

# specialreport

by Corporate Knights

## FIRST ANNUAL CORPORATE KNIGHTS RANKING

### A Unicorn embodies the ethos of Cleantech.

Mayer (The Unicorn and the Lake) has observed, "The unicorn is the only fabulous beast that does not seem to have been conceived out of human fears. In even the earliest references he is fierce yet good, selfless yet solitary, but always mysteriously beautiful. He could be captured only by unfair means, and his single horn was said to neutralize poison."

Corporate Knights has observed "Cleantech is the only fabulous ecological solution that does not seem to have been conceived out of human fears. In even the earliest references Cleantech is fiercely efficient yet good, selfless yet profitable and distributed, but always mysteriously beautiful like the offshore wind turbines dotting the seaway of the Rotterdam shipyard. The potential of Cleantech can only be stifled by unfair means, and Cleantech's secret edge is said to neutralize the poison of our polluting ways."



The most successful investors in the world are all over Cleantech like a kid in a candy store. From the savvy Silicon Valley venture capitalists who financed Google to JP Morgan and Goldman Sachs, and perhaps most interestingly, three of the ten richest people in China.

Zhang Yin is the richest person in China with a \$10 billion fortune derived from her paper recycling company, Nine Dragons Paper Holdings. Solar kings Peng Xiaofeng of LDK Solar and Dr. Zhengrong Shi of Suntech Power round out the other two Cleantech members of the Chinese Rich list with fortunes of \$5.3 billion and \$2.2 billion.

"Greentech could be the largest economic opportunity of the 21st century."

—John Doerr, Senior Partner at Kleiner Perkins Caufield & Byers, 2006

#### SIZE OF CLEANTECH MARKETS

TECHNOLOGY	Market in 2000	Market in 2012
Wind	\$5.5 billion	\$49 billion
Solar	\$3.5 billion	\$27.5 billion
Power Quality	\$5.0 billion	\$15 billion
Industrial Water Purification	\$5.6 billion	\$20 billion
Desalination	\$4.5 billion	\$75 billion

Source: Cleantech Group

Cleantech is more than just green energy and recycling though, it spans across the economy.

In agriculture, you have bio-based materials, farm efficiency technologies, microirrigation systems, and natural pesticides. In energy, there is distributed and renewable energy generation and conversion (including fuel cells, geothermal, wind and photovoltaics); energy management systems; superconducting transmission; energy storage and power quality; key enabling technologies; and related Internet and information technology-based services. In manufacturing, there is advanced packaging; high value materials recovery; natural chemistry; sensors; smart construction materials; precision manufacturing instruments. In transportation, hybrid vehicles, lighter materials, smart logistics software, and telecommuting. In water, you'll find recycling and ultra-filtration systems (UV and membrane based systems), sensors and automation systems, and desalination equipment.

So the billion dollar question is: How does Canada capture some of this action? In a parity-dollar world, this question goes to the core of our industrial survival strategy. It is no longer good enough for us to just chop down trees and suck oil out of the ground or haul ore out of the mine. With no weak dollar, we have no cushion. Value-add and innovation as an industrial ethos are no longer optional, but mandatory.

Canada is at once one of the world's most vibrant resource economies and the most wasteful. This dual identity

combined with an abundant Canadian inventiveness sets us up better than any other country in the world to capitalize on the Cleantech revolution—and we have 300 million customers right to our south, many of whom will be facing water and energy crunches in the not-so-distant future.

The good news, as the following pages make clear, is that we have plenty of Cleantech champions in Canada. We also have more than our fair share of Cleantech enablers, whether it's Nick Parker, Chairman of Cleantech Group, who has pioneered Cleantech as an asset class, or Jane Ambachtsheer, Global Head of Responsible Investment for Mercer, who is literally writing the principles of ecological sustainability into trillions of dollars of investment funds, or Tyler Hamilton, the only dedicated Cleantech reporter for a major daily, who is bringing Cleantech info to the masses, or Andrew Taylor and Richard Sutin, Partners at Ogilvy Renault LLP Cleantech Law practice, or Vicky Sharpe, Head of Sustainable Development Technologies, which provides hundreds of millions of dollars of oxygen to cutting-edge clean Canucks, who would mostly otherwise have to cross south over the border to take their ideas to a commercial scale.

While Cleantech will not deliver us clear of environmental purgatory and forgive us our overconsumption, the companies on the following pages will help us make better use of what we have, creating economic and ecological value along the way.

## OTHER DRIVERS FOR CLEANTECH

### Large quantities of ultra pure water.

Who wants it? Pharmaceutical, semiconductor and thermoelectric companies who use lots of water.

### Fuel efficiency from lighter, stronger materials.

Who wants it? Automobile and aircraft manufacturers keen to improve fuel efficiencies.

