ltd.* | \$3,000,000 | 27% |
| | Prairie Pulp and Paper Inc.* | \$3,400,000 | 27% |
| | Pratt & Whitney Canada Corp.* | \$5,624,850 | 33% |
| | Science Applications International Corporation (SAIC Canada)* | \$1,516,779 | 33% |
| | Sunarc of Canada Inc.* | \$493,350 | 33% |
| | Terra Gaia Inc.* | \$5,300,000 | 16% |
| | University of British Columbia* | \$2,342,600 | 33% |
| Round 7 - 2005-A | AirScience Technologies Inc.* | \$1,038,180 | 32% |
| | Clear-Green Environmental Inc.* | \$2,300,000 | 24% |
| | Dépôt Rive-Nord inc.* | \$3,070,564 | 33% |
| | EcoSmart Foundation Inc.* | \$1,721,909 | 33% |
| | Envirogain Inc.* | \$1,285,164 | 32% |
| | Hatch Ltd.* | \$8,604,672 | 33% |
| | Maratek Environmental Inc.* | \$1,900,000 | 26% |
| | Netistix Technologies Corporation* | \$540,554 | 39% |
| | Nexterra Energy Corp.* | \$1,950,000 | 33% |
| | Outland Technologies Inc.* | \$2,000,000 | 33% |
| | Petroleum Technology Research Centre* | \$3,168,990 | 33% |
| | Plasco Energy Group Inc.* | \$6,600,000 | 31% |
| | Power Diagnostic Technologies Ltd.* | \$1,716,000 | 33% |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | \$2,076,667 | 33% |
| | Vaperma Inc.* | \$4,486,138 | 33% |
| 2005 Project Total | | \$169,842,040 | 27% |

* Amounts are based on approved project values – contracting to be finalized.

These projects represent the full portfolio of funded projects including completed/terminated projects.

Refer to section 1 for a brief description of the funded projects.

2005 Completed Projects

The following represents the SDTC contribution amounts for the projects which have been completed as of December 31st, 2005.

| Funding Round | Lead Consortia Member | Announced SDTC Funding | % of Total Eligible Project Costs |
|--------------------------------------|--|-------------------------------|--|
| Round 1 - 2002-A | Carmanah Technologies Inc. | \$466,167 | 23% |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$5,000,000 | 42% |
| | Enerkem Technologies Inc. | \$750,000 | 36% |
| | Highmark Renewables Inc. | \$1,000,000 | 16% |
| | Mikro-Tek Inc. | \$500,400 | 13% |
| Round 3 - 2003-A | Hydrogenics Corporation | \$1,560,000 | 44% |
| | Paradigm Environmental Technologies Inc. | \$250,000 | 31% |
| 2005 Completed Projects Total | | \$9,526,567 | 31% |

Section 3 – Total Eligible Project Costs

The following represents the Total Eligible Project Costs for the projects approved for funding in Rounds 1 – 7 covering the period from inception to December 31st, 2005.

| Funding Round | Lead Consortia Member | Total Eligible Project Costs |
|-------------------------|--|-------------------------------------|
| Round 1 - 2002-A | Bio-Terre Systems Inc. | \$2,305,000 |
| | Carmanah Technologies Inc. | \$2,035,062 |
| | CO2 Solution Inc. | \$6,829,961 |
| | Mabarex inc. | \$3,400,000 |
| | NOVA Chemicals Corporation ¹ | \$1,408,081 |
| | Suncor Energy Inc. | \$8,391,371 |
| | Westport Research Inc. | \$3,041,000 |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$12,038,000 |
| | Enerkem Technologies Inc. | \$2,058,945 |
| | Ensyn Technologies Inc. | \$8,895,871 |
| | Highmark Renewables Inc. | \$6,450,000 |
| | IBC Technologies Inc. | \$960,000 |
| | Mikro-Tek Inc. | \$3,871,600 |
| | Radiant Technologies Inc. | \$5,500,000 |
| | University of New Brunswick | \$622,200 |
| | ZENON Environmental Inc. | \$5,334,000 |
| Round 3 - 2003-A | BET Services Inc.* | \$14,050,000 |
| | Blue-Zone Technologies Ltd. | \$8,100,000 |
| | Cansolv Technologies Inc.* | \$4,562,000 |
| | Cellex Power Products, Inc. | \$9,026,000 |
| | Hydrogenics Corporation | \$3,545,182 |
| | Paradigm Environmental Technologies Inc. | \$818,000 |
| | Quantiam Technologies Inc. | \$9,768,313 |
| | Railpower Technologies Corp. | \$3,634,902 |
| | Saskatchewan Power Corporation | \$7,367,900 |

* Amounts are based on approved project values – contracting to be finalized.

¹ Due to technological difficulties the project was terminated.

