→ It is now that with foresight and will such action can be taken without disturbing the essence of our way of life, by adjusting behaviour not altering it entirely. Prime Minister Tony Blair

THIN ICE

Clean technology: A beacon of hope for Canada

VICKY J. SHARPE
President and CEO of SDTC, a not-for-profit foundation created by the Government of Canada

The development of innovative clean technologies to reduce greenhouse gas emissions is creating new opportunities for economic growth, in Canada and around the world.

While the growing threat of climate change underlying these opportunities is sobering, the solutions – and the ingenuity and willpower behind them – give rise to optimism. It is within our grasp to reduce greenhouse gas emissions, and to do so in a way that builds a more productive and competitive Canadian economy.

The economic benefits are generated not only through domestic and export sales of clean technologies, but also through improved efficiencies made possible in existing industries. The technologies involve advanced processes that will help move Canada's largely commodity-based economy up the value chain, providing opportunities for higher returns and additional exports, and strengthening our country's position in the global economy.

In today's energy-intensive Canadian economy, which emits relatively large amounts of greenhouse gases relative to GDP, cleantech can result in disproportionately large emission reductions. This is especially true in three areas where we have developed world-leading expertise: biomass conversion and utilization; the hydrogen economy; and energy exploration and production.

In biomass-based technology, Canada is becoming a global leader in producing value-added products and energy from forestry and agricultural wastes. The funding that flows to this area gives a picture of its importance in Canada's cleantech scene: of 75 projects funded by Sustainable Development Technology Canada (SDTC), a foundation created by the Government of Canada to support the development and demonstration of clean technologies, 37 per cent are biomass-related.

The economic and environmental benefits offered by these projects are impressive. For example, a consortium led by Ottawa-based Ensyn Technologies Inc. is developing an innovative technology that delivers multiple revenue streams from low-value wood waste by producing fuel as well as two byproducts: a resin used in particleboard manufacturing, and food flavourings and colourants. This, in effect, moves a resource-based product several steps up the value chain.

Innovation has helped Canada gain a leading position in the hydrogen-based economy. For example, North Vancouver-based Sacré-Davey Innovations Inc. is heading an SDTC-funded project to demonstrate the capture and use of hydrogen emitted as an industrial by-product. The resulting hydrogen could be used to fuel a fleet of up to 20,000 vehicles, reducing greenhouse gas emissions. The project will also demonstrate the full hydrogen value chain, from supply to storage, distribution and use – an important step in building a hydrogen infrastructure.

Energy exploration and production commands 24 per cent of SDTC's investment portfolio. This area is increasingly significant, both economically and environmentally, as activity expands in Alberta's vast oil sands deposits, where enormous energy inputs are required to extract usable oil.

For instance, an SDTC-funded project, led by Mississauga, Ontario-based Hatch Ltd. and involving N-Solv Corporation and Nenniger Engineering Inc., will demonstrate a patented, solvent-based process for oil extraction from oil sands. Compared to conventional steam injection, the process could produce double-digit percentage reductions in energy costs and greenhouse gas emissions.

This is just the tip of the cleantech iceberg. With growing interest from private sector investors along with support from SDTC and other public sector sources, Canada is becoming a significant player in this field relative to our country's size. In fact, Canada accounts for about 12 per cent of North America's cleantech venture capital investment, estimated at US$1.5 billion this year.

Through the expertise of such organizations and the private and public sector funding that drives them, Canada is positioning itself for a bright economic future, and as a beacon of hope in the battle against climate change. ■

Clean energy gets push

BY TAMMY LABER

Renewable energy proponents say clean technologies will be crucial in Canada's fight against global climate change. Among the solutions are clean fuels (ethanol), wind and a little-known renewable source called ground source heat pumps, which draw energy from the earth.

Renewable energy solutions are being investigated by the BIOCAP Canada Foundation, a national, not-for-profit organization harnessing Canada's research capacity to find biologically based solutions to the challenges of climate change and the need for clean energy.

"Alternative energies, such as biomass, reduce our reliance on non-renewable fossil fuels, and tend to be more price-stable and better for the environment," says Dr. Susan Wood, associate research director of BIOCAP. Biomass includes residual forestry and agricultural materials and municipal waste products. "Although biomass and other alternative fuel sources are currently viable energy sources, more research is necessary to make them widely available," she says.

According to Dr. Wood, "Government research dollars are increasingly available for renewable energy technologies because they are so key to meeting Canada's Kyoto commitments. Also, 77 per cent of Canadians feel alternative energy is our best strategy for long-term price stability."

The Canadian GeoExchange Coalition (CGC) represents another alternative – the geo-exchange or ground source heat pump industry. According to Denis Tanguay, the CGC's executive director, "Ground source heat pumps tap stored solar energy from the earth. They use the earth's relatively constant temperature to provide heating, cooling and hot water at tremendous efficiencies."

In a ground source heating system, a water-based solution circulates through underground pipes. In winter, the fluid collects heat from the earth, carrying it through the system into the building. In summer, the system reverses, cooling by pulling heat out, carrying it through the system and placing it in the ground. This creates free hot water in summer and hot water savings in winter.

Geo-exchange systems save money in buildings requiring both heating and cooling because they accomplish both functions with one system. "Installation is expensive, but over time, lower maintenance fees and the energy dollars saved make them much more economical than conventional heating and cooling."

The bottom line, says Mr. Tanguay, is that "geo-exchange systems save consumers money, protect against energy price fluctuations and drastically cut emissions."

Geo-exchange systems are among the array of clean energy technologies that will be demonstrated in Vancouver at the National Research Council's new Institute for Fuel Cell Innovation, expected to open in early 2006.

Among its integrated energy technologies, this facility – itself a model of energy efficiency – will feature solar panels that produce electricity for manufacturing hydrogen from water. The pure gas will be used in labs and to refuel a fleet of zero-emissions automobiles. ■