### Affordable and low carbon power supplies.

Who wants it? Utilities and large energy users demanding reliable power supply.

### Safer more reliable crops.

Who wants it? Agricultural producers requiring safer and more precise inputs and products.

### More efficient use of fleets and containers.

Who wants it? Logistics organizations seeking to lower their transport costs.

## THE NEXT TEN



The Next 10 Emerging Cleantech Leaders of Tomorrow represents the up and coming Canadian companies that through a combination of internal strengths and external drivers have the best potential for being the Cleantech leaders of the future. The Next 10 were selected by an advisory panel of Canada's foremost authorities on Cleantech that included:



### VICKY SHARPE,

*President and CEO, Sustainable Development Technology Canada*

Vicky Sharpe is the adroit and charming sugar momma for clean technologies which provide solutions to issues of climate change, clean air, water quality and soil, and which deliver economic, environmental and health benefits to Canadians. [www.sdte.ca](http://www.sdte.ca).



### TYLER HAMILTON,

*Energy Reporter/Clean Break, Toronto Star*

Tyler Hamilton is the only dedicated Cleantech reporter of a major daily newspaper, and runs Clean Break, which is Corporate Knights' favourite Cleantech blog. [tyler.blogware.com](http://tyler.blogware.com).



### ANDREW HEINTZMAN,

*President, Investeco Capital Corp.*

In addition to kicking tires for hot green investment prospects, Andrew Heintzman plays a mean guitar and is rumoured to have jammed with Raffi. [www.investeco.com](http://www.investeco.com).



### NICK PARKER,

*Chairman, Cleantech Venture Network LLC*

Nick Parker founded and chairs the Cleantech equivalent to Dow Jones. He likes to swim in his lake when he can get lost from the nexus of finance and Cleantech. [www.cleantech.com](http://www.cleantech.com).



### TOM RAND,

*Director, VCI Green Funds Inc.*

Tom Rand made a bundle in the dotcom era, and is now putting it to work in the Cleantech era—which is more of a long-term play. [www.vcigreenfunds.com](http://www.vcigreenfunds.com).

# O&A

Q&A with Rafael Coven, Managing Director, Cleantech Indices, LLC the public equities arm of the Cleantech Group—the global leader in Cleantech investing, research, information, and related services. In 2006, it launched the Cleantech Index (CTIUS), the only equity index tracking the broad Cleantech sector. In the first nine months of 2007, CTIUS has returned 30 per cent vs. 7.5 per cent for the S&P 500 and 10.5 per cent for the S&P/TSX Composite.

## What is Cleantech?

Cleantech refers to clean technologies: those that enable us to make more with less and to minimize the negative impact of human activity on the environment and public health. Cleantech is much broader than 'greentech' or 'enviro-tech'—which focus on regulatory-driven pollution control and remediation. Why not proactively avoid creating those problems? Cleantech goods and services are found in a wide range of industry sectors—from advanced materials and efficient manufacturing to energy and low-impact agriculture.

ergy and resources and in environmental degradation on an incomprehensible scale. Our future is closely linked with that of Asia. These are serious long-term issues and we all need to change how we produce and consume.

## Sounds scary.

It should; the planet is at stake. Yet every crisis contains an opportunity. Whether the problems manifest themselves as soaring prices for energy, tainted products or water shortages, they drive demand for a broad range of Cleantech solutions. Moreover, improved resource efficiency raises productivity—which creates wealth. A higher-standard of living requires not only more wealth but a healthy environment in which to enjoy it.

## How does Cleantech differ from typical socially responsible investing (SRI)?

They are quite different yet highly complementary and we need them both. SRI usually focuses on screening companies for negative criteria such as ethics, social and environmental performance, involvement in weapons, tobacco, or regions like Darfur and also engages in shareholder advocacy. SRI can be a big help in getting companies to behave better, but it's not enough. A Cleantech strat-



Cleantech business, and whether or not it's really 'clean' and quality (strategy, management, financial strength, sector leadership). Other key criteria include growth, earnings, liquidity, capitalization, technology/intellectual property, overall impact, etc.

## An example of a company that wouldn't qualify for the CK Cleantech 10™ ranking?

Any grain-based ethanol company—it's an environmentally harmful, tax-financed boondoggle that wastes precious resources and drives up food prices for the poor.

## How can the average investor invest in Cleantech?

We created the Cleantech Index with investors in mind. The PowerShares Cleantech Portfolio (Ticker: PZD) is an exchange-traded fund that tracks the Cleantech Index and trades on the American Stock Exchange. For the first time, all investors have an easy low-cost way to participate in the broad Cleantech sector and do so with far less risk than previously possible.