| Funding Round | Lead Consortia Member | Total Eligible Project Costs |
|-------------------------|---------------------------------------|-------------------------------------|
| Round 4 - 2003-B | BIOX Canada Ltd. | \$34,504,071 |
| | DeCloet Greenhouse Mfg. Ltd. | \$1,724,489 |
| | Fifth Light Technology Ltd. | \$9,200,000 |
| | Gradek Energy Inc.* | \$25,322,000 |
| | Lignol Innovations Corporation* | \$5,110,000 |
| | Nanox inc. | \$4,463,248 |
| | NxtPhase T&D Corp.* | \$2,958,660 |
| | Sacré-Davey Innovations Inc. | \$17,832,999 |
| | Synodon Inc.* | \$2,570,176 |
| | Whitefox Technologies Canada Ltd.* | \$6,487,990 |
| Round 5 - 2004-A | Alternative Green Energy Systems Inc. | \$1,789,393 |
| | Atlantic Hydrogen Inc. | \$6,454,479 |
| | Atlantic Packaging Products Ltd.* | \$7,620,000 |
| | B.C. Eco-Systems Inc.* | \$5,000,000 |
| | Dofasco Inc.* | \$3,000,000 |
| | Great Northern Power Corp. | \$6,988,114 |
| | M.A. Turbo/Engine Ltd. | \$332,270 |
| | QuestAir Technologies Inc.* | \$21,848,000 |
| | Techint Goodfellow Technologies Inc. | \$12,262,110 |
| | Xantrex Technology Inc.* | \$15,000,000 |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Total Eligible Project Costs |
|---------------------------------|---|-------------------------------------|
| Round 6 - 2004-B | Angstrom Power Incorporated* | \$1,346,775 |
| | Clean Current Power Systems Inc.* | \$3,435,500 |
| | Electrovaya Corp.* | \$5,615,000 |
| | Encelium Technologies Inc.* | \$8,665,000 |
| | EnerWorks Inc.* | \$7,489,100 |
| | GE Canada* | \$24,100,000 |
| | Group IV Semiconductor Inc.* | \$6,434,000 |
| | NORAM Engineering and Constructors Ltd.* | \$16,471,426 |
| | Parkland BioFibre Ltd.* | \$11,130,000 |
| | Prairie Pulp and Paper Inc.* | \$12,740,000 |
| | Pratt & Whitney Canada Corp.* | \$17,045,000 |
| | Science Applications International Corporation (SAIC Canada)* | \$4,596,300 |
| | Sunarc of Canada Inc.* | \$1,495,000 |
| | Terra Gaia Inc.* | \$32,500,000 |
| University of British Columbia* | \$7,098,914 | |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Total Eligible Project Costs |
|----------------------------|--|-------------------------------------|
| Round 7 - 2005-A | AirScience Technologies Inc.* | \$3,248,000 |
| | Clear-Green Environmental Inc.* | \$9,505,504 |
| | Dépôt Rive-Nord inc.* | \$9,304,740 |
| | EcoSmart Foundation Inc.* | \$5,165,728 |
| | Envirogain Inc.* | \$4,077,729 |
| | Hatch Ltd.* | \$25,814,016 |
| | Maratek Environmental Inc.* | \$7,305,000 |
| | Netistix Technologies Corporation* | \$1,370,350 |
| | Nexterra Energy Corp.* | \$5,900,000 |
| | Outland Technologies Inc. | \$6,000,000 |
| | Petroleum Technology Research Centre* | \$9,603,000 |
| | Plasco Energy Group Inc.* | \$21,147,000 |
| | Power Diagnostic Technologies Ltd.* | \$5,200,000 |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | \$6,230,000 |
| Vaperma Inc.* | \$13,600,750 | |
| 2005 Projects Total | | \$618,115,219 |

* Amounts are based on approved project values – contracting to be finalized.

These projects represent the full portfolio of funded projects including completed/terminated projects.

Refer to section 1 for a brief description of the funded projects.

2005 Projects Completed

The following represent the Total Eligible Project Costs for the projects completed as of December 31st, 2005.

| Funding Round | Lead Consortia Member | Total Eligible Project Costs |
|--------------------------------------|--|-------------------------------------|
| Round 1 - 2002-A | Carmanah Technologies Inc. | \$2,035,062 |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$12,038,000 |
| | Enerkem Technologies Inc. | \$2,058,945 |
| | Highmark Renewables Inc. | \$6,450,000 |
| | Mikro-Tek Inc. | \$3,871,600 |
| Round 3 - 2003-A | Hydrogenics Corporation | \$3,545,182 |
| | Paradigm Environmental Technologies Inc. | \$818,000 |
| 2005 Completed Projects Total | | \$30,816,789 |

The following represents the aggregate amounts contributed by the Eligible Recipient to the projects approved for funding in Rounds 1 – 7 covering the period from inception to December 31st, 2005.

| Funding Round | Lead Consortia Member | Recipient's Funding Contribution | % of Total Eligible Project Costs |
|--------------------------------|--|---|--|
| Round 1 - 2002-A | Bio-Terre Systems Inc. | \$800,974 | 35% |
| | Carmanah Technologies Inc. | \$1,568,895 | 77% |
| | CO2 Solution Inc. | \$2,557,960 | 37% |
| | Mabarex inc. | \$1,960,000 | 58% |
| | NOVA Chemicals Corporation ¹ | \$268,081 | 19% |
| | Suncor Energy Inc. | \$4,691,371 | 56% |
| | Westport Research Inc. | \$1,491,000 | 49% |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$7,038,000 | 58% |
| | Enerkem Technologies Inc. | \$1,077,147 | 52% |
| | Ensyn Technologies Inc. | \$3,295,871 | 37% |
| | Highmark Renewables Inc. | \$3,195,325 | 50% |
| | IBC Technologies Inc. | \$677,580 | 71% |
| | Mikro-Tek Inc. | \$3,371,200 | 87% |
| | Radiant Technologies Inc. | \$4,181,000 | 76% |
| | University of New Brunswick | \$354,200 | 57% |
| ZENON Environmental Inc. | \$3,574,000 | 67% | |
| Round 3 - 2003-A | BET Services Inc.* | \$3,710,000 | 26% |
| | Blue-Zone Technologies Ltd. | \$5,150,000 | 64% |
| | Cansolv Technologies Inc.* | \$3,042,000 | 67% |
| | Cellex Power Products, Inc. | \$7,026,000 | 78% |
| | Hydrogenics Corporation | \$1,985,182 | 56% |
| | Paradigm Environmental Technologies Inc. | \$263,000 | 32% |
| | Quantiam Technologies Inc. | \$5,321,313 | 54% |
| | Railpower Technologies Corp. | \$1,911,870 | 53% |
| Saskatchewan Power Corporation | \$5,565,000 | 76% | |

* Amounts are based on approved project values – contracting to be finalized.