## What is the Cleantech investment thesis and why is suddenly so hot?

Huge problems create huge opportunities. The scale of human footprint of six billion people and their global economic activity is now so large that it puts tremendous pressure on the earth's resources and the environment. The externalities of rising consumption and population cause increasingly visible and chronic problems—from global warming and shortages of clean water to tainted products, depleted fisheries, and deforestation. Increased government regulation and enforcement worldwide, while essential, will be insufficient and too late to halt this downward spiral.

Nowhere is this more evident than in the effects of China and India's booming economies. We see it daily in higher prices for en-

egy focuses on positive screens—selecting the companies that will provide us with the clean technology solutions that deliver major advances in energy supply, resource efficiency, agriculture etc. And, of course, profit handsomely in the process.

## How do you select the CK Cleantech 10™?

We want technology-driven growth companies that have big impacts on resource efficiency and the environment—not simply those re-branding themselves as 'green'.

We applied a set of 18 screening criteria to all TSX companies that we use for our broad Cleantech Index. Since Canada has far fewer Cleantech stocks and they tend to be younger and smaller, those criteria were not as strictly applied. We place heavy emphasis on purity (percentage of revenues or income from

## What do you think of these 10 companies?

First, they are mostly young, emerging companies that while promising, are individually quite speculative investments. Yet, I've watched companies like Xantrex, Carmanah and WFI grow over the years and their progress has been remarkable.

## What is the future of the Canadian Cleantech Sector?

Quite good, I think. Canada has strong capital markets, a skilled population, a strong research base, rather progressive environmental policies, and good access to markets in NAFTA, China and Europe. Moreover, Canada has captured over \$600 million in Cleantech venture capital since 2005, which bodes well for a future crop of Cleantech companies and additions to the list. **CK**

# THE CLEANTECH 10



**Corporate Knights Cleantech 10™** is compiled by Corporate Knights Inc. and Cleantech Indices LLC, the leading provider of Cleantech Indices and information globally. Cleantech Indices LLC determined the Corporate Knights Cleantech 10™ by applying a set of 18 screening criteria to all TSX companies that are part of the broad Cleantech investment category. The Cleantech criteria emphasizes purity (percentage of revenues or income from Cleantech business, and whether or not it's really "clean") and quality (strategy, management, financial strength, sector leadership). Other key criteria include growth, earnings, liquidity, capitalization, technology/intellectual property, overall impact, etc.



**Note:** Since Canada has far fewer Cleantech stocks and they tend to be younger and smaller, those criteria were not as strictly applied as they are for The Cleantech Index™ run out of the US, which has a larger and more established universe from which to select.



Boralex Inc.

TSX:BLX

Boralex is a private electricity producer (Cascades Inc. owns a 35 per cent share) that develops and operates power stations that run on renewable energy. The company generates electricity from natural or recycled sources, and has an embedded approach to providing positive consideration for affected communities and the environment. Distinguishing characteristics for the company include becoming, over the past five years, one of the biggest wind power producers in France, where it currently operates seven wind farms with a total installed capacity of 103 MW. It is the largest producer of wood-residue energy in North America, operating six wood-residue thermal power stations in the states of Maine and New York with a total installed capacity of 204 MW.

Employing close to 300 people, Boralex owns and operates 22 power stations with a combined installed capacity of 347 MW in Quebec, the northeastern United States, and France, and manages an additional 10 facilities through the Boralex Power Income Fund.

"Boralex is focusing on expanding and

increasing our capacity over the next couple of years to over 1,000 MW, mainly in green energy in Canada and Europe," says Patrick Lemaire, Boralex's President and CEO.

Their portfolio of green energy includes wind power, hydroelectric power, and thermal and cogeneration power from natural gas or wood residue, such as bark, treetops, or branches.

"We all hear about the Kyoto Protocol and—a lot lately—about global warming," Lemaire says. "There is a big focus on investment in green energy. And Boralex has been in it for many years." Boralex was founded in 1982 and its first plant began to operate in 1989 in Kingsley Falls, Quebec.

Lemaire's vision for Boralex is simple: "To be ahead of the game, proactive, and innovative in the types of energy production."



Canadian Hydro Developers Inc.

TSX:KHD

Canadian Hydro Developers operates 19 green power generation facilities in British Columbia, Alberta, and Ontario, with 265 MW of capacity currently in operation and an additional 403 MW nearing construction.

"The number one thing that investors should know about Canadian Hydro is that it is possible to balance the needs of investors with the needs of the environment," CEO John Keating says. "All our electricity is generated from renewable resources in an environmentally friendly, low-impact manner, and sources include wind, water, and biomass."

"Through building and operating environmentally friendly wind, small hydro, and biomass projects, Canadian Hydro has achieved an exceptional compounded annual return of 24 per cent annually over the last 10 years."

The company's facilities are also certified or slated for certification under Environment Canada's EcoLogo standard.

Canadian Hydro Developers is the only pure-play company in Canada that provides a diversified portfolio of renewable energy.