¹ Due to technological difficulties the project was terminated.

| Funding Round | Lead Consortia Member | Recipient's Funding Contribution | % of Total Eligible Project Costs |
|---------------------------------|---|----------------------------------|-----------------------------------|
| Round 4 - 2003-B | BIOX Canada Ltd. | \$29,504,071 | 86% |
| | DeCloet Greenhouse Mfg. Ltd. | \$960,407 | 56% |
| | Fifth Light Technology Ltd. | \$3,914,000 | 43% |
| | Gradek Energy Inc.* | \$9,422,000 | 37% |
| | Lignol Innovations Corporation* | \$2,256,500 | 44% |
| | Nanox inc. | \$1,238,248 | 28% |
| | NxtPhase T&D Corp.* | \$1,736,173 | 59% |
| | Sacré-Davey Innovations Inc. | \$4,596,140 | 26% |
| | Synodon Inc.* | \$1,920,176 | 75% |
| | Whitefox Technologies Canada Ltd.* | \$3,879,445 | 60% |
| Round 5 - 2004-A | Alternative Green Energy Systems Inc. | \$1,200,518 | 67% |
| | Atlantic Hydrogen Inc. | \$4,454,479 | 69% |
| | Atlantic Packaging Products Ltd.* | \$5,105,400 | 67% |
| | B.C. Eco-Systems Inc.* | \$3,350,000 | 67% |
| | Dofasco Inc.* | \$2,000,000 | 67% |
| | Great Northern Power Corp. | \$5,006,200 | 72% |
| | M.A. Turbo/Engine Ltd. | \$179,426 | 54% |
| | QuestAir Technologies Inc.* | \$15,593,000 | 71% |
| | Techint Goodfellow Technologies Inc. | \$7,033,477 | 57% |
| | Xantrex Technology Inc.* | \$10,000,000 | 67% |
| Round 6 - 2004-B | Angstrom Power Incorporated* | \$902,339 | 67% |
| | Clean Current Power Systems Inc.* | \$2,502,500 | 73% |
| | Electrovaya Corp.* | \$3,753,805 | 67% |
| | Encelium Technologies Inc.* | \$5,845,000 | 67% |
| | EnerWorks Inc.* | \$5,040,000 | 67% |
| | GE Canada* | \$15,700,000 | 65% |
| | Group IV Semiconductor Inc.* | \$4,089,000 | 64% |
| | NORAM Engineering and Constructors Ltd.* | \$11,267,926 | 68% |
| | Parkland BioFibre Ltd.* | \$4,630,000 | 42% |
| | Prairie Pulp and Paper Inc.* | \$6,140,000 | 48% |
| | Pratt & Whitney Canada Corp.* | \$11,420,150 | 67% |
| | Science Applications International Corporation (SAIC Canada)* | \$1,529,521 | 33% |
| | Sunarc of Canada Inc.* | \$901,650 | 60% |
| | Terra Gaia Inc.* | \$27,200,000 | 84% |
| University of British Columbia* | \$3,543,309 | 50% | |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Recipient's Funding Contribution | % of Total Eligible Project Costs |
|---------------------------|--|---|--|
| Round 7 - 2005-A | AirScience Technologies Inc.* | \$1,108,720 | 34% |
| | Clear-Green Environmental Inc.* | \$4,425,504 | 47% |
| | Dépôt Rive-Nord inc.* | \$3,834,176 | 41% |
| | EcoSmart Foundation Inc.* | \$3,343,819 | 65% |
| | Envirogain Inc.* | \$2,251,395 | 55% |
| | Hatch Ltd.* | \$17,209,344 | 67% |
| | Maratek Environmental Inc.* | \$5,405,000 | 74% |
| | Netistix Technologies Corporation* | \$574,796 | 42% |
| | Nexterra Energy Corp.* | \$3,525,000 | 60% |
| | Outland Technologies Inc.* | \$2,813,500 | 47% |
| | Petroleum Technology Research Centre* | \$5,684,010 | 59% |
| | Plasco Energy Group Inc.* | \$13,947,000 | 66% |
| | Power Diagnostic Technologies Ltd.* | \$3,153,000 | 61% |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | \$4,153,333 | 67% |
| Vaperma Inc.* | \$5,164,612 | 38% | |
| 2005 Project Total | | \$368,485,038 | 60% |

* Amounts are based on approved project values – contracting to be finalized.

These projects represent the full portfolio of funded projects including completed/terminated projects.

Refer to section 1 for a brief description of the funded projects.

2005 Projects Completed

The following represents the aggregate amounts contributed by the Eligible Recipient to the projects which have been completed as of December 31st, 2005.

| Funding Round | Lead Consortia Member | Recipient's Funding Contribution | % of Total Eligible Project Costs |
|--------------------------------------|--|---|--|
| Round 1 - 2002-A | Carmanah Technologies Inc. | \$1,568,895 | 77% |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | \$7,038,000 | 58% |
| | Enerkem Technologies Inc. | \$1,077,147 | 52% |
| | Highmark Renewables Inc. | \$3,195,325 | 50% |
| | Mikro-Tek Inc. | \$3,371,200 | 87% |
| Round 3 - 2003-A | Hydrogenics Corporation | \$1,985,182 | 56% |
| | Paradigm Environmental Technologies Inc. | \$263,000 | 32% |
| 2005 Completed Projects Total | | \$18,498,749 | 60% |

The following represents the amounts contributed by all other government programs to the projects approved for funding in Rounds 1 – 7 covering the period from inception to December 31st, 2005.

| Funding Round | Lead Consortia Member | Other Government Funding | % of Other Gov't Funding to Total Eligible Project Costs |
|--------------------------|--|---------------------------------|---|
| Round 1 - 2002-A | Bio-Terre Systems Inc. | \$639,651 | 28% |
| | Carmanah Technologies Inc. | - | - |
| | CO2 Solution Inc. | \$3,272,001 | 48% |
| | Mabarex inc. | \$250,000 | 7% |
| | NOVA Chemicals Corporation ¹ | \$820,000 | 58% |
| | Suncor Energy Inc. | \$1,450,000 | 17% |
| | Westport Research Inc. | \$550,000 | 18% |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | - | - |
| | Enerkem Technologies Inc. | \$231,798 | 11% |
| | Ensyn Technologies Inc. | \$3,600,000 | 40% |
| | Highmark Renewables Inc. | \$2,254,675 | 35% |
| | IBC Technologies Inc. | \$16,420 | 2% |
| | Mikro-Tek Inc. | - | - |
| | Radiant Technologies Inc. | \$319,000 | 6% |
| | University of New Brunswick | \$8,000 | 1% |
| ZENON Environmental Inc. | - | - | |
| Round 3 - 2003-A | BET Services Inc.* | \$7,260,000 | 52% |
| | Blue-Zone Technologies Ltd. | \$250,000 | 3% |
| | Cansolv Technologies Inc.* | - | - |
| | Cellex Power Products, Inc. | - | - |
| | Hydrogenics Corporation | - | - |
| | Paradigm Environmental Technologies Inc. | \$305,000 | 37% |
| | Quantiam Technologies Inc. | \$2,997,000 | 31% |
| | Railpower Technologies Corp. | \$250,000 | 7% |
| | Saskatchewan Power Corporation | \$20,000 | 0.3% |