Carmanah Technologies Corp.

TSX:CMH

Carmanah Technologies is a world leader in the production and distribution of solar and LED (light-emitting diode) energy technologies. A technological advantage for the company is how it integrates LED lighting with their batteries for remote LED lighting systems for off-grid applications, such as bus stops, runways, buoys, and difficult-

to-reach or remote applications.

With an impressive customer list that includes the United States Navy, the Japan Air Force, and a host of international airports, transit authorities, and casinos, Carmanah's solar-powered LED lighting, solar power systems and equipment, and LED-illuminated signage are reaching millions of people daily.

"We create a lot of believers," says CEO Art Aylesworth. "Everybody that we've presented to that has had a need [for our product] tends to become a buyer very quickly."

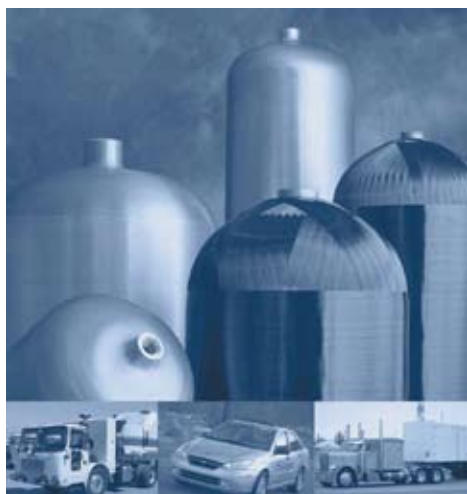
Carmanah is no stranger to accolades. In 2005, International Trade Canada named Carmanah Canadian Exporter of the Year. In 2006, Ernst & Young chose Aylesworth as its Entrepreneur of the Year for Canada's Pacific Region. And in 2007, Carmanah won the Company of the Year Award at the British Columbia Technology Impact Awards.

The appeal of Carmanah's lighting solutions and signage is that they are portable and require no additional infrastructure or maintenance.

"We allow a lot of things to be done in pristine areas without disturbing them," Aylesworth explains, as traditional off-grid solutions often use diesel and require disruptive infrastructure.

Aylesworth is confident that the market for his technology will only expand.

"There's no place where it's being pushed back. It's all a matter of how fast the technology uptakes," he says. "I think the mainstream transition is happening right now... [It's] probably the hottest economic opportunity of all time."



Dynetek  
Industries Ltd.

TSX:DNK

Dynetek Industries is a small Canadian fuel storage company with a global reach, with

partners ranging from Nissan-Renault to Ballard to Ford.

Dynetek specializes in lightweight alternative fuel storage systems that make use of compressed natural gases (CNG) to fuel the cars of the future. Strong quality control systems have allowed the company to satisfy certification requirements and gain access to markets in over 20 countries.

"Dynetek's expertise is offering practical and innovative lightweight fuel storage systems and solutions for the automobile industry," President and CEO Dr. Christian Rasche says from his office in Germany. "This expertise includes research and development, exceptional product quality, on-time delivery, and customer service."

CNG-powered vehicles produce up to 75 per cent less carbon monoxide than gasoline-powered vehicles, and up to 99 per cent less carbon particles than diesel-powered vehicles.

By 2020, Rasche expects the number of natural gas-powered vehicles to increase substantially.

"With a conservative estimate of 20 million vehicles, a demand would arise for approximately 45 million compressed gas cylinders," explains Rasche.

Dynetek also supplies hydrogen systems for fuel cell vehicles.



Hydrogenics Corp.

TSX:HYG

Hydrogenics is a leading producer of commercial hydrogen and fuel cell products.

"We have focused on markets that are available now, where fuel cells make economic sense for end-use customers," says CEO Daryl Wilson.

Hydrogenics has three points of focus: onsite generation of hydrogen; power systems that power data centres, telecom sites, and forklifts (with a 40 to 50 per cent advantage over batteries), and test systems for other hydrogen technologies.

Fuel cell technology is often touted as fu-

ture, and Wilson understands that some may look at his company with trepidation.

"Investors might have questions about the value and prospects of fuel cells," he says. "But I think with our focus on specific markets where it makes economic sense, our investors are getting something that can grow and shows promise in the future."

This future includes using hydrogen generation technology as a storage medium for intermittent renewable sources of electricity, such as wind power. Hydrogenics is currently working on four such projects in Spain, Argentina, Norway, and the United States, with two more opportunities in development.

"The vision here," Wilson says, "is that with all of the know-how that we've developed within the past 12 years, we've learned a lot and attained a high level of competency in hydrogen technology."



RuggedCom

TSX:RCM

RuggedCom is helping to make sure that the "Great Northeast Blackout" of August 2003 never happens again.