* Amounts are based on approved project values – contracting to be finalized.

¹ Due to technological difficulties the project was terminated.

| Funding Round | Lead Consortia Member | Other Government Funding | % of Other Gov't Funding to Total Eligible Project Costs |
|---------------------------------|---|--------------------------|--|
| Round 4 - 2003-B | BIOX Canada Ltd. | - | - |
| | DeCloet Greenhouse Mfg. Ltd. | \$195,000 | 11% |
| | Fifth Light Technology Ltd. | \$2,250,000 | 24% |
| | Gradek Energy Inc.* | \$10,900,000 | 43% |
| | Lignol Innovations Corporation* | \$1,153,500 | 23% |
| | Nanox inc. | \$1,425,000 | 32% |
| | NxtPhase T&D Corp.* | \$236,267 | 8% |
| | Sacré-Davey Innovations Inc. | \$7,357,859 | 41% |
| | Synodon Inc.* | - | - |
| | Whitefox Technologies Canada Ltd.* | - | - |
| Round 5 - 2004-A | Alternative Green Energy Systems Inc. | - | - |
| | Atlantic Hydrogen Inc. | - | - |
| | Atlantic Packaging Products Ltd.* | - | - |
| | B.C. Eco-Systems Inc.* | \$1,150,000 | 23% |
| | Dofasco Inc.* | - | - |
| | Great Northern Power Corp. | - | - |
| | M.A. Turbo/Engine Ltd. | - | - |
| | QuestAir Technologies Inc.* | \$2,365,000 | 11% |
| | Techint Goodfellow Technologies Inc. | \$1,550,000 | 13% |
| | Xantrex Technology Inc.* | - | - |
| Round 6 - 2004-B | Angstrom Power Incorporated* | - | - |
| | Clean Current Power Systems Inc.* | - | - |
| | Electrovaya Corp.* | \$129,195 | 2% |
| | Encelium Technologies Inc.* | - | - |
| | EnerWorks Inc.* | - | - |
| | GE Canada* | \$2,400,000 | 10% |
| | Group IV Semiconductor Inc.* | \$200,000 | 3% |
| | NORAM Engineering and Constructors Ltd.* | - | - |
| | Parkland BioFibre Ltd.* | \$3,500,000 | 31% |
| | Prairie Pulp and Paper Inc.* | \$3,200,000 | 25% |
| | Pratt & Whitney Canada Corp.* | - | - |
| | Science Applications International Corporation (SAIC Canada)* | \$1,550,000 | 34% |
| | Sunarc of Canada Inc.* | \$100,000 | 7% |
| Terra Gaia Inc.* | - | - | |
| University of British Columbia* | \$1,213,005 | 17% | |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Other Government Funding | % of Other Gov't Funding to Total Eligible Project Costs |
|---------------------------|--|---------------------------------|---|
| Round 7 - 2005-A | AirScience Technologies Inc.* | \$1,101,100 | 34% |
| | Clear-Green Environmental Inc.* | \$2,780,000 | 29% |
| | Dépôt Rive-Nord inc.* | \$2,400,000 | 26% |
| | EcoSmart Foundation Inc.* | \$100,000 | 2% |
| | Envirogain Inc.* | \$541,170 | 13% |
| | Hatch Ltd.* | - | - |
| | Maratek Environmental Inc.* | - | - |
| | Netistix Technologies Corporation* | \$255,000 | 19% |
| | Nexterra Energy Corp.* | \$425,000 | 7% |
| | Outland Technologies Inc.* | \$1,186,500 | 20% |
| | Petroleum Technology Research Centre* | \$750,000 | 8% |
| | Plasco Energy Group Inc.* | \$600,000 | 3% |
| | Power Diagnostic Technologies Ltd.* | \$331,000 | 6% |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | - | - |
| | Vaperma Inc.* | \$3,950,000 | 29% |
| 2005 Project Total | | \$79,788,141 | 13% |

* Amounts are based on approved project values – contracting to be finalized.

These projects represent the full portfolio of funded projects including completed/terminated projects.

Refer to section 1 for a brief description of the funded projects.

2005 Completed Projects

The following represents the amounts contributed by all other government programs to the projects which have been completed as of December 31st, 2005.

| Funding Round | Lead Consortia Member | Other Government Funding | % of Other Gov't Funding to Total Eligible Project Costs |
|--------------------------------------|--|---------------------------------|---|
| Round 1 - 2002-A | Carmanah Technologies Inc. | - | - |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | - | - |
| | Enerkem Technologies Inc. | \$231,798 | 11% |
| | Highmark Renewables Inc. | \$2,254,675 | 35% |
| | Mikro-Tek Inc. | - | - |
| Round 3 - 2003-A | Hydrogenics Corporation | - | - |
| | Paradigm Environmental Technologies Inc. | \$305,000 | 37% |
| 2005 Completed Projects Total | | \$2,791,473 | 9% |

All SDTC projects approved for funding are categorized as Climate Change or Clean Air with any related co-benefits also identified. SDTC's mandate was expanded to include Clean Water and Clean Soil in 2005, approval and related categorization for projects to the expanded mandate will take place in 2006.