RuggedCom products are designed for use in harsh environments such as those found in electrical power substations, oil refineries, military applications, roadside traffic control cabinets, and metals and minerals processing.

The company's Ethernet switches and routers are enabling the move towards an electrical "smart grid" that is automated, more efficient, self-healing, and intelligent, which would prevent major outages by alerting officials immediately when problems arise.



SunOpta Inc.

TSX:SOY

SunOpta has three business units: biomass conversion technology for cellulosic ethanol, environmentally friendly cleaning abrasives, and a vertically integrated natural and organic food line, which represents the bulk of the company's current revenues.

"Three prongs, all with huge growth opportunities, and an environmental and sustainability spin to them," says Steve Bromley, President and CEO of SunOpta.

The most relevant to the Cleantech area is SunOpta BioProcess Inc., which specializes in converting biomass such as wheat straw, corn stover, grasses, oat hulls, and wood chips to food for human consumption, as well as to alternative fuels.

SunOpta's conversion technology is the only continuous, industrially proven process in the world that can pre-treat biomass in order to produce fermentable sugars.

This technology can also be applied to convert biomass into cellulosic ethanol, a renewable fuel.

"There's a huge energy security issue in North America, and ethanol is one of the answers, but it's not the only answer given that there's just not enough corn," Bromley says. "So technologies that can facilitate cellulosic ethanol will be important going forward, and we happen to have one of those."

SunOpta BioProcess Inc. represents one per cent of the total revenue of SunOpta Inc, but it expects to derive at least a third of its overall revenues from its SunOpta Bioprocess Inc. division within the next three years.

SunOpta also owns a two-thirds interest in Opta Minerals Inc., which specializes in providing environmentally friendly abrasives that are free of silica, are clean, efficient, and recyclable.

The company also currently derives five per cent of its revenue from healthy and environmentally sound IP (Identity Preserved) fibre products that they produce from oats and soy.

The third and largest SunOpta prong, representing 90 per cent of revenue, is the SunOpta Food Group, which specializes in sourcing, processing, packaging, and distribution of natural and organic food products.



Westport Innovations Inc.

TSX:WPT

Photo © Westport Innovations Inc.

Westport Innovations is a global leader in converting commercial fleets to use natural gas, environmentally more benign than diesel. Its mission is advancing the shift of commercial transportation to natural gas and hydrogen.

David Demers, CEO and founder of Westport, says, "We need a new fuel for transportation."

Explaining that commercial vehicles create over two-thirds of transportation energy use, Demers says that their demand for traditional oil-based fuels is far outweighing supply.

Westport develops and deploys natural gas-based fuel systems that produce approximately 50 per cent less nitrogen oxides, 80 per cent less particulate matter, and 20 to 25 per cent less carbon dioxide emissions than equivalent diesel engines.

"Natural gas is the only [fuel] that makes sense. It's cleaner, it's available, it's domestic, it's cheap—it's the one that's going to take most of the market share," Demers explains.

Westport believes that there will always be customers who place a value on lower-than-diesel emissions.

Though it will be decades before the science is refined, Demers says that Westport's current technology is paving the way towards the development of a direct hydrogen fuel.

"For now, we can work with natural gas immediately and start getting the experience we need."

## THE CBC CONNECTION

### DAVID MILLS

A physics graduate from McMaster University, Mills was a camera technician with the CBC, fixing cameras for a short time in the 1970s. When boredom kicked in, he set off to travel the world. He discovered the viability of renewable energy as a business after speaking with an entrepreneur in Islamabad in 1974 about his desert wind generator project.

Mills is now the founder, chairman, and Chief Scientific Officer of Ausra, a Palo Alto, CA company that develops and deploys utility-scale solar technologies. The technology is proven, easily manufactured and installed, and scalable to a high volume. With Ausra's technology, California and Texas alone have the potential to supply 96 per cent of all electricity in the United States.

Ausra also has the financial support of Florida Power & Light, a subsidiary of FPL Group Inc., which plans to use Ausra's technology to construct a 300-MW solar thermal power plant—starting with a smaller 10-MW project and expanding from there.

[www.ausra.com](http://www.ausra.com)

### STEPHEN DEWAR

Dewar is a former broadcast journalist and co-producer of the 1980s nature series *Lorne Greene's New Wilderness*. He also wrote an episode of *Danger Bay*, a drama chronicling the adventures of a marine biologist and his family as they fight environmental crimes and other problems. Now, he's fighting for the environment himself as VP of Business Affairs with Toronto-based WhalePower Corp.

WhalePower is in the final stages of testing a unique type of wind turbine blade that mimics the aerodynamic performance of a humpback whale's flipper, allowing a turbine to capture more of the wind's energy at much lower speeds. Instead of the traditional smooth turbine blades, WhalePower's have serrated edges. The Ontario Centres of Excellence and the Ontario Power Authority have contributed about \$70,000 in early-stage research funding. WhalePower has also collaborated with the Wind Engineering Group at the University of Western Ontario.