| Funding Round | Lead Consortia Member | Climate Change Project | Clean Air Project |
|--------------------------------|--|-------------------------------|--------------------------|
| Round 1 - 2002-A | Bio-Terre Systems Inc. | Yes | co-benefit |
| | Carmanah Technologies Inc. | Yes | co-benefit |
| | CO2 Solution Inc. | Yes | — |
| | Mabarex inc. | Yes | co-benefit |
| | NOVA Chemicals Corporation ¹ | Yes | co-benefit |
| | Suncor Energy Inc. | Yes | — |
| | Westport Research Inc. | — | Yes |
| Round 2 - 2002-B | DynaMotive Energy Systems Corporation | Yes | co-benefit |
| | Enerkem Technologies Inc. | Yes | co-benefit |
| | Ensyn Technologies Inc. | Yes | co-benefit |
| | Highmark Renewables Inc. | Yes | co-benefit |
| | IBC Technologies Inc. | Yes | co-benefit |
| | Mikro-Tek Inc. | Yes | — |
| | Radiant Technologies Inc. | Yes | co-benefit |
| | University of New Brunswick | Yes | co-benefit |
| | ZENON Environmental Inc. | Yes | co-benefit |
| Round 3 - 2003-A | BET Services Inc.* | Yes | co-benefit |
| | Blue-Zone Technologies Ltd. | Yes | — |
| | Cansolv Technologies Inc.* | Yes | — |
| | Cellex Power Products, Inc. | — | Yes |
| | Hydrogenics Corporation | — | Yes |
| | Paradigm Environmental Technologies Inc. | Yes | co-benefit |
| | Quantiam Technologies Inc. | Yes | co-benefit |
| | Railpower Technologies Corp. | — | Yes |
| Saskatchewan Power Corporation | — | Yes | |

* Amounts are based on approved project values – contracting to be finalized.

¹ Due to technological difficulties the project was terminated.

| Funding Round | Lead Consortia Member | Climate Change Project | Clean Air Project |
|------------------------------------|---|------------------------|-------------------|
| Round 4 - 2003-B | BIOX Canada Ltd. | co-benefit | Yes |
| | DeCloet Greenhouse Mfg. Ltd. | Yes | — |
| | Fifth Light Technology Ltd. | Yes | — |
| | Gradek Energy Inc.* | Yes | — |
| | Lignol Innovations Corporation* | co-benefit | Yes |
| | Nanox inc. | — | Yes |
| | NxtPhase T&D Corp.* | Yes | — |
| | Sacré-Davey Innovations Inc. | co-benefit | Yes |
| | Synodon Inc.* | Yes | — |
| Whitefox Technologies Canada Ltd.* | Yes | co-benefit | |
| Round 5 - 2004-A | Alternative Green Energy Systems Inc. | Yes | co-benefit |
| | Atlantic Hydrogen Inc. | Yes | co-benefit |
| | Atlantic Packaging Products Ltd.* | Yes | co-benefit |
| | B.C. Eco-Systems Inc.* | Yes | co-benefit |
| | Dofasco Inc.* | Yes | co-benefit |
| | Great Northern Power Corp. | Yes | co-benefit |
| | M.A. Turbo/Engine Ltd. | — | Yes |
| | QuestAir Technologies Inc.* | Yes | co-benefit |
| | Techint Goodfellow Technologies Inc. | Yes | co-benefit |
| Xantrex Technology Inc.* | Yes | co-benefit | |
| Round 6 - 2004-B | Angstrom Power Incorporated* | Yes | co-benefit |
| | Clean Current Power Systems Inc.* | Yes | co-benefit |
| | Electrovaya Corp.* | co-benefit | Yes |
| | Encelium Technologies Inc.* | Yes | co-benefit |
| | EnerWorks Inc.* | Yes | co-benefit |
| | GE Canada* | Yes | co-benefit |
| | Group IV Semiconductor Inc.* | co-benefit | Yes |
| | NORAM Engineering and Constructors Ltd.* | Yes | co-benefit |
| | Parkland BioFibre Ltd.* | Yes | co-benefit |
| | Prairie Pulp and Paper Inc.* | Yes | co-benefit |
| | Pratt & Whitney Canada Corp.* | co-benefit | Yes |
| | Science Applications International Corporation (SAIC Canada)* | Yes | co-benefit |
| | Sunarc of Canada Inc.* | Yes | co-benefit |
| Terra Gaia Inc.* | Yes | co-benefit | |
| University of British Columbia* | Yes | co-benefit | |

* Amounts are based on approved project values – contracting to be finalized.

| Funding Round | Lead Consortia Member | Climate Change Project | Clean Air Project |
|-------------------------|--|------------------------|-------------------|
| Round 7 - 2005-A | AirScience Technologies Inc.* | Yes | co-benefit |
| | Clear-Green Environmental Inc.* | Yes | co-benefit |
| | Dépôt Rive-Nord inc.* | Yes | co-benefit |
| | EcoSmart Foundation Inc.* | Yes | co-benefit |
| | Envirogain Inc.* | Yes | co-benefit |
| | Hatch Ltd.* | Yes | co-benefit |
| | Maratek Environmental Inc.* | co-benefit | Yes |
| | Netistix Technologies Corporation* | Yes | co-benefit |
| | Nexterra Energy Corp.* | Yes | co-benefit |
| | Outland Technologies Inc.* | Yes | co-benefit |
| | Petroleum Technology Research Centre* | Yes | co-benefit |
| | Plasco Energy Group Inc.* | Yes | co-benefit |
| | Power Diagnostic Technologies Ltd.* | Yes | co-benefit |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | Yes | co-benefit |
| | Vaperma Inc.* | Yes | co-benefit |

* Amounts are based on approved project values – contracting to be finalized.

These projects represent the full portfolio of funded projects including completed/terminated projects.

Refer to section 1 for a brief description of the funded projects.