WhalePower forecasts that it will begin manufacturing the blades in 2008.

[www.whalepower.com](http://www.whalepower.com)

(Special thanks to Tyler Hamilton for pointing out the CBC connection)

# THE WINDMAKER

## INTERVIEW WITH DAI CLEMENT, RBC CAPITAL MARKETS' HEAD OF UTILITIES & ENVIRONMENTAL SERVICES, INFRASTRUCTURE, EUROPE.

This past year, RBC was Infrastructure Journal's top renewable player worldwide. So I guess that makes you a busy guy.

We probably had the bulk of the M&A business in Europe for renewables over the past 2-3 years. We've done both buy and sell, sector-wise we cover wind, landfill gas, biomass, hydro. In underwriting we've done over a billion pounds of underwriting in the sector, over the last couple of years. We've advised on over 5 billion euros of transactions in the last 3 years. I think we've advised on over 4000 megawatts this year. We must have from an advisory perspective – certainly if you look at this year we must have done more than 30 to 40 per cent at least. That might be conservative. We're advising Trinity at the moment on selling 650 megawatts of Italian and German wind which will go for somewhere between 1.5 and 2 billion euros. It's going to be the biggest renewables deal this year.

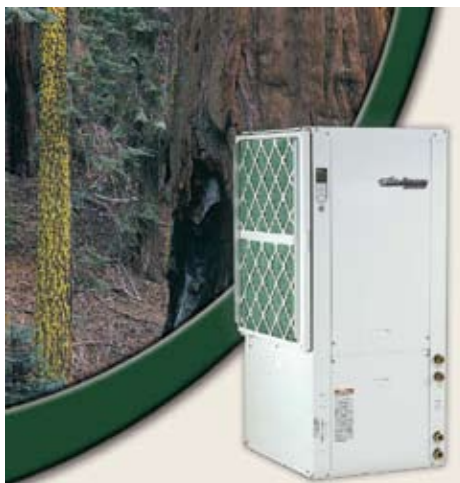
**“For M&A, [renewables]—if you looked this morning—is the biggest part of RBC's advisory work in Europe.”**

### How did you guys become the leader?

When we came over here several years ago from Natwest, it was just one of the areas we started to look at, we hired someone from Fortis who had been doing wind in the US, and she was particularly interested in renewables. We started really looking at some ideas on renewables. If we took the view that it was a niche sector of power generation, we could get some expertise in and compete, but we took the view that we thought it was going to develop significantly into a market—luck or judgment that came true, probably a bit of both.

### What's driving all this?

Climate change. If you look now there isn't a government in Europe or party in opposition that would dare come out and oppose subsidies for renewables. There's just been a massive shift in every government budget toward renewable energy. The renewable power generation is now picking up substantially, so the deals are getting bigger and bigger. Hence why the bulge brackets are coming in to try to compete with us.



WFI Industries

TSX:WFI

WFI Industries produces geothermal heating and cooling units for industrial and residential properties. These geothermal pump systems heat and cool buildings by exchanging heat from the ground.

“We're not high technology. We're not cutting-edge anything, really. The technology that we use [has] been around for a long time and it's well proven,” says Bruce Ritchey, CEO.

This technology controls the temperature in WFI's offices in Fort Wayne, IN, and the results have been more than satisfactory for Ritchey.

“We like to say that we're cash flow-positive immediately,” he says, explaining that a WFI unit will save the consumer more each month than a mortgage or loan will cost them.

The geothermal system is also quiet, self-contained, odorless, and stable.

“We like to call it the invisible appliance,” he says.

Ritchey admits this is a niche market but hopes it won't be a niche for long. He believes that within 10 years, the Canadian market could grow from the current 50,000 units to 750,000, citing the similar success of air-to-air heat pumps, which also do not use fossil fuels.

For every unit of electricity used in the pump, a geothermal system generates four

times the units of heating energy, making it an environmentally sound purchase.

“It is the single biggest thing that a consumer can do to improve the environment,” says Ritchey. “It is the environmental equivalent of taking two cars off the road, permanently.”



Xantrex Technology Inc.

TSX:XTX

Xantrex Technology is a world leader in small, lightweight, efficient and reliable products that can convert raw electrical power from any source. These products include battery backups, solar inverters, and wind converters. Xantrex products are portable and suitable for use in remote locations.

Xantrex is a leading supplier of inverters for large-scale solar electrical systems that turn the sun's energy into clean, reliable electricity. During the past 20 years, the number of total solar-photovoltaic systems installed worldwide has increased dramatically, growing at a rate of approximately 20 per cent each year.

Xantrex is also a leading designer and builder of 10 kW to 1.5 MW three-phase power conversion systems for variable-speed wind turbines. Xantrex products help provide more than 3,000 MW of energy around the world.