Total Portfolio Project Classification as a %

The following represent the project classification allocation % to Climate Change and Clean Air for the projects approved for funding. SDTC selects projects for funding which meet the requirements of the mandate while at the same time maintaining the classification allocation requirements.

| | # of Projects Funded | % of Funding Allocation |
|---|----------------------|-------------------------|
| Total Number of Projects Funded | 75 | — |
| Projects with Climate Change Impact | 61 | 81% |
| Projects with Clean Air Impact | 14 | 19% |
| Projects with Climate Change and Clean Air Co-benefit | 58 | 77% |

Hydrogen Economy and Clean Fossil Fuels Projects

Within the classification of Climate Change and Clean Air SDTC projects are further classified as Hydrogen or Clean Fossil Fuels, as required by the Funding Agreement. The breakdown for those two sub-categories is as follows:

Hydrogen Economy Projects

| Round | Lead Consortia Partner | Total Eligible Project Costs | SDTC Announced Funding |
|-------------------------|--|------------------------------|------------------------|
| Round 3 - 2003-A | Cellex Power Products, Inc. | \$9,026,000 | \$2,000,000 |
| | Hydrogenics Corporation | \$3,545,182 | \$1,560,000 |
| Round 4 - 2003-B | Sacré-Davey Innovations Inc. | \$17,832,999 | \$5,879,000 |
| Round 5 - 2004-A | Atlantic Hydrogen Inc. | \$6,454,479 | \$2,000,000 |
| | QuestAir Technologies Inc.* | \$21,848,000 | \$3,890,000 |
| Round 6 - 2004-B | Angstrom Power Incorporated* | \$1,346,775 | \$444,436 |
| Round 7 - 2005-A | AirScience Technologies Inc.* | \$3,248,000 | \$1,038,180 |
| | SHEC LABS (Solar Hydrogen Energy Corporation)* | \$6,230,000 | \$2,076,667 |
| Total | | \$69,531,435 | \$18,888,283 |

* Amounts are based on approved project values – contracting to be finalized.

Clean Fossil Fuels Projects

| Round | Lead Consortia Partner | Total Eligible Project Costs | SDTC Announced Funding |
|-------------------------|---------------------------------------|------------------------------|------------------------|
| Round 1 - 2002-A | Suncor Energy Inc. | \$8,391,371 | \$2,250,000 |
| Round 4 - 2003-B | Gradek Energy Inc.* | \$25,322,000 | \$5,000,000 |
| | Synodon Inc.* | \$2,570,176 | \$650,000 |
| Round 7 - 2005-A | Hatch Ltd.* | \$25,814,016 | \$8,604,672 |
| | Petroleum Technology Research Centre* | \$9,603,000 | \$3,168,990 |
| Total | | \$71,700,563 | \$19,673,662 |

* Amounts are based on approved project values – contracting to be finalized.

Clean Water and Clean Soil Projects

In accordance with the Funding Agreement signed March 31, 2005 SDTC placed its first call for Clean Water and Clean Soil submissions in August of 2005. The approval for funding for any resulting projects will take place in June of 2006 and therefore as of December 31st, 2005, there are no announced projects to report in this area.

2005 Completed Projects – Project Impacts

The following provides an evaluation by Market Sector of the Project Impact of each completed project. Post-project reporting will continue so as to understand the evolution of the technologies and the Market Impact of each funded project.

It is important to recognize that SDTC funding is focused in the development and demonstration of new technologies. In so doing projects are progressed from early development along the innovation chain towards commercialization. This staged approach to innovation will result in some successful project providing technology that requires further development and/or demonstration before it can be commercialized. It is expected that not all projects will be successful considering the unproven nature of the technologies and the de-risking nature of the funding.

Overall, the results are encouraging. While project impacts vary depending on the nature and the stage of the projects, all 7 projects have achieved positive results that will enable them to move to the next stage of their progress to market.

Sector: Power Generation

Project Name: DynaMotive Energy Systems Corporation

Round:

2002-B

Project Delivery Completion:

July 2005

Market Impact Report Due:

July 2007

Project Impact - Technology/Environmental/Other

Objectives:

- To demonstrate biomass to energy conversion using pyrolysis can be achieved economically and technically at a scale of production which would enable subsequent deployment.

Results:

- DynaMotive's pyrolysis process was used to generate BioOil and subsequently fuel an Orenda turbine to generate electricity. Primary benefits included reduction of GHGs, SO_x, NO_x and associated criteria air contaminants (CACs) such as heavy metals and particulates, when compared to a baseline using fossil fuels.
- Secondary benefits included the reduction of methane emissions (i.e. landfill gas) and leachate contaminants from diverting biomass destined for landfill disposal.
- For turbine operation using BioOil, CAC emissions are significantly lower than fossil fuel emissions, according to tests conducted for TerraChoice Environmental certification.

Project Impacts:

- Emissions intensity: reduction of ~ 212 kg CO₂e/t of biomass
- Emissions intensity: 7.6 kg /MWh reduction of NO₂; 19.4 kg /MWh reduction of SO₂
BioOil electrical generation was reported to be 0.85 kg CO, 1.60 kg NO₂, 0.057 kg SO₂ and 0.09 kg PM. Canada average fossil-based electricity generation (NO_x = 9.2 kg/MWh; SO_x = 19.5 kg/MWh) {Reference: Statistics Canada. Electricity Generation and GHG Emissions in Canada (1990-2001)}

Path to Market:

- Once fully operational each plant is expected to reduce GHG emissions by 7 kt CO₂e/year. A cumulative reduction of 140,000 t CO₂e is expected over each plant's expected 20-year lifetime.

Sector: Energy Utilization

Project Name: Carmanah Technology Inc.

Round:

2002-B

Project Delivery Completion:

January 2005

Market Impact Report Due:

January 2007

Project Impact - Technology/Environmental/Other

Objectives:

- Carmanah's technology uses renewable solar energy and a Light Emitting Diode lighting system which is intended to remove the need for grid electricity. Further, the project aims to demonstrate safer environments at night (such as in public transit bus stops) where grid connection is not possible. A key objective of the project is to establish an early niche market for photovoltaic lighting which will assist in lowering the costs of PV-based electricity generation. Emissions reductions are expected over the longer term.

Results:

- The project produced sufficient units for demonstration purpose. In fact, SDTC funding of Carmanah appears to have catalyzed market roll-out and led to significant sales (greater than projected for market rollout) being realized by the company immediately after completion of project delivery. Carmanah executives noted that "The economic return to date from the \$500,000 investment from SDTC has been approximately \$8 million in sales of LED edge-lighting in the first year after completion of the project (e.g. sold 2700 bus signs and 200 traffic signs in 2005), with total employment in sales, engineering and production of approximately 40 staff, and the creation of two manufacturing facilities, one in Calgary and one in Victoria."

Project Impacts:

- Emissions intensity (address signs): reduction of 0.013t CO₂e / unit / year;
- Emissions intensity (traffic signs): reduction of 0.0967 kg CO₂e / unit / year;
- Emissions intensity (bus shelter signs): reduction of 0.129 t CO₂e/ unit /year
Based on displacement of fossil fuel-generated electricity associated with running conventional light bulbs.

Path to Market:

- Significant benefits could be realized during market roll-out of the technology – it is estimated that if 60,000 units were sold in Canada and the U.S. by 2010 it could result in a cumulative reduction of up to 21 kt of GHG reduction depending on a number of variables including location of installation, timing, and type and final number of units sold.

Sector: Transportation

Project Name: Hydrogenics Corporation

Round:

2003-A

Project Delivery Completion:

September 2005

Market Impact Report Due:

September 2007

Project Impact - Technology/Environmental/Other

Objectives:

- The goal of this project was to reduce the costs of fuel cell technology in transportation applications using an early niche market with viable economics. This approach was intended to provide a pathway to the larger transportation market.

Results:

- Significant technology milestones were achieved by Hydrogenics during their demonstration project, including their first-ever deployment of fuel cell forklift power packs. Over 1000 hours of operational time were logged in the field with minimal maintenance and reliability issues and high driver satisfaction.
- The project showed its intended value as a cost-reduction step in moving to a hydrogen economy.

Project Impacts:

- Emissions intensity (propane forklift replacement): reduction of 9 tonnes CO₂e per year per vehicle ; reduction of CO, NO_x, and VOCs by 1.5, 0.23, and 0.18 tonnes per year per vehicle, respectively.
- Emissions intensity (battery forklift replacement): increase of 5 tonnes CO₂e per year per vehicle
The emissions benefits of hydrogen-powered vehicles are substantially reduced in this project based on the inclusion of electrolysis-generated hydrogen, which accounts for approximately 0.5 tonnes CO₂e per MWh.

Path to Market:

- Further development and demonstration is required to achieve broader operating parameters prior to market entry.

Sector: Agriculture

Project Name: Highmark Renewables Inc.

Round:

2002-B

Project Delivery Completion:

June 2005

Market Impact Report Due:

June 2007

Project Impact - Technology/Environmental/Other

Objectives:

- The main objective of this project was to utilize Alberta Research Council's IMUS system to generate electricity and heat from manure-derived biogas. A further objective was to test the system in field operations on one of Canada's largest cattle feedlots.

Results:

- Successful demonstration of the IMUS technology and the production of biogas that was consistent with quantity & quality expected from lab scale process.
- Reduction in emissions of methane, nitrous oxide and dust typically generated by unprocessed manure when it is piled and spread.
- Avoidance of GHG and CAC emissions that would have been created by the combustion of fossil fuel to generate electricity and heat/steam. Further reductions of GHGs and CAC emissions resulted by eliminating the need to transport and spread manure;
- Lower surface and ground water contamination by removing excess nitrogen, phosphorous, soluble salts and pathogens; and
- Production of stabilized organic fertilizer—thereby offsetting the need for chemical fertilizers and associated emissions to manufacture such products.

Project Impacts:

- Emissions intensity: reduction of 1.28 tonnes CO₂e per head of cattle
- Tonnes of land application avoided: 3000 tonnes (3.5 kg/head/day)
- Avoided surface water contamination (pathogen removal)

Path to Market:

- It is estimated that the introduction of ten – 3 MW IMUS units in Ontario alone (between 2007 and 2010) could result in the cumulative reduction of up to 171 kt of CO₂e.

Sector: Forestry, Wood Products and Pulp and Paper Products

Project Name: Mikro-Tek Inc.

Round:

2002-B

Project Delivery Completion:

June 2005

Market Impact Report Due:

June 2007

Project Impact - Technology/Environmental/Other

Objectives:

- The main objective of the project was to demonstrate enhanced grass-species biomass growth using mycorrhizal fungi inoculation to improve soil organic carbon (SOC) levels.

Results:

- Improved retention of soil nutrients, and reduced nutrient run-off into nearby watercourses and groundwater
- Better uptake of a range of nutrients (including phosphorous) by plants, which can have benefits in terms of disease resistance, crop quality, etc.
- More rapid growth of reclamation grasses on poor quality soils
- Identification of gaps in the industry's ability to measure and monitor SOC levels.
- Improved yields attained in the laboratory-based inoculum production process to the point where the more time-consuming and costly field production method (growing the microorganism on plant roots in the field) could be completely replaced by the lab method. The lab method avoids the need for agricultural inputs (fertilizer, etc.), and related environmental impacts.
- Ability to produce the inoculum in a pure form, which facilitates the licensing of the organism to other companies.

Project Impacts:

- Given the complexity of the project and difficulties of measurement, conclusive GHG benefits for the demonstration project and for the market roll-out have not yet been determined. Further work has been proposed to develop an industry practice for soil organic carbon sequestration from grasslands to ensure conclusive results

Path to Market:

- The project may lead to quantifiable GHG benefits in the future if increased growth rate properties of the technology are used to grow higher yield biomass fuel crops (thus resulting in increased amount of displaced fossil fuel) and grassland-based GHG emissions reduction protocols are developed.
- Development of reliable technology to measure SOC may be a significant opportunity for the sector by allowing accurate quantification of increases in SOC resulting from the use of technologies such as those demonstrated in the project. This could lead to enhanced economic returns through more certain access to carbon trading markets.