As well, Xantrex produces residential solar and wind energy systems. These systems have been installed across the world, from the Galapagos Islands to Tanzania. You can buy them off the shelf at Canadian Tire.



Today there are more than 1,000,000 geexchange installations in the United States. The current use of geothermal heat pump technology has resulted in the following:

- Reduced electricity demand by more than 2.6 GW
- Elimination of more than 5.8 million metric tons of CO<sub>2</sub> annually



# Sustainability – a future worth pursuing.

Sustainability is at once a simple word, an elusive goal and a relentless pursuit. From some perspectives, a mining company that has survived and prospered for more than a century is the very model of sustainability.

It also means balancing the triple bottom line of people, planet and profits. At CVRD Inco, we're creating a future that provides meaningful and rewarding employment for this generation of employees and the next while solidifying our position as the world's leading nickel company. And we're doing so while supporting the needs of our communities and helping restore and preserve the beauty of our natural surroundings.

It's an ambitious task, but it's one we're committed to – and we believe that's worth 'sustaining'.

## **CVRD Inco**

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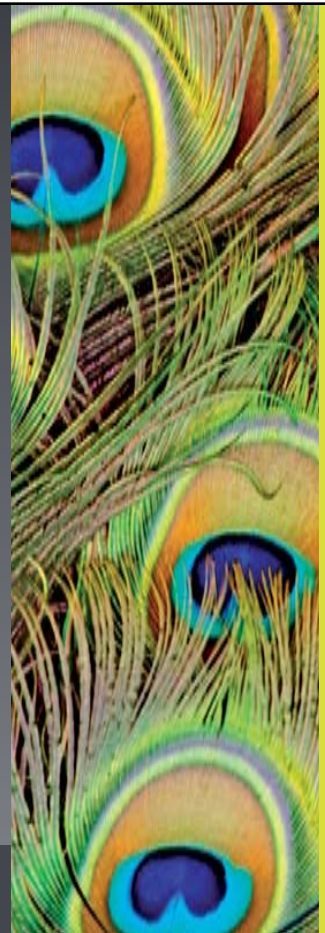
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**The Corporate Knights** Next 10 Emerging Cleantech Leaders of Tomorrow represents the up and coming Canadian companies that through a combination of internal strengths and external drivers have the best potential for being the Cleantech leaders of the future. The Next 10 were selected by an advisory panel of Canada's foremost authorities on Cleantech (see p 21).



**6N SILICON INC.**

6N's proprietary low-cost silicon purification process provides a revolutionary approach to the production of solar grade silicon for the photovoltaic industry. The global market for solar grade silicon in 2006 was approximately \$2.3 billion and is projected to grow to \$10.4 billion by 2010, according to Ventures West, a private venture capital group.

By converting cheap, readily available metallurgical grade silicon directly into solar-grade silicon, 6N is able to avoid the chemically-intensive and expensive process employed by the semiconductor industry. By significantly reducing the cost and energy consumed to purify the principal material used in the manufacturing of crystalline photovoltaic cells, the project aims to help speed up the adoption and growth of photovoltaic power.

**"Our process will decrease the cost of the silicon, which will help to decrease the cost of solar cells and the electricity from solar cells," says Nichol. "We will significantly decrease the amount of energy required to purify silicon, which is the largest energy usage in making a solar cell."**

—Scott Nichol, President and CTO

**ENERWORKS INC.**

Enerworks is North America's leading developer and manufacturer of solar thermal technology, using a technology developed at the Queens University solar lab. Producing the only CSA-approved solar thermal systems, EnerWorks' client list includes Toronto's Hospital for Sick Children, where it will be preheating the hospital's hot water supply and the Drake Landing Solar Project in Alberta, North America's first solar-heated community.

**ENSYN TECHNOLOGIES INC.**

Ensyn Technologies is demonstrating an industrial integrated biomass refinery concept which uses a Rapid Thermal Processing (RTP) process to produce biofuel and other valuable chemical products from what would otherwise be a waste source such as sawmill waste.

"It is the only commercially proven pyrolysis process that exists that's been offered on a sustained basis,"

says Randal Goodfellow, spokesman for Ensyn. Pyrolysis is the conversion of biomass into a liquid, from which chemicals and energy can be extracted. This energy can be converted into liquid fuel for heating, and eventually for transportation.

**GROUP IV SEMICONDUCTOR INC.**

Group IV Semiconductor is demonstrating a new breed of low cost, high efficiency silicon based solid-state lighting products. The project builds on a revolutionary silicon thin-film process that for the first time will enable solid-state lighting to reach the mass market. The benefits of solid-state lighting derive from a much higher efficiency than conventional light bulbs, reducing energy consumption by as much as

80 percent. Unlike compact fluorescent light bulbs, solid-state lighting is able to reproduce the full colour spectrum required by mainstream applications.