Sector: Waste Management

Project Name: Paradigm Environmental Technologies Inc.

Round:

2003-A

Project Delivery Completion:

October 2005

Market Impact Report Due:

October 2007

Project Impact - Technology/Environmental/Other

Objectives:

- To demonstrate the effectiveness of Paradigm's MicroSludge™ process for the reduction in volatile solids in municipal waste water treatment plants.

Results:

- Over 90% reduction in volatile solids were realized when Waste Activated Sludge (WAS) was treated with the MicroSludge™ process – considered an exceptional result for the industry.
- Increased generation of biogas
- Reduction in GHGs and CACs emitted during waste transport and GHG emissions once solid residuals are applied to land.
- Reduction in land use requirements.

Project Impacts

- Emissions Intensity (avoided landfill): reduction of 3,000 tonnes CO₂e per 1,000 tonnes of WAS
- Emissions Intensity (waste-to-energy): reduction of 8,500 tonnes CO₂e per 1,000 tonnes of WAS.

Path to Market:

- Increased biogas production can be used to generate additional renewable electricity and heat energy, reducing GHG and CAC emissions associated with the combustion of fossil fuels that it would displace. The demonstration project did not include conversion of biogas to electricity, but power generation would be expected at facilities during market roll-out.
- The successful Paradigm demonstration project has led to significant interest in North America and abroad for the technology, including the delivery of an evaluation system to a potential customer in Los Angeles, CA.

Project Name: Enerkem Technologies Inc.

Round:
2002-B
 Project Delivery Completion:
January 2005
 Market Impact Report Due:
January 2007

Project Impact - Technology/Environmental/Other**Objectives:**

- The demonstration project was aimed at reducing GHG emission relative to a benchmark landfilling case by synthesizing mixed alcohols (methanol and ethanol) from municipal solid waste (MSW). One of the key objectives was to make gasification more affordable to smaller municipalities by creating higher-value end products.

Results:

- The project resulted in the successful integration, at a pilot scale, of Enerkem's existing waste sorting and gasification processes with an alcohol synthesis process, resulting in the production of methanol from biomass versus conventional methanol production using natural gas. This project has positioned the company to produce higher-value product streams from MSW feedstocks.
- Other environmental benefits to air (e.g. reduced landfill gas emissions), water and soil (e.g. lower quantities of leachate contaminants, reduced land use) associated with diverting waste from landfill would also be expected.

Project Impacts:

- Emissions intensity: reduction of 1.3 tonnes CO₂e / dry tonne MSW processed, when compared against a benchmark landfilling case involving 50% landfill gas capture.

Over 90% of these benefits are attributed to displacement of landfill gas emissions from conventional waste disposal practices (a benefit of Enerkem's pre-existing waste sorting and gasification processes), with relatively low remaining benefits due to alcohol synthesis.

Path to Market:

- Enerkem considers the project to be one of a number of steps along the way to producing high-value products from waste, which could enable additional environmental and economic benefits.

2005 Completed Projects – Market Impacts

In accordance with the Funding Agreement, a Final Market Impact report is required two years after project completion. As of December 31st, 2005 there are no completed projects that fall under this category.

Conflict of interest and non-disclosure requirements for SDTC's funding allocation process

All due diligence and decision making processes at SDTC require that the individuals involved are subject to conflict of interest guidelines and non-disclosure agreements. This is applied consistently whether the individuals are experts reviewing applications or part of the SDTC organization. It should be noted that Members of the Board also are subject to conflict of interest guidelines that require Directors to declare potential conflicts of interest and refrain from participating in any discussions regarding matters that could give rise to a conflict of interest.

A

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Alternative Green Energy Systems Inc. 14

Angstrom Power Incorporated 18

Atlantic Hydrogen Inc. 14

Atlantic Packaging Products Ltd. 15

B

B.C. Eco-Systems Inc. 15

BET Services Inc. 7

Bio-Terre Systems Inc. 2

BIOX Canada Ltd. 10

Blue-Zone Technologies Ltd. 7

C

Cansolv Technologies Inc. 7

Carmanah Technologies Inc. 2

Cellex Power Products, Inc. 8

Clean Current Power Systems Inc. 18

Clear-Green Environmental Inc. 24

CO2 Solution Inc. 2

D

DeCloet Greenhouse Mfg. Ltd. 10

Dépôt Rive-Nord inc. 25

Dofasco Inc. 15

DynaMotive Energy Systems Corporation 4

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EcoSmart Foundation Inc. 25

Electrovaya Corp. 19

Encelium Technologies Inc. 19

Enerkem Technologies Inc. 4

EnerWorks Inc. 20

Ensyn Technologies Inc. 4

Envirogain Inc. 25

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Fifth Light Technology Ltd. 10

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GE Canada. 20

Gradek Energy Inc. 11

Great Northern Power Corp. 16

Group IV Semiconductor Inc. 20

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Hatch Ltd. 26

Highmark Renewables Inc. 5

Hydrogenics Corporation. 8

I

IBC Technologies Inc. 5

L

Lignol Innovations Corporation 11

M

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| M.A.Turbo/Engine Ltd. | 16 |
| Mabarex inc. | 3 |
| Maratek Environmental Inc. | 26 |
| Mikro-Tek Inc. | 5 |

N

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|---|----|
| Nanox inc. | 11 |
| Netistix Technologies Corporation. | 26 |
| Nexterra Energy Corp. | 27 |
| NORAM Engineering and Constructors Ltd. | 21 |
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| Outland Technologies Inc. | 27 |
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| Saskatchewan Power Corporation | 9 |
| Science Applications International Corporation (SAIC Canada) | 22 |
| SHEC LABS (Solar Hydrogen Energy Corporation). | 29 |
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| Suncor Energy Inc. | 3 |
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| Techint Goodfellow Technologies Inc. | 17 |
| Terra Gaia Inc. | 23 |

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| University of British Columbia | 23 |
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