Group IV is challenging conventional light sources, which are highly inefficient, and vying for a chunk of the \$12 billion spent annually on lamps for illumination.

Solid-state lighting could save some 860 TWh of electricity per year, which translates to 200 million tonnes less of annual carbon emissions worldwide.

**"The race is on to create energy-efficient lighting alternatives and we intend to be front runners."**

—Stephen Naor, CEO

**IOGEN CORP.**

Iogen produces cellulose ethanol, a fully renewable, advanced biofuel that can be used in today's cars. All major North American auto manufacturers currently warrantee the use of gasoline blended with up to ten per cent ethanol.

Iogen's technology converts biomass into cellulose ethanol using a combination of thermal, chemical and biochemical techniques. The yield of cellulose ethanol is more than 340 litres per tonne of fibre. Iogen's biggest investors include Royal Dutch Shell, Petro-Canada, and Goldman Sachs.

According to the Government of Canada, if 35 per cent of gasoline in Canada contained ten percent ethanol, GHG emissions would be reduced by the equivalent of removing more than 400,000 vehicles from the road (or 1.8 Mt of GHGs per year).



Enerworks Residential EnergyPack Panels



**MAGENN POWER INC.**

Magenn Power has developed the Magenn Air Rotor System (MARS), a new type of wind power generator, a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy. It uses helium to elevate higher than traditional wind turbines, thereby capturing

more energy. The company has attracted the former Chairman and CEO of Hydrogenics as its new CEO. Since it can rise above other turbines, the need for coastline or off-shore wind farm locations is eliminated; MARS can be deployed anywhere worldwide. As well, MARS is bird and bat friendly, allaying some of the concerns that environmentalists have with traditional systems.

MARS technology is also cost-effective, since its efficiency level is 40 to 50 per cent and its mobility allows for wind farms to be placed closer to where demand is greatest, lowering the costs of transmission. Magenn Power plans to ship its first official product, a 10 kW version of MARS, in 2008.

#### **MENOVA ENERGY INC.**

Menova has developed the Power-Spar® system, a high efficiency solar concentrator that uses a patented system to create heat, electrical power, and lighting for everyday and emergency use. It has been specifically engineered for performance in extreme climates. The company's new generation of triple-junction solar cells can accept intense sunlight with approximately 40 per cent efficiency compared to traditional flat-panel cells' 10 to 20 per cent. Menova's technology also has applications in the creation of renewable fuels. Algae, which can be turned into ethanol or biodiesel, can be grown in a

photo bioreactor. Menova entered into a joint venture in December 2006 with Trident Exploration, a natural gas exploration company whose processes create carbon dioxide. This carbon dioxide is being used by Menova as an input in algae production.

**"It is a solar concentrator that does both photovoltaic electricity and heat on the same unit – and nobody else does that."**

—Randal Goodfellow, Advisory board member

#### **PLASCO ENERGY GROUP INC.**

Plasco Energy is demonstrating a Plasma Gasification process that will economically convert 75 tonnes a day of municipal solid waste into synthetic gas, inert solid material and heat. The heat and gas will be utilized in a power plant to produce electricity for sale into the electricity grid. By avoiding current disposal methods such as landfill or incineration, Plasco's new approach represents a breakthrough in both economic and environmental attractiveness.

**"There continues to be a large portion of waste that is not environmentally or economically practical to recycle. With our technology, only one-tenth of one percent of waste will remain to be disposed of."**

—Rod Bryden, President and CEO of Plasco



Regen wireless controller

#### **REGEN ENERGY INC.**

REGEN Energy has developed a wireless device that is attached to major appliances that cycle on and off in buildings and factories. The devices communicate with each other—using what some call "swarm logic"—to make sure the appliances, such as air conditioners and fans, don't operate at the same time. This reduces peak consumption and represents a more efficient use of energy.

**"It's a completely new way of thinking how to control equipment."**

—Mark Kerbel, President and CEO.

## EDITOR'S PICK



Triton Logging specializes in finding buried treasure—and in this case, the treasure is underwater forests.

#### **TRITON LOGGING INC.**

Triton Logging is the world's leader in harvesting flooded forests. This company has a patented technology that allows for safe, environmentally sound commercial logging of hydroelectric sites. Today, 300 million submerged trees globally are a sunken treasure, and Triton has developed the "Sawfish," the world's only deep-water logging machine, to retrieve them. The Sawfish uses biodegradable fuel and can handle larger trees than any land-based harvester due to water buoyancy.

They are the technology leader in an estimated \$50 billion international industry.

**"We're reducing the consumption of living forests, we're reusing something that was lost in a hydro project, and we're recovering resources."**

—Chris Godsall, President and CEO